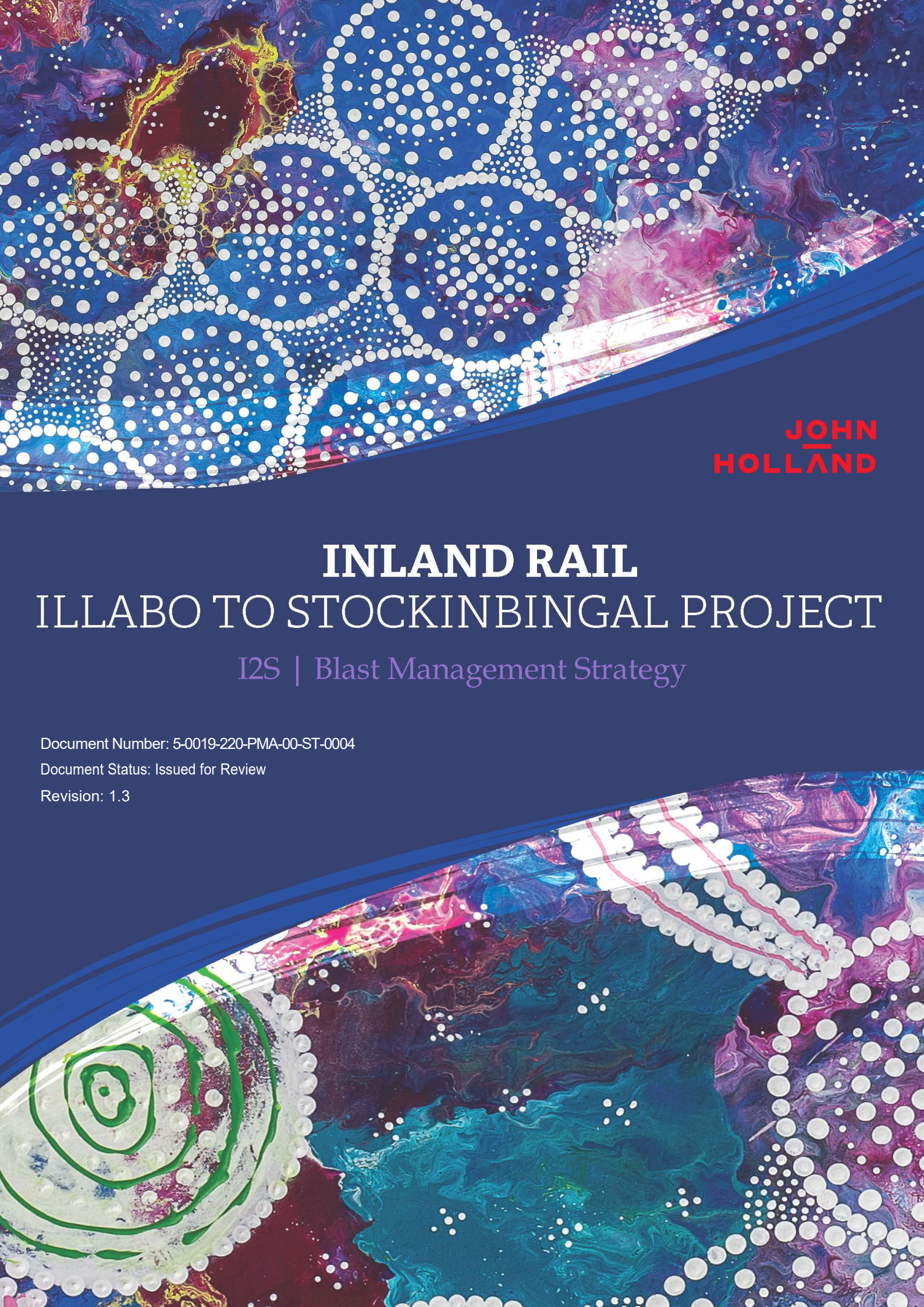




**JOHN
HOLLAND**

INLAND RAIL ILLABO TO STOCKINBINGAL PROJECT

I2S | Blast Management Strategy

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Table of Contents

1	Revisions and Distribution	5
1.1	Revisions	5
1.2	Distribution	5
2	References, Definitions and Abbreviations.....	6
2.1	Definitions and Abbreviations	6
2.2	Compliance Roadmap.....	8
2.3	Applicable Legislation, Guidelines, Codes and Standards.....	10
3	Introduction.....	12
3.1	Context	12
3.2	Scope	12
3.3	Background.....	15
4	Hazards And Risks	19
4.1	Explosive and Explosive Precursor Hazards	21
4.2	Storage of explosives.....	22
4.3	Security of Explosives	22
4.4	Environmental Hazards.....	22
5	Roles and Responsibilities	24
6	Procedures.....	26
6.1	Authorised Employees	26
6.2	Validation of Licenses	26
6.3	Explosive Transport, Handling and Use Procedures	26
7	Blast Vibration and Overpressure Monitoring	27
7.1	Blast Timing and Regulatory Compliance.....	29
7.2	Community Consultation	30
7.3	Road Traffic Management and Road Safety	32
7.4	Approvals and Notifications.....	32
8	Flyrock Management.....	34
8.1	Causes of Flyrock	34
8.2	Precautions To Take	35
9	Emergency Response	36
9.1	Fire Emergency.....	36
9.2	Adverse Weather, Lightning and Thunderstorms	37
10	Communications, Blast Clearance and Shot Firing	38
10.1	Blast Clearance Procedure	38



10.2 Record Keeping	39
Appendix A – Site Specific Details	40
Appendix B – Authorised Employees	45
Appendix C – SWMS	46
Appendix D – RA011 BMP Explosives and Blasting Related Activities	47
Appendix E – Emergency Procedure Guide	51
Appendix F – Utility Assets Maps	53
Appendix G – Blast Management Plan	54
Appendix H – Ecologist Advice	55
Appendix I – CoA E11 Endorsement	56
Appendix J – Consultation log – Telstra	57

Table of Figures

Figure 3-1 Project locality (Source: Illabo to Stockinbingal - Environmental Impact Statement, 2022)	16
Figure 3-2 Key Project features (Source: Illabo to Stockinbingal - Environmental Impact Statement, 2022) 17	
Figure 4-1 Risk Matrix	20
Figure 4-2 Hierarchy of Control	20

Table of Tables

Table 2-1 Definitions and Abbreviations	6
Table 2-2 State CoA relevant to the BMS	8
Table 2-3 EPL 22021 BMS	9
Table 2-4 Recommended Mitigation Measures	10
Table 5-1 Roles and Responsibilities	24
Table 7-1 Blasting Impact Criteria and Limits	27
Table 7-2 Regulatory Compliance and Indicative Control Measures	28
Table 7-3 Proposed Monitoring Locations	29
Table 7-4 Regulatory Compliance and Indicative Control Measures	29
Table 7-5 Closest Sensitive Receivers and Utility Assets	32



1 Revisions and Distribution

1.1 Revisions

Draft issues of this document are identified as Revision A, B, C etc. Following acceptance by the document approver, the first finalised revision will be Revision 0. Subsequent revisions will have an increase of “1” in the revision number (1, 2, 3 etc.).

1.2 Distribution

The controlled master version of this document is available for distribution as appropriate and maintained on the document management system being used on the project. All circulated hard copies of this document are deemed to be uncontrolled.

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Quality Assurance and Completions Manager	Kane Prescott
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2 References, Definitions and Abbreviations

2.1 Definitions and Abbreviations

Definitions and abbreviations to be applied to the [I2S | Blast Management Strategy](#) are listed below.

Table 2-1 Definitions and Abbreviations

Term/Abbreviation	Definition
ARTC	Australian Rail Track Corporation
AQMP	Air Quality Management Plan
AS 2187.2:2006	<i>Australian Standard AS 2187.2:2006 Explosives - Storage and Use - Use of Explosives</i>
Blast	Any explosive charge or shot, regardless of size or number
Blast Rock	Rock or other material projected from a blast that remains within the nominated exclusion zone
BMP	Blast Management Plan
BMS	Blas Management Strategy
BS 7385-2:1993	<i>British Standard BS 7385.2:1993—Evaluation and Measurement for Vibration in Buildings: Part 2—Guide to damage levels from ground borne vibration British Standards Institute, 1993)</i>
Burden	Distance between blast rows, or in case of front burden the distance between the face of the blast and the front row of holes
CEMP	Construction Environmental Management Plan
Charge	Explosive or blasting agent, or both, placed in a blast hole or other position for the purpose of producing an explosion
CCS	Community Consultation Strategy
CSSI	Critical State Significant Infrastructure, as generally described in Schedule 1 (of the Conditions of Approval), the carrying out of which is approved under the terms of the Conditions of Approval.
DIN 4150-3	Structural Vibration – Effects of Vibration on Structures
EPA	Environment Protection Agency
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Commonwealth Environment Protection and Biodiversity Conservation Act 1999</i>
EIS	Environmental Impact Statement
Environment	Includes all aspects of the surroundings of humans, whether affecting any human as an individual or in his or her social groupings.
EPL	Environment Protection Licence
Explosive	Explosive and explosive precursor have the same meanings that they have in the <i>Explosives Act 2003</i> which means any article or substance prescribed by the regulations as an explosive
Fly Rock	Flying rock or other material projected from a blast beyond the nominated exclusion zone
JHG	John Holland Group
ICNG	<i>Interim Construction Noise Guideline (Department of Environment and Climate Change (DECC), NSW, 2009)</i>
IMS	JHG Integrated Management System
Incident	An occurrence or set of circumstances that causes or threatens to cause material harm and which may or may not be or cause a non-compliance.
IR-NVMS	Inland Rail Noise and Vibration Management Strategy (0-0000-900-EMN-00-ST-0001



Term/Abbreviation	Definition
IRPL	Inland Rail Pty Ltd
I2S	Inland Rail – Illabo to Stockinbingal Project
MIC	Maximum Instantaneous Charge
Misfire	The complete or partial failure of an explosive to explode as planned
MCoA	Minister's Conditions of Approval
Nonel	Non-electric signal tube type delay detonator
NVMP	Noise and Vibration Management Plan
OOHW	Out-of-hours work
Responsible Shot Firer	The Shot Firer who has the responsibility for the blast or shot being undertaken.
Shot Firer	A person, over the age of 18, who has been trained and/or certified by Safework NSW and / or mines department as being able to design, supervise and undertake explosive work
Spacing	Distance between blast holes within a row.
Subdrill	Length of drilling and charge which lies beneath the required grade level
TP	Technical Paper
Type 1 Blast	Normal Production or Presplit Blast
Type 2 Blast	Toe, boulder or other Secondary Blast
WHS Act	<i>The Work Health and Safety Act 2011</i>

2.2 Compliance Roadmap

The Inland Rail – Illabo to Stockinbingal Project (I2S), the Project, is subject to both state (CSSI-9406) and Commonwealth (EPBC 2018/8233) approval. Further project background is provided in Section 3.2.

The following section provides a tabular representation of the Project approval requirements, as described in the Commonwealth and State Conditions of Approval (CoA), and a reference link to detail how these requirements would be achieved during Project delivery.

It is noted that there are no blast specific Conditions in the Commonwealth Approval. A cross reference is also included to indicate where each requirement is addressed in this Blast Management Strategy (BMS) or other Project management documentation.

2.2.1 State Conditions of Approval

The CSSI CoA relevant to the Project and the BMS under the *Environmental Planning and Assessment Act 1979* are provided in Table 2-2.

Table 2-2 State CoA relevant to the Blast Management Strategy (BMS)

CoA No.	Condition Requirements	Strategy Response/Control Measure
E10	If blasting is proposed during construction, a Blast Management Strategy must be prepared and must include: (a) sequencing and review of trial blasting to inform blasting; (b) regularity of blasting; (c) intensity of blasting; (d) monitoring blast overpressure and ground vibration; (e) consultation with utility asset owners and managers; (f) measures to minimise blasting impacts; (g) periods of relief; and (h) blasting program.	a) Conduct trial blasts to confirm compliance; review monitoring data to optimise production blasting designs. b) Blast schedule limits frequency to minimise community impact; no more than one production blast per day unless otherwise approved. c) Control maximum instantaneous charge (MIC) to maintain compliance with vibration/overpressure criteria. d) Blast monitoring program with automated reporting. e) Engage utility owners prior to blasting near assets; confirm vibration limits and implement asset protection measures. f) Optimised blast design, reduced MIC, controlled timing, blast mats for flyrock, dust suppression, fume management procedures. g) Scheduled “no-blast days” where practicable; avoid critical community times. h) Documented program outlining number, location, and timing of blasts; updated as project progresses and shared with stakeholders.
E11	The Blast Management Strategy must be endorsed by a suitably qualified and experienced person.	BMS to be signed and endorsed by accredited consultant prior to submission
E12	The Blast Management Strategy must be prepared in accordance with relevant guidelines to ensure that all blasting and associated activities are carried out so as not to generate unacceptable noise and vibration impacts or pose a significant risk to sensitive receivers.	Compliance with AS 2187.2:2006 and BS 7385-2:1993 criteria; adaptive management if monitoring indicates risk of exceedance.

CoA No.	Condition Requirements	Strategy Response/Control Measure
E13	The Blast Management Strategy must be submitted to the Planning Secretary for approval no later than one month prior to the commencement of blasting. The Strategy as submitted to the Planning Secretary, must be implemented for all blasting activities.	Strategy prepared and submitted for approval; implementation only after approval received.
E14	Blasting associated with the CSSI must only be undertaken during the following hours: (a) 9:00 am to 5:00 pm, Monday to Friday, inclusive; (b) 9:00 am to 1:00 pm, Saturday; and (c) at no time on Sunday or on a public holiday; or as authorised through an EPL if blasting is proposed outside of these hours. This condition does not apply in the event of a direction from police or other relevant authority or utilities for safety or emergency reasons to avoid loss of life, property loss and/or to prevent environmental harm.	Scheduling aligned with EPL L4.3 and CoA E14; emergency blast procedures documented.

2.2.2 Environment Protection Licence

John Holland Group (JHG) have been issued an Environment Protection Licence (EPL No. 22021) from NSW Environment Protection Authority (EPA) for the Project. The EPL applies to the works approved under the CoA's described in the table above.

EPL Conditions relevant to the Project and this Plan are provided in Table 2-3.

Table 2-3 Relevant conditions to be managed under the BMS (EPL 22021)

EPL	Condition Requirements	Document Reference
L4	L4.1 When blasting operations occur at the premises, the air blast overpressure level must not exceed 120 dB (in peak) at any time at the most impacted residence or other sensitive receiver. L4.2 When blasting operations occur at the premises, the air blast overpressure level must not exceed 115 dB (in peak) at any impacted residence or other sensitive receiver for more than 5% of the total number of blasts over the course of the project. L4.3 Blasting associated with the project can only be undertaken during the following hours: a) 9:00 am and 5:00 pm Monday to Friday; b) 9:00 am and 1:00 pm Saturdays; and Blasting works which do not comply with the above conditions may be undertaken following written approval from EPA.	Section 7
L5	L5.6 Works outside of standard construction hours under this condition, works and activities may be undertaken outside of standard construction hours specified in condition L5.1 and L5.2, but only if they are required in relation to one or more of the following: setup, preparation and finishing works associated with blasting activities, excluding the actual blasting works.	Section 7.1.1

2.2.3 Mitigation Measures

In addition to the CoA's, the relevant Revised Mitigation Measures (REMMs) set out in the Project EIS and summarised in Table 2-4 will be implemented.

Table 2-4 Revised Mitigation Measures (RMMs)

Ref	Impact	Mitigation Measure	Timing	Document Reference
NV-3	Blasting Management	A blast management strategy would be prepared in accordance with relevant guidelines, and in consultation with the NSW Environment Protection Authority, and would include: • sequencing and review of trial blasting to inform blasting • regularity of blasting • intensity of blasting • periods of relief • blasting program. Monitoring of airblast and ground vibration caused by blasting would be conducted in line with AS 2187.2:2006: <i>Storage and use Part 2: Explosives (Standards Australia, 2006)</i>. Monitoring would be conducted at the nearest sensitive receiver and non-sensitive receiver (if closer to the blasting zone, then the closest sensitive receiver) and assessed in accordance with the criteria outlined in this document.	Detailed design / pre-construction	This document
NV-11	Minimising potential for impacts of blasting	Blasting would be undertaken during the recommended standard hours for blasting. Management measures defined by the blasting management strategy would be implemented.	Construction	Section 7 Section 3.3.2
AQ-3	Blasting Management	Blasting will not be undertaken if the prevailing wind conditions are likely to transport dust emissions towards the nearest sensitive receptors.	Construction	Section 3.3.2

2.3 Applicable Legislation, Guidelines, Codes and Standards

Controlled blasting will be undertaken in accordance with the relevant legislation, guidelines, codes and standards including:

- *NSW Explosives Act, 2003;*
- *NSW Explosives Regulation, 2024;*
- *Australian Explosives Code;*
- *ANZEC Guidelines for Blasting Pressure and Ground Vibration;*
- *AS2187.2:2006 – Explosives – Storage and Use – Use of Explosives*
- *AS4326 The storage and handling of oxidising Agents*
- Design and Construct Deed No: 2200-0019
- Inland Rail Specification
- *Work Health and Safety Act 2011*
- *Work Health & Safety (Mines and Petroleum Sites) Act 2014*
- *Work Health and Safety Regulation 2017*
- *Project Scope and Requirements – Annexure C: Construction Requirements (0-0000-220-PMA-00-SP-0006_0)*



A Notification of Blasting Activity will be lodged no less than seven working days before the intended blast date with SafeWork NSW by the holder of a blasting explosives user licence. The notification will be valid for a single event, or for a maximum of three months where there are multiple blasts at the same work location. Any subsequent changes to the notified details shall be provided to SafeWork NSW by email prior to the controlled blasting activity (note: the licence holder must retain evidence of the date/time the notification or variation was submitted via e-mail date stamp).

Additionally, documented procedures for Explosive Works will be submitted to the IRPL Representative not less than twenty-eight (28) days prior to the date when explosives are first to be brought onto the Site. A copy of any relevant Explosive Works licence documentation will also be provided to the IRPL Representative.

3 Introduction

3.1 Context

Blasting is proposed at various locations along the project site to facilitate excavation in areas where rock formations exceed depths of 2 metres. Chapter 8 of the Environmental Impact Statement (EIS) identifies specific cuts requiring blasting, with depths ranging from 5 metres to 13.7 metres.

While blasting has the potential to impact sensitive receivers, it is often a more efficient and less disruptive alternative to prolonged noisy activities such as rock hammering and drilling. Planning for blasting will consider the rock profile, earthworks design, and construction requirements, and will adhere to environmental management measures outlined in Chapter 27 of the EIS. Key measures include limiting blasting activities to the recommended hours specified by the Interim Construction Noise Guidelines (ICNG) and conducting blast monitoring at sensitive receivers (e.g., residences) located within 1 km of the blast site.

In accordance with E12 CoA, the BMS must be developed in line with relevant guidelines to ensure that blasting and associated activities do not result in unacceptable noise or vibration impacts, nor pose a significant risk to sensitive receivers. Given the inherently hazardous nature of explosive-related activities—including their use, storage, manufacture, security, and transport—the BMS outlines stringent controls to manage these risks and ensure compliance with applicable legislative and safety requirements.

3.2 Scope

The BMS along with Blast Management Plan (BMP) included in Appendix G outlines the common steps that will be followed by the Blasting Contractor in order to achieve safe blasting outcomes. Project and Site-specific details can be found in Appendix A.

Location of blasts were determined following ongoing geotechnical investigations to inform the I2S detailed design.

Blasting at I2S will utilise predominantly 102mm diameter blast holes, which will be loaded with a bulk emulsion or watergel based explosive, and stemmed at 2.5m or greater. Other diameters may be utilised as changes in geology or licensing constraints dictate to maintain compliance with vibration and overpressure limits. Blast designs will maintain adequate burdens to minimise fly rock, ensuring that all rock remains within the blast exclusion zone footprint. Initiating explosives will be non-electric detonators.

Applicable sections of the BMS will be used in conjunction with the Blasting Contractor's procedures to ensure that Drill and Blast Team members who are employed on the above-mentioned site understand their role and responsibilities.

In accordance with Condition of Approval E10, the below blasting criteria will be adhered to.

(a) sequencing and review of trial blasting to inform blasting;

The first blast of the blasting program will be treated as the trial blast. The trial blast will be located at cut 19. The geometry and rock type in this cut provides appropriate baseline data to inform the remaining blast locations. This location was chosen due to the distance away from the nearest receiver (approximately 1.67 km). The geometry and rock type in this cut will also provide good data to inform the remaining blast locations. Monitoring data from the trial blast will be reviewed and blast designs for future blasts altered where required.

- The Maximum Instantaneous Charge (MIC) (kg/delay) for the first blast will not be reduced. The actuals will be noted in the pre-blast calculations and dictated by depth of cut and stem height.
- Stemming length will be increased to reduce the risk of flyrock. This will be included in the blast design data submitted in the pre-blast documentation.
- The Blasting Contractor will monitor compliance by setting up linear array formation at 3 locations (200m, 300m and closest sensitive receiver) for verification of site K factors to allow for more realistic vibration predictions and K factor refinement.
- Each blast will have a pre blast document with the blast design summarised and submitted prior to blasting for review by JHG.

- Post Blasting documentation will include the Blast Report, Monitor Reports and Video of each blast.

Every blast (including the trial) will be designed and developed to comply with airblast overpressure and ground vibration criteria defined in EPL 22021. The below table shows nominal MIC calculations for each site including the trial site at Cut 19 which will be designed to meet the required limits.

Table 3-2 MIC Calculations

Cut No.	Closest sensitive receiver	Closest utility asset	Maximum Depth (m)	Hole Diameter (mm)	Stemming Depth (m)	MIC (kg)	Distance to 5mm/s K=1750	Closest Sensitive Receiver Predicted mm/s K=1750	Closest Utility Asset Predicted mm/s K=1750
Cut 12	846m	>1 km	8.2	102	2.7	58	296m	0.85	N/A
Cut 13	1.40 km	None	5.5	102	2.5	32	220m	0.26	N/A
Cut 15	1.81 km	None	7	102	2.7	45	261m	0.23	N/A
Cut 16	1.20 km	90m	3.5	102	2.5	11	129m	0.14	8.9
Cut 18	1.44 km	None	5.6	102	2.7	30	213m	0.24	N/A
Cut 19	1.67 km	900m	6.9	102	2.7	44	258m	0.25	0.68
Cut 20	490m	>700m	13.5	102	2.7	113	413m	3.69	2.76
Cut 23	675m	>500m	6.1	102	2.7	36	233m	0.91	1.48
Cut 24	1.00km	700m	11.1	102	2.7	88	365m	1.58	1.76
Cut 29	680m	>1 km	10.8	102	2.7	85	358m	1.39	0.97
Cut 30	682m	600m	11.4	102	2.7	91	371m	1.81	2.32

(b) regularity of blasting;

Blasting is expected to be required at 11 discrete locations/cuttings, with 1 to 3 blasts required per location.

(c) intensity of blasting;

To manage the intensity of blasting and demonstrate compliance with EPL 22021 criteria, the vibration and airblast predictions for each blast are calculated in accordance with AS 2187.2. The MIC forms the primary input into these prediction models, as it directly determines the expected ground vibration and airblast levels at sensitive receivers. For initial predictions—prior to establishing site-specific constants through the trial blast—a conservative K-factor of 1750 and attenuation exponent $B = -1.6$ are applied, consistent with standard industry practice and AS 2187.2 guidelines. These parameters will be refined following analysis of the trial blast monitoring array to ensure site-specific accuracy.

(d) monitoring blast overpressure and ground vibration;

Please refer to Section 7 of this document.

(e) consultation with utility asset owners and managers;

Consultation with the I2S John Holland Utilities Manager and following a review of GIS mapping (Appendix F) no utilities—including overhead power lines, underground gas pipelines, water mains, sewerage or infrastructure assets—are located within 500 m of any proposed blasting location with the exception of telecommunications assets within 90m of Cut 16.

Note: For the purposes of this BMS, the influence zone is defined as the maximum distance at which ground vibration or airblast from a blast could approach the relevant criteria for structural or service-asset protection.



The closest identified telecommunications asset (Telstra) is located approximately 90 m from Cut 16 and has been assessed as part of the vibration modelling. Conservative modelling indicates that the 5 mm/s contour extends to approximately 129 m, accordingly, the asset lies within a conservative screening distance for perceptible vibration. However, predicted vibration at the asset remains low (approximately 8.9 mm/s) and is well below applicable utility asset protection criteria (refer Section 7).

Blasting at this location will incorporate reduced MIC, site-specific design optimisation and monitoring to ensure compliance. Where refined predictions or monitoring results indicate that vibration levels may approach conservative asset criteria, consultation with the relevant utility asset owner (Telstra) will be undertaken and additional mitigation measures implemented as required. For initial calculations prior to trial blasting, a K-factor of 1750 and $B = -1.6$ have been adopted, consistent with the Blast Management Plan and providing a conservative upper-bound prediction.

Utility asset protection limits are taken from commonly adopted guidelines and standards such as DIN 4150-3, which specify typical vibration limits of:

- 50 mm/s for masonry or plastic pipes,
- 80 mm/s for concrete pipes, and
- 100 mm/s for steel pipelines.

For the expected MIC values at I2S (calculated per blast based on hole depth, charge weight and delay timing), predicted vibration levels fall well below these asset protection limits at distances exceeding several hundred metres. Using the conservative initial prediction parameters noted above, assets located beyond approximately 400–500 m are outside the zone where blast vibration could approach even the lowest utility criteria.

Final MIC values and predicted vibration levels will be refined following the trial blast, at which point site-specific K and B values will be validated through the monitoring array. These refined values will then be used in all subsequent pre-blast calculations to confirm compliance with utility vibration limits. Where actual site constants differ from initial assumptions, the blast influence zone will be updated accordingly and documented in the Pre-Blast Documentation.

(f) measures to minimise blasting impacts;

In addition to designing the blast to meet the criteria, monitoring of blast airblast and vibration at nearest sensitive receivers will be undertaken. Sensitive receivers will be notified and consulted on blasting activities leading up to the proposed date of blasting. Where feasible, blasting activities will be confined to one blast only per discrete blasting location/cutting.

(g) periods of relief; and

Blasting will be undertaken only within the days and hours prescribed in EPL 22021 Condition L4, with 1 to 3 blasts expected at each discrete blasting location/cutting.

(h) blasting program.

Blasting is expected to be undertaken at the 11 nominated locations between June 2026–December 2026, dependent upon approvals.

3.3 Background

3.3.1 Project Description

The Project is located in south-western New South Wales (NSW) in the Riverina region (refer to Figure 3 1). Illabo is a small town located at the southern end of the alignment 16 kilometres (km) north-east of Junee in the Junee Local Government Area (LGA).

Stockinbingal is situated at the northern end of the Project, approximately 20 km north-west of Cootamundra in the Cootamundra–Gundagai Regional LGA. The major towns surrounding the Project are Wagga Wagga, about 50 km to the south, Young to the north-east and Cootamundra to the east.

The Project comprises a new rail corridor that would connect Illabo to Stockinbingal. The alignment branches out from the existing rail line north-east of Illabo and travels north to join the Stockinbingal–Parkes Line west of Stockinbingal. The route will travel primarily through undeveloped land predominantly used for agriculture.

The Project includes modifications to the tie-in points at Illabo and Stockinbingal to allow for trains to safely enter and exit the Illabo to Stockinbingal section of Inland Rail. The alignment also crosses several local and private roads, watercourses and privately owned properties. Additionally, no major towns are located within the Project site between Illabo and Stockinbingal.

The Project will include a total extent of approximately 42.5 km, including 39 km of new, greenfield railway which will incorporate the following key features:

- single track standard gauge on a combination of existing ground level embankments and within cuttings
- new bridges and road overpasses
- crossing loop and maintenance siding
- new level crossings, stock crossings and upgrades to existing level crossings
- new major stormwater diversion and minor drainage works associated with installation and upgrades to culverts.

The Project will also include upgrades to approximately 3 km of existing track associated with tie-in works and construction of an additional 1.7 km of new track to maintain the existing rail network connections. Road upgrade works will also be undertaken to re-align approximately 1.4 km of Burley Griffin Way to provide a road-over-rail bridge at Stockinbingal. Re-alignment of Ironbong Road will also be completed to allow for safe sight lines. A temporary workforce accommodation camp will also be constructed to house the workforce for the duration of the Project.

Key features of the Project are shown on Figure 3- 2.

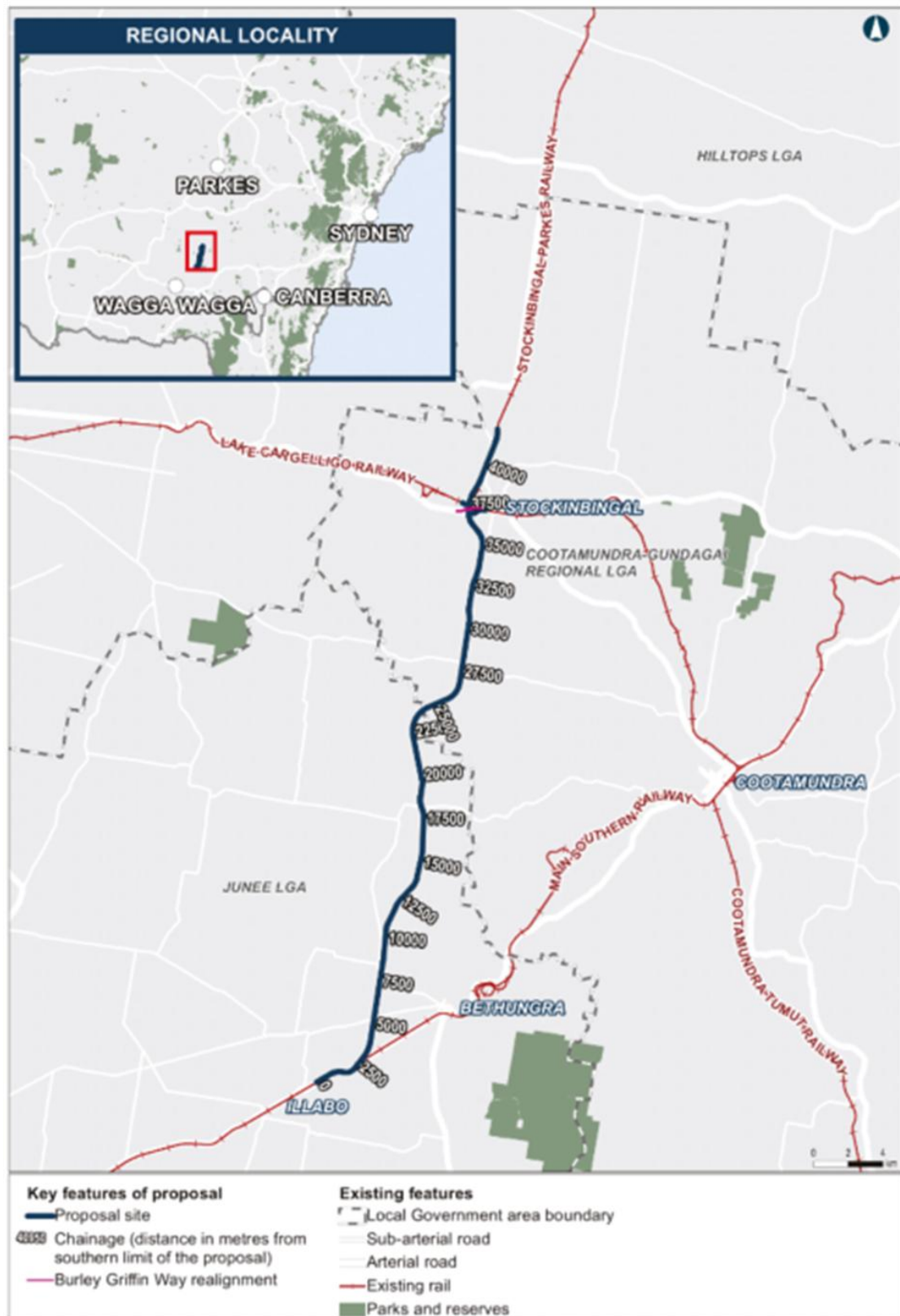


Figure 3-1: Project locality (Source: Illabo to Stockinbingal - Environmental Impact Statement, 2022)

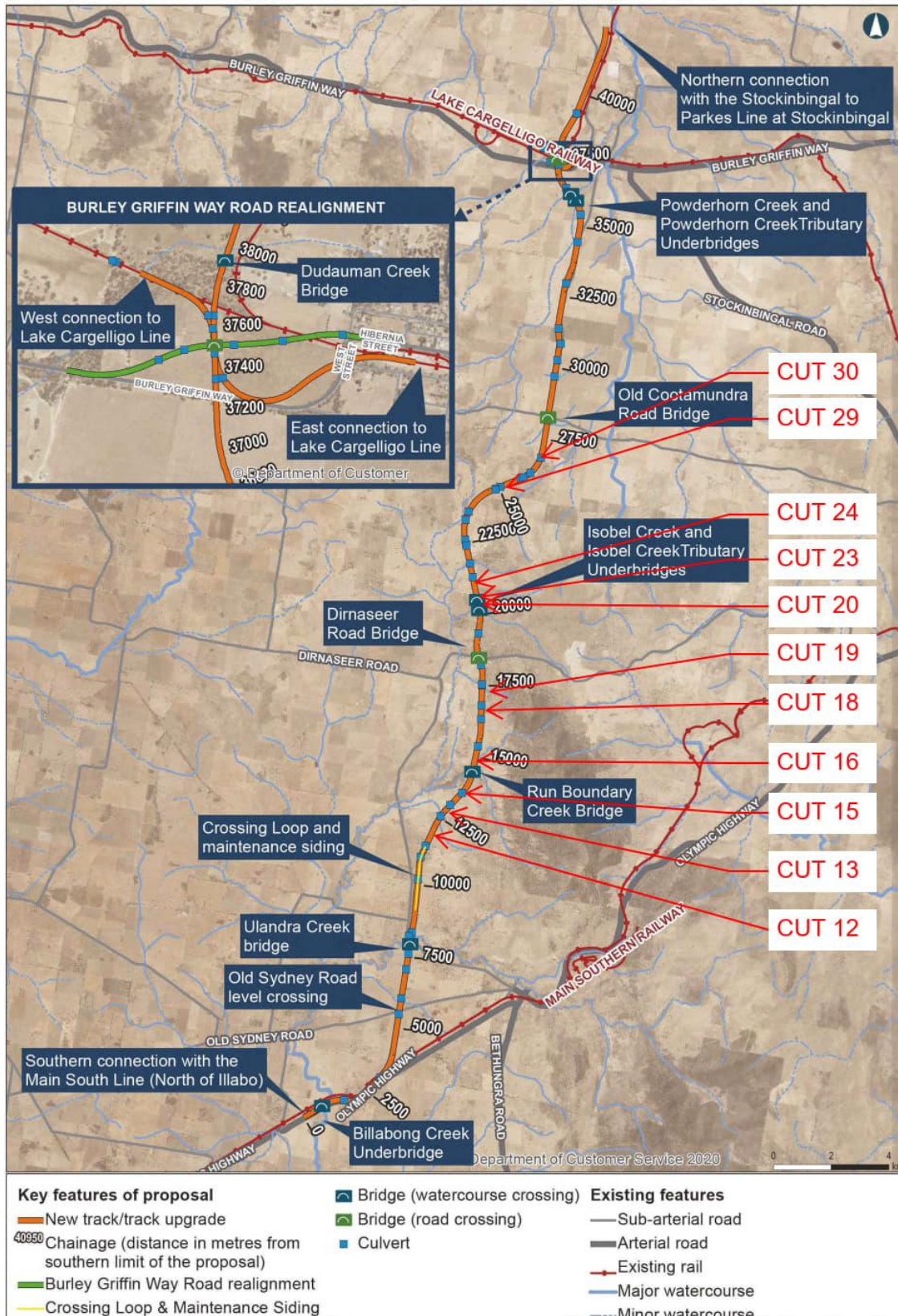


Figure 3-2: Key Project features (Source: Illabo to Stockinbingal - Environmental Impact Statement, 2022) and blasting locations



3.3.2 Statutory Context

The Project was declared Critical State Significant Infrastructure (CSSI) in 2021, requiring approval under Division 5.2 of the *NSW Environmental Planning and Assessment Act 1979*. In accordance with the Secretary's Environmental Assessment Requirements (SEARs) (dated 30 April 2021), an EIS was prepared by Australian Rail Track Corporation (ARTC) in August 2022. The EIS was exhibited by the Department of Planning, Housing and Infrastructure (DPHI) for a period of six (6) weeks, commencing on 14 September 2022 and concluding on 26 October 2022.

Following public exhibition of the EIS, ARTC prepared a Response to Submissions Report (RtS) to respond to submissions and describe Project design refinements.

Approval for the Project was granted on 4 September 2024 by the Minister for Planning and Public Spaces (SSI-9406) and was subject to a number of CoAs.

The Project was determined to be a controlled action under the *Environmental Protection Biodiversity Conservation Act 1999* (EPBC Act). The Project received EPBC Controlled Action Approval from Department of Climate Change, Energy, the Environment and Water (DCCEEW) (EPBC Referral 2018/8233) on 28 October 2024.



4 Hazards And Risks

All Hazards and Risks are managed in line with the **WHSMP - Section 3.4 – Hazard Identification And Managing Risk**. The Blasting Contractor's roles and responsibilities are described in Section 5 and Appendix B.

Activities related to the use, storage, manufacture, security and transportation of explosives and explosives precursors on all sites are high risk activities and are subject to specific work risk assessments reviewed constantly within the sitespecific SWMS.

SWMS are reviewed on a job-by-job basis and updated to reflect identified risks and their control methods employed for that site. Hazards are classified utilising the Risk Matrix (Figure 4-1). Suitable controls are determined and implemented using the hierarchy of control that effectively manages the levels of risk to as low as practicably possible.



		LIKELIHOOD				
Risk Analysis		5 Almost Certain	4 Likely	3 Possible	2 Unlikely	1 Rarely
R = C x L		Almost certain to happen i.e. could occur daily or more frequently	Could happen anytime i.e. could occur weekly or longer	Could happen sometime i.e. could occur monthly or longer	Could happen i.e. could occur yearly or longer	Could happen but probably never will i.e. occur once each 10 years or longer
CONSEQUENCE	5 Catastrophic	25 Class 1 / H	20 Class 1 / H	15 Class 1 / H	10 Class 2 / M	5 Class 3 / L
	4 Serious	20 Class 1 / H	16 Class 1 / H	12 Class 2 / M	8 Class 2 / M	4 Class 3 / L
	3 Moderate	15 Class 1 / H	12 Class 2 / M	9 Class 2 / M	6 Class 2 / M	3 Class 3 / L
	2 Minor	10 Class 2 / M	8 Class 2 / M	6 Class 2 / M	4 Class 3 / L	2 Class 3 / L
	1 Insignificant	5 Class 3 / L	4 Class 3 / L	3 Class 3 / L	2 Class 3 / L	1 Class 3 / L
		No injury				

Figure 4-1 Risk Matrix

Eliminate	Where the condition or hazard is completely removed by removing the process or source
Substitution	Where the risk is removed and replaced with another method, device, <u>operation</u> . (The replacement must also be analysed!)
Isolation	Isolation by creating a mechanical barrier or other method to prevent the hazard from impacting on personnel, property, or the environment.
Engineering Control	A physical barrier or lockout system is introduced to control the risk by isolation
Administration	Providing procedures, instructions, training, signs
PPE	Where personnel are required to wear equipment to protect <u>themselves</u> from personal injury, or the environment is protected by having emergency equipment devices or spill kits on standby

Figure 4-2 Hierarchy of Control

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Individual SWMS will be reviewed and signed on to by each person carrying out the prescribed tasks and stored with this BMS under Appendix C.

4.1 Explosive and Explosive Precursor Hazards

The use of explosives to break rock involves the sudden application and release of large amounts of energy, and is therefore a process requiring the effective management and control of activities to ensure that hazards are identified and appropriately controlled. On a mine, quarry or construction site, the potential hazards are increased by the need to handle sensitive initiating explosives while working in a harsh environment and sometimes within close proximity to plant, infrastructure and other workers.

The blasting process will be managed in a way that minimises the risks associated with the transport, use, manufacture and security of explosives, especially in relation to the catastrophic consequence of unplanned detonation of explosives, and uncontrolled blast behaviour at time of firing. These are specifically addressed within individual SWMS and risk assessments.

In considering the safety of site personnel, contractors and the general public, hazards associated with blasting include, but are not limited to, the following:

- Loss or theft of explosives from a transport vehicle while transporting to or from the mine / quarry site, representing a security risk
- Terrorist threat
- Unplanned detonation of explosives due to incorrect handling or application, or during transportation
- Unplanned detonation during placement due to impacts associated with operating equipment (e.g. MPU or LV on bench, drill and excavators in adjacent areas); impact from passing equipment; or snap-slap-shoot risks from passing equipment;
- Unplanned detonation of explosives after placement, from an external source of initiation such as hot or reactive ground or lightning;
- Unplanned detonation of explosives due to the application of electrical energy for testing or firing of electronic initiation systems, e.g. following undetected damage by lightning;
- Unintended or uncontrolled detonation or underperformance of explosives due to deterioration beyond manufacturers recommended shelf life of explosives
- Flyrock risks to persons, equipment and infrastructure, outside the blast exclusion zone, generated by an inadequately confined blast, within a blast exclusion zone that has not adequately been cleared prior to firing or an exclusion zone inadequately determined based on ground conditions;
- Environmental compliance risk (overpressure and ground vibration) associated with overloaded blast holes, large (reinforcing) blasts, and unfavourable meteorological conditions;
- Persons at risk from dust and fumes generated by the blast, outside the blast exclusion zone or potentially outside the site boundary;
- Persons at risk from misfired blastholes, particularly during subsequent excavation or redrilling of the blast area.

These risks are necessarily generic in order to remain applicable across a broad range of applications, using a variety of explosives products with varying properties suitable to each task, to achieve different blasting outcomes. It is understood that specific blast practices and applications vary significantly across open cut coal and metal mines, quarries and construction sites, therefore a review of specific risks and appropriate controls will occur first before work commences via the review of the site specific SWMS and then continuously reviewed on a daily, blast by blast basis and be recorded on the daily pre start blast risk assessment. Ongoing risks identified in the daily pre start will be reflected in future reviews of the SWMS

Specific controls for a range of risks associated with Blasting Contractor activities can be found in the applicable SWMS for the task being carried out. A roadmap for more specific hazards and risks can be found in RA011 BMP Explosives And Blasting Related Activities which is to be continuously updated and included in Appendix D of this BMS.

The SWMS and applicable procedures are continuously reviewed, improved and updated as more effective controls are identified and implemented.

4.2 Storage of explosives

Due to the security risks and hazards associated with storage of explosives at active sites, the Blasting Contractor will maintain its own off site storage magazines in secure locations as registered, approved and licensed with Safework NSW. Details of these facilities are not publicly available to maintain their ongoing security. Operations of these facilities are in line with the Blasting Contractor's Explosives Management Plan which is an internal secure document not publicly available.

Storage of explosives is not planned to occur on any sites serviced by the Blasting Contractor and will be transported to and from site as required on a blast-by-blast basis to reduce this risk.

If a blast needs to be delayed overnight (commonly referred to as "sleeping a shot") or if explosives are required to remain on-site in vehicles (e.g., explosives in utes), a specific risk assessment will be undertaken. Appropriate controls will be implemented, which may include secure storage and overnight supervision by a suitably qualified person, such as a licensed security guard.

4.3 Security of Explosives

Security of explosives will be maintained at all times, both in transit and whilst on site. The mobile magazine vehicle will be locked when personnel are not accessing product.

Reconciliations of product will occur before firing to ensure that counts match what has been consumed during the approved activity.

Any product that cannot be accounted for will be fully investigated as well as reported both to the regulator and to the police as per legislation.

4.4 Environmental Hazards

Blasting activities, while essential for efficient rock excavation, have the potential to create various environmental hazards that must be carefully managed to minimize impacts on the surrounding environment and community. These hazards primarily arise from the generation of noise, vibration, airblast overpressure, dust.

- **Dust:** Blasting can release significant quantities of dust, reducing air quality, visibility, and potentially impacting local amenity. Pre-blast watering of blast faces and haul roads will be undertaken to minimise dust lift-off. Blasts will be scheduled to avoid periods of high wind directed towards sensitive receivers. Blasting will not be undertaken if the prevailing wind conditions are likely to transport dust emissions towards the nearest sensitive receptors. After firing, additional water suppression will be applied to any residual dust sources.
- **Ground Vibration** has the potential to cause cosmetic or structural damage to nearby buildings and utilities, and to create disturbance for residents. This risk is particularly important near heritage structures or sensitive infrastructure. Blast designs will incorporate measures such as controlling Maximum Instantaneous Charge (MIC), burden, and delay intervals to minimise vibration impacts. Monitoring will be undertaken in accordance with Section 7 to ensure compliance with AS 2187.2 and EPL requirements.
- **Noise Impacts:** although blasting typically generates a single, short-duration noise event, it can still cause disturbance to the community if frequent or poorly managed. All blasts will be scheduled within approved hours (09:00–17:00 Monday to Friday, 09:00–13:00 Saturday, and never on Sundays or public holidays) and in accordance with the criteria outlined in the Project EPL. Blast frequency will be limited, generally to one event per day. Community consultation and notifications will follow the Community Communication Strategy and the Noise and Vibration Management Plan, including:
 - Issuing notifications 10–30 days prior to any Out-of-Hours blasting, unless otherwise required by an EPL.
 - Consulting affected receivers at least every three months for extended hours works, providing schedules, activity details, noise characteristics, and mitigation measures.Complaints will be logged, investigated, and corrective actions implemented where required. See Section 7.2 for further details including notification procedures.



- Fume impacts: Blast fumes are the gases that may be generated during blasting. Some of the gases are toxic and some are not. In terms of health impacts, the critical gases generated are oxides of nitrogen (NO_x) - nitrogen dioxide (NO₂) and nitric oxide (NO). Nitrogen dioxide gives blast gas plumes their characteristic reddish orange colour and pungent odour. Gases produced during blasting usually disperse rapidly and pose no acute health risk. Under certain conditions the gas plume may persist and can affect nearby people or residents who are downwind of the blast site. If a plume is suspected:
 - Avoid exposure to the plume. If you see a plume, do not enter it (this includes driving through it) and move out of the plume's path if possible. If at home, head indoors, close all doors and windows. If you are in a car, wind up windows and close vents until the plume passes.
 - If you find yourself in a plume, try to move out of it as quickly as possible.
 - If you have been exposed, use water to thoroughly wash eyes, and to clear your nose and throat.
 - If you experience respiratory symptoms you should seek immediate medical attention and inform the doctor of possible NO₂ exposure. Be alert for possible delayed breathing problems. If you are an asthmatic, use your reliever medicine.

For all hazards, contingency procedures are established to manage unexpected events. This includes isolating blast areas, notifying regulators of any exceedance or incident, and implementing revised blast designs or additional mitigation before resuming operations. Near misses and incidents are recorded in the project's HSE system and discussed during toolbox talks to prevent recurrence.

5 Roles and Responsibilities

Table 5-1 Roles and Responsibilities

Role	Responsibility
Project Manager	Ensure adequate resources are available to ensure the implementation of this Blast Management Strategy Induct Blasting Contractor personnel into the site safety management system and provide support in ensuring ongoing adherence to its requirements. Ensure resident notifications as required are carried out in the time frame stipulated within any conditions of approval Advise Blasting Contractor of any changes to conditions of approval Ensure any exceedances of monitoring criteria are reported in line with BMS, BMP and approval conditions
Superintendent	Oversee daily blasting activities to ensure compliance with BMS and BMP and project schedule. Coordinate with the shotfirer and site supervisor to confirm exclusion zones and clearance procedures. Ensure all personnel adhere to site safety protocols and environmental requirements.
Environment and Sustainability Manager	Provide oversight on environmental compliance during blasting activities. Ensure dust suppression, noise, and vibration mitigation measures are implemented. Review monitoring data and liaise with regulators as required. Support community consultation and manage environmental incident reporting.
Environmental Advisor	Conduct pre-blast environmental checks as required and confirm compliance with environmental controls. Monitor dust suppression and vibration monitoring setup. Maintain records of environmental inspections and assist with reporting obligations.
Site Supervisor	Manage on-site operations during blasting, ensuring all personnel follow clearance and safety procedures. Confirm exclusion zones are established and maintained. Coordinate with the shotfirer for timing and sequencing of blasts. Report any safety or compliance issues immediately.
Shot Firer	The Shot Firer employed at the Site must ensure all blasting activities are compliant with the requirements of this Blast Management Strategy. The appointed shotfirer shall be on-site at all times during blasting works and is responsible for carrying out all charging and firing operations. Ensure all blast parameters are reviewed prior to shot loading commencement and are adhered to as outlined in the design. Supervise and instruct all personnel on the shot as to the safe handling and use of explosives. Maintain supervision of personnel without suitable security licenses ensuring they are always with line of sight of a licensed person while explosives are being used. Account for all explosives usage and ensure the security of explosives on bench enforcing that all personnel having unsupervised access to explosives are licensed with a valid Security Clearance. Prevent unauthorised access to explosives and the blast area, remaining vigilant to other activities and personnel/plant movement within the immediate vicinity. Ensure exclusion zone is clear prior to firing. Fire the blast in a safe manner. Thoroughly inspect blast after firing and ensure all explosives have detonated before handing the site back to the client.



Role	Responsibility
Personnel Assisting Shot Firers	Personnel assisting shotfirers will be made aware of the shot specific risks and hazards as well as receive instruction on the safe handling of explosives before commencing work. Assistants are to sign on to the Pre-Start meeting form as a record of receiving this instruction. Ongoing training will be provided in the form of supervised on bench guidance and mentoring until the assistant is deemed competent. Assistants are to follow all reasonable instructions provided by the shotfirer. If unsure of anything on bench, assistants are to stop work and ask for clarification from the shotfirer before proceeding. Assistants without a current security clearance license have a duty of care to ensure that they are not left unsupervised (in line of sight of a licensed person) whilst having access to unsecured explosives.

6 Procedures

6.1 Authorised Employees

All Blasting Contractor employees are inducted in the understanding and application of the company Work Health and Safety Management System and Blast Management Plan (Appendix G) as well as company procedures and SWMS. These inductions are updated on a regular basis, usually following a major revision of the plans as well as when commencing works on a new site.

Employees that are authorised by the Blasting Contractor's Management to Shotfire on their behalf, to have unsupervised access to, receive on behalf of or are required to handle explosives will be documented in the form 312.1 – Employees Authorised to Handle Explosives and will be updated regularly or as employee circumstances change. When this document is revised, it is to be printed and stored under Appendix B.

- The Authorised employee list is to be reviewed and updated at least every 12 months.
- No one under the age of 18 years will be allowed access to explosives unsupervised.
- Minimum age for explosive transport vehicle drivers is 21 years

If anyone is on a shot without a valid security clearance, then they are to be supervised at all times while having access to any security sensitive items. Supervised means that they remain in the immediate vicinity of and **in line of sight** of an authorised and licensed employee at all times.

(Handling includes the activities of conveying, manufacturing, processing, possessing, using, preparing for use, treating, dispensing, storing, packing, selling, supplying, importing into the state from another country, rendering harmless, abandoning, destroying and disposing)

6.2 Validation of Licenses

Personnel are to carry all personal explosives licenses such as Blasting Explosives User License (BEUL) and Security Clearance (SC) on them at all times to meet legislative requirements. This means that they must be available to produce upon request if demanded by a police officer or an inspector. As a minimum they must remain with their personal belongings whilst on bench.

If any BEUL or SC have limiting conditions placed on them, it is expected that the license holder will adhere to any conditions and make Blasting Contractor's managers aware so that compliance can be maintained.

Company explosives licenses, such as License to transport and license to store are readily available to be sent electronically from the office within the required 48 hours after the request.

6.3 Explosive Transport, Handling and Use Procedures

All transport, handling and use of explosives on site will be carried out in accordance with specific Blasting Contractor's procedures. Details of explosives use procedures are not listed within this BMS due to the security sensitive nature of these activities.

Security of explosives is the highest of priorities behind development of all procedures. All personnel will ensure that explosives that are not to be used immediately will remain securely locked within the mobile magazines (transport vehicle). Stock balances will be verified against explosives loaded each day to ensure all items used are accounted for.

In order to reduce exposure to risks associated with the manufacture of explosives, the Blasting Contractor utilises specialist suppliers of bulk explosives. The relevant procedures, SWMS and risk assessment are not specifically referenced here as they will be supplied as required on a site by site basis from suppliers as needed.

Pre-Blast Documentation for each blast will include design and layout of blast holes, including consideration of drill patterns, hole lengths, type and quantity of explosive, appropriate burden, stemming material and charge depth.

7 Blast Vibration and Overpressure Monitoring

Environmental monitoring of air blast overpressure and vibration will occur at the nearest potentially affected residential properties during each blasting event to confirm that vibration levels are within the acceptable range as outlined in AS2187.2 preventing cosmetic building damage and human discomfort, or as per project specific licensing conditions.

Recommended vibration and airblast/overpressure limits are generally based on international standards for human comfort and structural building damage. Ground vibration and airblast levels which cause human discomfort are generally much lower than the recommended structural damage limits. Therefore, compliance with the lowest applicable human comfort criteria at residences ensures that the potential to cosmetic damage is minimal.

Predicted vibration will be modelled as final cut designs are determined, in line with maintaining compliance at nearest sensitive receivers.

AS2187 has established guidelines for blasting based on human comfort levels. The guidelines are defined in terms of impact on airblast (pressure), measured in dB(Linear) (dBL), and ground vibration, measured as peak particle velocity (PPV), and are presented in the table below for an occupied residential property:

Table 7-1 Blasting Impact Criteria and Limits

Blasting Impact	Recommended 95th Percentile Maximum Level	Maximum Level
Air blast (dB Linear Peak)	115	120
Ground Vibration (mm/s)	5	10
Buried Services*		
Steel pipes	-	100 mm/s
Concrete pipes	-	80 mm/s
Masonry/Plastic pipes	-	50 mm/s

*These limits align with DIN4150-3 and NVMP. They apply to short-term vibration measured on the pipe and are consistent with AS 2187.2 for blasting vibration management.

Limits may be increased if a written agreement is reached with the property owner. Blasting Contractor will require evidence of agreements to utilise any higher limits for monitoring locations. Each agreement will include:

- details of the proposed blasting program and justification for the proposed increase in blasting criteria
- an assessment of the environmental impacts of the increased blasting criteria on affected residences or other sensitive receivers including, but not limited to noise, vibration and air quality
- details of the blast management, mitigation and monitoring procedures that will be implemented

It is noted that the blasting criteria for ground vibration presents a highly conservative approach to the protection of residential amenity.

A map of nearest residential properties and sensitive sites can be seen in Appendix A.

Blasting generates noise (i.e. overpressure or airblast) and vibration, which can be detectable at residential receptor locations. Vibration levels also have the potential to impact infrastructure and heritage features in proximity to the site. Blast monitoring units capable of recording overpressure and vibration in accordance with the requirements of Australian Standard AS 2187.2-2006 'Explosives—Storage and use Part 2: Use of explosives' will be used at the nearest sensitive receiver generally positioned near the perimeter of the sensitive receiver at the point closest to the detonation.



Generally, a vibration and airblast monitor will be installed with microphones set at 900mm height, and vibration sensors will be mounted using spikes into undisturbed ground. Locations will generally be implemented using the following criteria:

- Set up near the perimeter of the sensitive receiver (building) at the point closest to the detonation.
- The location will be away from structures to prevent reflections.
- The monitor/s are to be set up in accordance with AS2187.2.

Monitoring locations may be altered where property owner permission cannot be obtained.

The monitoring program will ensure compliance with the EPL conditions and document the following records as part of each blast:

- Date and time of measurements
- Name of person undertaking the measurements
- Type and model number of instrumentation
- Time of day, length of measurement and measurement time intervals
- Monitoring location (including a sketched map of area)
- Measurement location details and
- Number of measurements at each location.

Monitoring results will be reviewed after each blast, and any exceedances of the recommended or maximum levels will trigger an immediate review of blasting parameters. Adjustments to charge weight, delay timing, or blast orientation will be implemented as necessary to prevent further exceedances and maintain compliance with the EPL and Australian Standards. Formula from AS 2187.2 is being used for the prediction method and assumptions for initial factors to determine blast design.

Table 7-2 summarises key regulatory requirements for blasting (as per EPL and CoA) and the indicative control measures that will be implemented to ensure compliance. These measures include pre-blast design modelling, continuous monitoring, and immediate corrective actions if exceedances occur.

Table 7-2 Regulatory Compliance and Indicative Control Measures

Regulatory Compliance	Proposed Indicative Control/Measure
EPL L4.1 & L4.2 – Airblast overpressure ≤ 120 dBL and ≤ 115 dBL for >95% of blasts	• Pre-blast design modelling to predict overpressure and vibration. • Continuous monitoring at most impacted sensitive receiver. • Immediate review/redesign if exceedance occurs.

Monitoring will be undertaken at the sensitive receivers located within 1km the planned blast sites. The locations listed in Table 7-3 correspond to properties closest to the 11 identified cuttings where blasting is proposed (as detailed in Appendix A).

These monitoring points have been selected to ensure compliance with EPL 22021 and AS 2187.2 criteria for airblast overpressure and ground vibration. The EIS (Chapter 08 Proposal description – construction) states that blast monitoring would be undertaken at sensitive receivers (i.e. residences) within 1 km of the blast site. Proposed monitoring locations are provided in Table 7-3 and further maps with sensitive receivers are provided in Appendix A.

**Table 7-3 Proposed Monitoring Locations where receivers are located within 1km of blast sites.**

Receiver Type	Coordinates	Min Distance to Receiver (m)	Associated Blast Site
Residence	X: 574420.77 Y: 6159118.84	846 m	Cut 12
Residence	X: 576227.19 Y: 6164897.48	490 m	Cut 20
Residence	X: 576187.47 Y: 6166151.14	675 m	Cut 23
Residence	X: 576187.47 Y: 6166151.14	1000 m	Cut 24
Industrial	X: 576727.32 Y: 6168514.53	1000m	Cut 24
Residence	X: 578742.72 Y: 6170717.82	680m	Cut 29
Residence	X: 578742.72 Y: 6170717.82	682m	Cut 30

Predicted levels of vibration and overpressure will be included in pre blast documentation. The first blast design will be compiled once survey data of the current surface of the planned cut is available and the model of design to plan against.

7.1 Blast Timing and Regulatory Compliance

Pursuant to CoA E14 and EPL L4.3 it is envisaged that controlled blasting must only be undertaken during the following hours:

- (a) 9:00 am to 5:00 pm, Monday to Friday, inclusive;
- (b) 9:00 am to 1:00 pm, Saturday; and
- (c) at no time on Sunday or on a public holiday;

or as authorised through an EPL if blasting is proposed outside of these hours.

This condition does not apply in the event of a direction from police or other relevant authority or utilities for safety or emergency reasons to avoid loss of life, property loss and/or to prevent environmental harm.

Table 7-4 Regulatory Compliance and Indicative Control Measures

Regulatory Compliance	Proposed Indicative Control/Measure
EPL L4.3 & CoA E14 – Blasting Hours	• Schedule blasting within approved hours. • Emergency blasts only under authority direction. • Notify residents at least 7 days prior to the commencement of blasting.

7.1.1 Works Outside Standard Construction Hours

Blasting activities themselves are not permitted outside standard construction hours under EPL L5. Only setup, preparation, and finishing works associated with blasting (excluding the actual blast) may occur outside these hours, subject to risk assessment and prior approval where required.

EPL L5 permits works outside standard construction hours only in certain circumstances, such as:

- Emergency work to avoid injury to persons, loss of life, damage to property, or to prevent environmental harm.
- Where works are essential for public safety or directed by police or another relevant authority.
- Where prior approval has been granted by the EPA or Planning Secretary, following consultation with affected residents.



If out-of-hours blasting is required:

- A specific risk assessment will be completed to demonstrate why out-of-hours blasting is necessary and how impacts will be minimised.
- Affected receivers will be consulted in advance where practicable, and notifications will include the reason, timing, and duration of the works.
- Where feasible, blast design will be further optimised to minimise overpressure and vibration impacts during the sensitive period.
- Written notification and approval will be obtained before works commence, except where directed immediately by police or emergency services.
- Monitoring data and incident reports will be provided to the EPA/DPHI as required, and lessons learned will be incorporated into future planning.

A log of all out-of-hours blasting events will be maintained, including:

- Date, time, and location of the blast.
- Reason for work outside hours.
- Approvals and notifications issued.
- Monitoring results and any exceedances.
- Community feedback or complaints received.

This log will form part of the monthly compliance reporting and be made available to regulators on request.

7.2 Community Consultation

7.2.1 Landowners and adjacent properties

A total of 7 sensitive receivers have been identified within 1 km of the proposed blast locations, with distances ranging from approximately 300m to 1000 m. The closest receiver is located at 490m (Cut 20). Vibration and airblast levels will comply with AS 2187.2 and EPL criteria, meaning impacts to livestock are highly unlikely. However, as part of community consultation, the relevant landowners will be informed of blast timing and offered the option to relocate livestock if they wish to minimise stress or startle response. The JH Community and Stakeholder Engagement Team will use a range of communication tools to provide clear, effective and timely information to the predicted affected sensitive receivers in accordance with the CCS.

Consultation will be carried out in stages, using a progressively more targeted approach. It will begin with inclusion in the monthly community notifications to inform the community that blasting methodology will be implemented as part of the project.

Community members identified as potentially impacted will receive notification at least seven days prior to the commencement of blasting. This update will include specific details about the timing, potential impacts, and any necessary mitigation measures related to the upcoming blast. Updates may be provided by email, phone call or in-person and will be tailored to the individual community member/landowner.

Additionally, a 24-hour prior notification will be provided via phone call to confirm the status of the scheduled blast, share any relevant safety or mitigation information, and address any questions from affected community members or landowners.

A fact sheet containing general information about the blasting activities will also be prepared. This document will be emailed to relevant stakeholders and made available at the Community Information Centre in Cootamundra for other interested parties.

The John Holland Community and Stakeholder Engagement Team will take into account the broader community's interests and provide information as deemed appropriate or necessary, in alignment with the I2S CCS framework.

7.2.2 Utility asset owners and managers

Condition E10(e) requires that the Blasting Monitoring Program is developed in consultation with utility asset owners and managers, as appropriate. Based on the revised blasting scope at each cut site and associated chainages, utility assets have been identified at varying distances from the proposed blast locations, as summarised in Table 7-5. Most utilities are located at distances greater than 500 m from blasting activities.

The process for determining whether consultation is required with a utility asset owner has been undertaken and will be managed during construction as follows:

1. Where a utility is identified within 500m of blast location, the Project will engage with the utility owner or manager to discuss the scope of work and confirm if there are any special considerations that need to be made for a blast to occur.
2. Advice from the utility owner or manager is taken into consideration of the blast design to ensure that the criteria required to be met for each blast is met as well as any specific criteria for the utility asset.
3. Notification to the utility owner or manager will be undertaken as per this Strategy.

At Cut 16, a telecommunications asset owned by Telstra is located approximately 90 m from the blast area. Consultation with Telstra has been undertaken, confirming an initial conservative criterion of 50 mm/s PPV, with potential acceptance of higher levels (up to 100 mm/s) subject to review of blast design and supporting documentation. The blast design at this location will incorporate reduced MIC, monitoring and design optimisation to ensure compliance with criteria set out in this Strategy and the EPL. Consultation log detailing the consultation undertaken with Telstra is included in Appendix J.

An irrigation pipeline is also located in proximity to Cut 16 (approximately 110 m from the blast area). This asset is a buried, privately owned irrigation pipeline which will be made redundant by the new rail corridor. A new line will be constructed by JHG to replace the existing line that is being adjusted as part of the new rail line construction. This pipeline is at an approximate depth of 2 m below ground level. Based on its material classification (plastic pipeline), an applicable vibration limit of 50 mm/s PPV has been adopted in accordance with Table 7-1. Predicted vibration levels at this distance are substantially below the adopted limit (refer Section 3.2/Table 3-2), indicating a significant margin of safety. In addition, the burial depth of approximately 2 m provides further attenuation of ground vibration, reducing the risk of impact to the asset.

The blast design at Cut 16 will incorporate conservative controls including reduced MIC, appropriate burden and spacing, and site-specific optimisation to ensure vibration remains well below the applicable criteria.

As the asset is privately owned, the landholder (asset owner) will be notified in accordance with the landowner consultation process outlined in Section 7.2.1. Where requested, consultation will be undertaken to confirm acceptance of the proposed blasting approach. Monitoring will also be implemented to verify compliance during blasting activities.

Appendix F provides mapping for each blast location, confirming the type and proximity of utility assets relative to proposed blasting areas.

Table 7-5 Closest Sensitive Receivers and Utility Assets

Cut No.	Start Chainage	End Chainage	Closest sensitive receiver	Receiver type	Closest utility asset
Cut 12	429,400	429,800	846m	Residential	>1 km
Cut 13	430,260	430,440	1,40 km	Residential	None
Cut 15	431,366	431,600	1,81 km	Residential	None
Cut 16	433,060	433,340	1,20km	Residential	90m
Cut 18	434,010	434,250	1,44km	Residential	None
Cut 19	434,510	434,710	1,67km	Residential	900m
Cut 20	436,208	436,510	490m	Residential	700m
Cut 23	437,745	437,900	675m	Residential	>500m
Cut 24	438,230	438,733	1000m	Agricultural (shearing sheds)	700m
Cut 29	442,698	443,195	680m	Residential	>1 km
Cut 30	443,955	444,247	682m	Residential	600m

Should complaints be received, consultation with complainants would occur more frequently (based on the nature of the complaints and the works they relate to). Evidence of this consultation will be reviewed by the Environmental Representative and available to the Planning Secretary on request.

7.3 Road Traffic Management and Road Safety

Where applicable, any localised surrounding public roads will be placed under a hold/release type traffic control arrangement to facilitate blasting. Consultation will also be undertaken with all relevant principal road authorities prior to commencement. To improve road safety either side of the blasting perimeter, where long periods of hold/release traffic is required, additional VMS boards will be installed along the roadway to inform road users. The reduced speed arrangement will be clearly signposted, where applicable, on all public roads.

7.4 Approvals and Notifications

Consultation and notifications will be carried out in accordance with the I2S CCS and commitments required between JHG and IRPL associated with the BMP attached as Appendix G. This is to ensure all relevant authorities and emergency services are informed prior to blasting activities. [Table 7-6](#) summarises required approvals and notifications:

Table 7-6 Approvals and Notifications

Authority	Notification required	Timing
SafeWork NSW	Notification of blasting	A minimum of 7 working days before commencement of blasting
NSW Police	Notification for traffic control	Prior to first blast and as required
NSW Rural Fire Service (RFS)	Notification during fire ban periods or fire risk	Prior to blasting during declared fire bans



Authority	Notification required	Timing
Junee Shire Council and Cootamundra–Gundagai Regional Council	Notification of blasting schedule	Prior to commencement of blasting
Emergency services	Emergency contact details and readiness	Prior to commencement of blasting
Utility asset owners	Where utilities are located within the conservative screening distance or where pre-blast predictions or monitoring indicate that vibration may approach relevant asset criteria	Prior to blasting, where required based on proximity and risk assessment
Community/Landowners	Specific notification The 7-day notification will provide specific details relating to timing, impacts and mitigation (if necessary) for the upcoming blast. The 24-hour prior notice, will be a phone call to confirm the status of upcoming blast, provide any safety/mitigation information as required and to answer questions from impacted community/landowners.	A minimum of 7 days before commencement of planned blasting, and; 24-hours prior to a confirmed blast.
Community/Landowners	Monthly community notification – this will be used to provide notice to the community that blasting methodology will be in place on the project.	10-30 days prior to the commencement of planned blasting.

8 Flyrock Management

Flyrock is the undesirable throw of rock from the blast outside of the exclusion zone. The high-speed ejection of rock creates high risk hazards that can endanger or severely injure personnel and damage plant. It is imperative that fly rock is managed effectively on every blast.

The appointed shotfirer shall be on-site at all times during blasting works and is responsible for carrying out all charging and firing operations. The shotfirer will supervise the safe handling and placement of explosives, ensure compliance with blast design parameters, and confirm that the exclusion zone is clear prior to firing. No charging or firing activities shall occur without the shotfirer present.

A specific risk assessment will be carried out on each and every blast that identifies specific risks and controls to be put in place unique to that particular day and will be recorded on the daily Pre-Start risk assessment. All personnel will be toolboxed by the shotfirer at commencement of work.

8.1 Causes of Flyrock

Flyrock generally comes from the collar of blast holes or the face of a blast. It is usually caused by the incorrect selection or application of burden, insufficient stemming length or blast holes initiated out of sequence. The geology of the rock being blasted is also important to consider, including joints, fissures and other planes of weakness. A well-designed shot must account for the type of rock and local variability in rock properties, including the presence of more highly weathered rock near the surface.

Flyrock risk is managed through a combination of geological assessment, blast design, and predictive modelling. The following approach will be applied:

- Geological assessment: drillers' notes from drilling the blast holes are reviewed to identify any geological variances such as joints, fissures, or weak zones that could influence flyrock projection.
- Predictive modelling: Paradigm Blast software will be used to model flyrock for each blast, taking into account hole diameter, depth, burden, stemming length, and explosive charge.
- Exclusion Zone calculation: the exclusion zone will be determined by the shotfirer using industry guidance and modelling outputs. For the anticipated 102 mm blast holes and depths of cut on site, a minimum exclusion zone of 350 m is recommended.

To minimise the risk of excessive blasting and overbreak, the following measures will be implemented:

- Blast design and planning: all blasts will be designed by a qualified shotfirer using site-specific geological data to optimise burden, spacing, and charge weight.
- Controlled MIC: MIC will be calculated to comply with vibration and overpressure limits and to avoid unnecessary energy release.
- Pre-blast modelling: predictive modelling will be used to assess vibration and fragmentation outcomes before firing.
- progressive review: trial blast results will be reviewed, and subsequent designs adjusted to prevent overbreak and maintain excavation profiles.
- On-site supervision: the shotfirer will supervise all charging and firing operations to ensure compliance with the approved design.
- Use of delay timing and sequencing: proper initiation sequence will reduce excessive energy concentration and control rock movement.
- Monitoring and feedback: post-blast inspections will confirm compliance with design tolerances. Any signs of overbreak will trigger immediate corrective actions for future blasts.

8.2 Precautions To Take

The designer and shotfirer must inspect the area surrounding the blast site to determine the distances to residences, roads, public places and infrastructure. Where roads are located within or near the calculated exclusion zone, traffic management will be implemented in accordance with the Construction Traffic, Transport and Access Management Plan (CTTAMP), Approved Traffic Guidance Schemes and Road Occupancy Licences.

Good blast design is the best way to avoid flyrock. This includes:

- Where possible, selecting the direction of the blasting face to place people and buildings behind the face
- Avoiding shallow blasts less than 1m in depth
- Ensuring burden is one-third to one-half the depth of holes
- Using a stemming depth either no less than 20-25 times the diameter of the hole or no less than the burden, whichever is greater
- Avoid overcharging by confirming stem heights by measuring the bulk product for each hole and removing any excess product when needed
- Ensuring stemming is clean and free from contamination and properly tamped
- Where light face burdens cannot be avoided, reduce the explosive energy by utilising stem or air decks
- Using sequential or delay firing so all shots initiate from the face backwards
- Avoiding overcharging when conducting secondary blasting.

Note: Trench blasting and blasting where bench heights are small compared with the burden usually provide the greatest potential for flyrock because the degree of confinement and the specific charge are both high, and the charge is sometimes placed close to the surface

Additional false burden or blast mats are not recommended as a flyrock control measure in most blasting scenarios as they can unnecessarily introduce more significant additional hazards such as damage to surface delays that can lead to a major misfire.

It is always more effective to control flyrock through good design, and best practice loading techniques as listed above.

Minimum exclusion zone distance will be calculated and set on a shot-by-shot basis and will be shown on aerial maps as part of pre blast documentation. Blast guards will be stations at any potential entry sites, with good clear vision across the area. Residents in the immediate vicinity will be notified of the intention to blast via the preferred method of communication by site personnel.

The exclusion zone set will be based on Table 1 of the Worksafe Victoria Guidance Note for Setting Safe Exclusion Zone Distances (Appendix A) which recommends a safe distance of 200m for a stemming height of 2.5m on a 102mm hole. Clearance zones can be adjusted based on actual design criteria, and site constraints once each blast is marked out.

9 Emergency Response

Before commencement of work on any site the Blasting Contractor will review and update the site emergency response plan with appropriate actions for an emergency involving explosives. This will be communicated to all site-based emergency response team members and blast crew members. A suitable muster point in case of evacuation will be communicated to all workers.

Emergency response shall be in line with the emergency procedure guide (EPG) supplied for Class 1 Explosives, and is located in the emergency document holder secured to the driver's door in all explosives and dangerous goods vehicles. The EPG is also stored with the sites emergency response plan and included in Appendix E of this BMS. Blasting Contractor personnel are continuously familiarised and trained in emergency response as part of ongoing training and emergency preparedness.

9.1 Fire Emergency

The highest risk hazard requiring immediate action is in regard to heat (fire), shock or friction. Fires may commonly occur on sites from vehicle fire, lightning strike, bush fire, unauthorised ignition sources or electrical faults.

Small fires away from the cargo area of a transport vehicle (such as engine fire, or fire on a vehicle next to a transport vehicle) may be attempted to be fought using one of the vehicles fire extinguishers. As a guide, if the fire cannot be extinguished using a single extinguisher, then an emergency should be called and evacuation commenced.

If bushfires approach the blast area, unused explosives should be secured in the transport vehicle, MPU washed out, and vehicles removed to a safe location using an unaffected route. Loaded holes should be stemmed, and blast area evacuated with blast exclusion zone set up until the fire threat has passed.

Fires within, near or immediately adjacent to a loaded explosives cargo area should not be attempted to be fought due to the toxic smoke that is emitted as well as the unpredictable extreme risk of mass explosion or unplanned detonation.

As per the Class 1 Explosives Emergency Procedure Guide, **“When subjected to heat, shock or friction, Explosives of division 1.1 or 1.5 will burn and may detonate IN A MASS EXPLOSION at any time”**. Evacuation to a minimum distance of 400m should commence immediately.

Site emergency evacuation procedure must be enacted and all site personnel notified by calling ‘Emergency, Emergency, Emergency fire involving explosives located at {blast location area}. All Personnel must immediately evacuate to {muster point} via a safe route.’ If possible shotfirer should advise of the best route in this transmission for clarity and to prevent anyone inadvertently entering the area.

Injured or smoke affected personnel are to be removed from the area immediately. Where possible, they are to be assisted into a vehicle to remove them from the area as quickly as possible. First aid should be administered enroute if possible or at the muster point.

The shotfirer is to liaise with the site emergency warden or coordinator to ensure the safe and swift movement of all personnel, or members of the public within the affected radius from the area. If the shotfirer is injured or unable to carry this out, the next most senior person is to liaise with site emergency warden or controller.

Emergency services will be immediately contacted advising that explosives are involved in the incident, and personnel not allowed to re enter the area until advised safe to do so. At a minimum the area will remain isolated for at least one hour after all fire and explosions have ceased.

9.1.1 Safety or emergency work (CoA E3a)

Scenarios above represent critical safety risks that may necessitate immediate response actions outside standard construction hours. In accordance with CoA E3a and NVMP, such emergency works are justified when required to:

- Avoid injury or loss of life,
- Prevent damage or loss of property,
- Mitigate environmental harm.



In the event of a fire emergency involving explosives, actions such as evacuation, securing explosive materials, and coordination with emergency services may need to occur outside approved working hours. These activities are considered emergency works under the OOHW Protocol and must be promptly communicated to the ER, Planning Secretary, and EPA. Additionally, best endeavours must be made to notify affected sensitive land uses of the potential noise and vibration impacts and expected duration of emergency response activities.

9.2 Adverse Weather, Lightning and Thunderstorms

SOP 003 – Adverse Weather Response outlines steps that will be taken in the event of heatwaves, fire bans and thunderstorms.

In the event of an approaching thunderstorm the Blasting Contractor will consult online weather services such as weatherzone.com.au and trusted lightning tracking apps. The Blasting Contractor uses the 30/30 rule as a guide for determining when to evacuate and re-enter:

Lightning 30/30 rule: If it takes less than 30 seconds to hear thunder after seeing the flash, **lightning** is near enough to pose a threat; when the storm ends, wait 30 minutes after the last heard thunder before resuming activities.

When the decision to evacuate is made, the response must be a whole site response as the full exclusion zone for blast firing must be cleared and secured.

If time permits, the MPU must washout hoppers and hoses of sensitised explosives.

The explosive transport vehicle and MPU must be secured and locked a safe distance away from the blast and clear of personnel.

All personnel are to evacuate to a safe position outside of the exclusion zone, and a sentry posted at a safe distance to ensure no one inadvertently enters the area until safe.

Personnel must wait the minimum of 30 minutes after the last heard thunder before re-entering the bench to continue loading, to ensure that no stray lightning strikes are present.

Fire Bans: No blasting will occur during declared Total Fire Ban days unless specific approval is obtained from the relevant authority and additional risk controls are implemented (e.g., fire suppression equipment on-site, emergency response readiness).

Heatwaves: A heatwave is defined as a period of three or more consecutive days with maximum temperatures significantly above the average for the location (typically $\geq 35^{\circ}\text{C}$ in the Riverina region). During heatwaves, blasting activities will be reviewed and may be postponed if conditions increase the risk of spontaneous ignition or compromise worker safety.

Controls: Increased hydration breaks, shaded rest areas, and monitoring of explosives for heat sensitivity will be implemented. If ground or product temperatures exceed safe handling limits specified by the manufacturer, blasting will be suspended.



10 Communications, Blast Clearance and Shot Firing

Clear communications are critical to ensure that all personnel know where the blast is to occur and when they are required to leave the evacuation zone. Blasts shall only be planned on days and times in accordance with Section L4 of the EPL No. 22021

On the day of the blast, the morning pre start meeting will alert site to the approximate time of blasting and where the exclusion zones will be. Personnel will also be notified of who the Blast Controller is. If no blast controller is to be utilised, the shotfirer will assume this role.

Approximately 30 minutes from blast time the blast controller or shotfirer will start the site clearance procedure and blast guards will begin to move into place.

10.1 Blast Clearance Procedure

30 minutes before the blast

1. Blast Controller begins evacuating Blast Area for firing. Whole of site is notified via UHF of upcoming blast.
2. Blast Controller assigns Blast Guards to their respective positions

15 minutes before the blast

3. Blast guards in position.
4. Blast Controller conducts blast clearance drive through, ensuring all personnel have retreated to the allocated safe location

10 minutes before the blast

5. Blast Controller ensures all blast guards are in position, their area is secure and they have blocked the road/s
6. Blast Controller confirms that blast area is clear and secure
7. Shotfirer and other Blasting Contractor personnel retreat to firing position

3 minutes before the blast

8. Blast Controller again confirms site clearance with Shotfirer
9. Blast Controller hands secured site over to Shotfirer
10. Shotfirer begins firing sequence and announces "Firing blast at (Site) in 30 Seconds"
11. Shotfirer sounds 20 second blast siren
12. Shotfirer announces "Firing the blast in 10 seconds"
13. Shotfirer calls "FIRING NOW" and the blast is initiated

Immediately after the blast

15. Shotfirer notifies site "Blast has been fired, All personnel are to remain in position while the blast is inspected";
16. Shotfirer checks blast and if no misfires are found announces "The blast has been inspected and is found to be ALL CLEAR. Handing site back to the Blast controller"



*** In the unlikely event that a misfire is discovered, the shotfirer is to announce to the Blast Controller "A misfire has occurred, All blast guards are to remain in position, keep their areas secure and await further instructions". The Blasting Contractor misfire procedure will then be followed.

17. Shotfirer sounds 3 short bursts of the siren

18. Blast Controller stands down all Blast Guards and resumes the sites activities.

10.2 Record Keeping

The contractor shall maintain comprehensive records for each blast event. These records will include:

- Pre-Blast inspections: documentation of exclusion zone clearance and safety checks.
- Blast design parameters: details of burden, spacing, MIC, initiation sequence, and any adjustments made.
- Monitoring data: airblast overpressure and ground vibration measurements recorded at all monitoring locations.
- Post-Blast inspections: observations of blast outcomes, including any signs of overbreak or flyrock, and corrective actions taken.
- Meteorological conditions: wind speed, wind direction, temperature, and humidity at the time of blasting.
- Hole details: confirmation of depth for each hole and stemming length.
- Predicted vs actual levels: Expected vibration and airblast levels compared to measured results.
- Explosives reconciliation: actual quantities used versus designed quantities.
- Post-Blast inspections: observations of blast outcomes, including any signs of overbreak or flyrock, and corrective actions taken.
- Community notifications: copies of notifications issued to stakeholders and any feedback received.

All records shall be retained in accordance with project document control requirements and made available to the ER, Planning Secretary, and regulators upon request.



Appendix A – Site Specific Details

Site Address:

I2S – Illabo to Stockinbingal Project.

Various cuts and borrow pits as advised.

UHF Channel: As per site inductions.

Key Personnel

Position	Mobile
Principal/Senior Shotfirer	0418 637 071
Principal/Senior Shotfirer	0438 637 071
Project Manager/Shotfirer	0419 929 773

Permits and Licenses Required for the Project

All site permits and licenses are the responsibility of the client. Blasting Contractor will comply with any listed restrictions or requirements.

As per EPL 22021:

Section 55 Protection of the Environment Operations Act 1997

Environment Protection Licence

Licence - 22021

NSW

L4 Blasting

L4.1

When blasting operations occur at the premises, the airblast overpressure level must not exceed 120 dB (lin peak) at any time at the most impacted residence or other sensitive receiver.

L4.2

When blasting operations occur at the premises, the airblast overpressure level must not exceed 115 dB (lin peak) at any impacted residence or other sensitive receiver for more than 5% of the total number of blasts over the course of the project.

L4.3

Blasting associated with the project can only be undertaken during the following hours:
a) 9:00 am and 5:00 pm Monday to Friday;
b) 9:00 am and 1:00 pm Saturdays; and
c) at no time on Sundays or Public Holidays

Blasting works which do not comply with the above conditions may be undertaken following written approval from EPA.

L5 Hours of operation

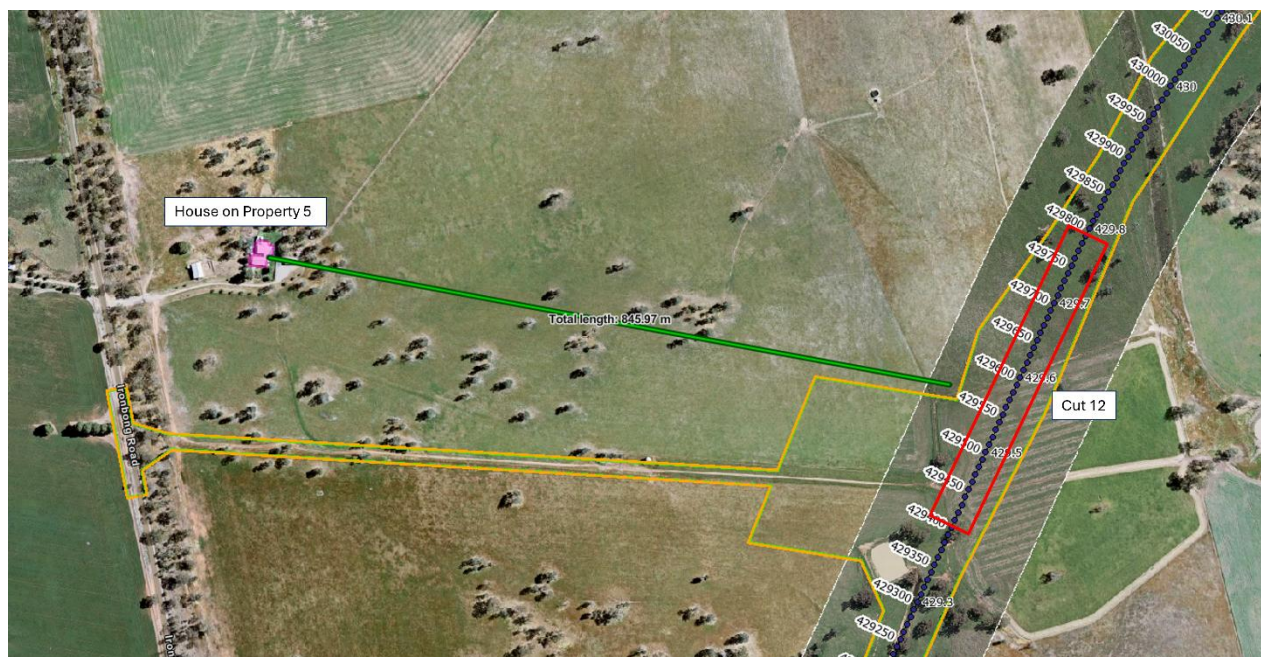
L5.1

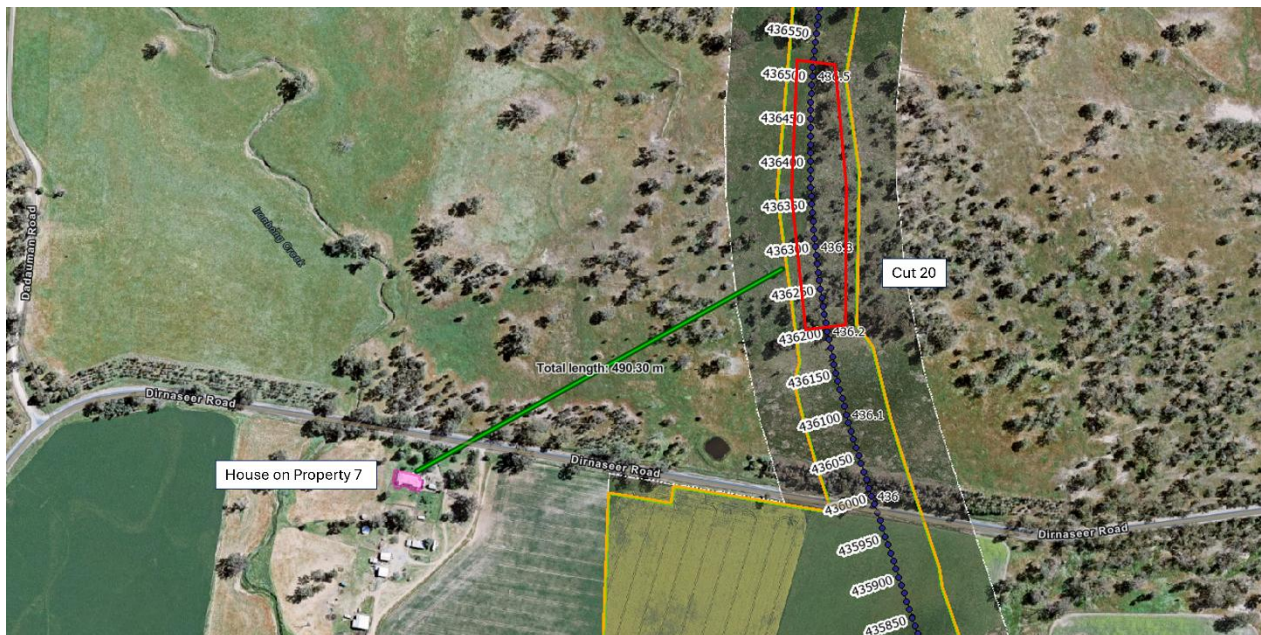
Standard Construction Hours

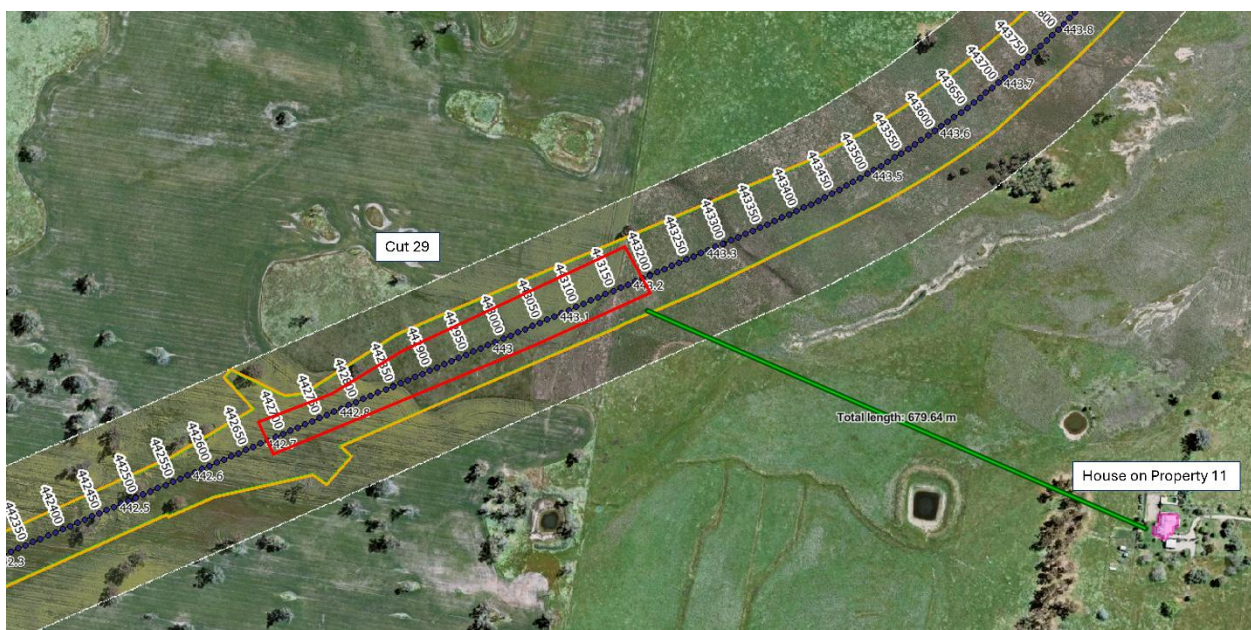
Unless otherwise specified by another condition of this licence, works and activities must only be undertaken during the following hours:
a) 7:00 am to 6:00 pm Mondays to Fridays;
b) 7:00 am to 6:00 pm Saturdays; and
c) at no time on Sundays or public holidays.

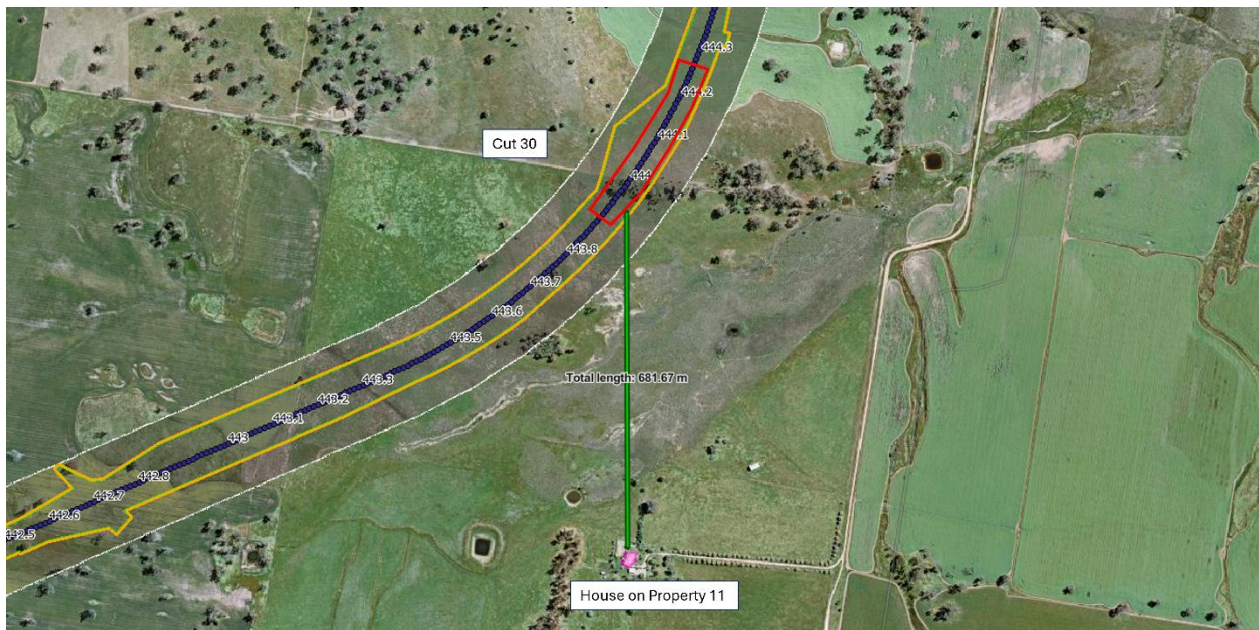
Nearest Sensitive Receivers

Sensitive Receiver Type	Coordinates	Min Distance to Receiver (m)	Associated Blast Site
Residence	X: 574420.77 Y: 6159118.84	846 m	Cut 12
Residence	X: 576227.19 Y: 6164897.48	490 m	Cut 20
Residence	X: 576187.47 Y: 6166151.14	675 m	Cut 23
Residence	X: 576187.47 Y: 6166151.14	1000 m	Cut 24
Residence	X: 576727.32 Y: 6168514.53	1000m	Cut 24
Residence	X: 578742.72 Y: 6170717.82	680m	Cut 29
Residence	X: 578742.72 Y: 6170717.82	682m	Cut 30









Description of Proposed Blasting

Blasting at I2S will utilise predominantly 102mm diameter blast holes, which will be loaded with a bulk emulsion or watergel based explosive, and stemmed at 2.5m or greater. Other diameters may be utilised as changes in geology or licensing constraints dictate to maintain compliance with vibration and overpressure limits. Blast designs will maintain adequate burdens to minimise flyrock, ensuring that all rock remains within the blast exclusion zone footprint.

Initiating explosives utilised will be non-electric detonators.

Predicted vibration will be modelled as final cut designs are determined, in line with maintaining compliance at nearest sensitive receivers.

Minimum exclusion zone distance will be calculated and set on a shot-by-shot basis and will be shown on aerial maps as part of pre blast documentation. Blast guards will be stations at any potential entry sites, with good clear vision across the area. Residents in the immediate vicinity will be notified of the intention to blast via the preferred method of communication by site personnel.

The exclusion zone set will be based on Table 1 of the Worksafe Victoria Guidance Note for Setting Safe Exclusion Zone Distances, which as an example seen below, recommends a safe distance of 100m for a stemming height of 2.3m on a 76mm hole. Exclusion zones for blasting are specified under SafeWork NSW requirements and are generally consistent with the guidance provided by WorkSafe Victoria. The minimum distances will comply with SafeWork NSW requirements and align with industry best practice, including WorkSafe Victoria recommendations.

Clearance zones can be adjusted based on actual design criteria, and site constraints once each blast is marked out.

WorkSafe Victoria Guidance Note for Setting Safe Exclusion Zone Distances

Evacuation distance (m)	Minimum stemming length (m)								
	51mm	76mm	89mm	102mm	114mm	127mm	140mm	152mm	165mm
100	1.4	2.3	2.9	3.7	4.3	4.9	5.6	6.3	7.0
150	1.1	1.9	2.3	2.9	3.5	4.0	4.5	5.1	5.7
200	0.9	1.6	2.0	2.5	3.0	3.4	3.9	4.4	4.9
250	0.8	1.4	1.8	2.2	2.6	3.0	3.4	3.9	4.3

Appendix B – Authorised Employees

Latest version of form 312.1 – *Blasting Contractor Employees Authorised to Handle Explosives* to be supplied and printed, then inserted here.

Blasting Contractor Employees Authorised to Handle Explosives

UNSUPERVISED Handling of Explosives

The employees listed below are authorized to receive, handle and use Explosives UNSUPERVISED on behalf of Blasting Contractor. All required security checks have been completed and appropriate licenses are reviewed regularly to ensure they remain current

DOB	Security Clearance (SC)	Expiry	Blasting Explosives User License (BEUL)	Expiry	Construction Induction #
08/01/1976	UHL204034	11/08/2026	XBLS100491	20/12/2026	CGI00517987SEQ1
20/07/1968	UHL102899	16/09/2026	XBLS100815 (NSW)	04/12/2026	CGI01124250SEQ1
21/06/1979	UHL104485	25/07/2027	XBLS102025(NSW)	15/10/2029	CGI01095892SEQ1
20/02/1962	UHL105765	08/08/2028	XBLS200368	08/08/2028	CGI1234025SEQ1

SUPERVISED Handling of Explosives

Employees authorised to handle Explosives while SUPERVISED by a suitably licensed and authorised person:

Position	Construction Induction #
Driller	CGI00841601SEQ1
Driller	CGI0259024SEQ01
Driller	CGI00843792SEQ1
Driller	875169 (WA)



Appendix C – SWMS

The following relevant SWMS will be printed, signed, and stored in the BMP folder at the main office, as well as securely kept within designated storage compartments on blasting equipment.

- SWMS 001 Transport of Explosives
- SWMS 002 Loading and Firing of Blast
- SWMS 003 Design & Markout of Blast
- SWMS 004 Handling Misfires Effectively
- SWMS 005 Service & Maintenance of Drills
- SWMS 006 Top Hammer Drill Operations

Appendix D – RA011 BMP Explosives and Blasting Related Activities

The following risk assessment is developed to satisfy the requirements of *WHS (Mines and Petroleum Sites) Regulation Schedule 2 Clause 4* and underpins the PHMP for Explosives otherwise known as the Explosives Control Plan.

As a high order level of assessment and control, this risk assessment will apply for the I2S Project as well.

(1) An explosives control plan must set out the control measures **for risks to health and safety** associated with explosives at the mine or petroleum site taking into account:

Applicable Subclause	RISKS	Potential Sources of risk	CONTROLS	References
(a) the potential for unintended or uncontrolled detonation of explosives,	• Fatality • Severe Injury • Damage to property/plant • Environmental exceedences • Flyrock • Geological Failure (highwall collapse)	• Premature detonation of explosives • Geological Failure (Highwall Collapse) • Fire • Misfire • Vehicle Impact • Snap Slap Shoot • Lightning strike • Excessive Impact • Hot or reactive ground • Excavation into unidentified Misfire • Inability to evacuate safely in emergency situation – lack of escape route • Failure to identify deteriorated explosives • Incompatible Chemicals	• Experienced personnel • Explosives handling and application training • Emergency Procedures • Traffic Management Plan • Removal of ignition sources • Severe weather evacuation procedures • Appropriate explosives selection • Reactive ground procedure (AEISG) • Transport procedures • Misfire identification and handling methods • Supervision • SDS and TDS	• SWMS 001 Transport of Explosives • SWMS 002 – Loading and firing of blasts • SWMS 004 – Handling Misfires Effectively • Blast Management Plan • Explosive SOP's
(b) the characteristics of relevant explosives and the purposes for which they are to be used,	• Premature or unintended detonation • Misfire • Inappropriate explosives • Chemical Exposure • Damage to property plant	• Inappropriate selection of explosives • Incorrect application	• Experienced personnel • Explosives handling and application training • SDS and recommended PPE • Bulk explosives supplier procedures • Explosive procurement and selection process	• SWMS 001 Transport of Explosives • SWMS 002 – Loading and firing of blasts • SWMS 004 – Handling Misfires Effectively • Blast Management Plan

Applicable Subclause	RISKS	Potential Sources of risk	CONTROLS	References
(c) the characteristics of the places in which the explosives are to be used,	• Highwall instability • Impact from rockfall • Entrapment • Environmental exceedances	• Poor bench Prep • Unidentified face instability • Proximity to highwall • Geological failure	• Pre work inspections • Site geological management • Bench prep approval prior to markout • Blast design calculations • Spotter	SWMS 003 – Blast design and markout
(d) the full set of phases for the use of relevant explosives such as the charging and firing phases,	• Fatality • Product failure • Misfire • Premature detonation	• Incorrect manufacturing process • Deteriorated, unsuitable or incompatible raw materials • Plant failure • Inadequate or poor maintenance • Vehicle breakdown or fire	• Experienced Personnel • Explosives handling and application training • Supplier QA/QC checks and guarantees • Plant failure and breakdown procedures • Emergency procedures (as per EPG for products) • Maintenance of Fire Fighting Equipment • plant and equipment maintenance procedures	• SWMS 001 Transport of Explosives • SWMS 002 – Loading and firing of blasts • SWMS 004 – Handling Misfires Effectively • Blast Management Plan • Supplier plant and maintenance procedures
(e) the potential for explosives to deteriorate,	• Premature deterioration • Failure to detonate • Unstable product • Unplanned detonation	• Out of date explosives • Inappropriate storage of explosives • Poor or unsuitable raw materials • Failure to identify and/or notify of substandard product • Vehicle impact	• DOM checks prior to use • Magazine Audits • Manufacturers QA/QC checks at manufacture • Inspections before use for condition of product • Manufacturer alerts and recall notifications	• SWMS 001 Transport of Explosives • SWMS 002 – Loading and firing of blasts • SWMS 004 – Handling Misfires Effectively • Blast Management Plan
(f) the potential for the theft or misuse of explosives,	• Fatality • Damage to plant or property • Acts of terrorism	• Unauthorised access • Unlicensed or unsuitable persons • Failure to secure explosives • Vehicle accident	• Explosives Security Plan • Delineation, Signage, Sentry • Security Clearance, ASIO Checks • Security Measures – Locks, magazines • Transport Procedures • Restriction of access to unauthorised personnel when unsupervised	• SWMS 001 Transport of Explosives • SWMS 002 – Loading and firing of blasts • SWMS 004 – Handling Misfires Effectively • Blast Management Plan



Applicable Subclause	RISKS	Potential Sources of risk	CONTROLS	References
(g) the potential for the ejection of fly rock or other material as a result of the detonation of an explosive.	• Fatality • Severe Injury • Plant damage	• Inadequate rock burdens • Overloaded holes • Inadequate stemming • Incorrect firing sequence • Broken ground/previously blasted ground	• Design checks and calculations – patterns, stemming, face burden appropriate to bench conditions and rock type • On bench practices – product removal from overloaded holes, stemming checks, appropriate face burdens • Removal of personnel and plant to safe distance	

(2) An explosives control plan must also set out the following:

Applicable Subclause	Documents Referenced
(a) the procedures for inspecting, reporting, isolating and disposing of deteriorated or damaged explosives,	Blast Management Plan – Section 7 – Destruction of Explosives
(b) the procedures for finding, recovering and disposal of explosives that misfire,	SWMS 004 – Handling Misfires effectively
(c) the inspection, testing, reporting and maintenance procedures in relation to the equipment used at the mine or petroleum site for manufacturing, storing, transporting and delivering explosives,	- Bulk Explosives Supplier Procedures - Blasting Contractor's Transport Of Explosives Procedures
(d) the procedures and equipment used in storing and transporting explosives at the mine or petroleum site,	- No explosives stored on any Blasting Contractor's Serviced sites - Blasting Contractor offsite magazine and transportation procedures
(e) the procedures used for the accounting of explosives at the mine or petroleum site,	- SWMS 001 – Transportation of Explosives - SWMS 002 - Loading and firing of Blasts
(f) the arrangements for the keeping of a register identifying persons who are licensed under the <i>Explosives Act 2003</i> to transport, use, store or handle explosives at the mine or petroleum site,	- Blast Management Strategy– Section 7 – Authorised Employees - Form 312.1 – Employees Authorised to Handle Explosives
(g) the procedures for ensuring that any person transporting, using, storing or handling explosives at the mine or petroleum site has any licence necessary under the <i>Explosives Act 2003</i> ,	- Blast Management Strategy – Section 6 – Authorised Employees - Form 312.1 – Employees Authorised to Handle Explosives
(h) the procedures in relation to consultation and co-operation to ensure that any transportation, use, storage or handling of explosives at the mine or petroleum site is conducted safely and in accordance with any conditions attached to the licence under which that transportation, use, storage or handling takes place.	- Blast Management Plan - Bulk Explosives supplier procedures and safety management plans.

(3) In this clause:

explosives includes explosive precursors.

Appendix E – Emergency Procedure Guide

	EMERGENCY PROCEDURE GUIDE	
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TRANSPORT EXPLOSIVES CLASS 1

This Emergency Procedure Guide, with all details completed below, must be carried at all times when transporting explosives and/or dangerous goods.

	Authorised Product Name:	UN Number	Classification Code	HazChem Code
	RIONEL LLE, LP-UG, MS, MS-UG, SCE, RIONEL LOADED DETONATORS, RIOBOOSTER, RIOBOOSTER PLUS, RIOCORD, RIOFLEX GX, RIOFLEX MX, RIOFLEX Rapid, RIOGEL TRONER, RIOPRIME 25, RIOSPLIT, RIOSHOCK Tube, RIOXAM & SINDET		1.1/1.4	E
	Non-MAXAM products – AXIS GII Electronic Det, ANFO, Blast-Tech Booster, Daveytronic SP Electronic Det, EZICORD, Megadrive, Megagel, Megasplit, Primacord, , Trojan Ringprime Boosters, Trojan Spartan Boosters.			
	Proper Shipping Names:			
	DETONATOR, NON-ELECTRIC, for blasting	0029		
	DETONATOR, ELECTRIC, for blasting	0030		
	BOOSTERS without detonator	0042		
	CORD, DETONATING, flexible	0065		
	EXPLOSIVE BLASTING, TYPE B	0082		
	EXPLOSIVE BLASTING, TYPE E	0241		
	DETONATOR, ELECTRIC, for blasting	0255		
	DETONATOR ASSEMBLIES, NON-ELECTRIC, for blasting	0360		
	DETONATOR ASSEMBLIES, NON-ELECTRIC, for blasting	0361		
	DETONATOR, ELECTRIC, for blasting	0456		
	DETONATOR, NON-ELECTRIC, for blasting	0500		

EMERGENCY CONTACTS EMERGENCY RESPONSE SERVICE: DIAL 1800 833 111 EMERGENCY SERVICES: DIAL 000			
Organisation	Location	Telephone	Point of Contact
MAXAM Australia Pty Ltd. Business Hours Contact Number	Brisbane Queensland	07 3717 1818 1800 657 072	HSS Manager
MAXAM Australia Pty Ltd. 24 Hour Emergency Response	Australia	1800 833 111	HSS Manager

HAZARDS	
FIRE	- When subjected to heat, shock or friction, explosives of division 1.1 or 1.5 will burn and may detonate IN A MASS EXPLOSION at any time. - Fire may produce irritating, toxic, and/or corrosive gases.
HEALTH	These substances may be toxic and corrosive.
OTHER	Nil.

EVACUATION	
IMMEDIATELY CONTACT POLICE OR FIRE BRIGADE. - Advise Emergency Services that 'Security Sensitive Explosive substances are involved in the incident'. - Evacuation distance in all directions based on transport NEQ	
NEQ on Transport	Evacuation distance
Up to 1000 kg	400m
1000 kg and up to 5000 kg	600m
5000 kg and up to 20,000 kg	1000m
20,000 kg and greater	1600m
- Use terrain or buildings for shielding. - Stay clear of windows.	

Prepared in accordance with the Australian dangerous goods code for land transportation of dangerous goods, "The Australian Dangerous Goods Code".

C&L-P01-G01 Emergency Procedure Guide – Class 1 Explosives	Uncontrolled if Printed or Saved	Revision: 10
	Page 1 of 2	Issue Date: 19/04/2017

	EMERGENCY PROCEDURE GUIDE	
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FIRST AID
- Obtain immediate medical care – Ensure that attending medical personnel are aware of identity and nature of product(s) involved, and take precautions to protect themselves. - Remove contaminated clothing and shoes immediately. - In case of contact with material, immediately flush skin or eyes with running water for at least 15mins.

EMERGENCY PROCEDURES	
IF THIS HAPPENS	DO THIS
Spill or Leak	- ELIMATE all ignition sources (no smoking, flares, sparks or flame) within at least 20m. - All equipment used when handling the product must be earthed. - Do not touch or walk through spilled material. - Do not touch damaged containers, packages or spilled material unless wearing appropriate protective clothing. - DO NOT OPERATE RADIO TRANSMITTERS WITHIN 100m OF ELECTRIC DETONATORS. - Seek Advice using the Emergency contact details on page 1.
Vehicle Accident	- Contact Emergency services. - Do not move vehicle if causes spillage. - Do not disentangle or move accident vehicles without specialist advice. - Maintain security of Explosives if storage is damaged/compromised.
Cargo Fire	- Do not fight fire when fire reaches cargo. Cargo may EXPLODE. - Contact Police by telephone or messenger. Tell them location, material in load and quantity. - Stop and divert all traffic and clear the area of people in all directions as directed above in "Evacuation" information. - Allow the cargo to burn and keep the area isolated for at least one hour after all fire and explosions have ceased.
Engine/Cabin fire	- Shut off engine and any electrical equipment and leave off. - Remove burning materials if safe to do so. - Use fire extinguisher provided in vehicle. Direct contents through any available opening without raising the bonnet if possible. - If necessary, extinguish the fire with sand, earth or large amounts of water. - If fire cannot be contained, treat as cargo fire.
Tyre Fire	- Stop vehicle - access fire in relation to load and its hazards. - Flood tyre with plenty of water – if water is not available, use fire extinguisher provided in vehicle, earth or sand. - If safe to do so, change tyre and place at least 15m away from vehicle in an area clear of combustible materials: tyre may reignite – stand by and have an extinguisher ready. - If fire cannot be contained, treat as cargo fire.
Brake Overheating	- Stop vehicle. Assess fire, if any, in relation to load and its hazards. - Allow brake to cool. - Use extinguisher or water only if there is a fire or immediate threat of fire. - Do not drive vehicle until the brakes have been inspected by a competent person and, if necessary, repaired.

IN ALL CASES, NOTIFY THE AUTHORITIES

*Prepared in accordance with the
Australian dangerous goods code for land transportation of dangerous goods, "The Australian Dangerous Goods Code".*

C&L-P01-G01 Emergency Procedure Guide – Class 1 Explosives	Uncontrolled if Printed or Saved	Revision: 10
	Page 2 of 2	Issue Date: 19/04/2017



Appendix F – Utility Assets Maps



ILLABO TO STOCKINBINGAL Cut 12 CH429,400-CH429,800

Coordinate System: GDA2020 MGA Zone 55

This data is provided for information purpose only. As this GIS pl has bee prepared for material provided to IR by an external source, IR cannot and does not attest to its completeness accuracy or suitability. While every care is taken to ensure the accuracy of the data, IR makes no representation or warranty and assumes no duty of care or other responsibility as to the completeness, accuracy or suitability of the information contained I this GIS plan. IR will not be responsible for any loss or damage suffered as a result of any person whosoever placing reliance upon the information contained within this GIS plan.



Blasting Area



Watermain (approx. 1km away)

INLAND
RAIL

Utility Assets
Illabo to Stockinbingal

JOHN
HOLLAND



ILLABO TO STOCKINBINGAL Cut 13 CH430,260-CH430,440

Coordinate System: GDA2020 MGA Zone 55

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Blasting Area

INLAND
RAIL

Utility Assets
Illabo to Stockinbingal

JOHN
HOLLAND



ILLABO TO STOCKINBINGAL Cut 15 CH431,366-CH431,600

Coordinate System: GDA2020 MGA Zone 55

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Blasting Area

INLAND
RAIL

Utility Assets
Illabo to Stockinbingal

JOHN
HOLLAND



ILLABO TO STOCKINBINGAL Cut 16 CH433,060-CH433,340

Coordinate System: GDA2020 MGA Zone 55

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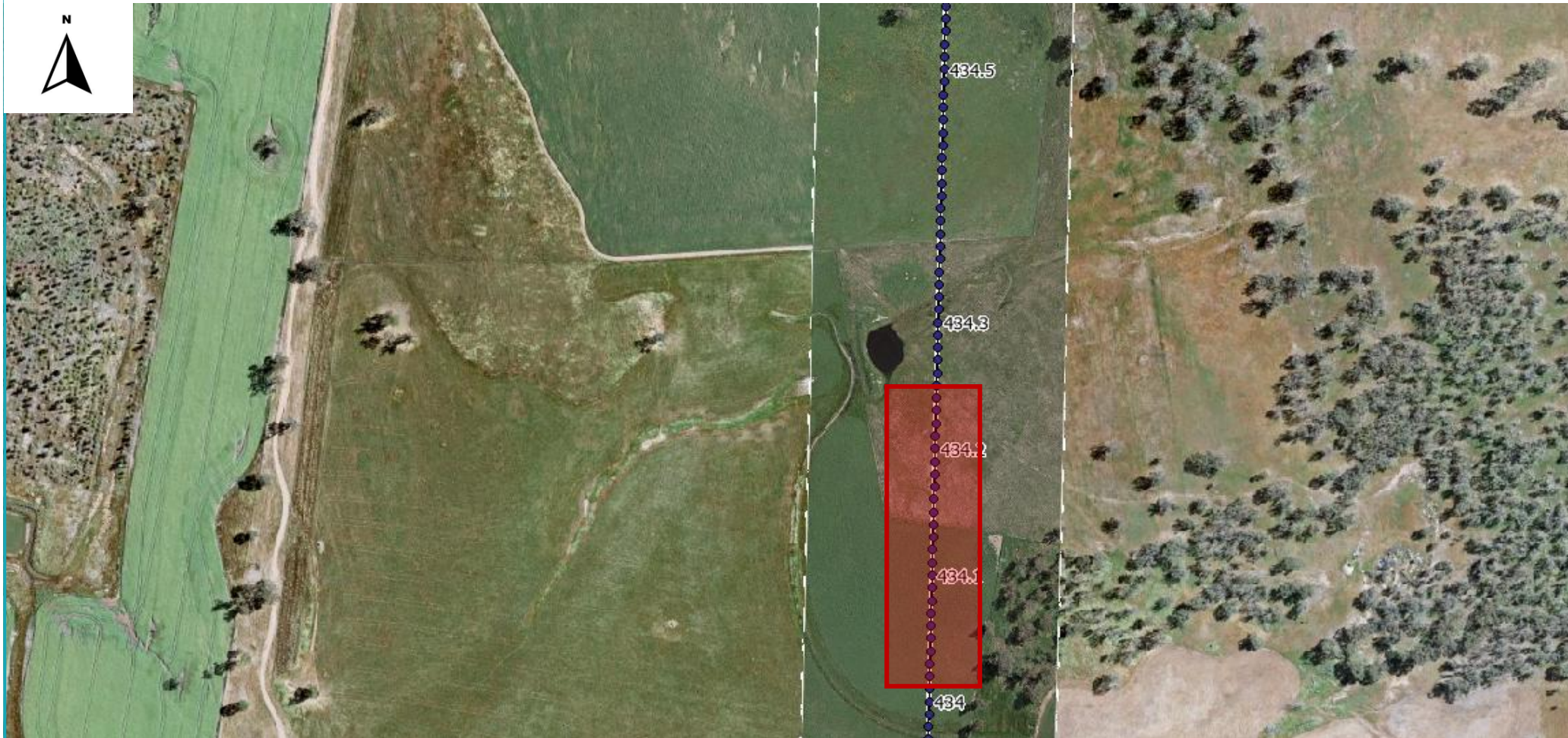
Blasting Area



Telstra (approx. 90m)



Irrigation (approx. 110m)



INLAND
RAIL

Illabo to Stockinbingal

JOHN
HOLLAND

ILLABO TO STOCKINBINGAL Cut 18 CH434,010-CH434,250

Coordinate System: GDA2020 MGA Zone 55

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Blasting Area



ILLABO TO STOCKINBINGAL Cut 19 CH434,510-CH434,710

Coordinate System: GDA2020 MGA Zone 55

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Blasting Area



Telstra (approx. 860m)



ILLABO TO STOCKINBINGAL Cut 20 CH436,208-CH436,510

Coordinate System: GDA2020 MGA Zone 55

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Blasting Area



Telstra (approx. 700m)

INLAND
RAIL

Utility Assets
Illabo to Stockinbingal

JOHN
HOLLAND



ILLABO TO STOCKINBINGAL Cut 23 CH437,745-CH437,900

Coordinate System: GDA2020 MGA Zone 55

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Blasting Area



Telstra (approx. 630m)



HV Overheads (approx. 535m)



ILLABO TO STOCKINBINGAL Cut 24 CH438,230-CH438,733

Coordinate System: GDA2020 MGA Zone 55

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Blasting Area



Telstra (approx. 380m)



HV Overheads (approx. 680m)

INLAND
RAIL

Utility Assets
Illabo to Stockinbingal

JOHN
HOLLAND



ILLABO TO STOCKINBINGAL Cut 29 CH442,698-CH443,195

Coordinate System: GDA2020 MGA Zone 55

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Blasting Area



Watermain (approx. 1,30km away)

INLAND
RAIL

Utility Assets
Illabo to Stockinbingal

JOHN
HOLLAND



ILLABO TO STOCKINBINGAL Cut 30 CH44,955-CH444,247

Coordinate System: GDA2020 MGA Zone 55

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Blasting Area



Watermain (approx. 600m away)



Appendix G – Blast Management Plan



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5-0019-220-PMA-00-PL-0076_A

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Mittagong NSW 2575

Paul 0418 637 071

Martyn 0438 637 071

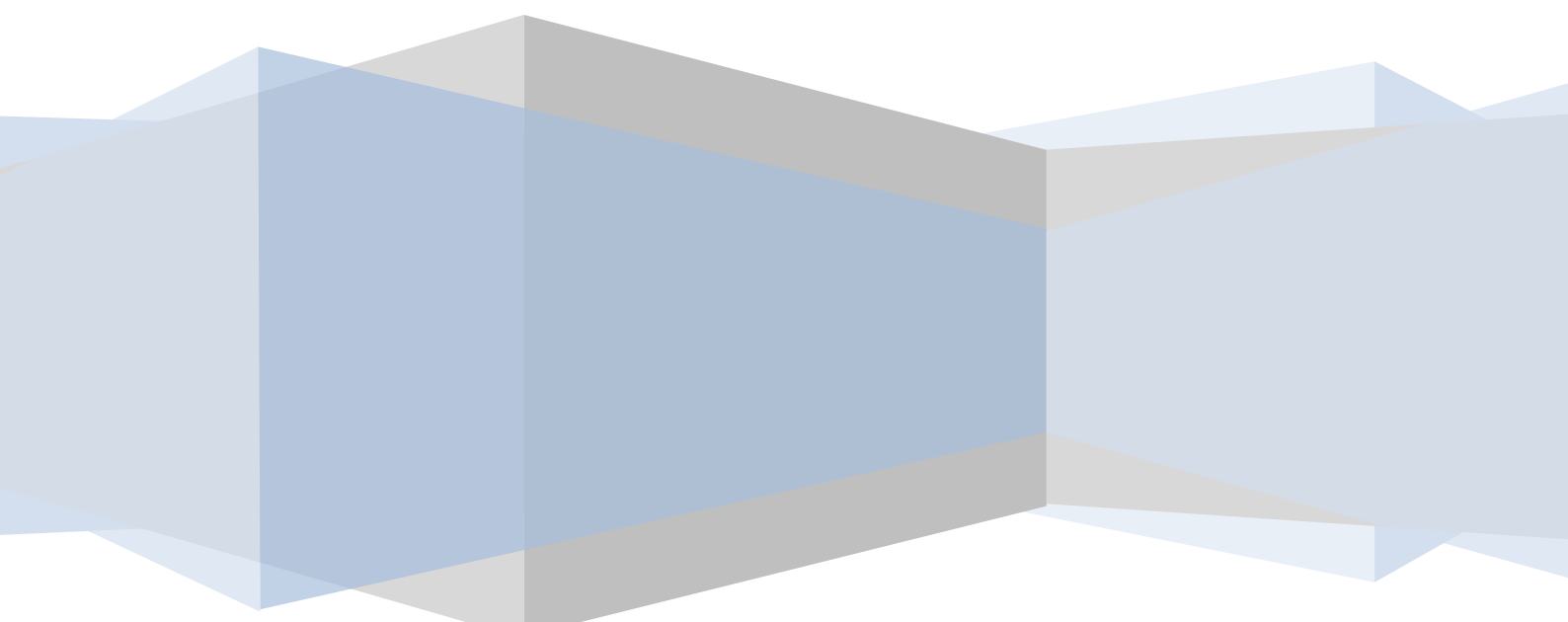
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www.precisiondb.com.au

Blast Management Plan

PROJECT: I2S – Illabo to Stockinbingal

August 2025



Commercial In Confidence - Unauthorised publication creates unnecessary security risk

BLAST MANAGEMENT PLAN

Document Control

Rev	Details	Date Issued	Changes	Authorised By	Signature
3.7	Complete review	Aug 25	Project Specific Updates	M.Bracher	

Disclaimer:

Precision Drill and Blast Pty Ltd takes all reasonable efforts to ensure an accurate understanding of client requirements. The information contained in this report is as accurate and up-to-date as possible based on this understanding. Precision Drill and Blast Pty Ltd accepts no liability to any person for any injury, loss or damage resulting from the use of or reliance upon the information contained in this report or for any injury, loss or damage resulting from the omission of any information in this report. No expressed or implied warranties are given other than those implied mandatory by territory legislation.

Contents

1. PURPOSE.....	4
2. SCOPE	4
3. REFERENCES.....	4
4. DEFINITIONS.....	5
5. HAZARDS AND RISKS	6
5.1 Explosive and Explosive Precursor Hazards	6
5.2 Storage of explosives	8
5.3 Security of Explosives	8
6. RESPONSIBILITIES.....	9
Project Manager.....	9
Shot Firer.....	9
Personnel Assisting Shot Firers:	9
7. PROCEDURES	10
7.1 Authorised Employees	10
Validation of Licenses	10
7.2 Explosive Transport, Handling and Use Procedures	10
8. Blast Vibration and Overpressure Monitoring	11
9. Flyrock Management.....	12
Causes of Fly Rock	12
Precautions To Take	12
10 Emergency Response.....	13
10.1 Fire Emergency	13
10.2 Adverse Weather, Lightning and Thunderstorms	14
11 Communications, Blast Clearance and Shot Firing	15
11.1 Blast Clearance Procedure	15
Appendix 1 – Site Specific Details.....	17
Appendix 2 – Authorised Employees	21
Appendix 3 – SWMS.....	22
Appendix 4 - RA011 BMP Explosives And Blasting Related Activities	23
4 Explosives control plan.....	23
Appendix 5 – Emergency Procedure Guide	28
Appendix 6 – AS2187.2 – 2006 BMP Content Map	30

1. PURPOSE

The use, storage, manufacture, security and transportation of explosives on sites are high risk activities.

The blast management plan systematically outlines the process followed for activities undertaken by the Precision Drill and Blast team in the conduct of drilling and blasting tasks to ensure conformance with legislative requirements while meeting community expectations

2. SCOPE

As PDB operates across various sites, the overall blast management plan outlines the common steps followed in order to achieve safe blasting outcomes. Project and Site specific details, restrictions and conditions can be found in the Appendices

Applicable sections of this management plan are to be read in conjunction with PDB procedures that apply to the Drill and Blast Team members employed on the above mentioned site, with respect to each employee role and responsibilities.

3. REFERENCES

- AS 2187.0-2006 – Explosives – Storage, Transport and Use, Part 0: Terminology
- AS 2187.1-2006 – Explosives – Storage, Transport and Use, Part 1: Storage
- AS 2187.2-2006 – Explosives – Storage, Transport and Use, Part 2: Use of Explosives
- Explosives Act 2003
- Explosives Regulation 2024
- Australian Explosives Code
- Work Health & Safety (Mines and Petroleum Sites) Act 2014
- Work Health & Safety (Mines and Petroleum Sites) Regulations 2014
- AS4326 The storage and handling of oxidising Agents
- Work Health and Safety Act 2011
- Work Health and Safety Regulation 2017

4. DEFINITIONS

Explosive:	Explosive and explosive precursor have the same meanings that they have in the <i>Explosives Act 2003</i> which means any article or substance prescribed by the regulations as an explosive.
Blast:	Any explosive charge or shot, regardless of size or number.
Burden:	Distance between blast rows, or in case of front burden the distance between the face of the blast and the front row of holes.
Charge:	Explosive or blasting agent, or both, placed in a blast hole or other position for the purpose of producing an explosion.
Flyrock:	Flying rock or other material projected from a blast <u>beyond</u> the nominated exclusion zone
Blast Rock	Rock or other material projected from a blast that remains <u>within</u> the nominated exclusion zone.
Nonel:	Non-electric signal tube type delay detonator.
Responsible Shot Firer:	The Shot Firer who has the responsibility for the blast or shot being undertaken.
Shot Firer:	A person, over the age of 18, who has been trained and/or certified by Safework NSW and / or mines department as being able to design, supervise and undertake explosive work.
Spacing:	Distance between blast holes within a row.
Subdrill:	Length of drilling and charge which lies beneath the required grade level.
Type 1 Blast:	Normal Production or Presplit Blast
Type 2 Blast:	Toe, boulder or other Secondary Blast
Misfire	The complete or partial failure of an explosive to explode as planned

5. HAZARDS AND RISKS

All Hazards and Risks are managed in line with the **PDB WHSMP - Section 3.4 – Hazard Identification And Managing Risk**. All PDB personnel are to be consulted in the risk assessment process.

Activities related to the use, storage, manufacture, security and transportation of explosives and explosives precursors on all sites are high risk activities and are subject to specific work risk assessments reviewed constantly within the site specific SWMS.

SWMS are reviewed on a job by job basis and updated to reflect identified risks and their control methods employed for that site. Hazards are to be classified utilising the Risk Matrix (figure 1). Suitable controls are to be determined and implemented using the hierarchy of control that effectively manages the levels of risk to as low as practicably possible.

		LIKELIHOOD				
Risk Analysis $R = C \times L$		5 Almost Certain Almost certain to happen i.e. could occur daily or more frequently	4 Likely Could happen anytime i.e. could occur weekly or longer	3 Possible Could happen sometime i.e. could occur monthly or longer	2 Unlikely Could happen i.e. could occur yearly or longer	1 Rarely Could happen but probably never will i.e. occur once each 10 years or longer
CONSEQUENCE	5 Catastrophic Kill or cause permanent disability or ill health	25 Class 1 / H	20 Class 1 / H	15 Class 1 / H	10 Class 2 / M	5 Class 3 / L
	4 Serious Serious injury or long term illness also includes a Lost Time Injury	20 Class 1 / H	16 Class 1 / H	12 Class 2 / M	8 Class 2 / M	4 Class 3 / L
	3 Moderate Medical Treatment Injury or illness	15 Class 1 / H	12 Class 2 / M	9 Class 2 / M	6 Class 2 / M	3 Class 3 / L
	2 Minor First aid needed	10 Class 2 / M	8 Class 2 / M	6 Class 2 / M	4 Class 3 / L	2 Class 3 / L
	1 Insignificant No injury	5 Class 3 / L	4 Class 3 / L	3 Class 3 / L	2 Class 3 / L	1 Class 3 / L

Figure 1 – Risk Matrix

Eliminate	Where the condition or hazard is completely removed by removing the process or source
Substitution	Where the risk is removed and replaced with another method, device, operation. (The replacement must also be analysed!)
Isolation	Isolation by creating a mechanical barrier or other method to prevent the hazard from impacting on personnel, property, or the environment.
Engineering Control	A physical barrier or lockout system is introduced to control the risk by isolation
Administration	Providing procedures, instructions, training, signs
PPE	Where personnel are required to wear equipment to protect themselves from personal injury, or the environment is protected by having emergency equipment devices or spill kits on standby

Figure 2 – Hierarchy of Control.

Individual SWMS will be reviewed and signed on to by each person carrying out the prescribed tasks and stored with this BMP under **Appendix 3 - SWMS**.

5.1 Explosive and Explosive Precursor Hazards

The use of explosives to break rock involves the sudden application and release of large amounts of energy, and is therefore a process requiring the effective management and control of activities to ensure that hazards are identified and appropriately controlled. On a mine, quarry or construction site, the potential hazards are increased by the need to handle sensitive

initiating explosives while working in a harsh environment and sometimes within close proximity to plant, infrastructure and other workers.

The blasting process will be managed in a way that minimises the risks associated with the transport, use, manufacture and security of explosives, especially in relation to the catastrophic consequence of unplanned detonation of explosives, and uncontrolled blast behaviour at time of firing. These are specifically addressed within individual SWMS and risk assessments.

In considering the safety of site personnel, contractors and the general public, hazards associated with blasting include, but are not limited to, the following;

- Loss or theft of explosives from a transport vehicle while transporting to or from the mine / quarry site, representing a security risk
- Terrorist threat
- Unplanned detonation of explosives due to incorrect handling or application, or during transportation
- Unplanned detonation during placement due to impacts associated with operating equipment (e.g. MPU or LV on bench, drill and excavators in adjacent areas); impact from passing equipment; or snap-slap-shoot risks from passing equipment;
- Unplanned detonation of explosives after placement, from an external source of initiation such as hot or reactive ground or lightning;
- Unplanned detonation of explosives due to the application of electrical energy for testing or firing of electronic initiation systems, e.g. following undetected damage by lightning;
- Unintended or uncontrolled detonation or underperformance of explosives due to deterioration beyond manufacturers recommended shelf life of explosives
- Flyrock risks to persons, equipment and infrastructure, outside the blast exclusion zone, generated by an inadequately confined blast, within a blast exclusion zone that has not adequately been cleared prior to firing or an exclusion zone inadequately determined based on ground conditions;
- Environmental compliance risk (overpressure and ground vibration) associated with overloaded blast holes, large (reinforcing) blasts, and unfavourable meteorological conditions;
- Persons at risk from dust and fumes generated by the blast, outside the blast exclusion zone or potentially outside the site boundary;
- Persons at risk from misfired blastholes, particularly during subsequent excavation or redrilling of the blast area.

These risks are necessarily generic in order to remain applicable across a broad range of applications, using a variety of explosives products with varying properties suitable to each task, to achieve different blasting outcomes. It is understood that specific blast practices and applications vary significantly across open cut coal and metal mines, quarries and construction sites, therefore a review of specific risks and appropriate controls will occur first before work commences via the review of the site specific SWMS and then continuously reviewed on a daily, blast by blast basis and be recorded on the daily pre start blast risk assessment. Ongoing risks identified in the daily pre start will be reflected in future reviews of the SWMS

Specific controls for a range of risks associated with PDB activities can be found in the applicable SWMS for the task being carried out. A roadmap for more specific hazards and risks can be found in ***RA011 BMP Explosives And Blasting Related Activities*** which is to be continuously updated and included in **Appendix 4** of this BMP.

The SWMS and applicable procedures are continuously reviewed, improved and updated as more effective controls are identified and implemented.

5.2 Storage of explosives

Due to the security risks and hazards associated with storage of explosives at active sites, PDB maintains its own off site storage magazines in secure locations as registered, approved and licensed with Safework NSW. Details of these facilities are not publicly available to maintain their ongoing security. Operations of these facilities are in line with PDB's Explosives Management Plan which is an internal secure document not publicly available.

Storage of explosives is not planned to occur on any sites serviced by PDB and will be transported to and from site as required on a blast by blast basis to reduce risk for clients.

In the event of a shot needing to be slept, or explosives stores stored on site a specific risk assessment will be undertaken and suitable controls put in place, such as the potential need for overnight supervision of explosives by a suitably qualified person such as a security guard.

5.3 Security of Explosives

Security of explosives will be maintained at all times, both in transit and whilst on site. The mobile magazine vehicle will be locked when personnel are not accessing product.

Reconciliations of product will occur before firing to ensure that counts match what has been consumed during the days activities.

Any product that cannot be accounted for will be fully investigated as well as reported both to the regulator and to the police as per legislation.

6. RESPONSIBILITIES

Project Manager

Ensure adequate resources are available to ensure the implementation of this Blast Management Plan

Induct PDB personnel into the site safety management system and provide support in ensuring ongoing adherence to its requirements.

Ensure resident notifications as required are carried out in the time frame stipulated within any conditions of approval

Advise PDB of any changes to conditions of approval

Ensure any exceedances of monitoring criteria are reported in line with management plan and approval conditions

Shot Firer

The Shot Firer employed at the Site must ensure all blasting activities are compliant with the requirements of this Blast Management Plan.

Ensure all blast parameters are reviewed prior to shot loading commencement and are adhered to as outlined in the design

Supervise and instruct all personnel on the shot as to the safe handling and use of explosives

Maintain supervision of personnel without suitable security licenses ensuring they are always with line of sight of a licensed person while explosives are being used.

Account for all explosives usage and ensure the security of explosives on bench enforcing that all personnel having unsupervised access to explosives are licensed with a valid Security Clearance

Prevent unauthorised access to explosives and the blast area, remaining vigilant to other activities and personnel/plant movement within the immediate vicinity

Ensure exclusion zone is clear prior to firing

Fire the blast in a safe manner

Thoroughly inspect blast after firing and ensure all explosives have detonated before handing the site back to the client

Personnel Assisting Shot Firers:

Personnel assisting shotfirers will be made aware of the shot specific risks and hazards as well as receive instruction on the safe handling of explosives before commencing work. Assistants are to sign on to the Pre Start meeting form as a record of receiving this instruction.

Ongoing training will be provided in the form of supervised on bench guidance and mentoring until the assistant is deemed competent. Assistants are to follow all reasonable instructions provided by the shotfirer.

If unsure of anything on bench, assistants are to stop work and ask for clarification from the shotfirer before proceeding.

Assistants without a current security clearance license have a duty of care to ensure that they are not left unsupervised (in line of sight of a licensed person) whilst having access to unsecured explosives.

7. PROCEDURES

7.1 Authorised Employees

All PDB employees are inducted in the understanding and application of the company Work Health and Safety Management System and Blast Management Plan as well as company procedures and SWMS. These inductions are updated on a regular basis, usually following a major revision of the plans as well as when commencing works on a new site.

Employees that are authorised by PDB Management to Shotfire on their behalf, to have unsupervised access to, receive on behalf of or are required to handle explosives will be documented in the form **312.1 – PDB Employees Authorised to Handle Explosives** and will be updated regularly or as employee circumstances change. When this document is revised, it is to be printed and stored under [Appendix 2 – Authorised Employees](#).

The Authorised employee list is to be reviewed and updated at least every 12 months.

No one under the age of 18 years will be allowed access to explosives unsupervised.

Minimum age for explosive transport vehicle drivers is 21 years

If anyone is on a shot without a valid security clearance, then they are to be supervised at all times while having access to any security sensitive items. Supervised means that they remain in the immediate vicinity of and **in line of sight** of an authorised and licensed employee at all times.

(Handling includes the activities of conveying, manufacturing, processing, possessing, using, preparing for use, treating, dispensing, storing, packing, selling, supplying, importing into the state from another country, rendering harmless, abandoning, destroying and disposing)

Validation of Licenses

Personnel are to carry all personal explosives licenses such as Blasting Explosives User License (BEUL) and Security Clearance (SC) on them at all times to meet legislative requirements. This means that they must be available to produce upon request if demanded by a police officer or an inspector. As a minimum they must remain with their personal belongings whilst on bench.

If any BEUL or SC have limiting conditions placed on them, it is expected that the license holder will adhere to any conditions and make PDB managers aware so that compliance can be maintained.

Company explosives licenses, such as License to transport and license to store are readily available to be sent electronically from the office within the required 48 hours after the request.

7.2 Explosive Transport, Handling and Use Procedures

All transport, handling and use of explosives on site will be carried out in accordance with specific PDB procedures. Details of explosives use procedures are not listed within this BMP due to the security sensitive nature of these activities.

Security of explosives is the highest of priorities behind development of all procedures. All personnel will ensure that explosives that are not to be used immediately will remain securely locked within the mobile magazines (transport vehicle). Stock balances will be verified against explosives loaded each day to ensure all items used are accounted for.

In order to reduce exposure to risks associated with the manufacture of explosives, PDB utilises specialist suppliers of bulk explosives. The relevant procedures, SWMS and risk assessment are not specifically referenced here as they will be supplied as required on a site by site basis from suppliers as needed.

8. Blast Vibration and Overpressure Monitoring

Project-specific monitoring locations, including associated blast cuts and distances, are detailed in the Blast Management Strategy (refer Table 7-3 and Appendix A). These locations will be reviewed and confirmed as part of the pre-blast planning process.

Monitoring requirements and locations will be refined following the trial blast, with site-specific vibration parameters adopted for subsequent blast design and compliance verification.

Recommended vibration and airblast/overpressure limits are generally based on international standards for human comfort and structural building damage. Ground vibration and airblast levels which cause human discomfort are generally much lower than the recommended structural damage limits. Therefore, compliance with the lowest applicable human comfort criteria at residences ensures that the potential to cosmetic damage is minimal.

AS2187 has established guidelines for blasting based on human comfort levels. The guidelines are defined in terms of impact on airblast (pressure), measured in dB(Linear) (dBL), and ground vibration, measured as peak particle velocity (PPV), and are presented in the table below for an occupied residential property:

Blasting Impact	Recommended Percentile Level	95 th Maximum Maximum Level
Airblast (dB Linear Peak)	115	120
Ground Vibration (mm/s)	5	10

Limits may be increased if a written agreement is reached with the property owner. PDB will require evidence of agreements to utilise any higher limits for monitoring locations.

It is noted that the blasting criteria for ground vibration presents a highly conservative approach to the protection of residential amenity.

Refer to project-specific Blast Management Strategy for monitoring locations and receiver mapping.

9. Flyrock Management

Flyrock is the undesirable throw of rock from the blast outside of the exclusion zone. The high speed ejection of rock creates high risk hazards that can endanger or severely injure personnel and damage plant. It is imperative that fly rock is managed effectively on every blast.

A specific risk assessment will be carried out on each and every blast that identifies specific risks and controls to be put in place unique to that particular day, and will be recorded on the daily Pre Start risk assessment. All personnel will be toolboxed by the shotfirer at commencement of work.

Causes of Fly Rock

Flyrock generally comes from the collar of blast holes or the face of a blast. It is usually caused by the incorrect selection or application of burden, insufficient stemming length or blast holes initiated out of sequence

The geology of the rock being blasted is also important to consider, including joints fissures and other planes of weakness. A well designed shot must account for the type of rock and local variability in rock properties, including the presence of more highly weathered rock near the surface.

Review of previous blast results and the driller of the blast holes can provide invaluable information about the rocks structure for suitable loading of the blast.

Precautions To Take

The designer and shotfirer must inspect the area surrounding the blast site to determine the distances to residences, roads, public places and infrastructure. Consider the presence of these areas when deciding how much protection is needed.

Good blast design is the best way to avoid flyrock. This includes:

- Where possible, selecting the direction of the blasting face to place people and buildings behind the face
- Avoiding shallow blasts less than 1m in depth
- Ensuring burden is one-third to one-half the depth of holes
- Using a stemming depth either no less than 20-25 times the diameter of the hole or no less than the burden, whichever is greater
- Avoid overcharging by confirming stem heights by measuring the bulk product for each hole and removing any excess product when needed
- Ensuring stemming is clean and free from contamination and properly tamped
- Where light face burdens cannot be avoided, reduce the explosive energy by utilising stem or air decks
- Using sequential or delay firing so all shots initiate from the face backwards
- Avoiding overcharging when conducting secondary blasting.

Note: Trench blasting and blasting where bench heights are small compared with the burden usually provide the greatest potential for flyrock because the degree of confinement and the specific charge are both high, and the charge is sometimes placed close to the surface

Additional false burden or blast matts are not recommended as a flyrock control measure in most blasting scenarios as they can unnecessarily introduce more significant additional hazards such as damage to surface delays that can lead to a major misfire.

Past experience has shown PDB that it is always more effective to control flyrock through good design, and best practice loading techniques as listed above.

10 Emergency Response

Before commencement of work on any site PDB will review and update the site emergency response plan with appropriate actions for an emergency involving explosives. This will be communicated to all site based emergency response team members and blast crew members. A suitable muster point in case of evacuation will be communicated to all workers.

Emergency response shall be in line with the emergency procedure guide (EPG) supplied for Class 1 Explosives, and is located in the emergency document holder secured to the drivers door in all explosives and dangerous goods vehicles. The EPG is also stored with the sites emergency response plan and included in Appendix 5 of this BMP. PDB personnel are continuously familiarised and trained in emergency response as part of ongoing training and emergency preparedness.

10.1 Fire Emergency

The highest risk hazard requiring immediate action is in regards to heat (fire), shock or friction. Fires may commonly occur on sites from vehicle fire, lightning strike, bush fire, unauthorised ignition sources or electrical faults.

Small fires away from the cargo area of a transport vehicle (such as engine fire, or fire on a vehicle next to a transport vehicle) may be attempted to be fought using one of the vehicles fire extinguishers. As a guide, if the fire cannot be extinguished using a single extinguisher, then an emergency should be called and evacuation commenced.

If bushfires approach the blast area, unused explosives should be secured in the transport vehicle, MPU washed out, and vehicles removed to a safe location using an unaffected route. Loaded holes should be stemmed, and blast area evacuated with blast exclusion zone set up until the fire threat has passed.

Fires within, near or immediately adjacent to a loaded explosives cargo area should not be attempted to be fought due to the toxic smoke that is emitted as well as the unpredictable extreme risk of mass explosion or unplanned detonation.

As per the Class 1 Explosives Emergency Procedure Guide, **“When subjected to heat, shock or friction, Explosives of division 1.1 or 1.5 will burn and may detonate IN A MASS EXPLOSION at any time”**. Evacuation to a minimum distance of 400m should commence immediately.

Site emergency evacuation procedure must be enacted and all site personnel notified by calling ‘Emergency, Emergency, Emergency fire involving explosives located at {blast location area}. All Personnel must immediately evacuate to {muster point} via a safe route.’ If possible shotfirer should advise of the best route in this transmission for clarity and to prevent anyone inadvertently entering the area.

Injured or smoke affected personnel are to be removed from the area immediately. Where possible, they are to be assisted into a vehicle to remove them from the area as quickly as possible. First aid should be administered enroute if possible or at the muster point.

The shotfirer is to liaise with the site emergency warden or coordinator to ensure the safe and swift movement of all personnel, or members of the public within the affected radius from the area. If the shotfirer is injured or unable to carry this out, the next most senior person is to liaise with site emergency warden or controller.

Emergency services will be immediately contacted advising that explosives are involved in the incident, and personnel not allowed to re enter the area until advised safe to do so. At a minimum the area will remain isolated for at least one hour after all fire and explosions have ceased.

10.2 Adverse Weather, Lightning and Thunderstorms

PDB SOP 003 – Adverse Weather Response outlines steps that will be taken in the event of heatwaves, fire bans and thunderstorms.

In the event of an approaching thunderstorm PDB will consult online weather services such as weatherzone.com.au and trusted lightning tracking apps. PDB uses the 30/30 rule as a guide for determining when to evacuate and re-enter:

Lightning 30/30 rule: If it takes less than 30 seconds to hear thunder after seeing the flash, **lightning** is near enough to pose a threat; when the storm ends, wait 30 minutes after the last heard thunder before resuming activities.

When the decision to evacuate is made, the response must be a whole site response as the full exclusion zone for blast firing must be cleared, and secured.

If time permits, the MPU must washout hoppers and hoses of sensitised explosives.

The explosive transport vehicle and MPU must be secured and locked a safe distance away from the blast and clear of personnel.

All personnel are to evacuate to a safe position outside of the exclusion zone, and a sentry posted at a safe distance to ensure no one inadvertently enters the area until safe.

Personnel must wait the minimum of 30 minutes after the last heard thunder before re-entering the bench to continue loading, to ensure that no stray lightning strikes are present.

11 Communications, Blast Clearance and Shot Firing

Clear communications are critical to ensure that all personnel know where the blast is to occur and when they are required to leave the evacuation zone. One the day of the blast the morning pre start meeting will alert site to the approximate time of blasting and where the exclusion zones will be. Personnel will also be notified of who the Blast Controller is. If no blast controller is to be utilised, the shotfirer will assume this role.

Approximately 30 minutes from blast time the blast controller or shotfirer will start the site clearance procedure and blast guards will begin to move into place.

11.1 Blast Clearance Procedure

30 minutes before the blast

1. Blast Controller begins evacuating Blast Area for firing. Whole of site is notified via UHF of upcoming blast.
2. Blast Controller assigns Blast Guards to their respective positions

15 minutes before the blast

3. Blast guards in position.
4. Blast Controller conducts blast clearance drive through, ensuring all personnel have retreated to the allocated safe location

10 minutes before the blast

5. Blast Controller ensures all blast guards are in position, their area is secure and they have blocked the road/s
6. Blast Controller confirms that blast area is clear and secure
7. Shotfirer and other PDB personnel retreat to firing position

3 minutes before the blast

8. Blast Controller again confirms site clearance with Shotfirer
9. Blast Controller hands secured site over to Shotfirer
10. Shotfirer begins firing sequence and announces "Firing blast at (Site) in 30 Seconds"
11. Shotfirer sounds 20 second blast siren
12. Shotfirer announces "Firing the blast in 10 seconds"
13. Shotfirer calls "FIRING NOW" and the blast is initiated

Immediately after the blast

15. Shotfirer notifies site "Blast has been fired, All personnel are to remain in position while the blast is inspected";

16. Shotfirer checks blast and if no misfires are found announces "The blast has been inspected and is found to be ALL CLEAR. Handing site back to the Blast controller"

*** In the unlikely event that a misfire is discovered, the shotfirer is to announce to the Blast Controller "A misfire has occurred, All blast guards are to remain in position, keep their areas secure and await further instructions". The PDB misfire procedure will then be followed.

17. Shotfirer sounds 3 short bursts of the siren

18. Blast Controller stands down all Blast Guards and resumes the sites activities.



Appendix H – Ecologist Advice

Maria Orlova-JHG

From: Gianluca Brozler <Gianluca@ozarkehm.com.au>
Sent: Monday, 3 November 2025 9:27 AM
To: Maria Orlova-JHG; Lauriane Citerne
Cc: Jane Book; Trent Doyle-JHG; Tess Anastakis-JHG
Subject: Re: Vegetation Impact from Proposed Blasting at Gum Flat

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Maria,

In response to your query, provided that appropriate dust suppression measures are incorporated into the Blast Management Strategy and that the calculated exclusion zones for each blast remain within the CIZ, no significant direct or indirect impacts to vegetation outside of the CIZ are anticipated.

Kind regards,
Lucca

Lucca Brozler
Ecologist



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PO Box 2069 DUBBO 2830
02 6882 0118
gianluca@ozarkehm.com.au
www.ozarkehm.com.au



OzArk and staff respectfully acknowledge the Traditional Owners and Custodians of the Country on which we work.

LEGAL DISCLAIMER. The contents of this electronic communication and any attached documents are strictly confidential, and they may not be used or disclosed by someone who is not a named recipient. If you have received this electronic communication in error, please notify the sender by replying to this electronic communication inserting the word "misdirected" as the subject and delete this communication from your system. The recipient agrees not to disclose the confidential information obtained from the discloser to anyone unless required to do so by law.

From: Maria Orlova-JHG <Maria.Orlova@jhg.com.au>
Sent: Friday, 31 October 2025 15:22
To: Gianluca Brozler <Gianluca@ozarkehm.com.au>; Lauriane Citerne <Lauriane@ozarkehm.com.au>
Cc: Jane Book <Jane@ozarkehm.com.au>; Trent Doyle-JHG <Trent.Doyle@jhg.com.au>; Tess Anastakis-JHG <Tess.Anastakis@jhg.com.au>
Subject: Vegetation Impact from Proposed Blasting at Gum Flat

Hi Lucca and Lauriane,
Happy Friday!

I'm currently finalising the Blast Management Strategy and received a client comment regarding blasting within the Gum Flat property, which is being assessed as an offset site.

They have asked us to confirm that impacts to vegetation outside the CIZ are not anticipated.

I've attached maps where:

- **Red area:** Proposed blasting location (its boundaries are slightly inaccurate – all blasting will be within CIZ)
- **Green area:** PCT within the offset site

Can you please kindly confirm:

1. Whether blasting activities (including vibration, flyrock, dust, and noise) are expected to cause any direct or indirect impacts to vegetation **outside the CIZ**, particularly in the offset site.

Each blast will have a calculated exclusion zone. This zone ensures all flyrock remains within the footprint and prevents physical impacts beyond the blast area.

2. If there are any mitigation measures or buffer requirements we should note.

Your confirmation will help us address the client's comment.

Thank you !

Maria Orlova,

HSC Advisor - Environment
Inland Rail | Illabo to Stockinbingal (I2S)

**JOHN
HOLLAND**
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Mascot NSW 2020
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W. johnholland.com.au



John Holland acknowledges the Traditional Custodians of the lands on which we work and live. We pay our respects to their Elders both past and present and extend that respect to all Aboriginal and Torres Strait Islander Peoples.



Appendix I – CoA E11 Endorsement

Dan Lidbetter
John Holland
Level 5, 15 Bourke Rd
Mascot NSW 2020

27 May 2026

Project No. 23023

Dear Dan

Endorsement of Blast Management Strategy

John Holland is building the Illabo to Stockinbingal section of the Inland Rail project (the Project).

At times during the Project, blasting will be necessary and, in accordance with condition E10 of the project approval (SSI 9406), a Blast Management Strategy (BMS) must be prepared and, under Condition E11, must be endorsed by a suitably qualified and experienced person.

The scope of the BMS must include:

- (a) sequencing and review of trial blasting to inform blasting;
- (b) regularity of blasting;
- (c) intensity of blasting;
- (d) monitoring blast overpressure and ground vibration;
- (e) consultation with utility asset owners and managers;
- (f) measures to minimise blasting impacts;
- (g) periods of relief; and
- (h) blasting program.

In line with Condition E12, the BMS must be prepared in accordance with relevant guidelines to ensure all blasting and associated activities are carried out so as not to generate unacceptable noise and vibration impacts or pose a significant risk to sensitive receivers.

The BMS (document number 5-0019-220-PMA-00-ST-0004), revision 1.2 dated 27 May 2026, has been prepared by John Holland and reviewed by a suitably qualified and experienced person, John Hutchison.



I am satisfied the BMS meets the requirements of Condition E10, with adequate detail on the sequencing, regularity and intensity of blasting, monitoring and consultation with asset owners as well as measures to minimise impacts including periods of relief.

In accordance with Condition E12, the BMS has been prepared in accordance with relevant guidelines, which should ensure blasting is carried out so as not to generate unacceptable noise and vibration impacts or pose a significant risk to sensitive receivers.

In accordance with Condition E11, I endorse the BMS as being consistent with the terms of the Infrastructure Approval (SSI 9406).

Qualifications and experience of endorser

I am a senior environmental and acoustic consultant with more than 25 years' experience in assessment and management of construction noise, vibration and blasting impacts for major linear infrastructure projects.

I hold a Master of Environmental Engineering from University of NSW) and am a Chartered Professional Engineer (CPEng) and active Member of the Australian Acoustical Society (AAS).

My experience includes working within NSW and Commonwealth regulatory frameworks, including the preparation, review and endorsement of Construction Noise and Vibration Management Plans and Blast Management Strategies for state-significant infrastructure projects, including as an independent Acoustic Advisor.

Based on my qualifications, professional affiliations and demonstrated experience on comparable projects, I am suitably qualified and experienced to endorse this Blast Management Strategy for the I2S section of Inland Rail.

Signed

John Hutchison
CPEng, MAAS



Appendix J – Consultation log – Telstra

From: Karl Tait <karl.tait@team.telstra.com>
Sent: Tuesday, 9 June 2026 4:08 PM
To: Jamie Milgate-JHG <Jamie.Milgate@jhg.com.au>
Cc: Sam Bell-JHG <Sam.Bell@jhg.com.au>; Daniel Lidbetter-JHG <Daniel.Lidbetter2@jhg.com.au>; Madeline Teow-JHG <Madeline.Teow@jhg.com.au>; Karl Tait <Karl.Tait@team.telstra.com>
Subject: RE: Blasting Threshold for Telstra Cables

Hi Jamie,

Yes, 50mm's is still the correct figure to work off initially. If it's above that pls provide a copy of the blasting consultants report, but generally speaking, we should be ok to proceed up to 100 PPV.

Regards

Karl Tait

Asset Protection & Relocation

Design & Construction | InfraCo Operations

M [0419 679 957](tel:0419 679 957)

E Karl.Tait@team.telstra.com

This email may contain confidential information.
If I've sent it to you by accident, please delete it immediately

[Request Asset Relocation Or Commercial Works - Telstra](#)



General

From: Jamie Milgate-JHG <Jamie.Milgate@jhg.com.au>
Sent: Tuesday, 9 June 2026 3:22 PM
To: Karl Tait <karl.tait@team.telstra.com>
Cc: Sam Bell-JHG <Sam.Bell@jhg.com.au>; Daniel Lidbetter-JHG <Daniel.Lidbetter2@jhg.com.au>; Madeline Teow-JHG <Madeline.Teow@jhg.com.au>
Subject: Blasting Threshold for Telstra Cables

[External Email] This email was sent from outside the organisation – be cautious, particularly with links and attachments.

Hi Karl,

We are looking to conduct some blasting near the Telstra copper cable (approx. 90m away) at cut 16 near McKenzies Lane, can you please confirm that the recommended threshold for Blasting and Rock Hammering is still 50mm/s PPV. Please see below Markup of blasting area.



ILLABO TO STOCKINBINGAL Cut 16 CH433,060-CH433,340

Coordinate System: GDA2020 MGA Zone 55
This data is provided for information purpose only. As this GIS pl has bee prepared for material provided to IR by an external source, IR cannot and does not attest to its completeness accuracy or suitability. While every care is taken to ensure the accuracy of the data, IR makes no representation or warranty and assumes no duty of care or other responsibility as to the completeness, accuracy or suitability of the information contained I this GIS plan. IR will not be responsible for any loss or damage suffered as a result of any person whosoever placing reliance upon the information contained within this GIS plan.

-  Blasting Area
-  Telstra (approx. 90m)
-  Irrigation (approx. 110m)

Regards,

Jamie Milgate
Utilities Manager
Inland Rail | Illabo to Stockinbingal (I2S)



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