

TERLICHS PIT Explosives Control Plan

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	Title	Name	Date
Owner:	Quarry Manager/Blast Supervisor	Darren Smallwood/Ed Holmes	
Creator:	WHS Compliance and Wellbeing Manager	Simon Taylor	01/04/22
Approver:	WHS Compliance and Wellbeing Manager/Blast Supervisor	Simon Taylor/Ed Holmes	01/04/22

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1 PURPOSE/SCOPE

The purpose of this plan is to provide the framework for controlling and managing safety of explosives and blasting activities undertaken at Lockhart Shire Councils Terlichs Pit. This plan incorporates all aspects of explosives safety, risk reduction and operational safety to ensure:

- The prevention of injury to people and plant / equipment from explosives, fly rock and blasting activities;
- Control the blast process from design to implementation, initiation and evaluation;
- Identify the risks and hazard associated with blasting, including control and/or mitigation;
- Implement best practice measures for the management and minimisation of dust and noxious fumes from surface blasting;
- Compliance with legislative requirements.

1.1 Application of ECP

The Explosives Control Plan (ECP) applies to Terlichs Pit operated by Lockhart Shire Council.

1.2 Relationship between ECP and Blast Management Plans

The site Blast Management Plan is to be read in conjunction with the ECP.

NOTE: The ECP will be read in conjunction to the applicable Blast Management Plans.

2 LEGISLATION

All interactions with explosives on Mawsons sites will be done in accordance with legislative requirements and any applicable Australian Standards.

- Work Health and Safety Act 2011
- Work Health and Safety Regulation 2017 - NSW
- Work Health and Safety (Mines and Petroleum sites) Act 2013
- Work Health and Safety (Mines and Petroleum sites) Regulation 2022
- Explosives Act 2003
- Explosives Regulations 2013
- AS 2187.0 –1998: Storage transport and use – Terminology
- AS 2187.1 - 1998: Explosives – Storage, Transport and Use, Part 1 - Storage
- AS 2187.2 – 2006: Explosives – Storage, Transport and Use, Part 2 – Use of Explosives
- Australian Explosives Code – Third Edition – April, 2009

3 THE SITE

Site details and plans will be provided to any Drill and Blast sub-contractor during the blast planning/design stage and are outlined in the site-specific Drill and Blast Management Plan.

4 COMPETENCIES/LICENCES

Workers including contractors working with explosives are required to have the following competencies/licences:

- The Shotfirer is to hold a Blasting Explosives Users Licence (BEUL) and a Security Clearance (or equivalent);
- Any persons who are supervising the handling, manufacture, transport or storage of explosives must hold a current Security Clearance;
- All other persons must be under the direct supervision of a Security Clearance holder at all times.
- Shotfirer to hold current First Aid Certificate;

Competencies/licences must be recorded:

- Workers - within the workers personal induction file on Mawcentral;
- Sub-contractor – within the contractor module on Mawcentral
- May be requested by Lockhart Shire Council

5 CONSULTATION, COOPERATION AND COORDINATION

Workers must work in consultation with Lockhart Shire Council relating to decisions likely to affect the health and safety of workers. This may include when work procedures are changed or new hazards are identified.

Coordination of the blast will require consultation with all stakeholders throughout the planning/design, drilling, blast and follow up phase.

6 RISK MANAGEMENT APPROACH

6.1 Risk Assessment

An Explosives Risk Assessment has been conducted to identify risks associated with the use of explosives on site, the Risk Assessment outlines the controls required to eliminate or minimise those risks.

6.2 Safe Work Method Statements (SWMS)

Any blasting sub-contactor provides SWMS (or equivalent documents) outlining the tasks being undertaken on site, including the hazards involved, and the controls to reduce the risks involved in the identified hazards.

6.3 Risk Controls

Hazard identification and risk assessment is undertaken to lead to the development of appropriate controls to eliminate risks or minimise risks so far as is reasonably practicable. The following hierarchy of controls has been considered in determining appropriate controls:

- Eliminate the hazard;
- Substituting (wholly or partly) the hazard giving rise to the risk with something that gives rise to a lesser risk;
- Isolating the hazard from any person exposed to it;
- Implementing engineering controls;
- Implementing administrative controls; and
- Ensuring the provision and use of suitable personal protective equipment.

The controls in place to manage hazards that pose a threat to workers and visitors to the site have been established taking into consideration factors including:

- The likelihood of the hazard or the risk concerned occurring;
- The degree of harm that might result from the hazard or the risk;
- The availability and suitability of ways to eliminate or minimise the risk;
- The cost associated with the available ways of eliminating or minimising the risk;
- OEM recommendations;
- Training, awareness and communication techniques;
- The experience and relevant qualifications of the workforce; and
- Previous incidents.

Controls will be monitored and reviewed, and additional controls identified, developed and implemented as part of the on-going improvement process for managing risks at site.

6.4 Supervision and Monitoring Processes.

All workers will be appropriately supervised by qualified and trained supervisory personnel at all times. The level of supervision provided will be based on the worker's experience and qualifications.

Sub-contractors will provide suitably competent personnel to complete the tasks. The Drill and Blast Supervisor shall ensure that all contractor personnel hold the required licences.

Monitoring of adherence to safe work practices is conducted through a number of processes including:

- Workplace inspections to identify hazards on site, including site daily inspections and periodical inspections; and
- Planned audits and reviews.

6.5 Explosive Worker (Including contractor) Induction and Training

Before a worker (including sub-contractors) commences work at the site, the worker is given an induction in which they must provide evidence of their explosives' competency. In addition, contractors must also provide relevant insurances and any other licences as requested. This will be retained by Mawsons and stored confidentially.

All visitors who enter the site will be informed about the risks associated with the site operations and on days when blasting is scheduled:

- shall be advised that blasting is scheduled;
- shall be briefed on the risk management plan for blasting;
- notified of exclusion zones; and
- advised as to their responsibilities.

Regular education and training will be provided to workers which covers recognising and dealing with risks posed by blasting. This will include daily pre-start ("toolbox") talks to communicate hazards associated with specific activities and conditions.

Safe work procedures will be readily available to all workers, so they are fully knowledgeable about the types of hazards present in the workplace and the control measures in place.

Type of Hazard	Controls
Competency - Workers not being competent	<ul style="list-style-type: none"> • Shotfirer to hold BEUL • All assistants to hold security clearance unless under training • All persons being trained to be under direct supervision of Security Clearance holder at all times • All quarry workers assisting shots to be under direct supervision of Security Clearance holder at all times • Sub-contractors provide copy of BEULS • Sub-contractor Register
Exclusion zones – Persons unaware of blasts	<ul style="list-style-type: none"> • Neighbours to be informed 24 hours before a blast • Neighbours to be informed 1 hour before blast • All neighbours to be notified of blast delays • Pre blast checklist has contact details for neighbours • Contact with neighbours to be recorded on pre blast checklist • Neighbours to be rung unless they have expressly requested otherwise. • Blast controls to keep blast parameters within legal limits • Daily toolbox talksBlast board used on site
Exclusion Zones – Inadequate exclusion zone	<ul style="list-style-type: none"> • Use 600m exclusion zone for all personnel from centre of pit. • Shotfirer can fire inside zone from protected position. • Assess rock spread. • Risk assess exceptional circumstances – refiring misfires etc – to determine if increased exclusion zone required. • Where a small exclusion zone is required (eg blasting close to sensitive areas), the blast design and subsequent fly rock modelling must be reviewed to allow a 3:2 ratio of flyrock modelling:buffer.
Exclusion zones - Persons / equipment in blast area	<ul style="list-style-type: none"> • Blasting siren to be sounded from shotfiring ute, ute to drive around all areas of site ensuring site clear. • Site to be fully cleared. • Site check before blasting. • Accounting for all employees/visitors using register. • Blast guards to be posted as per blasting procedure. • Shotfirer will make radio call 5 minutes prior to blasting and consecutively 1 minute prior, 30 seconds prior, 10 seconds prior and when firing shot. • Blast board on site. • Radio communication between blast guards and shotfirer to be established. • Shotfirer to receive positive communication confirmation from all blast guards and person checking quarry before firing. • Blasting sequence to be terminated immediately if a person enters or is found in exclusion zone. • Blast sequence to be terminated if clear positive communication is not received from every blast guard and person checking inside exclusion zone.

Type of Hazard	Controls
	<ul style="list-style-type: none"> • Blast event checklist to be filled in. • 500m exclusion zone around blast. • Pre blast meetings with blast guards. Visual inspection of off-site areas within exclusion zone to be undertaken with drone as well as in person to account for neighbours.
<p>Access to explosives - Unauthorized persons accessing explosives</p>	<ul style="list-style-type: none"> • Locked explosives boxes for explosive precursors • Reconciliation of explosives brought to site used/unused • Transport manifest • Transport risk assessment • Transport vehicles to be guarded at all times • Visitor register • Toolbox Talks • No entry to blast area signage
<p>Access to explosives – On Site Security</p>	<ul style="list-style-type: none"> • Explosives stored in purpose built portable magazines • Portable magazines located in direct area of shotfirer/security clearance holders. • Exclusion Zones • Signage • Site fenced and secure as far as practical • Sentries in place to enforce exclusion zones • Blast Management Plan - Reconciliation count of Boosters/Detonators
<p>Access to explosives – Sabotage</p>	<ul style="list-style-type: none"> • Transport manifest • Transport risk assessment • Transport vehicles to be guarded at all times • Locked explosives boxes for explosive precursors • Site fencing • Visitor register • No entry to blast area signage • Manifest for unused explosives • Reference checking employees • Security Clearance
<p>Transport – Explosives transport accident</p>	<ul style="list-style-type: none"> • Transportation undertaken by sub-contractor. • Traffic management plan • Precursors segregated in mobile magazines
<p>Transport – Unloading explosives</p>	<ul style="list-style-type: none"> • Transport in separate containers • Design registered containers

Type of Hazard	Controls
	<ul style="list-style-type: none"> • Trained and competent personnel • Explosives control plan in place • Blast management plan in place • Selection of less sensitive materials where available • Substances not mixed until being poured into drill holes • Procedure allows that only trained competent and qualified personnel are involved in unloading
Transport Inadequate - Security	<ul style="list-style-type: none"> • Transportation undertaken by sub-contractor • Transport manifest • Transport risk assessment • Transport vehicles to be guarded at all times • Designated transport route • Separation of bulk delivery vehicle and vehicle carrying explosive precursors • Locked explosive boxes for precursors
Blast Design - Blast plan not suited to Geotechnical structure	<ul style="list-style-type: none"> • Blast Management Plan • Shot Planning and Preparation • Preparation of the bench • Selection of correct product for conditions at blast site/drill holes • Covering drill holes to minimise water entry • Pumping out drill holes when necessary • Markout • Drill patterns • Drill depths • Drill logs • Competent drill operators
Blast Design – Incorrect product selection	<ul style="list-style-type: none"> • Selection of bulk explosive to suit hole dampness • Blast Management Plan • Shot Planning and Design • Markout • Drill Patterns • Site Blasting parameters • History parameters • Explosives comply with Australian standards • No mixing of materials from different suppliers • Storage of products in OEM packaging until use

Type of Hazard	Controls
	<ul style="list-style-type: none"> Quality of product is assessed when delivered to ensure product appears consistent and of suitable quality.
Blast Design - Poorly planned drill and blast layout	<ul style="list-style-type: none"> Blast Management Plan Shot Planning and Preparation Geotechnical data available and considered in plan Preparation of the bench Blast Designed by qualified, competent shot firer Checksheets inspections Trained Competent Personnel Drill Log review Previous drill and blast records consulted
Blast Design – Inadequate burden	<ul style="list-style-type: none"> Face Profiling Boretracking front rows Shotfirer competency Blast plan Placement of false burden Blast exclusion zone
Blast Design - Inadequate stemming depth	<ul style="list-style-type: none"> Blast design Shot firer competency Procedure Holes dipped before stemming Flush out overloaded holes
Blast Design - Incorrect stemming material	<ul style="list-style-type: none"> Use 10 to 14mm rock for stemming Suitable product available on site
Blast Design – Inadequate blast/delay design	<ul style="list-style-type: none"> Subject matter expert contracted to undertake blast designs Shotfirer competency
Ground and Strata - Employees & plant exposed to hazardous overhangs, loose rocks & unstable conditions from bench above	<ul style="list-style-type: none"> Maintain distance of half bench height away from benches above Do not work below machinery operating on higher benches Look for previous rock falls Do not create overhangs or undercuts in stockpiles or faces If overhangs or undercuts are present seek assistance if necessary to make the slope or face safe again
Ground and Strata -	<ul style="list-style-type: none"> At least 1m bunding to be placed on exposed edges before commencement of drill and blast activities Fall restraint system to be used where a worker must work near an unbanded face (eg during a misfire)

Type of Hazard	Controls
Employees & plant exposed to hazardous edges	<ul style="list-style-type: none"> • Spotter to be used where a worker must work near an unbunded face • Compliance with site exclusion zones • Check faces for unstable back break • No person or plant to be on back break area
Failure during loading – Loss of sensitivity	<ul style="list-style-type: none"> • Correct mixing ratios of bulk explosives • Selection of compatible boosters • Selection of correct explosives for hole conditions (water) • Design shot to avoid sleeping holes
Failure during loading – Mixing initiation product from different suppliers	<ul style="list-style-type: none"> • All initiation product used in a blast to be from one supplier • No mixing of products • Products stored in OEM packaging in magazine • Products from different suppliers not to be mixed in magazine
Failure during loading – Incorrect tie in	<ul style="list-style-type: none"> • Shotfirer to walk shot • Drill and blast supervisor to walk shot • Tie in procedure • Blast design • Shotfirer competency
Failure during loading – Overcharging	<ul style="list-style-type: none"> • Shotfirer competency • Blast plan • Recording of blasts
Failure during loading – Lead falls down hole	<ul style="list-style-type: none"> • Attach lead to rock to prevent falling in • Recover and secure lead • Reprime is unrecoverable – mark on blast design
Failure during loading – Overloaded hole	<ul style="list-style-type: none"> • Boretracking of front row • Blast design • Measure emulsion discharge • Measure bulk explosive depth • Flush out / correct to design
Failure during loading – Runaway of product	<ul style="list-style-type: none"> • Boretracking of front row • Stop load and stem off • Mark on blast design
Failure during loading – Wet holes	<ul style="list-style-type: none"> • Use emulsion in wet holes • Cover drill holes • Pump out wet holes if required

Type of Hazard	Controls
Failure during loading -Stemming bridges	<ul style="list-style-type: none"> • Use 10 to 14mm rock for stemming • Tamp stemming with appropriate tamping stick
Unintended Initiation -Sympathetic Detonation During Transport	<ul style="list-style-type: none"> • Explosive precursors transported in blast containers • Competent persons • Traffic management plan
Unintended Initiation - Sympathetic detonation during blasting	<ul style="list-style-type: none"> • Blast design • Selection of bulk explosive with low sensitivity • Hole spacing more than 200mm • Drill patterns clearly marked before drilling • Drill logs showing any abnormal holes
Unintended Initiation - Slap, Snap and Shoot	<ul style="list-style-type: none"> • Emulsion to be pumped in by MMU located outside pattern • Machine carrying ANFO MMU to be guided by spotter • Filling to be completed from furthest hole (initiation point) backwards in the pattern • Downhole lines to be secured at top of hole • All vehicles/plant not involved in filling holes to be separated from pattern. • No Entry signage • Blast design to ensure delays used do not allow rock from blast to strike uninitiated signal tube. • Any misfired explosives in the muck pile to have general location marked. • Risk assessment to be undertaken before excavating known misfires • Teeth to be removed from bucket when excavating near misfired explosive. • Additional operator protective structure to be used when excavating misfire. • Stemming to be stockpiled before loading commences
Unintended Initiation - Heat or sparks in vicinity	<ul style="list-style-type: none"> • No heat sources within 20m of blast pattern / explosives / precursors • Only diesel powered plant to be used to assist loading shot
Unintended Initiation - Plant driving over product	<ul style="list-style-type: none"> • All plant to be excluded from loading area unless involved in loading shot. • Spotter to be used for plant loading shot. • Stemming material to be stockpile before loading commences • Detonators to be placed alongside holes after plant removed from loading area.
Product deterioration – incorrect material selection	<ul style="list-style-type: none"> • Use emulsion in wet holes • Cover drill holes • Pump out wet holes if required
Product deterioration – age of explosive product	<ul style="list-style-type: none"> • Use material on first in first out basis

Type of Hazard	Controls
Product deterioration – emulsion structure breakdown	<ul style="list-style-type: none"> • Emulsion used on day of supply • Avoid sleeping shots where possible
Product deterioration – Defective Explosives	<ul style="list-style-type: none"> • Explosives Control Plan • Blast Management Plan • Trained, competent personnel • Supplier QA processes • Use of product within shelf life • First in - first out • Disposal procedures • Product checked on delivery for consistency • Storage to AS 2187
Failure During Firing – Misfire	<ul style="list-style-type: none"> • Explosives Control Plan • Blast Management Plan • Blast design • Trained, competent personnel • Explosives comply with Australian standards • No mixing of materials from different suppliers • Storage of products in OEM packaging until use • Precursors kept separately until use • Misfires which are unsafe for immediate re-firing are reported to WHS department – then to regulator • Selection of bulk explosive with low sensitivity • Drill holes at minimum 200mm spacing • Where emulsion is used, MMU does not drive over loaded holes • MMUs guided by spotters • Filling completed beginning at furthest hole • Downhole lines are secured at top of hole • All vehicles and plant not involved in filling are separated from the pattern • No entry signage • Blast design ensures that the delays used do not allow blast rock to cut signal tube • Quality of product is assessed when delivered to ensure product appears consistent and good quality • Precursors kept in appropriate containers until use (portable magazines) • Prohibition of ignition sources anywhere within exclusion zone • Shotfirer to check for misfire before giving all clear. • All clear not to be issued if misfire identified

Type of Hazard	Controls
	<ul style="list-style-type: none"> • Blast guards to remain in place • Shotfirer to assess whether misfire can be refired immediately, safely
Failure During Firing- Product failure	<ul style="list-style-type: none"> • Supplier quality assurance processes • Use products within shelf life
Failure During Firing- Cut off	<ul style="list-style-type: none"> • Shotfirer competency • Blast/delay design • Tie in procedure
Flyrock – Flyrock produced from blast	<ul style="list-style-type: none"> • Explosives Control Plan • Blast Management Plan • Trained Competent Personnel • Blast history at site considered • Measuring of emulsion discharge • Cut off if use more than 10% overload • Measuring bulk explosive depths and density • Flushing out overloads or correcting to design • If product runs away, cease loading and stem off • Selection of correct stemming size and depth (10 – 14mm) • No pumping of product over the face • Tamping of stemming • Placement of false burden when required • Defined blast exclusion zones • Front row, and sensitive holes boretracked • Face is lazer profiled before drilling • Risk assess exceptional circumstances – refiring misfires etc – to determine if increased exclusion zone required.
Column Dislocation	<ul style="list-style-type: none"> • Blast design • Face profiling
Environmental - Excessive hole temperature	<ul style="list-style-type: none"> • Redesign blast if hole temperature above 55 degrees
Environmental - Reactive Ground	<ul style="list-style-type: none"> • Not present on site
Environmental - Electrical storms	<ul style="list-style-type: none"> • Lightning Procedure – to implement • Lightning detector • Remove all persons from loading area until storm passes

Type of Hazard	Controls
	<ul style="list-style-type: none"> • Remove lead in line – if safe to do so • Use lightning tracker apps • 30/10 rule - when 10 seconds or less between lightning and thunderclap, withdraw until 30 minutes after storm passes • Setting up blast only when atmospheric conditions are suitable/safe • If conditions become unsafe during set-up, area is made safe as far as practical and personnel withdraw to a safe distance
Environmental – Irregularity in geology	<ul style="list-style-type: none"> • Weekly Pit inspection • Drilling reports
Environmental - Exceedance of site EPA blast limits	<ul style="list-style-type: none"> • Report results to required internal and external stakeholders as per incident reporting process. • Conduct investigation. • Monitoring equipment is calibrated by OEM to OEM specifications. • Blast plans, drill patterns and any variances considered when loading shots.
Dust and other Airbourne contaminates -Exposure to Dust / fumes	<ul style="list-style-type: none"> • Do not enter blast area for 5 mins. Mark off / sign post area, Follow 10.3 AS21872 • Blast design • Shotfirer competency • Blast monitoring • Blast reviews
Dust and Other Airbourne Contaminates – Blast fume	<ul style="list-style-type: none"> • All bulk explosives to be mixed to correct fuel/oxygen ratio • Minimising sleep times within OEM recommended timeframes • Dewatering wet blastholes if using ANFO • Using suitable bulk explosive eg. Emulsion where moisture is present • Covering blastholes between drilling and loading • Exclusion zones
Sleeping shots	<ul style="list-style-type: none"> • Put security plan in place • Exclusion Zones • No Surface Connections • Signage • Toolbox talks to ensure all site personnel are aware of sleeping shot status • Blast planning to reduce likelihood of requirement to sleep shot • Only person with security clearance can remain on site to guard the sleeping shot
Emergency Response	<ul style="list-style-type: none"> • Good relationship fostered with emergency responders: <ul style="list-style-type: none"> ○ Show and Tell - make responders aware of materials kept on site, storage locations, types of structure and appropriate response measures planned

Type of Hazard	Controls
	<ul style="list-style-type: none"> • Explosives Control Plan • Blast Management Plan • Trained Competent Personnel • Emergency management plan • Emergency contacts list • Evacuation procedure • Safety data sheets available • UHF radios available • First Aid kits available • First aid officers on site • Fire extinguishers available • Training

7 Characteristics of Explosives

ANFO - (Ammonium Nitrate / Fuel Oil) is used as a bulk explosive and is transported to site as/when needed. This is currently a process completed by an authorised blasting contractor. Loading into the blasthole is done via a mixing auger to an excavator. ANFO is a product which will dissipate and degrade if it comes into contact with water or significant moisture. Generally, ANFO is made up of 94% Ammonium Nitrate and 6% diesel.

Emulsion – Emulsion is a waterproof bulk explosive that is generally transported to site as/when required. Metering and delivery of the product from the delivery truck to the blasthole is done via pump and hose, with calibrated metering to confirm the quantity delivered hole by hole.

Non –Electric (Nonel) Downhole Detonators – Nonel in-hole detonators are used to initiate the primer or booster that is located at the bottom of a single blasthole. The primer or booster then in turn initiates the bulk explosive, which releases energy and fragments the rock. Nonel detonators have standard initiating times assigned to the detonator such as; 400ms, 500ms etc.

Non-Electric (Nonel) Surface Connecting Detonators – Nonel surface detonators are used to link one's blast hole to another via the means of a millisecond delay.

Like the downhole detonators, they are set with millisecond delays such as; 17ms, 25ms, 42ms, 65ms etc.

Electric Detonators – Electronic initiation systems have a computer chip located in the head of the detonator, this way more accurate and sophisticated timing delays can be programmed to ensure single hole initiation, and therefore, to eliminate the amount of explosive that is being detonated at any one time.

Primers- Primers are used to initiate the bulk explosive and are initiated via a detonator.

Detonation Cord – Detonation Cord can be used in applications such as pre-split blasting or smooth wall blasting in conjunction with packaged bulk explosives. Detonating Cord does not have an assigned delay and is initiated using a Nonel detonator.

Lead in Line – Lead in line is used in the initiation process, a plunger which is loaded with a shotgun shell is stomped on by the shotfirers foot, this then sends a shock through the lead in line which is lined with a fine explosive. The lead in line is hooked into a downhole lead in the blasthole which initiates the blast.

8 STORAGE OF EXPLOSIVES

Strontian Quarry currently does not store explosives or explosive precursors. Explosives and precursors are only transported to site at the time of the blast by contractors.

Should a misfire occur resulting in explosives remaining on site a security plan shall be completed for the duration of time until the misfire is rectified.

9 TRANSPORT OF EXPLOSIVES

9.1 Off Site Transportation

The blasting sub-contractor shall be responsible for all off site transport of explosives and explosive precursors.

The ECP will only address transportation of explosives within site boundaries.

9.2 Security of Explosives and Explosives Precursors

The blasting contractor shall transport explosives and explosive precursors in alignment with AS2187.

Bulk explosive will be transported in a purpose built MMU.

Detonators and boosters shall be transported in purpose built certified portable magazines attached to contactor vehicles.

Portable magazines shall be locked unless they are required to be unlocked for the purpose of unloading to load into blast holes.

Incompatible types of explosives will be separated during transportation as per the requirements of AS2187.

9.3 Accounting for Explosives

The explosives contactor shall carry a manifest showing the amounts of explosives and explosive precursors delivered to site.

The contactor shall record the amount of explosives and explosive precursors used on site, against the amount of explosives and explosive precursors remaining in the portable magazines after loader the shot.

All discrepancies shall be investigated immediately, if the discrepancy cannot be reconciled, all persons and persons vehicles who had access to the explosives or explosive precursors shall be checked.

Any unexplained losses shall be reported to the WHS Compliance and Wellbeing Manager who shall report the loss internally as well as to Lockhart Shire Council, and externally to Safework NSW, The Resources Regulator and NSW Police.

9.4 Guarding of Portable Magazines

Portable magazines are not to be left unattended at any time, a person holding a security clearance shall provide close supervision at all times.

10 SITE SECURITY

10.1 Fencing

Terlichs Pit has perimeter fencing on all sides of the site.

10.2 Visitors Registers

All visitors to site, including sub-contractors shall be required to sign the visitors register upon entry and exit to site.

10.3 Toolbox Talks

Daily toolbox talks will be undertaken on site, all workers attending site on the day are required to note their name and sign their attendance on the toolbox talk.

10.4 Exclusion Zones – Blast Patterns

All blast patterns will have exclusion zones, the blasting contractor shall place signage stating no entry to blast area, no person not involved in the blast will be allowed entry unless permission is expressly given by the shotfirer.

11 BLAST DESIGN

11.1 Compliance with Mine Plan

The blasting shotfirer is engaged to design blasts in line with the site mine plan.

11.2 Competent Person Designing Blasts

The blasting shotfirer shall engage a competent person to undertake blast designs at Terlichs Pit.

11.3 Consultation

The blasting surveyor shall consult with the Quarry Manager and Drill and Blast Supervisor when undertaking blast design.

The blast design shall be submitted to the Quarry Manager and Drill and Blast Supervisor for review before being implemented.

11.4 Face Profiling

The face shall be laser profiled, enabling the blast designer to be aware of potential hazards, allow the designer to control the risks of the hazard affecting the blast.

11.5 Product Selection

The blasting shotfirer shall detail explosive and explosive precursors to be used taking into consideration:

- Site conditions
- Expected hole dampness
- Expected burden
- Expected stemming
- Drill hole diameter
- Site geological and geotechnical conditions
- History of previous blasts
- Compliance of product with Australian Standards
- Explosive compatibility
- Designing blast to reduce likelihood of sleeping shots
- Expected ground temperatures

12 DRILLING

12.1 Bench Preparation

The Quarry Manger shall be responsible for arranging appropriate shot preparation, including but not limited to:

- Stripping and stockpiling of overburden
- Providing edge bunding of faces
- Provision of safe access roads/tracks to shot

12.2 Blast Pattern Setout

The blast designer shall mark out all drill patterns following the blast design.

12.3 Driller Competency

Drillers may either be Mawsons employees or sub-contractor personnel, the drillers shall be assessed as competent to operate a drill rig.

12.4 Drilling to Design

The blast pattern shall be drilled to the blast design. Where a variation to the design is required, the driller shall notify the blast designer.

12.5 Redrilling

Should a hole require redrilling, the new hole must be a minimum of 200mm away from any existing holes. Redrilled holes must be clearly marked on the drill log

12.6 Drill Log

The driller shall complete a drill log, outlining drilling conditions on site, as well as any holes that were unable to be drilled, required drilling, as well as lost drill rods.

13 POST DRILLING

13.1 Covering of Drill Holes

Drill holes shall be covered after drilling to help prevent the entry of water into drill holes.

13.2 Pumping out Drill Holes

Where drill holes have been identified as having an unacceptable level of water for the bulk explosive being used, the Drill and Blast Supervisor shall be responsible for pumping the water out of the hole.

13.3 Boretracking

The front row of holes shall be boretracked, additionally and identified hazardous holes shall be boretracked.

Where boretracking shows deviation to drilling design, the blast designer shall review the blast design to minimize any identified hazard.

13.4 Delivery of Stemming

The blast supervisor shall be responsible for the amount, type and location of any stemming required.

The blast supervisor shall arrange for the stemming to be laid out before the day of the blast.

14 Environmental Conditions

14.1 Lightning

Loading of blast holes must not occur if storms are predicted on site.

The Milbrae Drill and Blast Supervisor shall set up a lightning detector.

If the lightning detector identifies lightning in the vicinity of site, all persons shall be removed from the loading area to an area outside of the exclusion zone.

The lead in line shall be removed from the shot if safe to do so, and the blast area will be made as safe as practical before withdrawal.

If lightning occurs without detection, all personnel shall follow the 30/10 rule, where there is less than 10 seconds between lightning and associated thunderclap all personnel shall withdraw.

Withdrawal must be in place until 30 minutes have past since the lightning has stopped, all personnel in the exclusion zone must withdraw.

15 LOADING OF BLAST HOLES

15.1 Worker Competency

Loading of blastholes shall be undertaken under the supervision of the shotfirer who holds a current BUEL.

All persons assisting with loading shot shall be under the direct supervision of a person holding a Security Clearance at all times.

15.2 Exclusion Zones – Blast Patterns

All blast patterns will have exclusion zones, the blasting contractor shall place signage stating no entry to blast area, no person not involved in the blast will be allowed entry unless permission is expressly given by the shotfirer.

No vehicles except for vehicles directly required for loading shall be allowed entry to the blast pattern.

No vehicles shall be allowed to operate near any loaded blast holes, no near any explosives or explosive precursors that have been laid out for use.

15.3 Vehicle Spotters

Where a vehicle is required to move near the blast pattern, eg an MMU, a spotter shall be used to ensure the vehicle does not post a risk to persons, plant, explosives or explosives precursors in the blast pattern.

15.4 Mixing Bulk Explosive

The shotfirer will supervise the mixing of the bulk explosives in the MMU.

15.5 Loading Furthest Hole from MMU

Loading of bulk explosives shall be undertaken from the blast holes furthest from the MMU, working backwards towards the MMU.

15.6 Load to Design

All blastholes shall be loaded to the blast design.

15.7 Securing Downhole Detonators

All downhole detonators shall have the lead secured to prevent leads falling into the hole, should a lead fall into the hole, all efforts shall be made to recover the lead, if the lead cannot be recovered the hold shall be reprimed.

15.8 Run Away Product

Where a blast hole takes more bulk explosive than designed, the amount of bulk explosive must be stopped at 110% of the design, at this point the bulk explosive must be stopped and the hole stemmed off.

15.9 Dipping Holes Before Stemming

All blastholes shall be dipped after loading bulk explosive to confirm that the hole has not been overloaded.

15.10 Overloaded Holes

Where dipping has determined a hole has been overloaded, the hole shall be flushed out and reloaded.

15.11 Correct Stemming

All stemming used on site shall be competent aggregate of the size range between 10 and 14mm.

15.12 Explosive compatibility

The blasting shotfirer shall ensure all explosives used in the blast are compatible with each other. Only one brand of explosive shall be utilized in a shot.

15.13 Delay Sequencing

Delay sequencing shall take into account the likelihood of blasted rock cutting signal tube lines to uninitiated explosives.

15.14 Working Below Faces

Where work is required below a face, ensure that an assessment has been undertaken on the face.

Where there is risk of rock fall, the Quarry Manager shall put in place a catch bund to create an exclusion zone under the face.

Machinery must not be working on the bench above whilst a shot is being loaded.

If any hazards are identified they must be immediately raised with the quarry manager.

15.15 Working Near A Face Edge

All face edges must be bunded to at least 1m as per site bunding standards.

Where a face cannot be bunded – eg after a misfire, a fall restraint system must be used, this will be risk assessed before being implemented. A spotter will also be required.

If unstable areas are identified such as back break, these are to be reported to the quarry manager, no persons or plant are to operate on back breaks on slippery backs.

15.16 Ignition Sources

No heat source, such as hot works or smoking are allowed within 20m of the blast pattern or explosives or explosive precursors.

Only diesel powered plant shall be utilized to load shots.

16 BLASTING

16.1 Blast Exclusion Zones

Mawsons/Milbrae adopt a mandatory site blast exclusion zone to be 500m, however a 600m exclusion zone is used from the centre of the pit at Terlichs Pit.

The document “pre blast checklist” contains an exclusion zone map, which will be centered upon each blast by the Drill and Blast Supervisor.

The exclusion zone outline in the Pre-Blast Checklist shall override any other exclusion zone.

No person apart from those directly involved in firing a blast, ie shotfirer and any shotfirer in training are permitted to be within the blast exclusion zone.

The shotfirer and any trainees are required to fire from a protected position behind the blast pattern.

If during blast planning, it becomes apparent that the blast exclusion zone will impact critical infrastructure, the blast design may be reviewed.

Should an event occur on site where there is identified inadequate burden, a risk assessment shall be undertaken with subject matter experts to determine if an increased exclusion zone is required.

16.2 Blast Notification

A portable blast notification board at the site entry shall be placed to detail the approximate time of the blast at commencement of operations on the day of the blast.

No unauthorised personnel may enter the site from 30 minutes prior to the blast time, unless authorised by the shotfirer.

The Pre-Blast Checklist contains a list of neighbours and stakeholders –who must be contacted at the following intervals:

- 24 hours prior to planned time of blast
- 1 hour prior to planned time of blast
- Upon becoming aware of need to change time of blast.

The Drill and Blast Supervisor shall record contact on the Pre-Blast Checklist.

Any incidences of non-contact must also be recorded on the Pre-Blast Checklist, including time and dates of attempts to contact.

Should a critical stakeholder (located within the exclusion zone) not be able to be contacted, the Drill and Blast Supervisor is responsible for verifying that the person is not within the exclusion zone, this will be done via a nominated person attending the property and checking building and infrastructure, and via drone.

Should a critical stakeholder (located within the exclusion zone), or any other person found within the exclusion zone, refuse to leave the exclusion zone the blast cannot be fired, such a situation will be elevated to Operational Managers.

Blast sirens shall be sounded at the follow time prior to blast:

- 5 minutes before blast
- 60 seconds before blast
- 30 seconds before blast
- 10 seconds before blast

16.3 Meeting

A meeting shall be held forty minutes before the planned blasting time.

The following personnel shall attend this meeting:

- Blasting personnel including shotfirer
- Quarry Manager
- Drill and Blast Supervisor
- Blast guards

During this meeting, the following will be discussed:

- Appointment of blast guards
- Briefing blast guards of their responsibilities
- Confirmation of responsibilities for all parties
- Any hazards identified during the loading of blast pattern that may impact upon the blast.

16.4 Blast Guards

Blast guards shall be appointed in the meeting forty minutes before the blast.

At the end of the meeting, thirty minutes before the planned time of blast, the guards shall mobilize to their blast guard locations.

Blast guards shall be placed at the following locations, unless the exclusion zone for a blast determines that the guard point needs to be relocated:

- North of Terlichs Quarry at the Grubben Rd/ Woodend Five Ways Rd intersection.
- South of Terlichs Quarry on Woodend Five Ways Rd (between the Willis and Barr residences).

Blast guards shall all be in possession of working UHF radios, that are turned on to maximum volume and tuned to the site frequency – UHF 31.

All blast guards shall respond to the shotfirers requests to confirm that their site is secure.

If at any time a blast guard has any concern that their site is not secure, or a person is within the exclusion zone, they must immediately notify the shotfirer, the blast shall be delayed until the exclusion zone is secure.

Blast guards will be posted prior to blast time and must remain guarding until verbal confirmation is received from the shotfirer, allowing the blast guard to leave their guarding position.

16.5 Clearing of Exclusion Zone

At the end of the site meeting thirty minutes before the blast, the Quarry Manager or delegate shall evacuate all personnel on site to the blast guard location.

16.6 Verification of Clearing of Exclusion Zone

The blast guards shall confirm that all persons present are located at the gate and accounted for.

The Drill and Blast Supervisor shall fly a drone over the exclusion zone five minutes before blasting, the following areas shall be checked:

- Entirety of Terlichs Pit
- All other property impacted by the exclusion zone

Should a critical stakeholder (located within the exclusion zone), or any other person found within the exclusion zone, refuse to leave the exclusion zone the blast cannot be fired, such a situation will be elevated to Operational Managers.

The Quarry Manager or approved delegate shall reconcile that all site personnel are accounted for using a combination of the Daily Toolbox Talk and Visitors Register.

Any person who cannot be accounted for shall be contacted immediately to verify their location, should a person not be accounted for and not be located, the exclusion zone must be rechecked.

If at any time there is any chance that a person who has not been accounted for is within the exclusion zone, the blast cannot be fired.

Once all persons have been accounted for the site shall be handed over to the control of the Shotfirer.

Five minutes before blasting the blast siren shall be sounded by the shotfirer, the shotfirer and/or blast supervisor vehicle shall visually drive around site to ensure that no person is within the exclusion zone, the vehicle shall check:

- The entirety of the site

16.7 Blast Notification

The blast board at the site entry shall be updated to detail the approximate time of the blast at commencement of operations on the day of the blast.

No unauthorised personnel may enter the site from 30 minutes prior to the blast time, unless authorised by the shotfirer.

The Pre-Blast Checklist contains a list of neighbours and stakeholders –who must be contacted at the following intervals:

- 24 hours prior to planned time of blast
- 1 hour prior to planned time of blast
- Upon becoming aware of need to change time of blast.

The Drill and Blast Supervisor shall record contact on the Pre-Blast Checklist.

Any incidences of non-contact must also be recorded on the Pre-Blast Checklist, including time and dates of attempts to contact.

A blast siren shall be sounded five minutes before blasting for thirty seconds.

16.8 Blasting

A Blast Siren will sound for Thirty Seconds (30), Five (5) Minutes prior to the Blast being Fired.

If at any time during the process, there is a breach of the exclusion zone, the person identifying the breach must clearing transmit **“Abort, Abort, Abort”** over the UHF radio, this must be repeated until confirmation is received by the shotfirer.

The Shotfirer will ask, one by one, **“Blast guard (1) are you in position and is your site secure”**. Blast Guard 1 will confirm. If confirmation is not received from a blast guard, the blasting sequence will be paused until positive confirmation is received.

The Shotfirer will ask, **“Blast guard (2) are you in position and is your site secure”**. Blast Guard 2 will confirm. If confirmation is not received from a blast guard, the blasting sequence will be paused until positive confirmation is received.

The shotfirer will sound a 60 second warning and broadcast **“Firing at Terlichs Pit in 60 Seconds”** All Blast guards to confirm if unsafe to proceed.

A Blast Siren will again be sounded 30 seconds prior to Blasting followed by Radio Broadcast **“Firing at Terlichs Pit in Thirty (30) seconds”**

A final Siren will be sounded Ten (10) seconds prior to blasting followed by a radio broadcast **“Firing at Terlichs Pit in Ten (10) seconds”**

16.9 Sleeping Shots

Blasts shall be designed to avoid sleeping shots.

Where a shot must be slept:

- All surface connections must be removed
- An exclusion zone must be set up around the blast
- A security plan must be written for the site
- A toolbox talk must be held with all personnel before leaving site to ensure they are aware of the slept shot
- A person holding a Security Clearance must guard the shot at all times

16.10 Monitoring

A monitor shall be set up at the closest residence (Terlich's Residence), as identified on the Pre-Blast Checklist.

Additionally, the shotfirer shall video the blast and provide the video to Mawsons.

16.11 Post Blast Inspection

The purpose of a post blast inspection is to ensure that all blastholes have been detonated and the area is safe for re-entry.

A post blast inspection is to be conducted by the shotfirer a minimum of 5 minutes post blast.

Do not re-enter the area if noxious fumes or excessive dust clouds are present. Extreme caution should be taken if the inspection requires the shotfirer to walk on blasted material.

If the post blast inspection can't be done by walking the blast, a visual inspection will be done by other means. This includes using:

- binoculars,
- looking over the high wall
- Drone footage
- other acceptable means

Any unusual blast rock spread within the exclusion zone shall be reported and used for future reviews of blast exclusion zones.

16.12 Identification of Misfire

If a misfire is found during the post blast inspection conducted by the Shotfirer, the shotfirer will notify the Quarry Manager / Supervisor immediately, along with the blast guards.

The all-clear signal will not be given.

The shotfirer and the Quarry Manager / Supervisor will decide if it is safe to re-fire the remaining part/s of the shot.

The same method of initiation will be used.

If the shot is unable to be fired safely, all blast guards are to await instructions as to the intended plan of actions.

If the misfire cannot be immediately refired, the event becomes an incident to be handled as per the ECP section 10 Incident Reporting.

If a misfire (unexploded explosive or initiation product) is subsequently discovered during excavation:

- Personnel will be instructed to stay well clear of the area.
- The reporting of an incident section of this plan will be invoked.
- A means of controlling access to the area will be put into place.

Before excavating a misfire a risk assessment must be undertaken with appropriate personnel, including but not limited to:

- Determining likely location of misfired explosives.
- Using machine attachments that reduce the likelihood of a slap-snap-shoot unintended initiation – eg removing teeth from buckets.
- Operator protective structures.
- Exclusion zones.
- Training of workers.

17 INCIDENT REPORTING

The following events constitute a reportable incident to the regulator and the Incident Notification Guideline must be followed:

- The ejection of fly rock that falls outside a blast exclusion zone.
- A misfire or unplanned explosion of an explosive or explosive precursor, but not a misfire at a mine or petroleum site other than a coal mine if the misfired explosive may be fired without significant risk to a person,
- Any loss of explosives or explosives precursors.

If any of these events occur the following process must be followed:

- Do not disturb the incident scene.
- Report incident to Quarry Management, WHS Compliance and Wellbeing Manager, Lockhart Shire Council.
- WHS Compliance and Wellbeing Manager is to assess incident against reporting guidelines.
- WHS Compliance and Wellbeing Manager to notify upper management of incident.
- WHS Compliance and Wellbeing Manager/Lockhart Shire Council to notify regulator.
- WHS Compliance and Wellbeing Manager to advise worksite of any additional requirements such as; preservation requirements.
- Incident investigation to be carried out as per Incident Investigation Procedure.



REPORT AN INCIDENT OR INJURY NSW Resources Regulator

Notifying the NSW Resources Regulator
 Serious safety incidents that occur at NSW mines, extractives or petroleum sites **must be reported** to the Resources Regulator under work health and safety legislation.

WHAT HAPPENED?	PHONE	REPORT ONLINE	PRESERVE SITE
DEATH, SERIOUS INJURY OR BLIND	IMMEDIATELY	AS SOON AS POSSIBLE	YES
DANGEROUS INCIDENT	IMMEDIATELY	AS SOON AS POSSIBLE	YES
NON-SERIOUS INJURY	NOT REQUIRED	AS SOON AS POSSIBLE	ON REQUEST
OTHER INCIDENT	NOT REQUIRED	AS SOON AS POSSIBLE	ON REQUEST

Further information is available on the Resources Regulator's website at www.resourcesregulator.nsw.gov.au.
 For other types of incidents, contact the Resources Regulator's free incident notification form on our website or call 1300 814 609.

REPORT AN INCIDENT TO THE NSW RESOURCES REGULATOR **1300 814 609**
 Online notification form: resourcesregulator.nsw.gov.au

18 AUDIT AND REVIEW

This plan will be reviewed:

- In accordance with Safety Management Systems audit and review protocol 12 months after implementation and at intervals not exceeding 3 years;
- In the event of an incident or emergency event;
- When there are changes to the workplace;
- When there are changes in the number or composition of workers; and
- When new/changed activities or processes have been introduced.

The audit process will address and ensure:

- This plan is relevant to the current operation;
- This plan is compliant with current legislative requirements;
- This plan is current in regard to management positions and organisational structure;
- The roles and responsibilities are current and relevant; and
- Adequate resources are available to maintain a safe operation.

19 DOCUMENT HISTORY

Revision	Date	Amended By	Reason for Change
0	01/12/2017	Simon Taylor	Document created
1	10/01/2023	Rachael Duff	Document made site specific