

QUARRY BLASTING PROCEDURE

This document specifies all blasting requirements for the site.

Site: Pakenham Quarry

Date prepared: 20.06.07

Shot firer(s) and certificate number(s): Matthew Shinnars (LTU 1036)
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Notification Requirements

Neighbours

Where quarry activities are planned which have the potential for off-site impacts, the following procedure will apply for notifying potentially affected residents:

- Every reasonable attempt will be made to notify all residents living within a radius of approximately 1 kilometre from the quarry prior to blasting.
 - Notify Don Petty by fax (59427482)
 - Notify Michelle Robinson by fax (59427583)
 - Notify Bo Waterhouse by phone when firing in the Southern Extension (0417 517 153)

Note that blasting or other works (except for maintenance) outside of Hours of Operation as set out in condition 13 of the Planning Permit cannot be undertaken without the written approval of the Responsible Authority (Cardinia Shire Council).

Government Department

- Nil

Shire

- Nil

Others

- Staff/employees/contractors notify verbally, place sign in lunchroom and office, place "Blasting Today" in front of office. Notify radio room if blast will affect sales.

Monitoring Requirements

Ground Vibration

- Suitably qualified blasting consultant to complete ground vibration at 3 points if firing in the Western Area (Quarry Office, North East Corner of Site and 650 Toomuc Valley Road.)
- Suitably qualified blasting consultant to complete ground vibration at 4 points if firing in the Southern Area (Quarry Office, North East Corner of Site, 650 Toomuc Valley Road and Waterhouse Shed.)

Air blast

- Suitably qualified blasting consultant to complete air blast at 3 points if firing in the Western Area (Quarry Office, North East Corner of Site and 650 Toomuc Valley Road.)
- Suitably qualified blasting consultant to complete air blast at 4 points if firing in the Southern Area (Quarry Office, North East Corner of Site, 650 Toomuc Valley Road and Waterhouse Shed.)

Videoring

- Video recording (including story board showing; date, time, site aerial photograph grid reference, ground vibration, air blast)

Clearance of persons from hazardous areas / Site Security

Persons on site

- Everyone (all site staff/employees, Drivers and Visitors) to assemble in stockpile area, workshop, office, lunchroom except shot firer and siren operator (in primary booth) or other area as determined by Quarry Manager or Shot Firer
- All road trucks to be parked in stockpile area
- Manager/sentry to check the visitors book to ensure that they have assembled at the office, workshop, lunchroom
- Barricade haul road at pugmill to prevent any vehicles travelling towards shot.

Neighbours / Others

- Manager to drive around site perimeter road to check for neighbours

Blasting Shelter

The approved blasting shelter for this site is a 50 tonne dump truck.

Blast time limitations

Blasting can only occur between 11am to 12pm.

This section summarises the activities involved in conducting blasting operations at the Readymix Quarry and lists the responsibilities and actions required by the various people involved. It lists the decisions and authorisations to be made by the Quarry Manager.

Legend

| Abbrev. | Description | Abbrev. | Description |
|---------|---|---------|---|
| QM | Quarry Manager | C | Contractor: |
| SF | Certified Shotfirer (may be quarry personnel or contractor) | | CD - Contractor – Drilling |
| S | Operator/Siren Operator | | CE - Contractor – Explosives Supply |
| | | | CS - Contractor – Face Surveyor |
| | | | CV - Contractor – Vibration Monitoring |
| D | Decision | L | Loading Crew (may be quarry personnel or contractor): |
| A | Approval necessary | | |
| ✓ | Action by | | |

| Activity | Action by | | | | |
|--|-----------|----|---|----|---|
| | QM | SF | L | C | S |
| Blast Design and Layout | | | | | |
| • Need to blast/decide blast location. | D | D | | | |
| • Visually assess face | ✓ | ✓ | | | |
| • Prepare blast site, access and bunding for drill rig. | | ✓ | | | |
| • Face profiling, hole design, hole layout. | A | ✓ | | CS | |
| Drill Blast Holes | | | | | |
| • Holes drilled to design (record any unusual events during the drilling such as; cavities, soft rock, inability to drill holes in accordance with plan, etc). | | A | | CD | |
| • Front row bore tracked. | | | | CS | |
| • Hole profiles produced and reviewed | A | ✓ | | CS | |
| • Redrill, if required. | | D | | CD | |
| • Install edge protection barrier | | ✓ | | | |
| • Inspect face from floor and note face weaknesses, shattered ground on profiles. | ✓ | ✓ | | | |
| • Check hole depths | ✓ | ✓ | | | |
| • Review Drillers log | ✓ | ✓ | | | |
| Design Blast And Source Explosives | | | | | |
| • Hole loading design and review. | A | ✓ | | | |
| • Prepare hole loading chart. | A | ✓ | | | |
| • Initiation sequence design. | A | ✓ | | | |
| • Determine quantities of explosives and detonators. | | ✓ | | | |
| • Decide on explosive source, i.e. magazine or supplier. | | D | | | |
| • Check availability of explosive supplier; decide time and date and order explosives, including boosters and detonators (if required). | D | ✓ | | CE | |
| • Notify vibration monitoring contractor of shot time and monitoring locations. | ✓ | ✓ | | CV | |
| • Organise loading crew. | ✓ | ✓ | ✓ | | |
| • Check site access for bulk tanker. | ✓ | ✓ | | | |
| • Check exploder is operational | | ✓ | | | |

| Activity | Action by | | | | |
|--|-----------|----|---|----|---|
| | QM | SF | L | C | S |
| <ul style="list-style-type: none"> Check weather forecast. | ✓ | ✓ | | | |
| Day Of Blast - Preliminaries | | | | | |
| <ul style="list-style-type: none"> Observe weather conditions (Blasting is not conducted in overcast and other weather conditions, which are likely to enhance propagation of air blast noise in the direction of sensitive residents/receivers). | ✓ | ✓ | | | |
| <ul style="list-style-type: none"> Decide to proceed with blast. | D | ✓ | | | |
| <ul style="list-style-type: none"> Notify neighbours. | ✓ | ✓ | | | |
| <ul style="list-style-type: none"> Place advisory signs, eg "Danger Charged Shot Holes" | ✓ | ✓ | | | |
| <ul style="list-style-type: none"> Place stemming material near blast holes. | ✓ | ✓ | | | |
| <ul style="list-style-type: none"> Remove all unnecessary machinery from blast area. | ✓ | ✓ | | | |
| <ul style="list-style-type: none"> Display blasting time. | ✓ | ✓ | | | |
| <ul style="list-style-type: none"> Check weather forecast. | ✓ | ✓ | | | |
| Loading Explosives | | | | | |
| <ul style="list-style-type: none"> Ensure no other quarry activities are occurring or can occur on the bench above or below the blasting activities | ✓ | ✓ | | | |
| <ul style="list-style-type: none"> Remove explosives from magazine; transport to site (Explosives should be issued in the order of date of manufacture so that the older explosives are issued first) | | ✓ | ✓ | | |
| <ul style="list-style-type: none"> Bulk tanker arrives at Quarry; and weighs in at weighbridge: Contractors sign in, proceed to blast site and prepare for operation. | | | ✓ | CE | |
| <ul style="list-style-type: none"> Contractor explosive's truck arrives at Quarry; Contractors sign in and proceed to blast site. | | | ✓ | CE | |
| <ul style="list-style-type: none"> Lay out boosters and down hole detonators (keep 1 metre apart, do not drop or throw) | | ✓ | ✓ | | |
| <ul style="list-style-type: none"> Check hole depths and record. | | ✓ | ✓ | | |
| <ul style="list-style-type: none"> Make up primers; lower booster down hole; secure lead line at surface. | | ✓ | ✓ | | |
| <ul style="list-style-type: none"> Determine hole charge from hole depth and density of product plus minimum stemming height. | | ✓ | ✓ | | |
| <ul style="list-style-type: none"> Commence loading and lift primer from bottom. | | ✓ | ✓ | CE | |
| <ul style="list-style-type: none"> Ensure column rises – be aware of the possibility of cavities – especially in front row holes. | | ✓ | ✓ | CE | |
| <ul style="list-style-type: none"> Stop loading at required delivery count and stemming height (mark on hose) or top up to required stemming height – systematically load all blast holes | | ✓ | ✓ | CE | |
| <ul style="list-style-type: none"> Add stemming material allowing for any gassing time. | | ✓ | ✓ | | |
| <ul style="list-style-type: none"> When loading complete, the Contractors clean up the bulk tanker, weigh out and sign out. | | | ✓ | CE | |
| <ul style="list-style-type: none"> Check explosive loading log (including densities) | | ✓ | | | |

| Activity | Action by | | | | |
|---|-----------|----|---|---|---|
| | QM | SF | L | C | S |
| <ul style="list-style-type: none"> Connect up surface detonators, commencing with echelon rows with control row last. | | ✓ | ✓ | | |
| <ul style="list-style-type: none"> Return excess explosives and detonators to the magazines (count stock and record). | | ✓ | ✓ | | |
| <ul style="list-style-type: none"> Ensure loaded shot holes are constantly supervised | ✓ | ✓ | | | |
| <ul style="list-style-type: none"> Remove edge protection barrier | | | | | |
| Firing the Blast | | | | | |
| <ul style="list-style-type: none"> Blast shelter in position. | | ✓ | | | |
| <ul style="list-style-type: none"> Exploder is taken to the shelter, key or handle in Shotfirer's pocket. | | ✓ | | | |
| <ul style="list-style-type: none"> Decide time of blast. | | D | | | |
| <ul style="list-style-type: none"> Advise Quarry Manager and plant operator (for sirens). | ✓ | ✓ | | | ✓ |
| <ul style="list-style-type: none"> Clear workforce and machinery to safe location. | ✓ | ✓ | | | |
| <ul style="list-style-type: none"> Place guards to prevent unauthorised access. | ✓ | ✓ | | | |
| <ul style="list-style-type: none"> Walk the shot to check that all holes have been tied in and that the sequence is correct. | | ✓ | | | |
| <ul style="list-style-type: none"> Connect Lead in Line to Initiation hole. | | ✓ | | | |
| <ul style="list-style-type: none"> Extend Lead in Line to blasting shelter | | ✓ | | | |
| <ul style="list-style-type: none"> Check by radio that control points are secure. | ✓ | ✓ | | | |
| <ul style="list-style-type: none"> Three short warning sirens are sounded to indicate that a blast is imminent. | | ✓ | | | ✓ |
| <ul style="list-style-type: none"> The blasting area is checked to ensure that the blast site is clear. After a pause of at least three minutes, two audible signals are given. | | ✓ | | | ✓ |
| <ul style="list-style-type: none"> The lead in line is connected to the exploder and a final clearance check is made. | | ✓ | | | |
| <ul style="list-style-type: none"> After a pause of at least one minute, a continuous siren is sounded, the exploder is charged and the shot fired as soon as possible after the siren has sounded for at least ten seconds. The siren will cease after the shot has been fired. | | ✓ | | | ✓ |
| <ul style="list-style-type: none"> The cap is removed from the exploder and placed in his pocket and the firing cable removed from the exploder. | | ✓ | | | |
| <ul style="list-style-type: none"> When the dust and fumes have cleared, the blast is inspected for signs of a misfire | | ✓ | | | |
| <ul style="list-style-type: none"> If all holes have fired, the "ALL CLEAR" is sounded by a long continuous siren of 10 seconds duration. | | ✓ | | | |
| After The "All Clear" | | | | | |
| <ul style="list-style-type: none"> Guards or sentries stand down and quarry operation returns to normal. | ✓ | ✓ | | | |
| <ul style="list-style-type: none"> The floor is swept before trucks enter the loading area. | | ✓ | | | |
| <ul style="list-style-type: none"> Excess shock tube is returned to the magazine and the exploder is returned to the safe located in the office. | | ✓ | | | |

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| <ul style="list-style-type: none"> The Blasting Report is made and stock record and Shotfirer's Report completed. | A | ✓ | | | |
| <ul style="list-style-type: none"> Video of blast is viewed. | ✓ | ✓ | | CV | |
| <ul style="list-style-type: none"> Vibration results are reviewed and entered in Manager's Report, pending full report. | ✓ | ✓ | | CV | |
| <ul style="list-style-type: none"> Blast Vibration Report prepared and sent to Quarry. | ✓ | ✓ | | CV | |
| Precautions When A Storm Approaches | | | | | |
| If an electrical storm, thunder storm or dust storm approaches a shot during loading, the Shotfirer must: | | | | | |
| <ul style="list-style-type: none"> If loading can be completed and the shot fired before the storm comes dangerously close then fire the shot. | | ✓ | | | |
| <ul style="list-style-type: none"> If loading cannot be completed then make all circuits safe; collect and return all unloaded explosives to the magazine; withdraw all persons to a safe distance from the blast or any explosive in the course of transportation. | | ✓ | | | |
| <ul style="list-style-type: none"> Keep the blast site under observation from a safe place until the storm passes. | | ✓ | | | |
| <ul style="list-style-type: none"> On the approach of a thunderstorm, all work in magazines must cease, the doors closed and locked, and people withdrawn to a safe distance until the storm passes. | | ✓ | | | |
| <ul style="list-style-type: none"> No person to return to the magazine until the shotfirer determines it is safe to do so. | | ✓ | | | |
| Dealing With Misfires | | | | | |
| <ul style="list-style-type: none"> Establish cause of misfire. | ✓ | ✓ | | | |
| <ul style="list-style-type: none"> Treat misfire as per Attachment 3.18C | ✓ | ✓ | | | |
| Transporting Explosives Around The Quarry | | | | | |
| <ul style="list-style-type: none"> Vehicles used to transport explosives and detonators shall comply with Attachment 3.18G "Vehicles used to transport explosives" | ✓ | ✓ | | | |
| <ul style="list-style-type: none"> The driver has a licence to use explosives | | ✓ | ✓ | CE | |
| <ul style="list-style-type: none"> Explosives shall be transported in Explosive Receptacles complying with Attachment 3.18F "Explosive Receptacles" | | ✓ | ✓ | CE | |
| Storage Of Explosives On Site | | | | | |
| <ul style="list-style-type: none"> Except for when being transported or used in a blast, explosives must be stored in a licensed magazines. | ✓ | | | | |
| <ul style="list-style-type: none"> The location, magazine construction and installation shall comply with the requirements of Attachment 3.18E "Magazine Specifications". | ✓ | | | | |
| <ul style="list-style-type: none"> The keys to the magazine shall be in the control of the Shotfirer when on duty or else securely locked in the safe. | | ✓ | | | |
| <ul style="list-style-type: none"> The magazine shall be kept locked at all times, other than when explosives are being placed in or removed | | ✓ | | | |

| Activity | Action by | | | | |
|--|-----------|----|---|---|---|
| | QM | SF | L | C | S |
| from the magazine or during stock take. | | | | | |
| <ul style="list-style-type: none"> Persons not authorised by the Quarry Manager or Shotfirer must not enter the magazine. | ✓ | ✓ | | | |
| <ul style="list-style-type: none"> All explosives in the magazine must be in enclosed cases, which are appropriately marked. | | ✓ | | | |
| <ul style="list-style-type: none"> Damaged or defective explosives must be labelled and stored in the magazine and until destruction/disposal in a safe manner as per Attachment 3.18D. | | ✓ | | | |
| <ul style="list-style-type: none"> Refuse, rubbish, empty boxes and dry grass must be kept away from the magazines; empty boxes must not be stored in magazines; the interior of the magazine must be kept free from grit and explosive spillage. | | ✓ | | | |
| <ul style="list-style-type: none"> There must be no smoking within 10 metres of magazines; items likely to cause fire or explosion must not be brought within 10 metres of magazines. | | ✓ | | | |
| <ul style="list-style-type: none"> The motors of any vehicles in the vicinity of a magazine must be switched off before the magazine doors are opened. | | ✓ | | | |
| <ul style="list-style-type: none"> Magazine contents shall be checked at least weekly | | ✓ | | | |
| Theft Of Explosives | | | | | |
| <ul style="list-style-type: none"> Theft of explosive or any unaccountable stock shortages shall be reported appropriately. Explosives shall be regarded as accountable items and any evidence of attempted forced entry to, or theft of explosives from, a magazine or an unaccountable stock discrepancy shall be immediately reported in accordance with the relevant legislation, to the regulatory authority and the police. The records shall be readily available to permit the determination of the type and quantity of missing explosive. | ✓ | | | | |
| Fire | | | | | |
| <p>If a small fire occurs in the magazine are then-</p> <ul style="list-style-type: none"> Secure the magazine Small fires outside the magazine can be tackled with a fire extinguisher. If the fire persists after using the fire extinguisher then follow the procedure for bushfire. | ✓ | | | | |

| | | | | | |
|---|--|--|--|--|--|
| <p>If a bushfire threatens an area containing an magazine then—</p> <ul style="list-style-type: none">• any explosives or detonators situated outside shall be promptly placed inside the magazine or removed to a safe location;• the magazine shall be closed and locked;• every person shall be withdrawn to a designated safe area prior to the arrival of the bushfire;• the person in charge of the magazine shall be available to advise and assist the local firefighting authority; and• no person shall return to the external magazine until a competent person determines that it is safe to do so. <p>Due to the considerable risk to firefighters, fires in proximity to magazines or within magazines should not be fought, all personnel should be removed to a safe location and access to the magazine secured.</p> | | | | | |
|---|--|--|--|--|--|