Work Plan Description

for

Hexham Wind Farm Pty Ltd

Extractive Industry Work Authority WA00####

To Be Assigned

RRAM Designation:- ***To Be Assigned***

HEXHAM

WA00#### – Hexham Wind Farm Temporary Quarry
'Woorabinda', off Keilors Road
CARAMUT 3274

Project No. W10_001
27 November 2025

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Revision History

Document Date:	Description:
15 Oct 2024	Draft A of Work Plan Description
11 Nov 2024	Draft B of Work Plan Description
12 Jan 2025	Draft C of Work Plan Description
30 Jan 2025	Draft D of Work Plan Description
28 Jun 2025	Draft E of Work Plan Description, updated IMMP description based on recent ERR Comments
7 Nov 2025	Draft F of Work Plan Description
27 Nov 2025	Draft G of Work Plan Description

1. INTRODUCTION

1.1. PLAN INFORMATION

Plan ID
To be assigned

Tenement
To be assigned

Plan Type
Work Plan

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Project Name
Hexham Wind Farm Pty Ltd Temporary Quarry

1.2. PLAN DESCRIPTION

NOTE to reader. This draft Work Plan is to inform the Hexham Wind Farm Environment Effects Statement (EES). It adopts the format, process and risk assessment methodology as required by the *Mineral Resources (Sustainable Development) Act 1990*, the *Mineral Resources (Sustainable Development) (Extractive Industries) Regulations 2019*, and gives consideration to the *Preparation of Work Plans and Work Plan Variations – Guideline for Extractive Industry Projects*, December 2020, and *the Preparation of Rehabilitation Plans – Guideline for Extractive Industry Projects*, March 2021.

A Work Plan, as approved by the Earth Resources Regulator, comprises four main documents that become the compliance documents for the quarry. Supporting these compliance documents are a number of technical studies and adaptive management plans. The four main compliance documents are the Work Plan Description (this document), a detailed Risk Management Plan (yet to be drafted), including relevant risk assessments, risk treatment plans and control measures, a Rehabilitation Plan (included with this submission) and a Community Engagement Plan (yet to be drafted).

It is emphasised that these four components of the Work Plan will become the compliance document for the site, and that the Work Plan as presented here, including all other supporting documents and reports, will not be the final version of the Work Plan once approved by the Earth Resources Regulator. If the Wind Farm project is approved by the Minister for Planning , a revised draft of the entire Work Plan will be required to first address any Ministerial requirements from the assessment of the EES and then any additional requirements of the Earth Resources Regulator once submitted for final approval.

The purpose of this draft Work Plan Description is to outline the quarry development and draws on available information from the technical studies undertaken for the EES.. Evaluation of the technical studies identifies that only the standard quarrying controls are required to adequately address the EES Scoping Requirements.

Some of the documents referenced by this Work Plan Description are not included as they are supplied elsewhere in the application or are yet to be developed, subject to the Ministerial Assessment of the EES.

Hexham Wind Farm Pty Ltd will be complying with all requirements of the *Mineral Resources (Sustainable Development) Act 1990* and associated Regulations in force at the time when the final Work Plan is submitted for approval.

This Work Plan relates to a greenfields site on private land within the precincts of the Hexham Wind Farm. This Work Plan supports a new Work Authority application to supply the estimated **1 million cubic metres**

(approximately 2.2 million tonnes) of the material for the construction material for the Hexham Wind Farm roading network and lay down areas.

The Work Authority will only supply material to the wind farm project and there will be no sales to, or access by, the general public or non-wind farm related entities.

All extractive industry related traffic and equipment will access the Work Authority from the private roading network within the landowner's property. There is no access directly onto public roads from the Work Authority for quarry equipment or traffic.

This Work Plan describes:

- ⇒ the risk-based Work Plan approach for all operations, required by extractive industry legislation
- ⇒ the community engagement plan, required by extractive industry legislation
- ⇒ the final landform and rehabilitation plan required by extractive industry legislation
- ⇒ the extraction, processing, rehabilitation methodology and ancillary processes adopted on the site.

The site address of the Work Authority, as listed on the planning property report, is Barwidgee Road, Caramut, but is located on the 'Woorabinda' property and accessed off Keilors Road to the south. The site is approximately 6.5km south of Caramut, 13km west of Hexham, or approximately 14km west of Mortlake, see Figure 1 Regional Plan. The Work Authority is entirely within land owned by the Kelly Family, and would be leased to Hexham Wind Farm Pty Ltd, see Figure 2, Location Plan. The Work Authority is located within parts of Lot 4 and Lot 5 of TP161627 and is located on the northern side of the private road within the Kelly land holdings.

Quarry materials will only be used to establish the wind farm infrastructure, such as the roading network, internal access tracks, hardstand areas and other laydown areas. The internal roading network will be used as much as possible for the supply of the construction materials.

The site will be a traditional drill and blast basalt quarry and will operate with either two 6-8m faces or a single 13-15m face (depending on overburden depth, product requirements and rock quality). The final rehabilitated landform will not leave any exposed rock faces, with all rock faces rehabilitated with overburden and soil to batters not steeper than 1v:4h for a return to general farming. This Work Plan describes a significantly larger resource and area than is required to achieve the estimated wind farm project needs to allow for contingencies in material requirements, variation in material quality and to provide access to suitable clayey and heavily weathered material to achieve the final rehabilitated landform

The site will operate with a base of 4-5 employees directly related to the extractive industry. The rate of extraction will be determined by wind farm construction scheduling and is expected to be approximately 1,000,000 tonnes per annum.

Descriptions of the geological information, the sensitive receptors and quarry operations are detailed in the following sections, with reference to the included maps.

1.3. CURRENT AND PAST LAND USES

The site is freehold/private land, with no depth limit, leased by Hexham Wind Farm Pty Ltd from Anthony Kelly, the farm owner.

As at October 2025, there are no Mining Licences nor any Minerals Exploration Licences over the Work Authority.

The site is on a working sheep and cattle farm, with parts of Work Authority area utilised for pasture hay. These farming activities have been occurring on the property for multiple generations.

Areas of the Work Authority not immediately required for quarrying or extractive industry related activities will continue to be used for grazing livestock and other agricultural purposes.

The land is fully covered by a Farm Zone in the Moyne Council Planning Scheme. The land tenure and depth limitations are presented under Area Details in Section 5.1.

Certificate of Title

The Work Authority is Part of Lot 4 / TP161627 and Lot 5 / TP161627. Parent Title Volume 03946 Folio 199.

A Caveat in favour of Hexham Wind Farm Pty Ltd exists on the title.

Copies of title and title plan are attached.

Planning Property Reports

The property is entirely located within a Farming Zone under the Moyne Council Planning Scheme. Part of Lot 5 is impacted by an area of Aboriginal Cultural Heritage Sensitivity (ACHS). The Work Authority avoids this ACHS area, see Figure 2 Locality Plan.

The Planning Property Reports are attached for Lot 4 and Lot 5, TP161627.

2. GEOLOGICAL INFORMATION

2.1. SITE GEOLOGY

The local site geology of the Hexham Wind farm Temporary Quarry is based off the resource definition drilling borehole logs. The borehole logs indicate that the site is comprised of basalt of varying weathering grades, with a thin regolith or alluvial deposits on from the ground surface. The general weathering profile within the basalt follows a uniform grade from extremely weathered at the surface, to slightly weathered or fresh at depth. In some instances, zones of increased weathering can be found (e.g. a zone of highly weathered material within generally fresh material). The thickness and depth of each weathering grade vary between borehole locations. A detailed assessment of the regional geology and site geology is described in the Hexham Wind farm Quarry – Geotechnical Competent Persons Letter, prepared by Civil Mine & Quarry Geotechnics.

The resource at the site has overburden ranging from almost zero to approximately 14m in depth and comprises clay and extremely to highly weathered basalt. The basalt resource is typically porous with minor vesicular intervals near the surface and at the base of the flow. There appears to have been partial alteration and weathering within the deeper parts of the flow which will dictate quarry face heights if / when higher quality products (such as aggregates) are required.

By adopting selective quarrying, scalping and blending techniques the basalt resource will be capable of producing a wide range of quarry products to meet the needs of the Wind Farm roading and hardstand areas and potentially other infrastructure needs. Overburden and more heavily weathered basalt will be used to achieve the comparatively flat rehabilitation batters

Geological Investigation

The Work Authority site was ultimately selected by considering the often-contradictory objectives of avoidance and minimisation of impacts, geological suitability, resource availability, resource suitability and lastly, site accessibility. The first step in the quarry identification process was a desk top assessment of the wind farm project area overlaid with known constraints and “no-go” areas as determined through environment impact assessments, cultural heritage assessments and landowner engagement. Publicly available geological mapping was then used to identify potential locations that were not constrained and met the minimum Work Authority area criteria that included suitable resource area as well as suitable area for plant and stockpiling.

The next step was to reality test these areas against aerial photography, both current and historic, looking for signs of rocky out crops, inundation, and / or pasture establishment.

Following the desktop assessment, potential sites were then compared to landowner’s holdings and the individual landowner’s appetite for a quarry on their land in addition to other wind farm infrastructure. The outcome from this discussion identified several potential sites that were earmarked for ground truthing by a site visit and walk over.

The ground truthing visit further narrowed the potential sites and identified other potential sites that were not obvious from the desktop assessment and involved the interested landowners and drew on their local knowledge. A review of these sites and the landowner’s enthusiasm for a quarry reduced the potential sites to a total of four, that was further reduced to three for preparation of the conductivity survey (keeping the

fourth site as a contingency). After completing the conductivity survey of these three sites, one site was rejected, one site selected for drilling, and the remaining site retained as a contingency

A percussion drilling and sampling program was then prepared for the chosen site consisting of 25 holes to a depth of 18m. Samples were collected at 1.8m intervals, dried, washed, logged and photographed, and geological model of the site prepared. Four of the exploration holes were cased with PVC pipe for preliminary groundwater level monitoring. The location of the drill holes and monitoring holes are shown on Figure 3 Site Layout Plan.

The extraction area described by this Work Plan has been designed as a maximum area to allow for the inherent variability of the basalt, contingencies in the required tonnages, and interaction with the groundwater therefore it is probable the final extraction area will be less than the maximum area this Work Plan describes. Based on the geological model and Wind Farm project requirements, a minimum extraction area of 10 hectares is required. This Work Plan describes an extraction area of 21.5ha, to provide ample contingency in material requirements as well as allowing flexibility to quarry the resource.

The geological model developed from the drilling program indicates a variable quality basalt resource of with depth of approximately 10-18 m. The identified resource has a deep and variable weathering profile and from logging of percussion chip samples, demonstrates large areas of alteration. The resource investigation identified “pockets” of fresh material that could potentially be “high graded” and meet Vic Roads specification, however, overall, the material is more suited for producing “commercial crushed rocks” suitable for the construction of the roading network, access tracks, hardstand areas and laydown areas. Additional resource testing and identification will be required if the resource is to be considered for supplying concrete aggregates (meeting the concrete aggregate quality specification).

The extraction area has identified a viable resource of at least of 2.1 million tonnes of fresh to moderately weathered basalt, suitable for the high grade crushed rocks or aggregates and 2.4 million tonnes of “salamander”, or low grade crushed rock, with an additional approximate 730,000 cubic metres of clayey overburden and extremely to highly weathered material. In addition, the Work Plan describes a shallow clay extraction area to be levelled for overburden storage that could be used to obtain additional material to complete the rehabilitation of the site if required. The purpose of including the clayey/ extremely weathered material within the overall extraction area is to provide additional fill material, if required for the project, to allow water storage dams to be constructed within the extraction area and to ensure that all the material to achieve the rehabilitation landform is available onsite.

The geological model developed from the investigation programs has been used in designing the extraction and rehabilitation sequence outlined in this proposal and has been used to support the geotechnical assessment of the terminal and rehabilitated batters.

There is no known contaminated land, no known slimes storages or decommissioned slimes storages and no underground workings on the site.

There are no known geological structures that would adversely affect the stability of the operation, and the extraction will remain above the water table.

2.2. ESTIMATED RESOURCE

The resource figures have been estimated from the available information and have been calculated from the total volume of the design from 3D terminal pit modelling, incorporating a single terminal face profile and topographical data.

It is noted that a significantly larger resource than is required by initial estimates of the project has been identified. Whilst this Work Plan describes a disturbance area of 39.4 hectares and has the potential to yield 3.5 million tonnes of fresh to moderately weathered basalt, the extraction area has been reduced to 21.5 hectares, with the “contingency” area included to allow the out of pit stockpiling of overburden.

A simplified geological interpretation is shown on the sections presented on Figure 3 Site Layout Plan.

- the top 200mm of material is treated as **soil** and used or stockpiled separately for rehabilitation. and totals approximately **73,000 cubic metres**.

- there is a highly varying level of clayey **overburden** and extremely to highly weathered material that is easily diggable. This can range from almost zero up to 14m in depth. The extraction area has been designed to include areas of the deeper weathering to provide access to suitable material for rehabilitation. The total volume of overburden is **730,000 cubic metres.**
- The quantity of highly weathered to moderately weathered **basalt** (salamander) totals approximately **2.4 million tonnes**. (or 1,100,000 insitu cubic metres blasted material)
- The quantity of fresh to moderately weathered **basalt** totals approximately **2.1 million tonnes**, (960,000 insitu cubic metres blasted material)

The total basalt resource available withing the basalt extraction area described by the Work Plan is more than sufficient to meet the wind farm needs and to provide flexibility in quarrying.

The site has the ability to supply a wide range of road base and potentially aggregate products to meet the construction needs of the wind farm, including a "soft" crushed rock that is suited to low volume / light trafficked tracks and paths.

3. QUARRY OPERATIONS

Note that there will be no fixed plant associated with the extractive industry on this Work Authority. Crushing and screening will be undertaken with mobile, self-powered crushing units. If the Wind Farm project goes ahead, it is proposed that site access for heavy and light vehicles will be from Keilors Road to the south, or as recommended after the Minister makes an assessment of the Environment Effects Statement.

3.1. AREA OF EXTRACTION & DISTURBANCE

The Work Authority Area is: 52.3 hectares.

The Extraction Area is: 21.5 hectares.

The total Disturbance Area is: 39.4 hectares.

The total disturbed area is inclusive of the extraction area, processing area, infrastructure and site access areas, and product, soil, clay and overburden stockpiles.

The extent of the extraction and disturbance areas is shown on Figure 3 Site Layout Plan. A minimum 20m buffer will be maintained between the extraction limit and the Work Authority boundary. It is noted that the Work Authority is not aligned to any title boundaries to avoid all the identified "no-go" areas, and sits approximately 100m from the northern title boundary, which is land owned by a neighbour, at least 10m from the eastern title boundary, approximately 15m from the southern title boundary and in the order of 40m from the western title boundary – all land is owned by the Kelly family. As required by the Earth Resources Regulator, the Work Authority boundary will be marked out on the ground with white posts, and the extraction limit marked out with yellow posts.

Given the short life span of the quarry, and the required production rates, there will be limited opportunity to achieve any significant progressive rehabilitation. The proposed maximum disturbance area at any time is estimated to be 39.4 hectares, comprising of:

⇒ approximately 21.5ha extraction area (which may include some product stockpiling and /or processing),

⇒ approximately 10.2ha out of extraction area for overburden and soil storage areas

⇒ approximately 3.0ha out of extraction area for processing operations.

⇒ approximately 3.2ha out of extraction area for hardstand, product stockpiling and site infrastructure.

⇒ approximately 1.5ha out of extraction area for soil bunds/stockpiles, drainage measures, site entrance and other sundry disturbance.

3.2. METHOD AND SCALE OF OPERATION

It is anticipated that the quarry will be operational for approximately two years, with a 3 to 6-month period, depending on weather conditions, to complete the final land forming activities. This phase will be followed by a period of monitoring and remediation of the rehabilitation and the Work Authority surrendered only when all the rehabilitation criteria are met.

The site will employ both traditional soft rock and hard rock extraction techniques. Soft rock extraction (excavator, dozer, truck) is to remove the diggable overburden (i.e. clays and extremely to highly weathered basalt) and the hard rock methods (drill and blast) will be utilised to extract the harder basalt. Product classification will be based on project design requirements and is predominantly focussed on the basalt's physical properties. The site will employ a small permanent workforce that will be supplemented with casuals and/or contractors as required for specific activities such as, but not limited to, stripping, drilling and blasting and rehabilitation works.

The production output for the quarry will be matched to meet the needs of the Wind Farm and will vary considerably across the life of the project, with the plant and stockpile area designed to be sufficient to allow at least two mobile crushing units to operate concurrently to meet peak demand. The quarry will undergo significant activity in the early stages of the project as it produces road base material to construct access roading infrastructure, then the hard stand areas for each wind turbine generator (WTG) and will taper off as construction of the WTGs and associated infrastructure occur.

Soil will be stripped and initially stockpiled outside the active extraction area, but within the disturbance area, close to where it will be required for rehabilitation, then either hauled directly to prepared progressive rehabilitation areas or stockpiled within the storage area north of the pit for later use in rehabilitation.

A brief summary of the extraction process is presented below.

- ⇒ soil removed and stored in temporary stockpiles within the disturbance area
- ⇒ overburden removed and placed in storage areas or used directly in any progressive rehabilitation for backfilling / reprofiling or to construct water storage dams.
- ⇒ resource extracted and hauled to the processing plant, or processed through a mobile processing unit close to the quarry face
- ⇒ cut-off drains, soil bunds and other surface water management control features will be continually updated and modified to ensure sediment-laden water is directed to sediment traps or the quarry sumps and clean water is directed away from disturbance areas.

The progress of works and any potential for progressive rehabilitation will be reviewed on a regular basis to ensure the rehabilitation activities and suitable material are effective in meeting the rehabilitation objectives.

3.2.1. Depth of Extraction

To allow for the inherent variability of the resource a maximum design depth of 14m (as measured at the terminal boundary) has been adopted. The base of extraction will vary according to the resource and the landform, with the floor a little deeper toward the east and south-east and needs to allow for the quarry sump(s) in a low point of the quarry floor. Therefore, the excavation will be down to approximately RL 126m in the west of the pit with a maximum depth of the excavation in the east (i.e. at the base of the quarry sump) being at approximately RL 122m.

The maximum depth of the excavation at the terminal batter will be 14m.

3.2.2. Volume of Extraction

The maximum total volume of the extraction, excluding topsoil, is approximately **2.8 million cubic metres**, but it is noted that this includes the entire extraction area being excavated to 14m, an unlikely event.

Overburden consists of clays and extremely to highly weathered basalts and may include some quarry waste rock.

The depth of overburden varies significantly across the site and will ultimately be determined by project requirements. If fit for purpose, diggable material (i.e. overburden) may be provided to the wind farm project

to meet the low-quality requirements or 'soft' crushed rock product, traditionally used for pedestrian paths or low volume light vehicle tracks.

Diggable material may also be blended with the blasted basalt at varying proportions to make a fit for purpose low grade crushed rock, and make better utilisation of the resource

3.2.3. Proposed Stages of Extraction

The various products often required by a quarry can range from spalls or rip rap (most typically used for waterway works) through to usual fine crushed rocks for road and hardstand construction. Typically, the broken (blasted) material is loaded into dump trucks and taken for crushing and processing at the plant to produce a range of crushed rock products and potentially aggregates or stockpiled within the disturbance area. It is also probable that some products (i.e. rip rap) may be sorted and stockpiled on the excavated quarry floor, at or close to the working face, where they will be loaded directly into road trucks for despatch.

It is anticipated that the operation will produce an excess of overburden/waste rock with respect to the minimum required to achieve the rehabilitation objectives.

The progressive development of the extraction area is provided schematically in Figure 3 Site Layout Plan.

Quarried areas and terminal faces will be rehabilitated as soon as practicable after they are established and returned to pasture, although it is noted that given the short life span of this quarry and the high production rate, opportunity for progressive rehabilitation will be limited.

The staging of the quarry development has been designed to expose the material of required quality and to accommodate the predicted maximum groundwater and surface water inflows.

Stage 1A will involve the initial groundbreaking and open an extraction area of approximately 4.4 hectares to the full depth of the resource. Initial collected water management will be via irrigation in the north west of the Work Authority, and as Stage 1A develops, and if groundwater inflows require it (as predicted by the groundwater impact assessment – see Section 4.6), a temporary water storage dam will be constructed within the area of Stage 2A, west of Stage 1B. Overburden will be temporarily stockpiled in the Overburden Storage Area to the north of the extraction area.

Stage 1B will involve developing the remaining 2.9 hectares of Stage 1 to the south, creating the eastern and southern terminal profiles, and when a sufficient excavated footprint has been achieved, construction of in-pit water storage dam within the worked out area of Stage 1A, with excess overburden stockpiled in the Overburden Storage Area to the north of the extraction area.

Stage 2A will involve extending the extraction area approximately 3.4 hectares to the west, along the southern extraction boundary, removing any temporary water storage dam, with overburden from this stage being used to back fill the quarry floor in Stage 1A (apart from the water storage dam) and other suitable areas of Stage 1 as much as possible. Any excess overburden will be stockpiled in the Overburden Storage Area to the north of the extraction area, or alternatively, if conditions allow it, overburden from the Overburden Storage Area may be moved into the quarry floor to continue progressive rehabilitation.

Stage 2B will initially be used to stockpile excess overburden and potentially lower grade products, or if the resource is suitable, may be extracted to meet the project needs. A larger in-pit water storage dam will be constructed within the worked out and partially backfilled area of Stage 1B and sized to accommodate the increased capture of surface and groundwater within the expanding pit.

Stage 3A will involve extending the extraction area approximately 5.1 hectares to the west and progress up to the western terminal profile if required. Overburden from this stage will be used to backfill the quarry floor in Stage 2A and any other suitable areas that are exhausted of resource. The in-pit water storage dam within Stage 1B will be resized, if necessary, to further accommodate the increased capture of surface and groundwater within the expanding pit.

Stage3B may be used to stockpile excess overburden and potentially lower grade products, or if the project requires additional material, may be extracted to meet the project needs.

The balance of land within the Work Authority not used for quarrying and ancillary operations and any rehabilitated areas of the site consistent with requirements may, by agreement with Hexham Wind Farm, continue to be used by the land owner for agricultural or other purposes in accordance with the Farming Zone over the land.

Only those areas approved in the Work Plan will be opened for quarrying and ancillary operations.

Imported Material: The definition of "imported material" under the current legislative environment is very broad and essentially encompasses any product brought onto the site. Traditionally products such as cement and or lime for producing stabilised crushed rocks, plastic or non-plastic fines to adjust the plasticity index of crushed rocks can potentially now fall under the "waste" definition of the EPA. Additionally, the site has the capacity to accept large quantities of "imported materials" from the wind farm project, which will typically include 'paddock rock' and/or 'clean fill' (uncontaminated soil, including gravel and rock) from across the Hexham Wind Farm Project. If suitable, this material will be processed and blended with the quarried products to be re-used on the project or alternatively used to assist in rehabilitation. Whilst the volume of overburden and quarry waste rock material generated by the site is more than sufficient to fulfil the rehabilitation requirements (see Section 3.5 of the Rehabilitation Plan), imported soil or clean fill, can be accepted to supplement material use across the whole wind farm project as well as quarry site rehabilitation.

It is emphasised that any material brought to the site will and have the appropriate determination and be in accordance with the Imported Materials Management Plan (see also Section 3.5.5).

3.2.4. Design of Extraction Pit

Working faces and terminal faces are shown diagrammatically on the Typical Method of Working inset on Figure 3 Site Layout Plan. The site will operate with either a two-face (i.e. two 6-8m faces) or a single face (i.e. 13-14m face), depending on overburden depth, rock quality and product requirements. Working two faces allows the quarry to selectively extract and process higher quality material to meet specific product quality requirements, for example Vic Roads specified crushed rocks, when necessary.

The terminal pit is designed as a single maximum 14m high face.

Overburden thickness is very variable, ranging from virtually zero to 14m.

Terminal Face Design (see inset Typical Terminal Crest Treatment on Figure 3 Site Layout Plan):

- Maximum number of faces = 1
- Maximum face height = 14m
- Terminal face angle = 80 degrees
- Maximum number of berms = n/a
- Minimum berm width = n/a
- Overall terminal wall angle / batter slope (top crest to bottom toe) = 80 degrees.

NOTE: Working faces may be steeper or flatter than the terminal design above, with the faces in the diggable material at 1V:0.3H and the blasted face typically about 80 degrees, see Typical Method of Working inset on Figure 3 Site Layout Plan. Terminal faces will be heavily scaled to ensure all loose material is removed from the face, prior to backfilling.

Where practical, safety bunds are established along the edge of pit ramps and all quarry faces. Safety bunds are constructed at an appropriate height, width and durability to withstand forces from the vehicles moving through that area. Where not practical other appropriate safety measures will be adopted to restrict access to the crest.

All slopes / batters including excavations, roadways, stockpiles and dumps are constructed and maintained to ensure stability. If there is a significant slope failure event, operations will cease in that area, the relevant authority notified, and the appropriate steps taken to address the incident.

3.3. PROCESSING METHODS & FACILITIES

The site will operate as a traditional hard rock crushing and screening operation, i.e. dry processing. There will be no washing of material on this site and therefore no production of slimes, and no past or present requirement for slimes dams.

The broken material may be sorted and stockpiled on the quarry floor, close to the face with a front-end loader and/or excavator to produce a rip rap / armour material if required or loaded into haul trucks and transported to the processing plant by front-end loader. Most commonly, material will be loaded into dump

trucks and taken to the processing plant. If production or demand require it, additional mobile crushing and screening units may also operate on the quarry floor as well as the processing area.

The site will operate with at least one, and potentially multiple mobile units to achieve the required production rates. The precise number and location of the mobile plants cannot be specified, as they will move around the site as the quarry develops and production peaks, but will always be within the authorised disturbance area, either in the excavation or in the processing plant area, as shown on Figure 3 Site Layout Plan

3.3.1. Fixed Plant

There will be no fixed plant on this Work Authority.

3.3.2. Mobile Plant

The site will employ (self-powered) mobile crushing and screening units to produce the range of aggregates or crushed rock products for the Wind Farm. The location of the mobile crushing and screening plant(s) is shown schematically on Figure 3 Site Layout Plan. The mobile processing plant will move around the site depending on blasting requirements, product stockpiles and traffic management priorities.

Mobile plants are typically more streamlined than a fixed plant as they are tailored to producing a narrow product range. Mobile plants generally consist of a primary and secondary crushing units, screens, sizing units, stacking conveyors and blending units to produce and stockpile the required end products. The mobile plants require loaders and/or excavators to feed the self-powered plant, and to assist in stockpile management.

Other mobile plant most frequently used for extraction will comprise an excavator and/or dozer for stripping to remove soil, overburden and highly weathered rock, and a drill rig for drill and blast to extract the harder, fresher rock. Front-end loaders, excavators or haul trucks will be used for material cartage.

Front-end loaders will also be used for product movement, stockpile duties and road truck loading, as well as general site tidy up works.

A dozer will also be used to push out backfill material, prepare and tidy up quarry floor, pushing overburden and for profiling overburden mounds.

A road grader will be used to maintain all internal roads and for the final profiling of rehabilitated areas.

A water cart / water tanker truck, and dedicated employee, will be available for dust suppression.

The earthmoving and mobile processing equipment will vary as demand requires but equipment choice will always be in consideration of meeting noise limit requirements.

All mobile equipment is serviced and operated by qualified personnel. All self-powered equipment will be fitted with appropriate noise suppression, spark arrestors, roll-over structures and fire extinguishers.

In addition to the standard equipment, specialised equipment may be brought in as required (e.g. cranes or elevated platforms) for plant maintenance, etc.

3.4. STOCKPILING FACILITIES

3.4.1. Topsoil

Stockpiling of soil and overburden will take place when the sequencing of stripping, extraction and progressive rehabilitation does not allow direct placement.

Soil is stripped and placed in windrows to assist in surface water diversion, then either used directly in progressive rehabilitation or stockpiled. Soil stockpiles will be limited in height to not greater than 2m and will be contoured and grassed to manage erosion until they are required for use in rehabilitation.

The location of soil stockpiles is shown schematically on Figure 3 Site Layout Plan. Soil stockpiles will not be retained post closure.

3.4.2. Overburden

Overburden will initially be stripped and placed in the overburden storage area to the north of the extraction area. As the excavation area increases, overburden will be used to create an in-pit water storage dam, with

excess overburden then used directly in progressive rehabilitation, backfilling the quarry floor and then the terminal batters as sufficient area is available and not required for water management. Excess overburden will be placed on the surface in the Overburden Storage Area. Overburden may also be blended with plant waste rock, imported material or other materials to create low grade products, such as "soft crushed rocks" or stockpiled on the quarry floor for use in backfilling and other rehabilitation activities.

Overburden stockpiles within the worked-out areas will be limited in height to a maximum 15m, and as they are only temporary, will not be benched, whilst overburden stockpiles located on the natural surface, within the disturbance area, will be limited to 8m in height. Overburden stockpiles will always be located to not impact the overall risk assessment of the site. Overburden stockpiles will have 1V:2H side slopes with a contour drain at the base of the stockpile to direct any runoff into the site drainage control system. Overburden stockpiles will be contoured and vegetated as required or otherwise stabilised to manage erosion.

The location of Overburden Stockpile Area, stockpile pads and stages to be backfilled into the floor of the pit is shown on Figure 3 Site Layout Plan. Stockpiles will always be located with a minimum 10m setback from any extraction crests.

3.4.3. Product

Product stockpiles will generally be located close to the entrance to the Work Authority to minimise the interaction of road trucks and heavy quarry equipment. If required, (i.e. to meet periods of very high demand) additional stockpiling of products may occur within the extraction area footprint, either in worked out areas of the pit or on the surface on prepared hardstand areas but always will be within the authorised disturbance area.

The maximum height of product stockpiles will be 12m and will generally be located close to the processing plant. Mobile processing plant units include stacking conveyors and the created product stockpiles may be as high as 12m under the stacking conveyors. Product stockpiles created by front-end loaders will typically be 4m high but could reach a maximum 12m if ramped.

By their very nature, product stockpiles are dynamic as they are continuously created and then removed. The indicative location of product stockpiles is shown on Figure 3 Site Layout Plan and will always be located with a minimum 10m setback from any extraction crests.

3.5. OTHER QUARRY INFRASTRUCTURE

3.5.1. Site Office, Amenities, Operational Support and Maintenance Areas

The typical infrastructure associated with an extractive industry will be located on site, such as a site office, amenities and other miscellaneous site huts. Other infrastructure will include a weighbridge, light vehicle parking for employees and visitors, a workshop, heavy vehicle parking, maintenance facilities, storage sheds, vehicle wash-down and hardstand areas for basic servicing and maintenance of mobile plant. This infrastructure will be in the southeast corner of the Work Authority. Refer to Figure 3 Site Layout Plan

Wheeled vehicles are generally accommodated in the heavy vehicle parking area next to the workshop when the site is not in operation, while tracked vehicles are generally parked in a safe place within the pit. The heavy vehicle accommodation will always be within the extraction area and/or workshop area.

There is no mains power on the site and generators will used to provide 240V power to the site infrastructure as required.

3.5.2. Fuel and Hydrocarbon Storage

All equipment on site is self-powered, and will require frequent refuelling, which may require more than one fuel storage facility. All hydrocarbon storages will be self-bunded with an expected fuel capacity for approximately 10,000 litres of diesel and 1000 litres of petrol, as well as stores for oil and other hydrocarbon and oxyacetylene will bel located in the workshop area (all fuel and hydrocarbon storage is AS1940 compliant).

3.5.3. Water Usage and Supply Infrastructure

Process water (which is clean water to be used for dust suppression, in crushing and screening, wetting of aggregate stockpiles, or irrigation of rehabilitated areas) will be obtained from the collected incident rainfall on disturbed areas and licenced groundwater extraction.

Process water will be used for dust suppression on the access road, hardstand and the quarry floor and irrigation on the site. There will be no washing of clayey sands or overburden on the site.

Incident rainfall is directed to quarry sumps and/or in-pit water storage dams located in the base of the excavation. The exact location of sumps, pipes, drains and pumps is dynamic as excavation progresses. The quarry sumps and larger in-pit water storage dams are designed to keep the pit floor dry and keep water away from the extraction faces.

Typical annual water usage for this site (as based on the predicted output and operations) is in the order of 15 megalitres for dust suppression.

There is no mains water supply to the Work Authority, with on-site requirements for potable water utilising rainwater collection and non-potable water transported to site if required. Additional bottled water for consumption will be supplied at the site as required. As a contingency, non-potable water may be used in amenities and for dust suppression around the plant and working areas.

3.5.4. Water Management Infrastructure

The pit will be operated dry and dewatering will be required. An environment impact assessment, Appendix B – Hydrology and hydrogeology has been prepared by Water Technology for the Environment Effects Statement. This impact assessment indicates that sufficient incident water is available to meet the quarry needs, and that the surface water capture and groundwater inflows can be managed via a closed system, utilising irrigation and water storage dams. Any collected rainfall on disturbed areas will be directed to the quarry floor and adequately contained by the site drainage system, quarry sumps and/or in-pit water storage.

Due to the dynamic nature of the earthworks around the site, the detailed location of the water management infrastructure changes constantly with the progression of extraction and rehabilitation works. The over-riding objective of the adaptive Surface Water Management Plan for managing the water on site is to divert surface water runoff from undisturbed areas away from disturbed operational areas and to collect all runoff from disturbed areas in the quarry excavation via sumps and sediment ponds. The location of these features is stage-dependent and will be relocated about the site as extraction progresses.

The water modelling indicates that there will be groundwater and surface water collecting in the excavation and this Work Plan describes several contingencies for managing the water balance that includes irrigation, in-pit water storage dams, and, with appropriate licences obtained, potential supply of water to the Hexham Wind Farm roading network for dust suppression or other uses. The in-pit water storage dam will need to be relocated and progressively increased in size to accommodate the increasing capture of surface and groundwater within the expanding pit. The surface water and groundwater assessment determined that the largest capacity likely to be required would be 88 megalitres, with all extraction stages opened up over the 2-year life of the quarry. The final in-pit water storage dam will be constructed within the worked out and partially backfilled area of Stage 1B.

Equipment / infrastructure to move water around the site will comprise pumps, dams, tanks, pipelines and constructed features such as swale drains, bunds and sediment ponds. The equipment includes self-powered / self-priming pumps and poly pipe / ‘lay flat’, or similar. Water will also be pumped to a holding tank or water truck for use in dust suppression.

The quarry sumps, drains and other surface water management features are shown in the adaptive Surface Water Management Plan for the initial stage of the operation and indicative locations are shown for subsequent stages. The Surface Water Management Plan has associated Trigger Action Response Plans (TARPs) for managing any risks that may be posed by this water management infrastructure.

3.5.5. Additional Processing Activities

Additional processing activities that may typically occur on the site include accepting, sizing, sorting, mixing and blending of imported and processed materials for various sundry / occasional uses.

Other uses for such materials that may occur on the site, including short-term stockpiling, are:

- maintenance of access roads, haul roads and site tracks.
- accepting, processing and placing of clean fill into bunds, embankments or backfilled areas.
- accepting and processing of clean fill for blending with quarry products; and
- accepting, processing and placing of clean fill, and possibly accepting limited mulch, for use in supplementing site rehabilitation / erosion control.

It is emphasised that the site does not need to import material to meet its rehabilitation objectives.

Extractive industries have regularly received and processed various inert imported materials, using their existing plant and equipment, as a secondary activity to supplement the quarry income or to use as engineered fill / structural fill. Such imported materials typically include 'clean fill' (uncontaminated soil, including gravel and rock), recycled aggregates (processed solid inert waste) and/or solid inert wastes (recyclable materials, such as reject tiles, bricks or concrete). 'Clean fill' materials typically consist of uncontaminated spoil from construction projects and earthworks, such as soil and 'paddock rock'. Additionally quarries commonly import other processed or extracted rock for blending with material extracted at the site to meet relevant product specifications and for use across the project. All these types of materials, or 'additives', are considered imported materials, but not all meet the definition of 'waste' under Environment Protection legislation, and of those that do, many do not require an EPA permission to be received at a quarry. Of those materials typically accepted at quarry sites that do classify as 'waste', all would classify as 'industrial waste (non-priority)'.

With respect to 'clean fill' materials, the site has the capacity to accept large quantities of such material. Whilst the volume of overburden and quarry waste rock material generated by the site is sufficient to fulfil the rehabilitation requirements (see Section 3.5 of the Rehabilitation Plan), imported clean fill, and possibly limited mulch, could potentially be incorporated into the site rehabilitation.

It is emphasised that any clean fill incorporated into the final landform will be managed to not change the rehabilitation objective, just the final levels, by simply raising the final floor level, locally flattening the final landform batter or moving the final landform batter more into the excavation (i.e. backfilling).

Typical examples of imported material are:

- the use of cement (lime) to blend with crushed rock to produce a cement (lime) stabilised / treated crushed rock (CTCR)
- the purchase of a plastic (or non-plastic) fine-grained material to blend with a non-plastic (or highly plastic) crushed rock to meet a Plasticity Index specification
- acceptance of 'paddock rock' to process then blend with onsite material for use on the project
- acceptance of reject tiles, brick and/or concrete to process, either as a recycled aggregate or for onsite processing, to be mixed with road base for topdressing site tracks or blended with other material onsite for use on the project
- the acceptance of 'clean fill' to either incorporate directly into the final landform, i.e. with no or minimal processing or to process and extract any viable resource for blending with site extracted resource and using the remaining material as engineered fill / structural fill in the final landform.
- acceptance of limited volumes of suitable mulch (i.e. not contaminated and not putrescible waste) for use in embankment stabilisation, manage erosion and/or to assist in retaining moisture in the ground to assist in revegetation success.

Any material imported as part of the Work Authority's operations will be handled in accordance with a site Imported Materials Management Plan. This management plan documents the process and control measures for managing the receiving, sorting, processing and stockpiling of imported materials, and ensuring that the materials are fit for the intended purpose. The potential impacts related to any imported materials would be considered in a Risk Treatment Plan for Imported Materials within the Risk Management Plan.

It is acknowledged that if solid inert waste materials (see Imported Material Management Plan for the definition) are accepted onto the site for processing and recycling into useable products then separate

planning permission may be required as a 'materials recycling' use is regulated by Council, although this use will be utilising much the same plant and equipment on site as the concurrent extractive industry use.

3.6. WASTE DISPOSAL METHODS & FACILITIES

3.6.1. Extracted Quarry Waste

Extracted quarry waste is natural materials that have been extracted at the site but are not fit for purpose on the wind farm project, and may consist of overburden, plant oversize, out of specification products, excess product or non-useable / returned products. However, this material is not wasted as it will remain onsite to be either:

- ⇒ blended with other material for use across the project as a low-grade product, if or when an opportunity arises; or
- ⇒ utilised in achieving the final rehabilitated landform.

It is emphasised that these extracted "wastes" are natural materials sourced from this site and contain no added chemicals or other harmful waste products, and therefore may be used in quarry rehabilitation, either directly or following temporary stockpiling.

Extracted quarry waste generated by the site is classified by its physical properties, with any clayey or friable materials stockpiled as overburden or used directly as compacted backfill on the quarry floor or on terminal berms. Overburden and waste rock stockpiles are located within the disturbance area as indicated on Figure 3 Site Layout Plan.

3.6.2. Sediment-laden Water

In the context of extractive industries, sediment-laden water is that containing natural solids from material washing processes and from surface water collecting within the disturbed area that is directed to sediment ponds. There will be no washing of material on this site and no production of slimes, so no significant volumes of sediment-laden water are produced.

Incident rainfall collected within the excavated and disturbed areas will be directed to quarry sump(s) and/or a water storage dam within the excavation, or as a contingency some water can be directed to the sediment pond in the south east corner of the Work Authority.

Surface water management on the site is designed so that collected water is given sufficient retention time in the various structures to allow solids to fall out of suspension. This ensures, as far as reasonably practicable, that there will be no discharge of dirty water from the site. The quarry sumps and in-pit water storage dams are at least 7m below the natural ground level and the capacity of these features throughout the life of the quarry will be more than sufficient to accommodate all storm events. If necessary, these sumps and settling ponds can be drained with pumps and the water used to irrigate rehabilitated areas or the surrounding pasture. Sediment ponds will be removed and incorporated into site rehabilitation.

The quarry sumps, drains and other surface water management features are shown in the adaptive Water Management Plan. The Water Management Plan has associated Trigger Action Response Plans (TARPs) for managing any risks that may be posed by sediment-laden water collected on the site.

3.6.3. Storage of Slimes

No slimes are produced on site and so there is no requirement for slimes storage.

3.6.4. Domestic Rubbish and General Waste

The site will generate a small amount of domestic and industrial rubbish. Domestic rubbish includes toilet waste, office waste and food and paper waste from the office and amenities. Industrial waste includes redundant / discarded plant and equipment, discarded conveyor belting, discarded screen decks, discarded tyres, discarded grease cartridges, discarded oil drums, oily rags. These materials will be removed by licenced contractors

3.6.5. Derelict and Redundant Plant

All derelict and redundant plant, tyres, vehicles, machinery and equipment is stored in a designated area, out of sight of the general public from Work Authority boundaries until removed or sold to a third party.

4. SENSITIVE RECEPTORS & KEY HAZARDS

The Risk Management Plan **(NOTE: this document will be developed following the Ministers assessment of Environment Effects Statement for the Hexham Wind Farm),** which includes individual Risk Treatment Plans and a Risk Register, addresses in detail the assessment and management of the risks associated with all the quarrying and rehabilitation hazards relevant to this operation.

When considering the impact to sensitive receptors, consideration and evaluation of the technical studies was undertaken to ensure the work plan adequately addresses the EES evaluation objectives of each of the listed specific environment effects, and to determine if any nonstandard quarrying controls are required.

Following is a brief description of the sensitive receptors potentially impacted by this operation, i.e. in relation to the environment, any member of the public, or land, property or infrastructure within the vicinity of the work, and an overview of the more significant hazards that may potentially impact those sensitive receptors.

4.1. SENSITIVE RECEPTORS

Figure1 Regional Plan and Figure 2 Location Plan identify the location of various waterways, residences, current commercial and industrial development, public facilities and public infrastructure, such as roads, bridges, pipelines, high voltage powerlines and other assets, within 2km of the Work Authority. The extent of Crown land within the vicinity is shown on Figure 2 Locality Plan, along with its classification in Figure 2A Crown Land Status. All Crown land within at least 5km of the site is road reserves.

It is noted that there are number of wind turbine generators (WTGs) proposed to be constructed in relative proximity to the Work Authority area and that these may be considered as sensitive receptors during their construction. However, the wind farm project scheduling will ensure that the quarry is not operational, or at least not undertaking extraction activities, when these WTGs are constructed and completed.

Groundwater is expected to be in the order of 10m below the natural surface and will most likely be intersected by the excavation. The groundwater assessment indicated s groundwater level to be between approximately RL 127m to RL 130m across the quarry, with the base of the quarry designed to approximately RL 122m at the deepest point. The nearest groundwater extraction bore is approximately 500m to the south of the site, but currently not in use, and all others are at least 2.8km from the site.

There are DELWP Mapped Wetlands, now referred to as “Current Wetland” as per the 2017 Native Vegetation Removal Guidelines, in the vicinity of the Work Authority, No 28207 approximately 160m to the north, No. 28215 approximately 1000m to the east, No.28214 approximately 700m to the south-east and No. 28202 approximately 1400m to the west. Additionally, there are other wetland features as mapped on the Victorian Wetland Inventory dataset in the vicinity of the quarry. All these wetlands and appropriate buffers were considered when identifying an area for the Work Authority.

The closest named waterway is Mustons Creek, some 2000m to the east or 1500m northeast. There is an unnamed drainage line some 200m north of the Work Authority. No drainage lines are impacted by the Work Authority.

There are no residences within 2km of the Work Authority, with the closest residence being the landowner, some 2200m to the east.

The township of Caramut is approximately 6,800m north of the site, and the township of Hexham some 13km from the site.

There are no historic heritage sites or mapped areas of Aboriginal Cultural Heritage Sensitivity (ACHS) within the vicinity that could be impacted by the quarry operations.

There is a mapped area of Aboriginal Cultural Heritage Sensitivity (ACHS) over the wetlands to the northwest, but outside of the Work Authority.

The closest public road is Saleyards Road, to the northwest, although this is a gated road.

Although the mapping data shows drainage lines crossing farm tracks, there are no constructed bridges or culverts within 2km of the site.

There are currently no powerlines, pipelines or other existing linear infrastructure within 2km of the Work Authority. The closest power line (low voltage) is to the east and to the south at approx. 2200m. The closest WTGs will eventually be located adjacent to the northwest, southwest and south boundaries of the Work Authority, but will not be constructed until all extraction activities have been completed. There will be above ground and underground electrical cabling and electricity power distribution infrastructure located near to the western and southern boundaries of the Work Authority.

There is no known contaminated land, no known slimes storages, and no underground workings on the site.

The land tenure and depth limitations are presented under Area Details in Section 5.1.

Risk Management Plan

The Risk Management Plan includes individual Risk Treatment Plans for each identified quarrying and rehabilitation hazard, as well as a Risk Register, that each summarise the hazards and control measures adopted. Each Risk Management Plan identifies the quarrying and rehabilitation hazards relevant to this operation, the risks these hazards may pose to sensitive receptors, and provides detailed risk assessment and risk management. The risks are assessed with respect to the sensitive receptors that may potentially be impacted by this operation, being those in relation to the environment, any member of the public, or land, property or infrastructure within the vicinity of the work under the Work Authority. The risk management set out in these documents is required to include control measures, performance standards and an outline of the relevant management systems, practices or procedures for monitoring and managing the risks. This Risk Management Plan will be developed and submitted to the Earth Resources Regulator for approval after the Ministers assessment of the Environment Effects Statement is made public and any additional requirements addressed in the various technical assessments.

The following is a brief discussion around the standard quarrying and rehabilitation hazards that have been considered in this Work Plan, with an outline of assessment of the risks posed by these hazards against the identified sensitive receptors.

Whilst the detailed Risk Management Plan, including Risk Treatment Plans and Risk Register do not form part of this draft Work Plan Description for the Hexham Wind Farm Environment Effects Statement, they will be submitted to the Earth Resources Regulator for approval before the quarry can start operating.

A detailed discussion around inherent and residual risk for each of the identified quarrying and rehabilitation hazards is included in the Risk Management Plan, which includes individual Risk Treatment Plans and the Risk Register detailing risk assessments and risk management, with included control measures.

4.2. DUST AND NOISE IMPACTS

The lack of immediate receptors within 2km of the quarry, the short life span of the quarry and the lack of any infrastructure within the vicinity of the Work Authority results in the general impacts from the quarry operation being very minor, and standard industry control measures are all that are required to manage the quarrying hazards, which will be sufficient to minimise any risks posed as far as reasonably practicable.

4.2.1. Dust

Due to the lack of any residences within 2000m of the Work Authority, a detailed Air Quality Impact Assessment specific to the extractive industry has not been conducted, with the Risk Treatment Plan for Dust within the Risk Management Plan meeting the EPA requirements of a Level 1 Assessment. The Jacobs report, Hexham Wind Farm - Air Quality Impact Assessment prepared for the Environment Effects Statement considers the impact of the quarry on air quality and concludes that standard control measures are adequate given the minimum separation distance of 500m is more than 4 times exceeded.

The level and nature of activity for this quarry means that dust impacts can remain below prescribed limits at the closest receptor and the risks can be minimised, as far as reasonably practicable, with the implementation of standard industry control measures for this hazard. A dust monitoring program forms part of the site's dust management.

Respirable Crystalline Silica

This operation does not pose a risk to the public from any fugitive respirable crystalline silica dust due to the negligible silica content of the basalt rock. This claim is supported by the attached documentation from

WorkSafe, *Worksafe Letter_basalt_in_quarries May 2022.pdf* and *WorkSafe Dust containing crystalline silica in the extractive industry – 2021.pdf*

The Risk Management Plan, including the relevant Risk Treatment Plan and Risk Register, detail the risk assessment and risk management, including all control measures.

4.2.2. Noise

Due to the lack of any residences within 2000m of the Work Authority or other sensitive receptors, a detailed Noise Impact Assessment specific to the quarry activities has not been conducted, with the Risk Treatment Plan for Noise within the Risk Management Plan documenting the standard industry control measures. The Marshall Day Noise and Vibration report prepared for the Hexham Wind Farm Environment Effects Statement concludes that the impacts of overall noise from the quarry activities on sensitive receptors will be low.

The level and nature of activity for this quarry means that noise impacts can remain below prescribed limits at the closest receptor and the risks can be minimised, as far as reasonably practicable, with the implementation of standard industry control measures for this hazard. A noise monitoring program forms part of the site's dust management.

The Risk Management Plan, including the relevant Risk Treatment Plan and Risk Register, detail the risk assessment and risk management, including all control measures.

4.3. VISUAL AMENITY IMPACTS

Due to the lack of any residences within 2000m of the Work Authority, and a lack of public access to the vicinity of the Work Authority a formal Visual Impact Assessment has not been conducted, with the Risk Treatment Plan for Altered Visual Amenity within the Risk Management Plan documenting the standard industry control measures.

The lack of public vantage points, no residences or other communities within the vicinity and the remote location of the quarry ensure that adverse effects on the landscape and visual amenity are minimised as far as reasonably practicable and therefore no additional control measures such as vegetation screens or plantations are necessary.

Regardless, good house-keeping and other standard industry control measures will be implemented at the site.

The Risk Management Plan, including the relevant Risk Treatment Plan and Risk Register, details the risk assessment and risk management, including all control measures.

4.4. UNAUTHORISED SITE ACCESS

Unauthorised access to the site may lead to members of the public as well as non-quarry related Hexham Wind Farm employees or contractors, being impacted during quarry operations. This hazard will be managed so that the risks posed to members of the public, and other non-quarry workers, are minimised as far as reasonably practicable. This will be achieved by adopting the relevant control measures such as fencing and identification of no-go areas at the Work Authority boundary to clearly identify the Work Authority extents in the vicinity of the nearby access tracks and proposed Wind Turbine Generator sites.

The remoteness of this site and the fact that access is only via private roads, means that the risk posed to the general public is very low, and that standard industry control measures for site access as well as the operational health and safety protocols of the Wind Farm will be sufficient to minimise the risks posed. This hazard does not require specialised risk management at this site.

The Risk Management Plan, including the relevant Risk Treatment Plan and Risk Register, detail the risk assessment and risk management, including all control measures.

4.5. SURFACE WATER IMPACTS

Surface water can be both a sensitive receptor, with downstream water quality and quantity potentially impacted (e.g. erosion and sedimentation), and a source of hazard for the quarrying operation that then

poses a risk to sensitive receptors (e.g. storm events or failure of water storages). Although the siting of the quarry means that there is very little external surface water flow toward the quarry site.

The site is located within the Glenelg Hopkins Catchment Management Authority management area and is not located within any proclaimed water supply catchment.

4.5.1. Surface Water Management

Surface water traversing over disturbed ground is managed by the strategic location of swale drains, bunding, sediment ponds and sumps to ensure this water does not leave the site, and is instead directed to the quarry sump and/or water storage dam within the extraction area. The erosion and sediment control measures adopted when disturbing new ground are consistent with EPA guidance.

Incident rainfall water falling outside the disturbance area is directed away from the disturbed areas by the strategic location of cut-off drains and bunds and, this water will be directed around the activity area and not be used in the operation. Only clean water, as defined by the EPA guidelines, is allowed to leave the site.

An adaptive Surface Water Management Plan will be maintained by the quarry, and adapted as necessary, that sets out surface water and control features and locations. If the project is approved, an initial Surface Water Management Plan addressing any Ministerial comments, will be provided to the Earth Resources Regulator with the Work Plan Submission.

The Risk Management Plan, including the relevant Risk Treatment Plans (Surface Water Flows, Erosion and Sedimentation) and Risk Register, detail the risk assessment and risk management. The control measures across the site to manage surface water, such as perimeter drains, pipelines, bunding and cut-off drains, are detailed in the Risk Management Plan.

4.5.2. Drainage Diversion

There is no diversion of natural waterways required by this operation and all surface water flows directed around the disturbed areas return to their natural downstream course. Only incident rainfall water within the disturbance area is collected.

4.6. GROUNDWATER IMPACTS

Groundwater can be both a sensitive receptor, with groundwater quality potentially impacted, and a source of hazard for the quarrying operation that then poses a risk to sensitive receptors (e.g. discharge of excess groundwater from the site or the unintended intersection of groundwater).

4.6.1. Depth of Groundwater

A Groundwater Impact Assessment, titled *Hexham Wind Farm - Surface Water and Groundwater Impact Assessment, 25 September 2025*.,Appendix B - Hydrology and hydrogeology has been prepared by Water Technology for the Environment Effects Statement. This report indicates that groundwater will be intercepted within the pit at approximately 10 to 12 metres below the natural surface, with low hydraulic conductivity observed and a groundwater surface that slopes downward toward the south-east. A groundwater Extraction Licence and / or Take and Use licence will be obtained, if required, from the relevant water authority, particularly if any water is to be disposed or utilised offsite.

As well as considering impacts on the groundwater, and making recommendation on groundwater management, the surface water and groundwater assessment also considers the recovered post closure groundwater levels and the surface water inputs to the resultant landform.

The pit will be operated dry down to the base of the excavation, with irrigation and dewatering into constructed water storages being the main controls (see Section 3.5.4). The groundwater level is expected to fluctuate seasonally by up to 0.5m above and below the mean level. Refer to the Surface Water and Groundwater Impact Assessment prepared for the Environment Effects Statement.

4.6.2. Groundwater Management

Groundwater will be intersected and whilst not required for the quarrying activity, may be extracted for use around the greater wind farm project. If required, all relevant licences and approvals will be obtained. It is emphasised that the surface water and groundwater assessment shows that with the implementation of the water management control measures and quarry staging that the expected groundwater inflows, as well as

surface water capture within the pit, can be managed within the site, if required, without any need to discharge water.

A Groundwater Management Plan will be developed for the site that describes and documents the site water management. The underlying principle is to create a closed system, whereby groundwater and collected surface water is either pumped to irrigation within the Work Authority or to constructed water storages. Initially the water storage dam may be an out of pit structure, and then, when sufficient room is available, a larger in-pit water storage dam will be constructed; which is then relocated and resized as the quarry expands (see Section 3.5.4).

The adaptive Groundwater Management Plan will include a groundwater monitoring program utilising the established groundwater monitoring bores on the site, and an initial Groundwater Management Plan will be provided to the regulator with this Work Plan.

The Risk Management Plan, including the relevant Risk Treatment Plan (Ground Disturbance) and Risk Register, detail the risk assessment and risk management. The control measures across the site to manage groundwater are detailed in the Risk Management Plan.

4.7. ECOLOGICAL IMPACTS

The ecological values within the vicinity of the operation can be impacted by the work being undertaken, most significantly by any clearance of native vegetation. The removal, destruction or lopping of native vegetation needs to be kept to the minimum extent necessary to undertake the work. The loss of biodiversity due to unavoidable native vegetation removal must then be compensated for with an appropriate offset strategy under a process administered by the Environment arm of the Department of Energy, Environment and Climate Action (DEECA).

The Risk Management Plan, including the relevant Risk Treatment Plan (Ground Disturbance) and Risk Register, detail the risk assessment and risk management, including control measures.

4.7.1. Vegetation Clearing

Significant ecological assessments were done across the wind farm project area before the quarry identification and selection process to specifically identify areas of assessable native vegetation as well as other sensitive ecological areas. These areas where identified, documented and suitable buffers applied and identified by Hexham Wind Farm as “No-Go” areas. A non-negotiable criterion for the quarry location was to comply with these no-go areas.

By design, no assessable native vegetation will be impacted by the extractive industry under this Work Authority and no native vegetation offsets are required.

The extractive industry activity is located in paddocks that have been farmed, cropped and grazed for several generations.

4.8. BLASTING IMPACTS

The site undertakes blasting to extract the basalt. The site requires almost weekly blasting to meet the Hexham Wind Farm projected demands, and adopts standard drill and blast techniques, including a Blast Management Plan for each blast. All blasting activities are carried out by qualified personnel, and no detonators or explosive materials are stored on site. The Blasting Contractor brings all necessary components on the day of the blast and after the blast removes all unused materials.

Blasting is a highly regulated activity with very prescriptive legislation and regulations. A Blast Management Plan with an appropriate Blast Exclusion Zone is developed and documented before, during and after each blast as per all relevant regulations. Blast Management Plans will be continually updated, based on monitoring results, to meet the requirements of the relevant regulations and any specific requirements of the Earth Resources Regulator. The Blast Management Plan includes blast design, initiation sequence and the site-specific procedures for exclusion zones, notifying neighbours and any other protocols that are required, as well as any required monitoring locations.

The site is well hidden and very remote from all sensitive sites. The closest residence, belonging to the landowner, is 2200m from the extraction area and is not anticipated to be aware of or impacted by any blasting.

A Blast Impact Assessment was prepared by Terrock and concludes that blasting operations at the quarry can be undertaken with a high degree of safety, comply with prescribed regulatory criteria for quarry blasting, and with a low or minimal impacts to the amenity of the surrounding areas and the environment. It was found that ground vibration and airblast overpressure levels would be largely imperceptible at the closest sensitive sites, though low-level blast noise may be occasionally heard by residents.

Airblast and ground vibration are controlled by designing all shots to minimise impacts at the nearest sensitive sites and any susceptible infrastructure and to meet the prescribed limits. All shots are videoed and where necessary the shots will also be monitored and the results recorded to demonstrate compliance with the airblast and ground vibration limits. Given the remoteness of any sensitive receptors, monitoring will be undertaken at the site office / weighbridge. This will allow site constants to be accurately quantified.

The blast facing orientations will always be designed to minimise the airblast and flyrock risks by ensuring that blasts face away from the nearest sensitive sites, as far as practicable. The Blast Impact Assessment concludes that any flyrock is likely to be contained within the boundaries of the Work Authority, although a modest stemming height increase may be required for terminal blasts at the southern and northern extraction limits. However, as the surrounding land potentially impacted is all within the same ownership, relatively open and distant from public roads, the conservative Blast Exclusion Zones that extend outside the Work Authority can easily be controlled with blast sentries during blasts. The Blast Impact Assessment recommends a Blast Exclusion Zone for each blast with at least 240m in front of and 160m behind the blast, and anyone working in the vicinity of the quarry when blasting would firstly need to be removed to a safe location. The closest neighbouring property is 350m to the north of the extraction area, so the Blast Exclusion Zones would not extend beyond the property on which the quarry is located.

There are number of wind turbine generators (WTGs) proposed to be constructed in relative proximity to the Work Authority area. However, the wind farm project scheduling will ensure that the quarry is not operational, or at least not undertaking extraction activities, including blasting, when these WTGs are being constructed and completed. If construction during blasting operations were considered, then the Blast Impact Assessment concludes that modelled ground vibration at the locations of the nearest proposed wind farm infrastructure would likely be below conservative damage limits typically observed. However, it is recommended that blast monitoring be conducted for blasts near to those sites to determine if there would be any need to modify the blast design to ensure not damage to the infrastructure occurs. Such monitoring data would be used in further predictive modelling to assess potential impacts on any nearby wind turbine generator foundations. It is also concluded that the nearest WTG locations are twice the distance of the modelled maximum flyrock throw, but the risk could be further reduced with modified blast design.

Blasting times will be consistent with those authorised by the Work Authority unless otherwise authorised by the Earth Resources Regulator.

Note that in the unlikely event that blast-day issues delay the firing of a shot till after the authorised time, it is safer to fire the shot late than “sleep” on the shot till the following morning.

The Risk Management Plan, including the relevant Risk Treatment Plan (Blasting) and Risk Register, detail the risk assessment and risk management. The control measures across the site to manage blasting will be detailed in a Blast Management Plan.

4.9. HAZARDOUS MATERIALS

There are no hazardous materials or chemicals contained within the resource to be excavated. No acid water is generated by the development. There are no known acid sulphate materials in the resource.

Apart from hydrocarbons (fuels and oils), dust suppressants, herbicides or pesticides, and potentially flocculants for erosion management, no other chemicals or additives are used in the processing or stored on the site.

All onsite storage of chemicals and any hazardous materials will be in accordance with relevant regulations and standards.

A register of MSDS sheets for any chemicals used on the site is maintained at the quarry office for review, if required.

The Risk Management Plan, including the relevant Risk Treatment Plans and Risk Register, detail the risk assessment and risk management, including control measures.

4.10. HERITAGE IMPACTS

A Historic Heritage Impact Assessment has been conducted for the Wind Farm Project, that includes the quarry site and will be reviewed by Heritage Victoria as part of the Environment Effects Statement process.

A preliminary assessment of the Victorian Heritage Register and Heritage Inventory suggests there are no places of historic heritage currently within the vicinity of the site. There are no Heritage Overlays in the vicinity shown under the Planning Scheme.

There are no mapped areas of Aboriginal Cultural Heritage Sensitivity impacted by the Work Authority. Additionally, the Work Authority area has been ground-truthed by the heritage consultants and no artefacts or other issues identified. The Hexham Wind Farm Cultural Heritage Management Plan concludes there are no specific requirements or control measures required for the Work Authority.

The Risk Management Plan, including the relevant Risk Treatment Plans and Risk Register, detail the risk assessment and risk management, including control measures.

4.11. REFERRAL TRIGGERS FOR ENVIRONMENT EFFECTS STATEMENT

The Hexham Wind Farm Pty Ltd quarry falls within the scope of the Hexham Wind Farm Environment Effects Statement and this draft Work Plan will be modified to address all the Ministerial recommendations as they relate to the Work Authority before being submitted to the Earth Resources Regulator for approval. It is anticipated that any relevant recommendations of the Minister will be discussed in detail in any relevant technical reports and also in the Risk Treatment Plans, that will be developed in the future.

5. KEY SUMMARY INFORMATION

5.1. AREA DETAILS

Property Name:
Hexham Wind Farm Temporary Quarry

Street Address:
'Woorabinda', off Keilors Road, CARAMUT 3274

Land Tenure:
Freehold:

Land Owned by Anthony Kelly and leased by Hexham Wind Farm Pty Ltd.

Depth Limitations
Nil

5.2. STONE RESOURCE & EXTRACTION

Work Authority Commodity
Basalt

Work Authority Commodity Primary
Basalt

Total Resource Estimate
3 million tonnes

Maximum Terminal Depth of Extraction
Maximum Terminal Depth of 14m

Overall Slope Angle (maximum of terminal batters)
80 degrees

Estimated Topsoil Volume
73,000 in situ cubic metres

Estimated Topsoil depth
200 mm

Estimated Overburden Volume
730,000 in situ cubic metres

Estimated Overburden Depth
3m

Area of Disturbance
39.4 hectares

Maximum Disturbance at Any Time
39.4 hectares

5.3. OPERATION TYPE

Dry open cut

5.4. OPERATION HOURS

Operating hours of the quarry will ultimately be at the recommendation of the Minister after considering the combined effects of the Wind Farm project on the community.

Given the lack of nearby sensitive receptors, and the type of equipment to be used on site, it is likely the site could meet EPA guidelines for 24-hour operation for processing and sales, with drill and blasting limited to daylight hours more out of safety issues than noise compliance issues. However, in the interest of establishing a base line, hours of operation will be initially limited to the EPA day period, with operations on Saturdays further limited to 1:00pm.

Extraction
(all earth works, stockpiling and onsite cartage)

All activities related to extraction will occur within the standard EPA day period, with more limited operating hours on Saturday.

7am to 6pm	Monday to Friday
7am to 1pm	Saturday

Drilling

7am to 6pm	Monday to Friday
7am to 1pm	Saturday

No extraction or haulage work Sundays or public holidays.

Despatch (Sales)
(movement of transport vehicles into and from the site)

All activities related to despatching or off-site movement of material will occur within the standard EPA day period, with more limited operating hours on Saturdays.

7am to 6pm Monday to Friday
7am to 1pm Saturday

No work Sundays or public holidays.

Processing

(crushing, screening, washing, etc., incl. cartage from stockpiles)

All activities related to the processing and sizing of material will occur within the standard EPA day period, with more limited operating hours on Saturdays.

7am to 6pm Monday to Friday
7am to 1pm Saturday

No work Sundays or public holidays.

Operation Hours Clarification

Blasting times are from 10:00am to 4:00pm Monday to Friday, unless otherwise authorised by the Earth Resources Regulator.

Works outside of the above hours is only for essential maintenance unless otherwise authorised.

5.5. OTHER WORK PLAN COMPONENTS

The *Mineral Resources (Sustainable Development) Act 1990* and its associated Regulations require, in addition to the information above, the following key components of a Work Plan. These are provided as separate documents.

Location Map (Work Plan Area)

The required information is presented on a combination of the following:

- Figure 1, Regional Plan
- Figure 2, Location Plan
- Figure 2A, Crown Land Status

Site Map

The required information is presented on the following:

- Figure 3, Site Layout Plan

Community Engagement Plan

It is a requirement of the *Mineral Resources (Sustainable Development) Act 1990* that a Work Plan must include a Work Authority specific Community Engagement Plan. This document is in addition to, but may reference, any other community reference groups or stakeholders.

This Community Engagement Plan is an operational plan and the aim is to share relevant information about the extractive industry operations, throughout the life of the Work Authority, with the community likely to be affected by the operations, and to provide reasonable opportunities for the community to express their views about activities at the site and the potential end uses of the site. The name and contact details of the site manager are to be displayed on a sign at the site entrance for any members of the community to provide feedback.

If the Wind Farm project gains approval, this Community Engagement Plan, drafted specifically to meet the requirements of the Earth Resources Regulator, but drawing on the history of Wind Farm consultation, will be compiled, and submitted with the Work Plan.

For the purposes of this draft Work Plan Description, the project's Community Engagement Plan for the Environment Effects Statement includes information of the proposed onsite quarry. A Work Authority specific Community Engagement Plan will be developed following the Ministers Assessment of the Hexham Wind Farm Environment Effects Statement and submitted as a part of the subsequent application to the Earth Resources Regulator.

Rehabilitation Plan

The objectives of the Rehabilitation Plan for the site is to leave the rehabilitated land in a safe, stable and sustainable condition, in a form that will be suitable to the proposed end land uses and will not be hazardous to the land users and the public after the completion of quarrying activities. The affected land will be managed and progressively rehabilitated throughout the quarry life to minimise the impact to the community, as far as reasonably practicable, i.e. without compromising the ability to work the site and the commercial viability of the operation.

The Rehabilitation Plan details the objectives strategies and design for rehabilitation, as well as the monitoring and criteria for rehabilitation of all domains within the site, up to the final closure of the site.

The Rehabilitation Plan objectives will be discussed with the broader community and relevant stakeholders, which are routinely and specifically canvased through implementation of the site Community Engagement Plan.

Refer to the attached Rehabilitation Plan and Figure 4, Rehabilitation Landform, for detail.

5.6. ATTACHMENTS

This table summarises the documentation that will ultimately form the Work Plan submission to the Earth Resources Regulator for approval. The colour coding is to highlight the documents that accompany this Work Plan Description (green), the documents referenced by the Work Plan but supplied separately as they relate to the entire Wind Farm Project area (yellow), and documents yet to be developed following the Ministers Assessment of the Environment Effects Statement (no highlight).

Documents supplied with this submission
Document supplied separately as part of the Environment Effects Statement
Documents not yet drafted and not supplied as part of Environment Effects Statement

Work Plan Attachments

Work Plan Components		Page No in Compiled PDF
Work Plan Description	Hexham_WPDescription_Nov2025_DraftF.pdf	3
Figure 1, Regional Plan	Figure1_RegionalMap_DraftD.pdf	28
Figure 2, Location Plan	Figure2_LocationMap_DraftG.pdf	29
Figure 2A, Crown Land Status	Figure2A_CrownLandStatus_Oct2025.pdf	30
Figure 3, Site Layout Plan	Figure3_SiteLayoutPlan_DraftI.pdf	32
Risk Management Plan: Risk Treatment Plans	NOT SUPPLIED	
Risk Management Plan: Risk Register	NOT SUPPLIED	
Community Engagement Plan	NOT SUPPLIED	
Rehabilitation Plan: Text	Hexham_RehabPlan_Nov2025_DraftD.pdf	33
Rehabilitation Plan: Figure 4 Rehabilitated Landform	Figure4_FinalLandformPlan_DraftG.pdf	72

Supporting Documents

Property Documents		Page No in Compiled PDF
Certificate of Title	WA_Titles.pdf	73
Planning Property Reports	Lot-4-TP161627-Vicplan-Planning-Property-Report.pdf Lot-5-TP161627-Vicplan-Planning-Property-Report.pdf	77 81
Other Documents		
Surface Water and Groundwater Impact Assessment (Water Technology)	Appendix B - Hydrology and Hydrogeology Supplied separately as part of the Environment Effects Statement	
Surface Water Management Plan incl TARP	NOT SUPPLIED	
Groundwater Water Management Plan incl TARP	NOT SUPPLIED	
Hexham Wind Farm Environment Noise & Vibration Assessment (Marshall Day)	Appendix E1 – Noise and vibration Supplied separately as part of the Environment Effects Statement	
Hexham Wind Farm - Air Quality Impact Assessment (Jacobs)	Appendix L1 – Air Quality Supplied separately as part of the Environment Effects Statement	

Respirable Crystalline Silica documentation	WorkSafe Dust containing crystalline silica in the extractive industry – 2021 Worksafe Letter_basalt_in_quarries May 2022.pdf	84 92
Groundwater licence	NOT SUPPLIED	
Geotechnical Assessment, Competent Person Letter (Civil Mine & Quarry Geotechnics)	HEX0001-RPT-0-Hexham Windfarm Quarry Competent Persons Letter.pdf	93
Ground Control Management Plan	NOT SUPPLIED	
Visual Impact Assessment	NOT SUPPLIED	
Ecological Assessment	NOT SUPPLIED	
DEECA-PEA Native Vegetation Advice	NOT SUPPLIED	
Imported Materials Management Plan	NOT SUPPLIED	
Fire Response and Readiness Plan	NOT SUPPLIED	
Blast Impact Assessment (Terrock)	HWF-2401_BIA_HWF Quarry_Final.pdf	129
Blast Management Plan	NOT SUPPLIED	
CHMP Requirement Declaration	NOT SUPPLIED	
Cultural Heritage Management Plan	Appendix J – Aboriginal cultural heritage Supplied separately as part of the Environment Effects Statement	

WA00##

Hexham Wind Farm
Temporary Quarry

10km
5km
2km
1km

Caramut
Hexham
Minjah
Lovel
Woolsthorpe
Ellerslie
Barney Swamp
Black Swamp

Plan Scale: 1:100 000

0 1 2 4
km

Base Plan derived from images scanned from portions of VICMAP 1:100000 series WARRNAMBOOL-MORTLAKE

WIND PROSPECT

BCA CONSULTING EARTH RESOURCES

For
Hexham Wind Farm Pty Ltd

Drawing: A3-DraftD Revision: 0 Author: CLB, MS
Fig1_RegionalPlanR01.WOR
Date: 30 Oct 2025

Project No: W10_001

Figure: 1

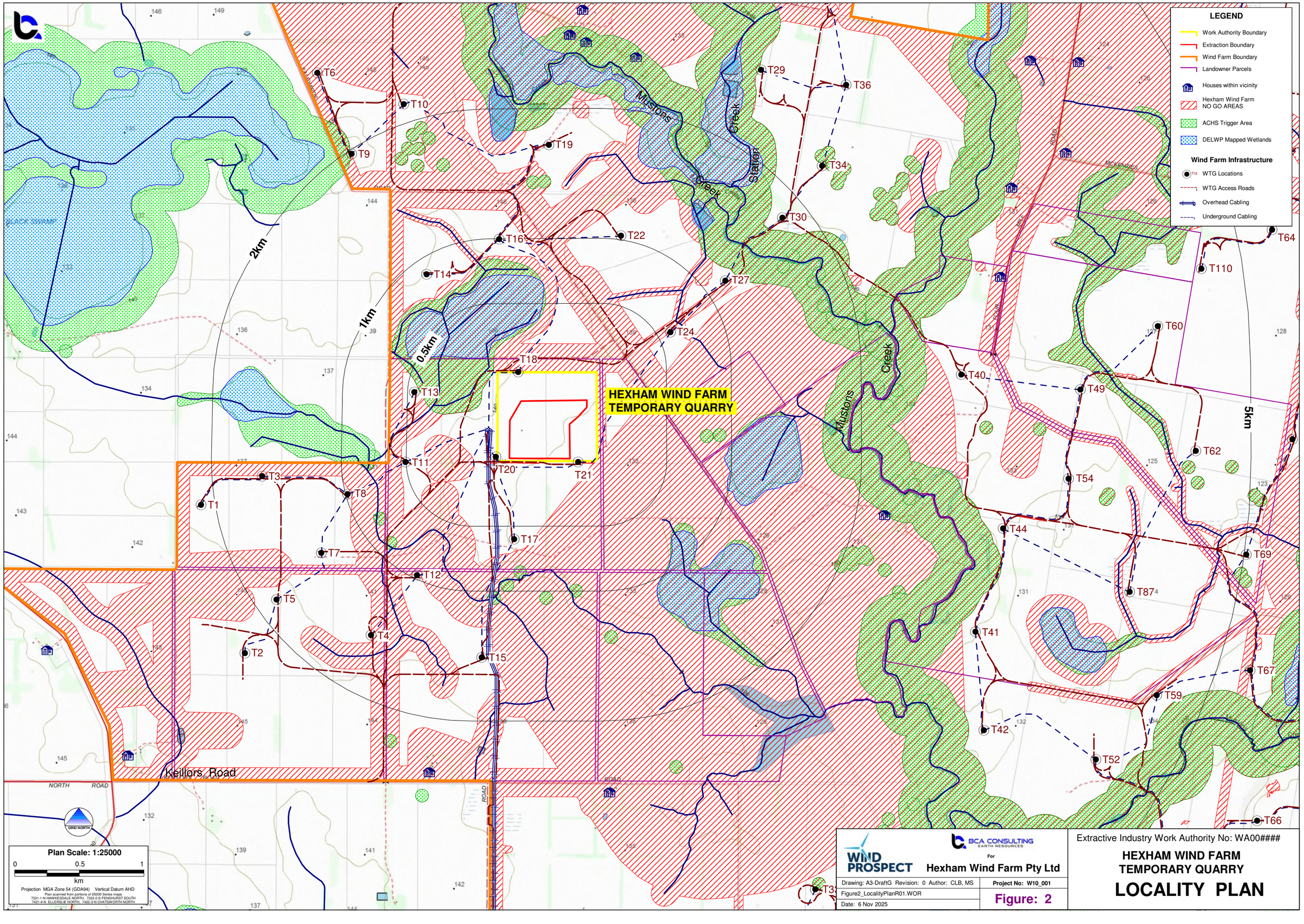
Extractive Industry Work Authority No: WA00####

HEXHAM WIND FARM
TEMPORARY QUARRY

REGIONAL MAP

LEGEND

- WORK AUTHORITY
- HEXHAM WIND FARM BOUNDARY
- WTG LOCATIONS


LEGEND
Work Authority Boundary
Extraction Boundary
Wind Farm Boundary
Landowner Parcels
Houses within vicinity
Hexham Wind Farm NO GO AREAS
ACHS Trigger Area
DELWP Mapped Wetlands
Wind Farm Infrastructure
WTG Locations
WTG Access Roads
Overhead Cabling
Underground Cabling
HEXHAM WIND FARM TEMPORARY QUARRY
T1
T2
T3
T4
T5
T6
T7
T8
T9
T10
T11
T12
T13
T14
T15
T16
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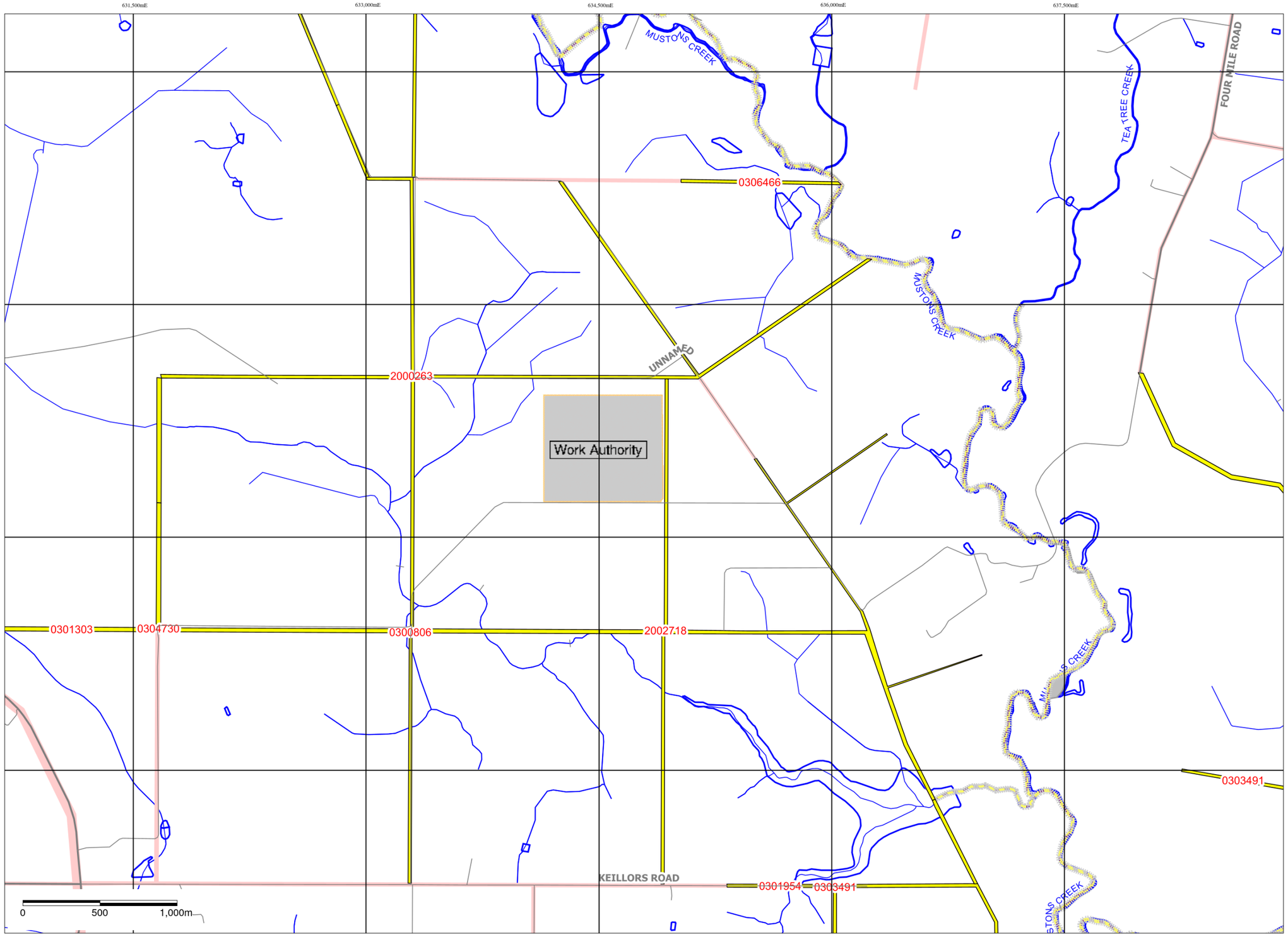
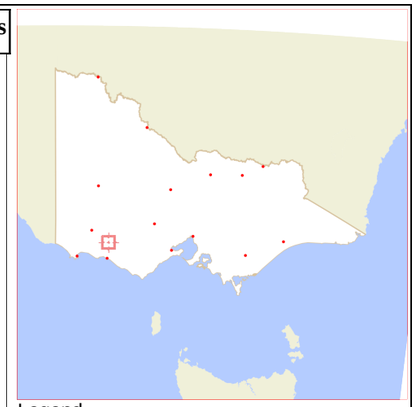
T40
T41
T42
T44
T49
T52
T54
T59
T60
T62
T64
T66
T67
T69
T87
T110
2km
1km
0.5km
5km
Keillors Road
Mustons Creek
Station Creek
Black Swamp
Plan Scale: 1:25000
0 0.5 1
km
Projection MGA Zone 54 (GDA94) Vertical Datum AHD
Plan scanned from portions of 25000 Series maps
7321-1-N HAWKESDALE NORTH, 7322-2-S PENSHURST SOUTH
7421-4-N ELLERSLIE NORTH, 7422-3-N CHATSWORTH NORTH
GRID NORTH
BCA CONSULTING EARTH RESOURCES
For
WIND PROSPECT
Hexham Wind Farm Pty Ltd
Drawing: A3-DraftG Revision: 0 Author: CLB, MS
Project No: W10_001
Figure2_LocalityPlanR01.WOR
Date: 6 Nov 2025
Figure: 2
Extractive Industry Work Authority No: WA00####
HEXHAM WIND FARM TEMPORARY QUARRY
LOCALITY PLAN

Department of Energy,
Environment and Climate Action

Figure 2A - Crown Land Status





Legend

Current Extractive Industry Work Authoritie

Roads (vmtrans)

- Freeway
- Highway
- Main Road
- Medium Road
- Other Roads

Tenure

- Grazing Licences
- Unused Road licences
- Water Frontage licences
- Water Supply licences
- Pipe licences
- Leases
- General Licence

Government Roads

- Dual Status Government Road
- Government Road

Unavailable Crown Land (MRSDA)

Other Public Land Boundary (500K)

GN MN

GDA

VICTORIA State Government

Generated from GeoVic 3

Map Created Thu Oct 30 2025 19:44:41 GMT+1100 (AEDT)

Map Scale: 1:25,000

Projection: MGA94 54

The map contains zonal grid lines that extends beyond their zone boundary.

Legend

Other Public Land Boundary (500K)

Public Land Management - Non Park or Rese

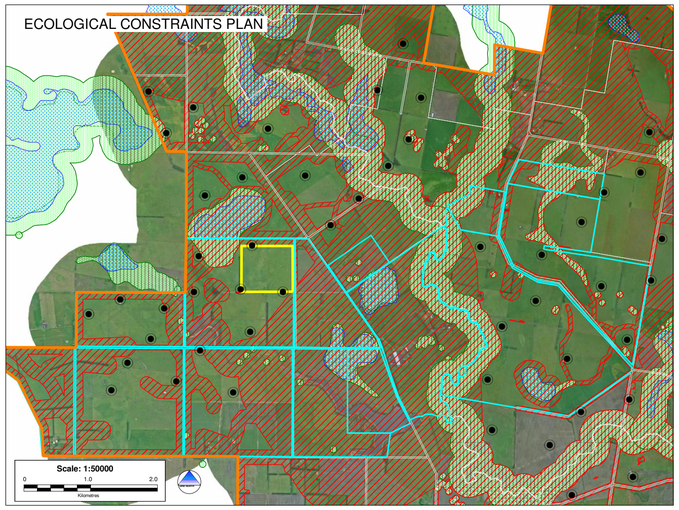
- Alpine Resort
- Commonwealth Land
- Community Use Area
- Earth Resources
- Plantation
- Port and Coastal Facility
- Services and Utilities
- State Forest
- Stream Frontage
- Uncatergorised Public Land
- Waterbody
- Water Production

Park or Reserve Boundary (500K)

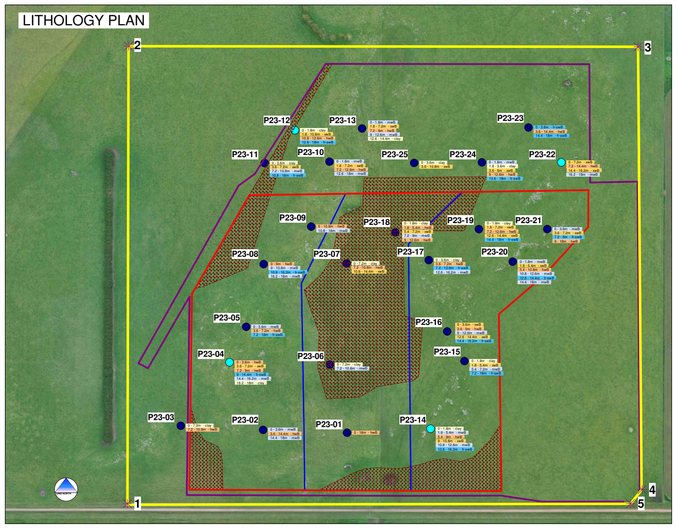
Public Land - Parks or Reserve (25K)

- National/State Park
- Proposed Park (NP Act)
- Wilderness Park
- Other Park (NP Act)
- Marine National Park/Sanctuary
- Nature Conservation Reserve
- Natural Features Reserve
- Regional Park
- Forest Park
- Coastal Reserve
- Education Area
- Historic Reserve
- Metro Park
- Other Reserves

ECOLOGICAL CONSTRAINTS PLAN

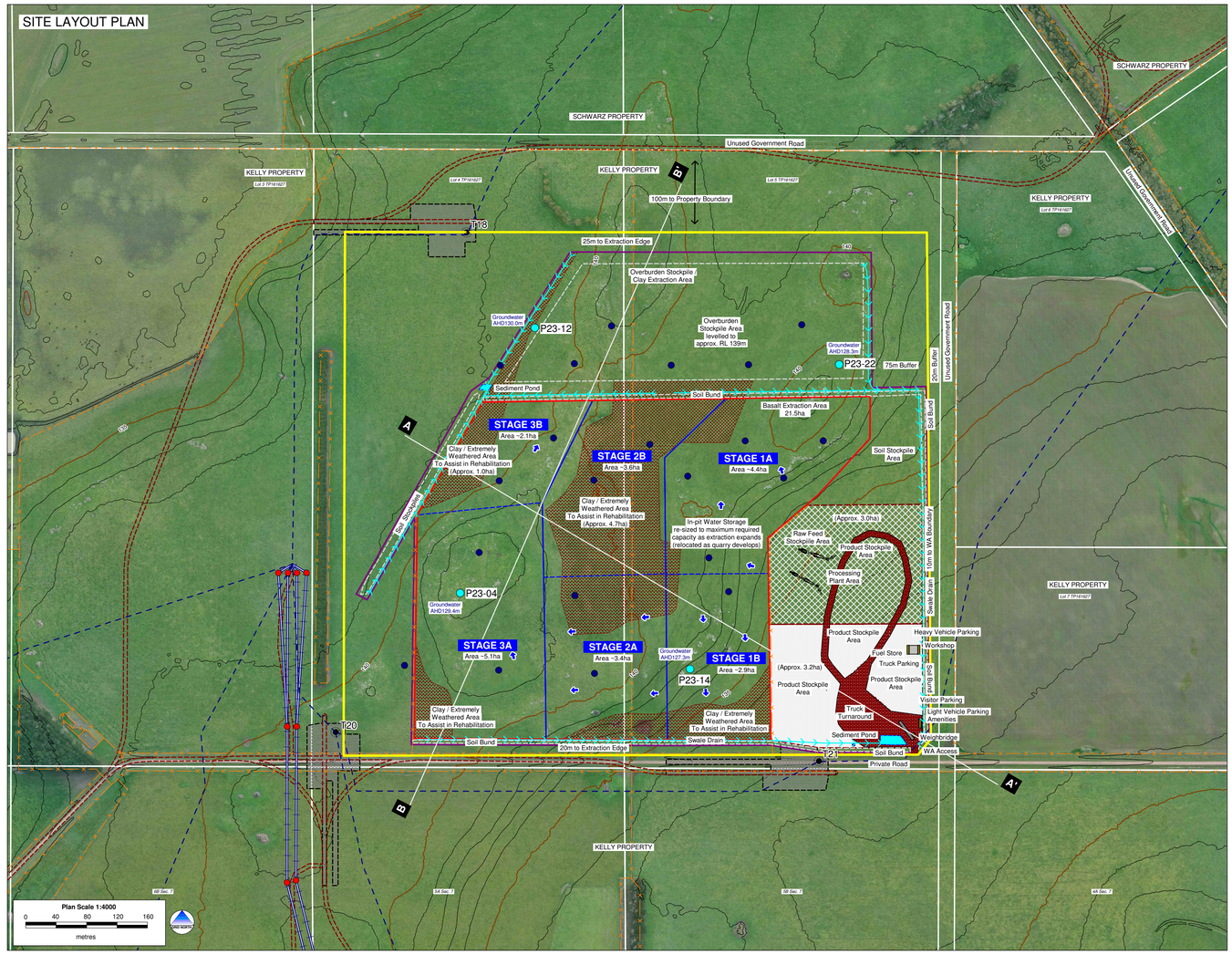


LITHOLOGY PLAN



Plan Scale 1:5000
0 100 200
Metres

SITE LAYOUT PLAN



LEGEND

- WORK AUTHORITY BOUNDARY
- WIND FARM BOUNDARY
- TITLE BOUNDARY (White)
- LANDOWNER PARCELS
- EXTRACTION LIMIT
- DISTURBANCE AREA
- STAGE BOUNDARY
- INDICATIVE DIRECTION OF WORKING
- WATER WAYS
- SOIL / OVERBURDEN STOCKPILES
- SWALE DRAIN
- DRILL HOLE (P23-11)
- DRILL HOLE (Cased) (P23-11)
- FENCE
- CONTOUR (1m Interval) (120)
- WIND FARM NO-GO AREAS
- ACHS Area
- DELWP MAPPED WETLANDS

WIND FARM INFRASTRUCTURE
(Subsequent to Quarry Development)

- WTG LOCATIONS
- WTG HARDSTANDS
- WTG ACCESS ROADS
- OVERHEAD CABLING
- POWER POLE
- UNDERGROUND CABLING

Hexham Wind Farm Pty Ltd

Extractive Industry Work Authority No: WA00####
HEXHAM

SITE LAYOUT PLAN

Author: CLB, MS Date: 6 November 2025	Drawing: NS-DRAFT I Revision: 0
Survey Source: LIDAR from Wind Prospect	Contours: 1metre Vertical Datum: AHD
Orthophoto Date : Wind Prospect - 17 Jun 2020	**Project No: W10_001**
Projection: MGA Zone 54 (GDA94)	**Figure: 3**
Figure3_SiteLayoutPlanv04.WOR	

BCA CONSULTING
EARTH RESOURCES
29/41 Norcal Road,NUNAWADING Vic, 3131 Tel: (03) 9873 5123
admin@bcaconsulting.com.au www.bcaconsulting.com.au

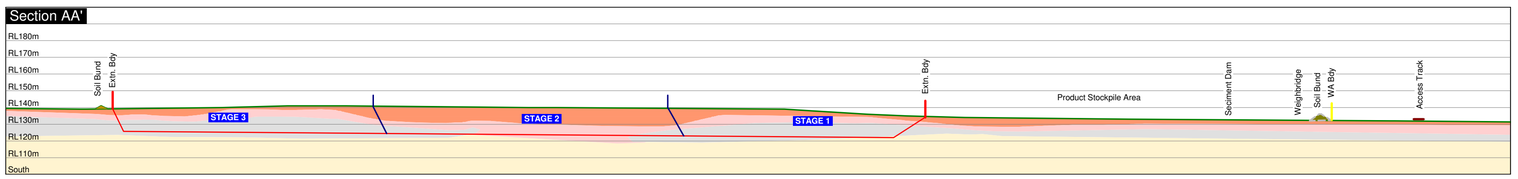
Work Authority Area
Coordinates MGA Zone55 (GDA94)

ID	Easting	Northing
1	634,144	5,790,232
2	634,146	5,790,916
3	634,907	5,790,915
4	634,913	5,790,253
5	634,896	5,790,232

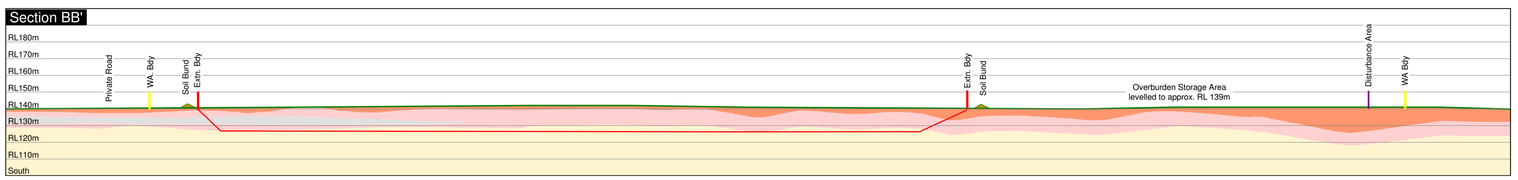
WA Area 52.3ha

	Stage 1	Stage 2	Stage 3	Totals
Clay & xwB	300,000m3	300,000m3	100,000m3	*700,000m3*
Salamander	540,000 t	810,000 t	1,080,000 t	*2,430,000t*
B Grade	400,000 t	240,000 t	320,000 t	*960,000t*
A Grade	400,000 t	80,000 t	480,000 t	*1,200,000t*
Volume	*990,000m3*	*820,000m3*	*990,000m3*	*2,800,000m3*
Area	7.35 ha	6.95 ha	7.16 ha	21.46 ha

Section AA'



Section BB'

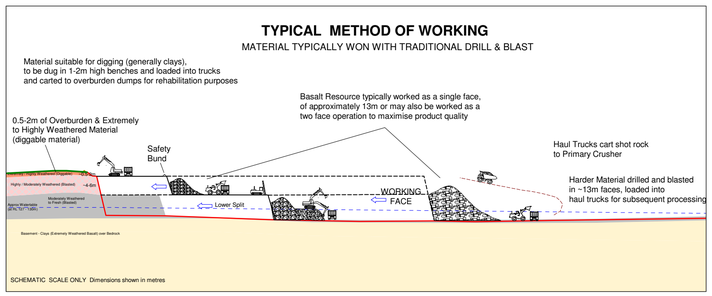


SECTION LEGEND

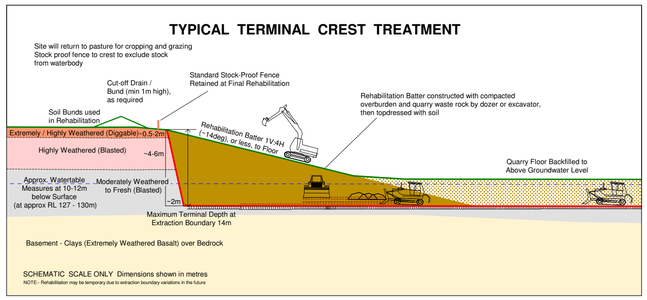
- WORK AUTHORITY BOUNDARY
- EXTRACTION LIMIT
- OVERBURDEN / CLAY
- HIGHLY TO MODERATELY WEATHERED BASALT
- MODERATELY WEATHERED TO FRESH BASALT
- BEDROCK / BASEMENT

TYPICAL METHOD OF WORKING

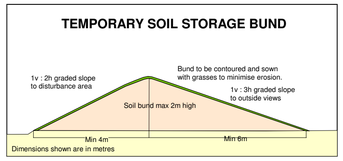
MATERIAL TYPICALLY WON WITH TRADITIONAL DRILL & BLAST



TYPICAL TERMINAL CREST TREATMENT

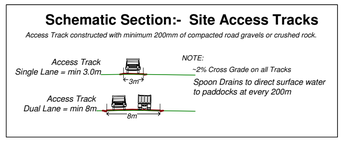


TEMPORARY SOIL STORAGE BUND

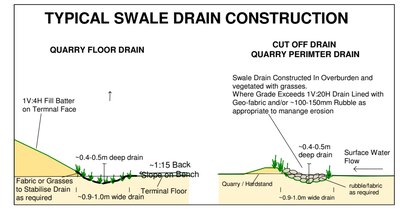


Schematic Section:- Site Access Tracks

Access Track constructed with minimum 200mm of compacted road gravels or crushed rock.



TYPICAL SWALE DRAIN CONSTRUCTION



Rehabilitation Plan

for

Extractive Industry Work Authority WA00####

RRAM Designation:- ***To Be Assigned***

Hexham Wind Farm Pty Ltd

WA00#### – Hexham Wind Farm Temporary Quarry
'Woorabinda', off Keilors Road
CARAMUT 3274

Project No. W10_001
November 2025

Hexham Wind Farm Pty Ltd
Suite 10, 19-35 Gertrude St
PO Box 110
Fitzroy Victoria 3065
Mob: +61 412958829
Email: Rory.McManus@windprospect.com.au

Table of Contents

Revision History

Document Date	Description
14 Nov 2024	Draft A of Rehabilitation Plan
17 Dec 2024	Draft B of Rehabilitation Plan
21 Jan 2025	Draft C of Rehabilitation Plan
7 Nov 2025	Draft D of Rehabilitation Plan

1. PURPOSE OF REHABILITATION PLAN

This Rehabilitation Plan has been developed to address the requirements of Part 2 the Mineral Resources (Sustainable Development) (Extractive Industries) Regulations 2019, and in consideration of the *Preparation of Rehabilitation Plans – Guideline for Extractive Industry Projects*, March 2021, Version 1.0. This Rehabilitation Plan forms part of the Work Plan for the purposes of the *Minerals Resources (Sustainable Development) Act 1990* (MRSD Act).

The background for this extractive industry operation, including descriptions of the work, site setting, risk assessment and risk management are set out in detail in the other components of the Work Plan, namely the Work Plan Description and the Risk Management Plan, with reference to the included drawings, particularly Figure 3 Site Layout Plan.

1.1. Overall Rehabilitation Objective

The overall objective of the Rehabilitation Plan is to leave the site in a manner that is:

- safe (is not likely to cause injury to members of the public)
- stable (is structurally, geotechnically and hydrogeologically sound)
- sustainable (is non-polluting and aligns with the principles of sustainable development, minimising as much as is feasible the potential long-term degradation of the environment), and
- in a form suitable to the Kelly family (the landowners) for the intended end land use, a combination of general farming and animal husbandry.

This objective has been accepted by the Kelly family, the landowner, and is consistent with the current surrounding land use and the activities conducted prior to extractive industry use. This objective is also generally consistent with broader community and local stakeholder expectations and will be routinely and specifically canvased through implementation of the site Community Engagement Plan after the Work Authority is granted.

The rehabilitated landform meeting this objective is represented as a concept plan on the included **Figure 4 Rehabilitated Landform**.

1.2. End Land Use

The site will be returned to general farmland suitable for livestock grazing and hay. The terminal quarry faces will be backfilled to a batter not steeper than 1V:4H, and both the rehabilitated batters and the quarry floor will be rehabilitated to develop suitable pasture.

Rainfall collecting within the rehabilitated landform will be directed to a retained farm dam located at the lowest point in the south-east part of the pit and used for stock water, irrigation and other uses on the Kelly family's properties. If required, any existing licences will be varied as required by the relevant authority. However, modelling shows that a shallow waterbody will eventually extend across the floor of the rehabilitated pit due to rainfall collection over many decades. This waterbody is modelled as having a maximum potential capacity of approximately 170ML, which equates to a level of approximately RL 131.5m.

This Work Authority is a solely a source of material for the adjoining wind farm project, with all processing and dispatch infrastructure, weighbridge, offices and amenities removed at site closure, and there will be fixed plant, buildings, huts or workshops that would require demolition / decommissioning.

No additional planning permission is required for the proposed end land use for the rehabilitated site.

In rehabilitating and preparing the land for the proposed end land uses, any additional planning permission that may be required will be obtained before undertaking those land use activities.

1.3. Other Rehabilitation Obligations

There are over-arching rehabilitation obligations under the standard Work Authority conditions, including a requirement for progressive rehabilitation and rehabilitating in accordance with the approved Work Plan (i.e. this Rehabilitation Plan and the associated Figure 4, Rehabilitated Landform).

Any remaining groundwater monitoring bores will be removed prior to closure and will be decommissioned in accordance with an authorisation from Southern Rural Water. The final in-pit water storage dam will be retained as a farm dam for the end land use and any obligations required by any authority will be obtained.

1.4. Rehabilitation Domains

The rehabilitation treatment required across the site will differ for the various elements of the landform and how they have been affected by the extractive industry operation, and does not always follow a linear timeline. The Regulations require that this Rehabilitation Plan set out distinct rehabilitation domains that collectively amount to the landform that will be achieved upon completion of the site rehabilitation.

The legislative context relevant to rehabilitation domains under the *Mineral Resources (Sustainable Development) (Extractive Industries) Regulations 2019* is Regulation 11 (2), which requires that:

> The Rehabilitation Plan must include details of the proposed rehabilitation of land disturbed by work under the Work Plan including—
> (a) proposed land uses for the affected land after it has been rehabilitated, that considers community views expressed during consultation; and
> (b) a land form that will be achieved to complete rehabilitation, which must—
> (i) be safe, stable and sustainable; and
> (ii) be capable of supporting the proposed land uses referred to in paragraph (a); and
> (c) objectives that set out distinct rehabilitation domains that collectively amount to the land form described in paragraph (b); and
> (d) criteria for measuring whether the objectives described in paragraph (c) have been met.

Section 2 of the Rehabilitation Plan sets out the strategy for rehabilitation of the site throughout the entire life of the extractive industry operation.

Section 3 of the Rehabilitation Plan sets out the rehabilitated landform design, as shown in Figure 4 Rehabilitated Landform, for each of the key components of the site and how this rehabilitation work is to be undertaken.

Section 4 of the Rehabilitation Plan sets out how the rehabilitation objectives will be achieved with reference to the detail contained within the Rehabilitation Domains Table.

Section 5 presents the detailed Rehabilitation Domains Table with reference to areas outlined in the included Rehabilitation Domains Plan – the domains being further subdivided into subdomains.

Section 6 of the Rehabilitation Plan sets out the overall management of the site rehabilitation.

Notes on the approach taken in the Rehabilitation Plan to satisfy the legislative requirement for domains

The rehabilitation domains by the Regulations, including subdomains, are not necessarily spatial in nature, they are areas, activities or aspects of the site that require common rehabilitation treatment, with common objectives and/or rehabilitation / closure criteria. The Regulations do not require that domains be defined as mutually exclusive spatial areas and it can be impractical to do so, for the following reasons:

- Those domains and subdomains that could be defined spatially can be overlapping, e.g. site roads / tracks, and sometimes overlapping with more than one other domain or subdomain.
- While some subdomains, not necessarily spatially confined, may occur across a number of broader domains, it should not be assumed that they require the same treatment or need to meet the same criteria across separate domains. The context and the hazards applicable to the broader domain and its particular rehabilitation objectives may impose differing requirements for each of these subdomains. For example, surface water control measures to be retained within a rehabilitated pit will usually have differing rehabilitation / closure criteria to those retained outside of the pit, particularly when the end use differs for those domains.
- Some subdomains do apply across the entire site with common hazards, objectives and rehabilitation / closure criteria, regardless of the site-wide domains – for example: areas requiring weed control, areas requiring pest animal control, internal site fencing, etc. The domain covering these various site-wide subdomains has been termed "Residual Work Authority Area" in the Rehabilitation Domains Table.
- The requirement to undertake progressive rehabilitation, to minimise the impacts of various hazards and minimise rehabilitation obligations, necessarily requires ongoing rehabilitation works, segment by segment, for most of the domains and subdomains throughout the life of the operation. So, in practice, assessment of rehabilitation outcomes against rehabilitation / closure criteria will be applied progressively to segments of each domain or subdomain, with a final assessment of the whole domains and subdomains against the criteria to achieve closure.

The domains and subdomains included in the Rehabilitation Domains Table should be self-evident with reference to Figure 3, Site Layout Plan, and Figure 4, Rehabilitated Landform, however, to satisfy legislative requirements a Rehabilitation Domains Plan is included in Section 5.

Achieving a safe, stable and sustainable rehabilitation outcome is about the rehabilitated landform considered as a whole, as required by the Regulations. While some rehabilitation domains are more directly linked to demonstrating aspects of a safe, stable and sustainable rehabilitation outcome for the site, most domains are not easily separated and can only be considered together in achieving the overall rehabilitation objectives – refer to Section 4.

2. REHABILITATION STRATEGY

Rehabilitation for the whole site will not be a single linear process, and it will occur in parallel to extraction and processing activities for much of the quarry life, nor will the parallel rehabilitation processes follow consistent timelines for differing parts of the site.

Rehabilitation will be undertaken progressively as much as possible throughout much of the quarry life, and only when it will not compromise the ability to work the site and the commercial viability of the operation. Once the resource extraction ceases there will be areas within the site, particularly within the extraction area, that may already be fully rehabilitated and possible have the rehabilitation objectives satisfied.

Any future changes to the overall rehabilitation objective, because of matters raised by the Earth Resources Regulator or by the local community through the Community Engagement Plan, will be discussed with the Earth Resources Regulator to determine the most appropriate pathway forward under the relevant regulations applicable at that time.

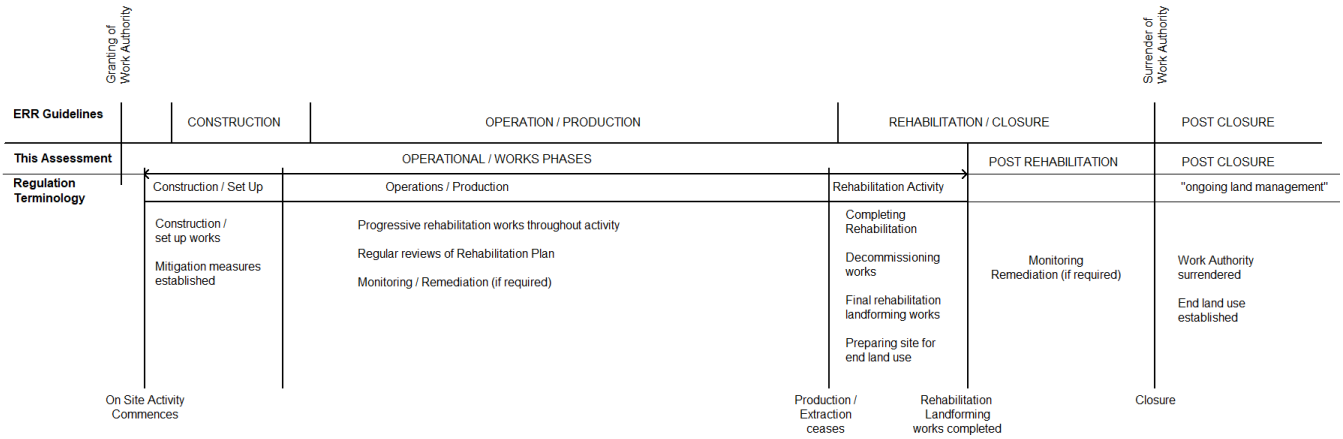
2.1. Phases of Rehabilitation

Rehabilitation for any particular part of the site will occur in a sequence of stages through the life of the quarry, and at any point in time the rehabilitation stage applicable to different parts of the site will differ.

The discussion of site rehabilitation presented in this document, along with any long-term risks associated with the rehabilitated land, aims to satisfy the Regulations while adopting extractive industry accepted norms, which do not neatly fit the requirements of the 2021 *Preparation of Rehabilitation Plans* guideline. A specific example of this is the use of the term “closure”. This is not a term commonly used in the extractive industries and not used in the applicable Regulations but is used throughout the 2021 rehabilitation guideline.

The term “closure” is used here to be the point in time, subsequent to completion of all rehabilitation works, when all the stated criteria for closure have been satisfied to achieve the rehabilitation objectives for all rehabilitation domains and thus allowing surrender of the Work Authority and return of the rehabilitation bond.

As is the case for the hazard identification and risk assessment process, set out in the Risk Management Plan, the rehabilitation at this site is in the context of the quarry life as represented in the following schematic, which includes the indicative rehabilitation sequence as it relates to any part on the site.



2.2. Progressive Rehabilitation

Progressive rehabilitation will be undertaken throughout the Works phases of the quarry to minimise, as far as reasonably practicable, the disturbed area remaining open and unrehabilitated at any given time. Progressive rehabilitation, wherever possible, will be integrated into daily operations and, within the extraction area, will occur as soon as practicable after extraction, however this will not always be possible. Factors affecting the timing of progressive rehabilitation include (but are not limited to):

- the availability at any given time of suitable areas for rehabilitation across the site
- the availability at any given time of suitable material to undertake rehabilitation works
- climatic conditions and seasonal weather variation.

The opportunity for progressive rehabilitation at this site is limited by the very short life span and is most likely limited to some the terminal batters within the extraction area. The proposed staging allows for some quarry batters, outside of any in-pit water storage dams, to be developed and available for rehabilitation as the quarry advances westwards and northwards and to full depth. This strategy maximises the extent of the terminal batters to be progressively revegetated and may allow the rehabilitation success to be monitored, with any remedial actions implemented and lessons learned integrated into ongoing rehabilitation.

As rehabilitation of available segments of terminal batter, including the placement of overburden, topsoiling and revegetation, can only occur after extraction limits have been reached, it is necessary to temporarily stockpile soil and overburden material until required. This stockpiling of soil and overburden will also limit the rehabilitation of those areas until the stockpiled material can be utilised.

The volume of overburden available on the site and the cost of rehandling overburden, along with regulatory requirements, are prime drivers for commencing the progressive rehabilitation of terminal faces as soon as possible. Additionally, progressive rehabilitation will be undertaken at the pit crests and upper terminal benches as soon as practicable after they are established.

Progressive rehabilitation is undertaken with the following principles applied to meet the rehabilitation objectives:

- storing adequate topsoil for use in site rehabilitation
- storing adequate overburden in nominated stockpile areas for future use
- undertake rehabilitation of available areas as soon as practicable, including the backfilling in compacted layers, topdressing and revegetating of any terminal faces and worked out pit floor areas
- where possible, directly place overburden in compacted layers in areas available for rehabilitation
- initially revegetate the final rehabilitated surfaces with pasture grass species to stabilise the surfaces and manage erosion
- actively encourage establishment of vegetation on rehabilitated batters and identify and plant out any other suitable areas
- minimising, as far as reasonably practicable, the disturbed area remaining open and unrehabilitated at any given time (including rehabilitated areas that have not yet met the rehabilitation objectives)
- continually monitor and evaluate the effectiveness of rehabilitation and revegetation, and modify as necessary, to ensure the stated objectives for individual rehabilitation domains are being achieved.

The success of progressive rehabilitation will be regularly reviewed and any required changes in the rehabilitation strategy will be implemented as appropriate. The criteria for achieving the rehabilitation objectives for individual rehabilitation domains and the monitoring frequency, as presented in Section 5 Rehabilitation Domains Table, are applied for all progressive rehabilitation undertaken on the site.

2.3. Maximum Disturbed Area

The progressive development of the extraction area is provided schematically in Figure 3 Site Layout Plan.

Given the very short life span of the quarry, limiting the disturbance area to something less that the maximum disturbance area will impose unachievable and uneconomic restriction on the operation. Specifically, it is typical to "monitor" rehabilitation for a three-year period, however the Works phase of this site is only two years.

Progressive rehabilitation for this site will mostly consist of developing the final landform.

Progressive rehabilitation will be integrated into daily operations as much as possible, however it must be noted that the processing, stockpiling and infrastructure areas of this site will be in use until extraction and processing cease, so progressive rehabilitation is largely limited to the excavation area only.

The total area to be disturbed by this operation, including all roads, hardstands, other earthworks and the extraction area, is estimated to be 39.4 hectares, comprising:

extraction area	21.5ha
overburden & soil storage area	10.2ha
processing operations	3.0ha
hardstand/product stockpile area	3.2ha
soil bunds/stockpiles, drains, etc	1.5ha

However, as set out in Section 2.2, progressive rehabilitation will be undertaken as soon as practicable after extraction reaches terminal batters, except areas required for in-pit water storage. So it is anticipated there will be some areas of the site that may have achieved the final landform, although not yet meet the closure criteria.

2.4. Achievability of Rehabilitation Outcome

The rehabilitation of the quarry will be in accordance with the overall rehabilitation objective set out above, i.e. resulting in a landform that is safe, stable and sustainable for all the domains, and in a form that is non-polluting and suitable for the intended end land use. The rehabilitated landform is designed to meet this objective, as shown in Figure 4 Rehabilitated Landform.

Based on current knowledge for this relatively uncomplicated site, the designed rehabilitation landform is found to be achievable and the rehabilitation objectives for each rehabilitation domain can be met, such that the land will be suitable for the intended end land use. The Work Authority cannot be surrendered until all the specified criteria for closure, as presented in Section 5 Rehabilitation Domains Table, have been satisfied – these criteria being designed to demonstrate that the rehabilitation objectives for each rehabilitation domain have been met.

There are no foreseeable issues at this site that would introduce a significant level of uncertainty in achieving the described rehabilitation outcome. The site's geotechnical, hydrogeological and other constraints are all well understood and so are very unlikely to be an impediment to achieving the rehabilitation outcome. Therefore, there is no requirement for further investigations during the quarry development to resolve any uncertainties in order to ensure the designed rehabilitation landform would be achieved with all objectives met.

A detailed assessment of the hazards potentially associated with the rehabilitated land (post closure), as a consequence of the changes due to the extractive industry use, is presented in Section 4.4, Identification of Post Closure Risks. Each potential hazard is assessed as to whether it may pose long-term risks to the environment, members of the public, or to land, property or infrastructure. It is concluded that there will be

no post closure risks that would require monitoring, maintenance, treatment or any other ongoing land management activities (post closure), as a consequence of the changes due to the extractive industry use.

In the event of any unforeseen or unlikely circumstance that would mean that the designed rehabilitation landform could not be achieved in line with the rehabilitation objectives, the Work Authority holder would seek a Work Plan variation, or other approval process as deemed appropriate at that point in time, to make the necessary changes.

2.5. Rehabilitation Milestones

Given the very short operational life of this quarry (approximately 2 years) there will be limited opportunities for progressive rehabilitation, but any such opportunities will be undertaken as soon as practicable across available areas of the site. Rehabilitation could be occurring at various parts within the site with each part at a different stage of rehabilitation. The progress of rehabilitation will mainly depend on the availability of areas for rehabilitation, the availability of suitable materials for rehabilitation and the climatic / seasonal conditions at the time.

As there are no significant uncertainties to resolve in achieving the rehabilitation outcome, and extraction will be continuous across the defined extraction area, it is largely impractical for this operation to identify any specific rehabilitation milestone prior to the cessation of extraction that would apply to the whole operation.

The following milestones in the site rehabilitation ("significant event or step" in the Regulations) and associated actions have been identified:

- Nearing fulfilment of Wind Farm project requirements / cessation of quarry product demand
    - progressive rehabilitation activities will be increased as soon as possible, particularly within the extraction area,
    - ensure progressive rehabilitation of segments of terminal face and pit floor, i.e. sites within the extraction area, has occurred as soon as practicable after extraction limits are attained – the treatment of these faces is detailed in Section 3.3.
    - ensure rehabilitation of segments of terminal face, as they become available, have included the placement of overburden in compacted layers, the spreading of topsoil and revegetation.
    - ensure progressively rehabilitated areas of the pit floor, as they become available, have included the spreading of overburden and topsoil, and revegetation.
    - ensure progressively rehabilitated areas are being monitored for rehabilitation success and, where practicable,
- Resource extraction ceases
    - at completion of all extraction activities, progressive rehabilitation has been maximised, as far as practicable, with regular monitoring for rehabilitation success, remediation and reviews of Rehabilitation Plan.
    - final rehabilitation activities commence (final land forming, preparing site for end use and decommissioning works) – note: processing of stockpiles, etc. may continue for some time.
- Completion of rehabilitation activities
    - cessation of all extractive industry activities and completion of major rehabilitation activities (earthworks, planting, decommissioning works, etc.) on the site.
    - post rehabilitation phase commences – monitoring for rehabilitation success, remediation (if required) and assessment against rehabilitation / closure criteria.
- Site closure

- post rehabilitation monitoring demonstrates that all closure criteria have been met, and all rehabilitation objectives have been achieved for all the rehabilitation domains.

Site Closure is effectively the last rehabilitation milestone. As defined previously, the term "closure" is used here to be the point in time, after completion of all rehabilitation works, when all the rehabilitation objectives have been met for all the rehabilitation domains and thus allowing surrender of the Work Authority and return of the rehabilitation bond.

2.6. Schedule for Rehabilitation

As stated previously, rehabilitation for the whole site will not be a single linear process, as it will occur in different areas in parallel to extraction and processing activities through the quarry life, nor will the individual areas undergoing rehabilitation across the site follow consistent timelines. The timing of rehabilitation works and the progress through phases of rehabilitation will differ for most of the separate rehabilitation domains. This timing is dependent on a range of factors, including the practical limits on extraction sequencing, availability of overburden / waste rock at various stages of extraction, practical operational limitations (e.g. areas required to remain open for processing, stockpiling, water management, etc.), the need to limit double handling costs, any need to undertake remedial measures for rehabilitated areas, and seasonal / climatic conditions.

Planning legislation normally prohibits the imposition of cessation dates on extractive industries, except in some urban situations, and allows for delays in starting the use of up to 5 years and the discontinuance of the use for up to 10 years. Given the recognition that a Work Authority is effectively issued for the life of the resource, and the factors already mentioned regarding the realities of progressive rehabilitation, a schedule of rehabilitation activities can only be stated in relative terms.

Ongoing Progressive Rehabilitation

The planned timing of progressive rehabilitation for any part, or segment, of the site to be rehabilitated, where this can be practicably applied, is as follows:

- ***As soon as practicable*** *(depending on a range of factors)*: Complete earthworks to achieve the rehabilitated landform for that part as the extraction sequence / quarry development allows, including the placement of overburden and topsoil.
- ***Within 3 months of completing earthworks***: Initially stabilise segments of slope by seeding with pasture / grasses and, where necessary, undertaking any remedial works, including additional short-term erosion control measures until vegetation is established, followed by seeding / fertilising for final intended vegetation, as appropriate.
- ***Within 12 months of the completed earthworks***: Initial pasture / grasses revegetation, where applied, will generally be established on rehabilitated segments of batters, however, this is dependent upon environmental and practical factors.
- ***Each Spring and Autumn*** *(i.e. six-monthly intervals)*: Review and report vegetation status of rehabilitated parts, undertake any remedial earthworks necessary and supplement vegetation as appropriate.

Given the short life span of the quarry, and the required production rates, the proposed maximum disturbance area at any time will be the same as the total disturbance area, i.e. 39.4 hectares, including rehabilitated areas that will have not yet met the rehabilitation objectives.

Final Rehabilitation Activities, Post Rehabilitation Phase and Closure

Once all resource extraction ceases, the final rehabilitation activities will involve completion of final earthworks, final revegetation works and the decommissioning and removal of any processing plant and/or other quarry infrastructure. This will be followed by a period of post rehabilitation monitoring and, where necessary, remediation until all the criteria for closure have been met.

It should be noted that the hardstand, plant and stockpile areas and overburden storage areas may be in use for some time after extraction has ceased, as stockpiles are processed and product is drawn down and, potentially, some of the stockpiled overburden / waste rock is reprocessed.

At completion of all extraction and processing activities progressive rehabilitation will have been maximised, as far as practicable, with regular monitoring for rehabilitation success, remediation and reviews against the Rehabilitation Plan. It is anticipated that all earthworks, decommissioning works and revegetation plantings involved in the final rehabilitation activities will be achieved within 6 months. However, the time required for full establishment of vegetation on the remaining unvegetated landform will be dependent upon environmental and practical factors.

- ***As soon as practicable after ceasing extraction***: Complete final earthworks and decommissioning works for remaining unrehabilitated areas to achieve the rehabilitation landform across the whole site, including the placement of overburden and topsoil.
- ***Within 3 months of completing final earthworks and decommissioning***: Initially stabilise remaining unrehabilitated slopes and pit floor by seeding with pasture / grasses and, where necessary, undertaking any remedial works, including additional short-term erosion control measures until vegetation is established, followed by later seeding / fertilising for final intended vegetation, as appropriate.
- ***Within 12 months of the completed earthworks and decommissioning***: Initial pasture / grasses revegetation, where applied, will generally be established on remaining unrehabilitated batters and pit floor, however, this will be dependent upon environmental and practical factors. Once initial pasture / grass cover is established, seeding and fertilising with final vegetation species (trees and shrubs) will be undertaken (generally within the 12 months).
- ***Within 12 months of the completed earthworks***: Any retained hardstands, etc., prepared in accordance with requirements for end land use.
- ***Post Rehabilitation Monitoring***: Continue monitoring of rehabilitation outcomes in accordance with the monitoring frequency, as presented in Section 5 Rehabilitation Domains Table, assessing against the criteria for closure to achieve the rehabilitation objectives for individual rehabilitation domains.
- ***Each Spring and Autumn*** *(i.e. six-monthly intervals)*: Review and report vegetation status of rehabilitation across the site, undertake any maintenance and remedial works, where necessary, including earthworks, supplementing vegetation as appropriate, and implementing any necessary remedial actions for site drainage.
- ***Site Closure – Meeting Criteria for Closure***: The post rehabilitation monitoring will continue until the criteria for closure have been met and the rehabilitation objectives achieved for all rehabilitation domains. This monitoring and maintenance period is planned to continue for at least three years. The post rehabilitation monitoring and remedial actions may continue for a longer period, if necessary, until the relevant authorities are satisfied. This period could potentially be shorter if all the closure criteria were to be met, and the rehabilitation objectives achieved prior to the end of the planned three years.

Potentially, previously extracted areas that have been fully rehabilitated could be excised from the Work Authority at some future stage, where it is practical to do so. This could occur where it can be demonstrated that the rehabilitation objectives are achieved for those areas and that they are ready for the proposed end land use. This would allow a reassessment and potential reduction of the rehabilitation bond at that time for the ongoing extractive industry on the remainder of the Work Authority.

3. REHABILITATION LANDFORM DESIGN

A conceptual, site wide plan of the Rehabilitated Landform is attached as Figure 4.

3.1. Assets To Be Retained

The Work Authority holder is not the landowner, and it has been agreed between the two parties that there will be no buildings, fixed or mobile plant, or other infrastructure retained at closure.

The constructed infrastructure / assets to be retained are mainly associated with the screening mound and water management, as listed below.

Assets retained post closure will be:

- Perimeter site fencing (by agreement with landowner, but not required to manage any post closure risk)
- Swale drains and diversion bunds (perimeter drains and cut-off drains above pit crests and soil bunds)
- Water dam(s)
- One site access road

Details regarding the retained onsite dams and other water infrastructure, and the decommissioning of the groundwater monitoring bores, are set out in Sections 3.6 and 3.7.

The southern, eastern and northern perimeter bunds and associated swale drains perform a valuable role in the management and control of surface water for the site and will remain intact post closure.

The closure criteria provided require that the various retained assets are functioning appropriately and do not need maintenance at the time of closure.

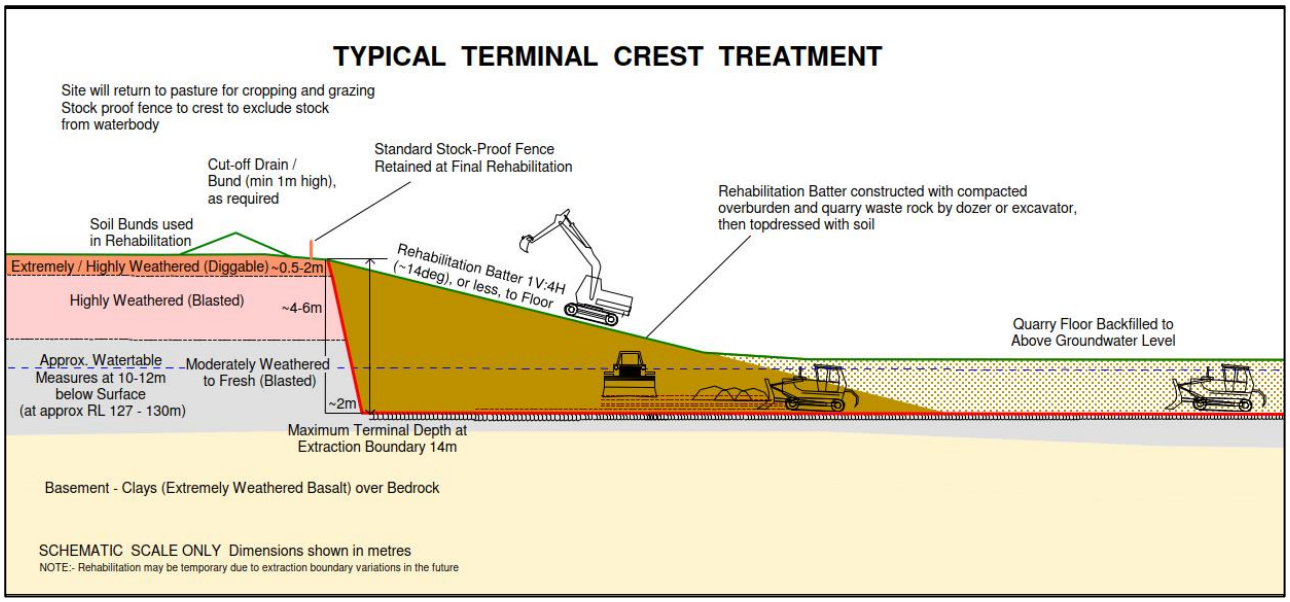
3.2. Site Fencing

The Rehabilitation Plan does not leave any steep or exposed faces; therefore, no fencing or other security measures are required post closure to manage any post closure risk to members of the public. However, the site perimeter fencing and any (improved) farm fencing will be retained at closure by agreement with the landowner, as advantageous infrastructure for the site end land uses.

The condition of the perimeter fencing and any additional farm fencing will be regularly reviewed at the annual reviews, as required, including during final rehabilitation works.

3.3. Terminal Face Treatment

Terminal faces will be rehabilitated as soon as practicable by placing and spreading suitable material (overburden and quarry waste rock / plant oversize and track-rolling with a dozer / excavator. The earthworks will start at the base of the excavation and work up in layers (no greater than 1m in thickness), backfilling and profiling to an overall slope of not steeper than 1V:4HThis method of placing and compacting material has been shown to achieve (at least) the minimum compaction criteria of 4 blows per 100mm for Dynamic Cone Penetrometer (DCP) testing. . Where necessary, to meet compaction requirements, a sheep's foot roller / padfoot roller may also be utilised. Batter slopes will be lightly scoured, covered with topsoil and vegetated with grasses within 3 months of completing the earthwork to aid in managing erosion and dust. Fill material characteristics and placement methodology will be in accordance with the recommendations of the included Ground Control Management Plan (GCMP) / any current or future recommendations by specialised consultants and/or the Earth Resources Regulator.



Terminal faces and the quarry floor will be rehabilitated to above the groundwater level as soon as practicable by placing, spreading and track-rolling suitable material. Batter slopes will be lightly scoured, covered with minimum 100mm of topsoil and vegetated with pasture grasses within 3 months of completing the earthwork to aid in managing erosion and dust.

During the Works phases, a swale drain and safety bund will be established around the crest of terminal faces. The safety bund will be remodelled into a small mound and swale drain as part of the rehabilitation landform.

A larger safety bund also be established that separates the retained site infrastructure (office, sheds, vehicle parking, product stockpiles etc.) from the crest of the pit. This is a structure will remain for the works phase and will be removed when extraction ceases, and the terminal faces rehabilitated.

3.4. Pit Floor Treatment and Reprofiling of Stockpile Pads

The base of the excavation will be lightly fractured from previous sub-drilling and the quarry floor will be spread with overburden to approximately RL 130-131m (ie approximately 1m above the recovered groundwater level) and 100mm of soil to allow establishment of suitable pasture grasses.

The rehabilitated floor of the pit will have a gentle slope towards a low point in the excavation, where the final in-pit water storage (approx. 2.5m deep) will be located. The purpose of the in-pit water storage is to accommodate the maximum likely volume of water collected over the 2 year life of the quarry, and this will also act as a sediment trap during final rehabilitation whilst pasture is being established, until sediment runoff is negligible.

The final in-pit water storage will be retained and initially act as a farm dam. However, modelling undertaken in Appendix B – Hydrology and hydrogeology (prepared by Water Technology for the Environment Effects Statement) shows that rainfall collecting within the pit will eventually result in a shallow waterbody across the floor of the whole pit. It is assessed that this waterbody will have a maximum potential capacity of approximately 170ML, which equates to a level of approximately RL 131.5m. It will be many decades after final rehabilitation and closure of the quarry before this waterbody reaches a state of equilibrium. The maximum fill level is well below the crest level of the rehabilitated pit and, with the floor of the pit being above recovered groundwater level, there is no risk that the quarry will ever overflow due to natural surface water capture.

The stockpile pads outside of the pit have been constructed of overburden and quarry waste rock on sloping land and are a key component of the overburden management strategy. Once extraction is completed these

stockpile pads will be decommissioned and the sites reprofiled and rehabilitated to pasture. Excess material from this reprofiling work will be placed into the floor of the pit. As for the construction of the stockpiling pads, their reprofiling will be based on Geotechnical Assessment and managed under the Ground Control Management Plan.

The overburden stockpile pads outside of the pit have been constructed with overburden and quarry waste on marginally rocky and sloping land and are a key component of the overburden management strategy. Once extraction is completed the overburden mounds exhausted, these overburden pads will be removed and the material used in achieving the final landform. The material balance indicates that additional material may be required to achieve the final landform, so these overburden pads may need to be extracted to a depth of approximately 2m in places when decommissioning, prior to returning to pasture.

Once the site is closed the floor of the pit, including backfill material, will be completely covered by captured surface water and re-charged groundwater resulting in the establishment of a small farm dam.

3.5. Overburden and Soil Requirements

The following estimates of material excavated have been obtained from the resource drilling, the pit design, local site experience and extrapolation:

- The top 200mm of material is treated as soil and used or stockpiled separately for rehabilitation and totals approximately **73,000 cubic metres**
- There is a highly varying level of clayey **overburden** and extremely to highly weathered material that is easily diggable. This can range from almost zero up to 14m in depth. The total volume of overburden is approximately 730,000 cubic metres.
- The highly to moderately weathered basalt to be excavated from 1-14m depth totals approximately 1,100,000 cubic metres and includes a significant proportion of material that will also be classified as overburden (ie not suitable for the wind farm project requirements)
- An additional area to be removed to level the overburden stockpile area (north of the pit), excavated to approximately 2m in places, will yield an additional 310,000 cubic metres.

The total volume of material **available** for rehabilitation is approximately **2,140,000 cubic metres**.

The volume of material **required** to achieve the rehabilitated landform is **2,135,000 cubic metres** and comprises:

- 1,300,000 cubic metres of material in the floor to backfill to above the recovered groundwater level, and
- 815,000 cubic metres of material in the floor to backfill the terminal faces to a minimum 1v:4h batter.

Note that there is an inherent contingency built into this Work Plan to ensure that there is ample material within the approved disturbance area to achieve the required landform by reshaping the overburden storage area to a shallower or deeper depth.

Please Note:

- The timing of overburden placement on the terminal batters and berms occurs after extraction limits have been achieved and will initially require the temporary stockpiling of soil and overburden until required. Where possible, overburden will be stockpiled within the excavation area close to where it will be required for rehabilitation or otherwise stored in the overburden stockpile area.
- The site has the capacity to accept large quantities of imported materials (see Section 3.8) and in addition to sources of quarry waste rock this may result in flatter batters than proposed or the overall surface of the rehabilitation landform being at a higher level and a more undulating than proposed but will always be consistent with the overall rehabilitation objective.

Overburden / fill quantities will be continually monitored to ensure consistency with the rehabilitation objectives, and if a significant deviation from the rehabilitation objectives is observed the relevant authorities will be notified and the appropriate actions set in place.

3.6. Dams and Constructed Works

There are no licenced water catchment dams on site, and this rehabilitation plan shows a farm dam in the base of the rehabilitated landform, which will be retained at closure. Any intermediate water storage dams within the excavation area will have been removed as part of the works.

It is emphasised that are no slimes dams or process water facilities proposed for the operation.

Any groundwater monitoring bores established will not be required after all closure criteria are met and the Work Authority is surrendered, having served their purpose by that point in confirming a successful rehabilitation outcome. Therefore, the groundwater monitoring bores can be decommissioned at closure, in accordance with rural water authority licences.

There will be no workshop, fuel stores, oil and grease stores, spare parts stores, amenities, weighbridge, offices, laboratory, etc. remaining on the site.

Roadways that might have been constructed as part of the works, other than those shown on Figure 4 Rehabilitated Landform, which are deemed unnecessary for the post closure land use will be removed / ripped and rehabilitated. Internal access tracks may be extended through the Work Authority buffer areas during final rehabilitation to provide practical linkages with existing external access tracks to facilitate post closure farming activities.

Hardstand and stockpile areas and associated infrastructure will be removed / ripped and the areas returned to pasture.

3.7. Surface Water Management

Through the Works phases surface water is managed to ensure run-off from disturbed areas (including roads, hardstand areas, stockpiles and overburden dumps is intercepted and directed to sediment ponds and sumps within the base of the quarry or to other strategic structures on the site. Thereby minimising the potential for dirty water run-off and erosion.

Water collecting in the sumps or in-pit water storage dam is used around the site for dust suppression, product mixing and irrigation. Any excess water is used to irrigate rehabilitated areas or used to irrigate the undisturbed areas of the site, and may be used for dust suppression or other uses by the wind farm project.

Post closure, any surface water diversion bunding or swale drains associated with the excavation area will be remodelled and remain in place after rehabilitation and closure to direct external surface water flows away from the rehabilitated landform. The final in-pit water storage dam in use during the final works phase will be converted to a farm dam by reshaping to remove any the steep sides (allowing stock access) and to retain about 2.5m depth for ongoing farm use. However, as above (Section 3.4), modelling shows that a shallow waterbody will eventually extend across the floor of the rehabilitated pit due to rainfall collection over many decades.

Some surface water diversion bunding and drains are retained to ensure ongoing, long-term management of surface water flows through and around the site without the need for ongoing maintenance. As set out in the closure criteria, these features must be functioning to manage surface water flows, diverting excessive flows away from rehabilitated extraction areas and will not requiring maintenance to achieve closure.

3.8. Imported Material

Whilst the volume of overburden, extremely weathered material and quarry waste rock generated by the site is sufficient to fulfil the rehabilitation requirements (see Section 3.5), imported soil or clean fill from the wind farm project could potentially be accepted to minimise material movement across the wind farm project area. Where suitable, imported material could be blended with quarry products or could be used in site rehabilitation or the soil used to rejuvenate soils stored on the site for rehabilitation. Any mulch that is brought to the site will be organic material (such as wood chips but not including any manures) to be used as a soil cover for short-term erosion control and/or improving vegetation establishment, by conserving soil moisture and reducing weed growth.

Imported material typically consists of "paddock rock", WGT foundation material which meets the classification of clean fill, or potentially other processed or extracted raw sands / rock, for blending with quarry products..\ The site has the capacity to accept large quantities of such imported materials and in addition to sources of quarry waste rock this may result in some variance to the rehabilitation landform within the pit as set out in Section 3.5. However, any stockpiled imported materials onsite will have a specific use and will be fit for purpose, and any changes to the pit rehabilitation will always remain consistent with the overall rehabilitation objective.

Prior to importing any external material, an Imported Materials Management Plan will be prepared in accordance with the Earth Resources Regulator's guidelines and any guidelines issued by the Environment Protection Authority.

The importation of any external material will be in accordance with the Imported Materials Management Plan, which is developed in accordance with the Earth Resources Regulator's guidelines and Environment Protection Authority requirements. The Imported Materials Management Plan will be regularly reviewed to continue meeting these guidelines and any other relevant guidelines issued by the Environment Protection Authority.

There will be no stockpiles of imported materials remaining on the site once rehabilitation is complete.

3.9. Weeds and Pest Animals

The development of any weed or pest animal issues on the site will be monitored and managed on an ongoing basis at the quarry through to site closure, to satisfy the requirements of both the Earth Resources Regulator and the Environment arm of the Department of Energy, Environment and Climate Action.

Spraying to control weeds will be undertaken using approved treatments and all pest animals will be controlled using approved methods.

There will be no legacy of the extractive industry related activity that poses a post closure risk of weeds, pest animals and/or soil-borne disease on the rehabilitated land.

3.10. Revegetation

The overall rehabilitation objective includes returning the site to a form suitable to the Kelly Family for farming activities, including hay and grazing, so a minimum amount of treed revegetation is planned.

It is not planned to establish any areas of indigenous native vegetation, nor any other vegetation (other than pasture / grasses)

The rehabilitated terminal batters, quarry floor and other disturbed areas will be fertilised and seeded with appropriate pasture grasses and/or agricultural crops. A variety of revegetation methods may be required to establish a viable vegetative cover and, where necessary, short-term cover grasses or brush-matting may be established initially on rehabilitated surfaces to stabilise them and manage erosion.

In due course rehabilitated pasture areas may be progressively incorporated into the general farming activities on the remainder of the site. Where necessary, during the life of the operation, cover grasses and native vegetation will also be utilised to stabilise topsoil stockpiles, overburden dumps, the faces of constructed stockpile pads and other disturbed areas prone to wind or surface water erosion.

The conceptual plan of rehabilitation is presented on Figure 4 Rehabilitated Landform.

4. ACHIEVING SITE CLOSURE

The Rehabilitation Domains Table in Section 5 outlines the criteria and monitoring to evaluate the success of the site's rehabilitation program in achieving a safe, stable and sustainable rehabilitated landform that supports the proposed end land use. These apply to the rehabilitation works carried out throughout the Works phases, i.e. the progressive rehabilitation works during the construction and production phases, and the final rehabilitation works completed toward the end of the site's Works phases. The rehabilitation of the site has been designed such that the rehabilitated land will not, after closure, pose any risks to the environment, members of the public, or to land, property or infrastructure that would require ongoing monitoring, maintenance, treatment or land management.

4.1. Rehabilitation / Closure Criteria

The success of site rehabilitation will be reviewed against the stated criteria for individual rehabilitation domains and sub-domains, which when met will demonstrate that the rehabilitation objectives have been achieved. The specific criteria and the monitoring frequency for assessing them are presented in Section 5 Rehabilitation Domains Table.

Progressive rehabilitation works will be ongoing throughout most of the quarry life as much as possible and its success will be assessed against the relevant criteria for the rehabilitated parts of the site on an ongoing basis.

In line with rehabilitation objectives, a focus of the criteria during progressive rehabilitation of the various domains will initially be on measuring the success of the prevention of erosion within the extraction area and dirty water run-off from the disturbance footprint. Landforms in erodible materials to be rehabilitated (cut or fill), such as cleared buffer areas and outer faces of overburden dumps / raised pads, will be progressively rehabilitated as soon as practicable. The risks will be mitigated through diversion drains / bunds, vegetation establishment (minimum 80% grass cover initially), additional short-term erosion control measures, strategic location of batter swale drains and other surface water management strategies as required.

Obtaining a quantitative measure of erosion from rehabilitated areas as erosion control measures / revegetation takes effect is difficult, therefore the erosion criteria presented in Section 5 Rehabilitation Domains Table are based on a qualitative (visual) assessment. The table below offers some generally accepted interpretations comparing quantitative soil losses to a visual assessment of any scouring on relatively uniform slopes (i.e. not involving concentrated flows).

Quantitative Assessment Soil Loss (RUSLE Equation or similar)	**Qualitative / Visual assessment**
Less than 5 tonnes per hectare per annum	Not noticeable to the naked eye
5-50 tonnes per hectare per annum	Scouring / erosion barely noticeable
50-200 tonnes per hectare per annum	Scouring typically up to 200mm wide and/or deep (criteria for rehabilitated batters not yet stabilised)
200-600 tonnes per hectare per annum	Scouring typically up to 5-600mm wide and/or deep

Other criteria will concentrate on the establishment and maintenance of the rehabilitated land for the intended end land uses on applicable areas and ensuring the health of the farmland

In addition to the criteria outlined in the Rehabilitation Domains Table it is understood that the Earth Resources Regulator may, from time to time, require specific rehabilitation and/or site closure requirements, including any monitoring and reporting requirements. If there are additional requirements, they shall be documented appropriately (i.e. Trigger Action Response Plans / TARPs, etc.) and available for review on request.

4.2. Rehabilitation Monitoring

Monitoring of rehabilitation success against the stated criteria, particularly progressive rehabilitation and through to the final rehabilitation works, is an integral part of the Works phases of the site and will continue after completion of all rehabilitation works (i.e. the Post Rehabilitation phase). The rehabilitation monitoring will occur at varying frequency, generally decreasing over the first three years, until the stated criteria are met. The ongoing rehabilitation monitoring records will adopt the worksheets / proformas used throughout the Works phases.

Section 5 Rehabilitation Domains Table lists the rehabilitation / closure criteria and details the monitoring frequency over the initial three years for each rehabilitation domain, during both the Works phases (throughout production and final rehabilitation works) and the period following completion of rehabilitation works (Post Rehabilitation). Given the uncertainties in the extent of quarry development it is difficult to commit to a more specific rehabilitation monitoring program at this point-in-time. For those parts of the site where progressive rehabilitation has been completed and the rehabilitation objectives already achieved, the rehabilitation monitoring will continue at the planned year-three frequency to ensure the rehabilitation objectives are maintained. The monitoring program is the subject of constant review and, if required, increased monitoring can be adopted, or more effective criteria imposed, if it becomes apparent through the Works phases that the rehabilitation objectives are not being met.

After completion of all the major rehabilitation and decommissioning works there will be a period of post rehabilitation monitoring for the final rehabilitation works, with maintenance and remedial works completed as necessary. This final post rehabilitation monitoring program is designed to demonstrate that the criteria for closure have been met and that the rehabilitation objectives have been achieved for all rehabilitation domains. This post rehabilitation monitoring phase will continue until the closure criteria have been met and is planned to continue for at least three years.

The post rehabilitation monitoring and remedial actions may continue for more than three years, if necessary, as could also be required by the Earth Resources Regulator. If so, the monitoring will be conducted at the planned year-three frequency, or more frequently if required, until the relevant authorities are satisfied that all the closure criteria have been met. It is also possible that all the closure criteria could be met, and the rehabilitation objectives achieved prior to the end of the planned three years, and then the Work Authority could be surrendered ahead of schedule.

A critical review of the rehabilitation monitoring program and effectiveness of the monitoring frequency and closure criteria will be undertaken either:

- some 5 years before the anticipated cessation of resource extraction, or
- when there is less than 5ha of undisturbed extraction area remaining.

and will address all relevant matters to the satisfaction of all the relevant authorities at that time.

To ensure that the rehabilitation monitoring reflects the stated criteria the following activities will occur:

- auditing the site for remaining plant, machinery, scrap, rubbish, etc.
- qualitative measure of erosion on rehabilitated batters
- establishment of vegetation on rehabilitated batters
- pasture establishment that is agriculturally viable on rehabilitated areas outside of the excavation
- measuring suspended solids in run-off from the site
- survey of weeds and pest animals.

4.3. Remedial Works

If criteria are not being met or rehabilitation is not satisfactorily progressing, based on the monitoring, maintenance and remedial activities will be undertaken to ensure criteria are met. Example situations would include, but not limited to:

- Damage to fencing – repair fencing, investigate the cause, initiate additional measures as necessary (Note: perimeter fencing to be maintained up to site closure and then retained by agreement with landowner, but is not required to manage any post closure risk associated with the rehabilitated land)
- Poor revegetation development – investigate cause, engage specialist for advice on pasture species, soil properties, fertiliser, remedial works as required
- Excessive weed presence – initiate one off weed eradication program, review weed management schedule and pasture establishment
- Excessive erosion – repair the area, review vegetation establishment, review surface water management activities, consider more appropriate location of drains and/or culverts. Investigate alternative erosion control devices (e.g. rock armour, hay bales, vegetation).

4.4. Identification of Post Closure Risks

Hazards potentially associated with the rehabilitated land (post closure), because of the changes due to the extractive industry use, may pose long-term risks to the environment, members of the public, or to land, property or infrastructure. If such post closure risks are posed to these sensitive receptors and require monitoring, maintenance, treatment or any other ongoing land management activities, then these 'relevant risks' (as defined in the Regulations) must be identified and assessed in the Rehabilitation Plan.

The table below, as per the Risk Management Plan, lists the hazards that are typically associated with extractive industries and rehabilitation works, with the last column specifically identifying the hazards potentially associated with the rehabilitated land (post closure). This list of hazards formed the basis of the hazard identification in relation to the whole proposal. Where such hazards are identified as being applicable to the site, individual Risk Treatment Plans are provided in the Risk Management Plan for the Works phases, which include undertaking Rehabilitation Activities. If the hazard is not applicable to the site, then it is marked as such in the table below.

While there may be identified hazards potentially associated with the rehabilitated land (post-closure), which relate to the past use of extractive industry, it firstly needs to be determined if such hazards would pose an actual risk to sensitive receptors that would require ongoing management after closure.

As detailed below for each hazard that is applicable, there will not be any 'relevant risks' (post closure) posed by the hazards potentially associated with the rehabilitated land that would require monitoring, maintenance, treatment or any other ongoing land management activities.

		WORKS PHASES		
HAZARD	**COMMENT**	**PRODUCTION & CONSTRUCTION**	**REHABILITATION ACTIVITIES**	**POST CLOSURE**
Altered visual amenity		YES	YES	NO
Noise		YES	YES	NO
Dust		YES	YES	NO
Surface water flows		YES	YES	NO
Erosion and sedimentation		YES	YES	YES
Ground disturbance		YES	YES	NO
Ground instability		YES	YES	YES
Blasting		YES	NO	NO
Process water and storages		YES	YES	YES
Slimes storage	NOT APPLICABLE	NO	NO	NO
Imported materials		YES	YES	YES
Unauthorised site access		YES	YES	NO
Fuel, lubricants, other hazardous materials		YES	YES	NO
Weeds, pests and diseases		YES	YES	NO
Rubbish / general waste		YES	YES	NO
Fire		YES	YES	NO
Loss of soil biological activity		YES	YES	NO
Vehicle sediment transport		YES	YES	NO

Altered visual amenity

The vegetation established during the Works phases of the site will be retained post closure, however, as there will be no legacy of the extractive industry related activity that would require screening, they are not required to manage any related risk. There is no ongoing maintenance or management required post closure in association with any vegetation or batter rehabilitation.

There is no post closure hazard posed by the rehabilitated land that requires visual screening that would need ongoing maintenance. Therefore, no relevant risks will be posed to the environment, members of the public, or to land, property or infrastructure in the vicinity of the rehabilitated land that would require monitoring, maintenance, treatment or any other ongoing land management activities after closure.

Noise

There will be no ongoing operation of vehicles or machinery post closure in association with the site's extractive industry, with the Rehabilitation Plan preparing the site for a return to general farming

There is no extractive industry related activity proposed post closure on the rehabilitated land that could generate noise. Therefore, no relevant risks will be posed to the environment, members of the public, or to land, property or infrastructure in the vicinity of the rehabilitated land that would require monitoring, maintenance, treatment or any other ongoing land management activities after closure.

Dust

There will be no ongoing operation of vehicles or machinery post closure in association with the site's extractive industry, with the Rehabilitation Plan preparing the site for a return to general farming, with vegetation fully established on rehabilitated areas at closure.

There is no extractive industry related activity proposed post closure on the rehabilitated land that could generate dust. Therefore, no relevant risks will be posed to the environment, members of the public, or to land, property or infrastructure in the vicinity of the rehabilitated land that would require monitoring, maintenance, treatment or any other ongoing land management activities after closure.

Surface water flows

There are no waterways or wetlands impacted by this work plan and post closure there will be no impact to any waterways or mapped wetlands. The risks associated with this hazard occur because of surface water flows that may need to be modified or diverted during Works phases, and this will no longer be the case in the rehabilitated landform, so it is concluded there is no hazard associated with surface water flows (including storm water) post closure.

As above, some surface water diversion bunding, drains and sediment dams / sumps will be retained to ensure ongoing, long-term management of surface water flows through and around the site without the need for ongoing maintenance. As discussed in Section 3.4, modelling shows that a shallow waterbody will eventually extend across the floor of the rehabilitated pit due to rainfall collection over many decades. However, this waterbody will eventually reach an equilibrium level well below the crest level of the rehabilitated pit, so there is no possibility that the water body could overflow.

At closure there will be no risks associated with surface water flows (including storm water) and there will be no legacy of the extractive industry related activity that increases the post closure risk associated with surface water flows and flooding on the rehabilitated land. Therefore, no relevant risks will be posed to the environment, members of the public, or to land, property or infrastructure in the vicinity of the rehabilitated land that would require monitoring, maintenance, treatment or any other ongoing land management activities after closure.

Erosion and sedimentation

Uncontrolled surface water flows have the potential to cause erosion on the rehabilitated landform, so this hazard could still exist post closure. The rehabilitated landform will have gentle (1V:4H) batters, that will be covered in pasture grasses at closure and suitable for general farming. This landform is consistent with the surrounding land. It is anticipated that when the rehabilitation objective of “pasture” has been achieved, the rehabilitated landform will be self-sustaining and erosion negligible. Some site drainage will be retained in the rehabilitated landform and any sedimentation that may occur, particularly because of any erosion on the rehabilitated batters, will be contained within the excavated landform and will not increase the risk to the surrounding environment.

The rehabilitated landform outside of the rehabilitated pit will have gentle slopes that will be covered in pasture grasses at closure and suitable for general farming. This landform is consistent with the surrounding land. It is anticipated that when the rehabilitation objective of established pasture has been achieved, the rehabilitated landform will be self-sustaining and erosion negligible. Some site drainage through this area and diversion bunding will be retained in the rehabilitated landform and any minor sedimentation that may occur will be contained onsite within the dams that are to be retained for the ongoing land uses.

The disturbed area within the rehabilitated pit is ‘self-contained’ and it is anticipated that when the rehabilitation objectives have been achieved, including established vegetation on the batters, the rehabilitated landform will be self-sustaining and erosion negligible. As detailed in Section 3.7, swale drains and bunds may remain in place at site closure directing surface water away from the void to the retained sediment dams on the site. These retained surface water management features will ensure that any sedimentation that may occur will be contained on the site until vegetation is established and erosion minimal, thus mitigating any long-term risk.

Any erosion and sedimentation risk at closure will be very low and there will be no legacy of the extractive industry related activity that increases the post closure risk of erosion and sedimentation on the rehabilitated land. Therefore, no relevant risks will be posed to the environment, members of the public, or to land,

property or infrastructure in the vicinity of the rehabilitated land that would require monitoring, maintenance, treatment or any other ongoing land management activities after closure.

Ground disturbance

The risks associated with the hazard of ground disturbance occur when disturbing the ground. Post closure there will be no quarry related ground disturbance, and no additional ground will be required to be disturbed to achieve the rehabilitated landform. Any topsoil or overburden stockpiles will have been used in rehabilitation of the batters or pit floor and excess overburden used as backfill within the pit (see Section 3.5), and these areas rehabilitated so there will not be any disturbance remaining post closure.

There will be no ongoing disturbance of groundwater or any potential acid producing materials within the pit, so there will not be any ground disturbance activity in association with extractive industry occurring post closure.

At closure all areas of ground disturbance will be fully rehabilitated and there will be no legacy of the extractive industry related activity that increases the post closure risk associated with ground disturbance on the rehabilitated land. Therefore, no relevant risks will be posed to the environment, members of the public, or to land, property or infrastructure in the vicinity of the rehabilitated land that would require monitoring, maintenance, treatment or any other ongoing land management activities after closure.

Ground instability

The majority of risks associated with the hazard of ground instability occur when excavating new ground or within a period of settlement following excavation. After completion of the final rehabilitation works some risk may still be present and a simple monitoring program will be put in place. The rehabilitated landform will be monitored / inspected as per the Rehabilitation Plan (settlement) with any recommendations and remediation implemented, or as directed by the Earth Resources Regulator.

Whilst some residual risk of ground instability remains post closure, .it is emphasised the rehabilitated batter will have a gentle 1V:4H slope, , significantly flatter than the failure angle of fill material, will be above the groundwater level and the likelihood of a failure post closure is considered very low

As set out in the closure criteria, to achieve closure it needs to be demonstrated that the terminal batters and pit backfill are stable and likely to remain stable in the long-term. Therefore, with ground control management implemented throughout quarry development and reducing likelihood of failures on developed batters over time it will be assured over the long-term that the stability of the terminal batter design and backfill will not be compromised and will not pose an unacceptable stability risk.

The ground instability risk at closure will be very low and there is no activity proposed post closure on the rehabilitated land that increases the risk of ground instability. Therefore, no relevant risks will be posed to the environment, members of the public, or to land, property or infrastructure in the vicinity of the rehabilitated land that would require monitoring, maintenance, treatment or any other ongoing land management activities after closure.

Blasting

There will be no blasting post closure, with the Rehabilitation Plan preparing the site for a return to general farming. Therefore, no relevant risks will be posed to the environment, members of the public, or to land, property or infrastructure in the vicinity of the rehabilitated land that would require monitoring, maintenance, treatment or any other ongoing land management activities after closure.

Process water and storages

Post closure the final in-pit water storage will become a farm dam, and the incident water collected and used for pasture irrigation and for stock. There will be no other process water infrastructure retained on site. This water storage dam will be constructed in a low point on the south-east part of the quarry floor, well below the surrounding natural surface and will have no potential to release water beyond the excavation in the event of a breach.

As set out in the closure criteria, to achieve closure this rehabilitated in-pit water storage dam must be suitable for the end use, with adequate capacity, functioning overflow structure and not requiring any maintenance, and additionally a farm dam must be accessible by stock. It is anticipated that this farm dam, and any other retained sumps, may collect some sediment until vegetation is fully established across the site during final rehabilitation. If required, any sediment collected in the retained farm dam or sumps will be cleared from these structures during the post rehabilitation monitoring phase and used to supplement site rehabilitation, prior to closure.

The risk associated with the retained water storages at closure, as a legacy of the extractive industry related activity and given that their there will be no other retained process water infrastructure, will be extremely low and there is no activity proposed post closure on the rehabilitated land that changes this risk. Therefore, no relevant risks will be posed to the environment, members of the public, or to land, property or infrastructure in the vicinity of the rehabilitated land that would require monitoring, maintenance, treatment or any other ongoing land management activities after closure.

Slimes storage

The workplan does not describe any material washing and no slimes storage.

Imported materials

Any materials importation to supplement site rehabilitation will be in accordance with an Imported Materials Management Plan and so it will be extremely unlikely that such imported materials incorporated into the site rehabilitation will pose any post closure risk. During the Works phases only soil / 'clean fill' or suitable mulch will be imported to the site and potentially used in rehabilitation. Additionally, there will be no stockpiles of imported materials remaining on the site once rehabilitation is complete.

During the Works phases only soil / 'clean fill' or solid inert waste suitable for recycling (paddock rock) will be imported to the site for use in site rehabilitation, along with any suitable, which may also include processed or extracted rock brought in for product blending. Additionally, there will be no stockpiles of imported materials remaining on the site once rehabilitation is complete. Any materials importation will be in accordance with the Imported Materials Management Plan and so it will be extremely unlikely that such imported materials incorporated into the site rehabilitation will pose any post closure risk.

The imported materials risk at closure will be extremely low and there will be no legacy of the extractive industry related activity that increases the post closure risk of imported materials on the rehabilitated land. Therefore, no relevant risks will be posed to the environment, members of the public, or to land, property or infrastructure in the vicinity of the rehabilitated land that would require monitoring, maintenance, treatment or any other ongoing land management activities after closure.

Unauthorised site access

Post closure the site will retain any (improved) farm fencing on the site, including a standard multi-stranded stock-proof fence around the crest of terminal faces, by agreement with the landowner. However, members of the public will no longer be at risk post closure as the rehabilitated landform will eliminate the steep slopes and the potential for falls from height / injury that will be present during the Works phases. While unauthorised site access by the public is still possible post closure, the public will not be at risk due to any past extractive industry on the site, sharing the same risk as the surrounding farmland with regard to unauthorised access. The fencing to be retained across the site is not required to manage any risk to the public. At closure it will be confirmed that the retained fences are to the landowner's satisfaction and suitable for the end land uses, and that no maintenance is required.

Fuel, lubricants, other hazardous materials

There will be no fuel, lubricants or hazardous materials stored on site post closure in association with extractive industry activities, with the Rehabilitation Plan preparing the site for a return to general farming, including the removal of any plant and equipment. Therefore, no relevant risks will be posed to the environment, members of the public, or to land, property or infrastructure in the vicinity of the rehabilitated

land that would require monitoring, maintenance, treatment or any other ongoing land management activities after closure.

Weeds, pests and diseases

While weeds, pest animals and/or soil-borne disease are still possible on the site post closure, they will not be as a result of the past extractive industry on the site, sharing the same risk as the surrounding farmland. All landowners / land managers have an obligation to manage weeds, pest animals and/or soil-borne disease, and the rehabilitated landform does not introduce any new or additional risk that requires any additional control measures beyond the monitoring and maintenance up to site closure that is set out in the Rehabilitation Plan.

There will be no legacy of the extractive industry related activity that poses a post closure risk of weeds, pest animals and/or soil-borne disease on the rehabilitated land. Therefore, no relevant risks will be posed to the environment, members of the public, or to land, property or infrastructure in the vicinity of the rehabilitated land that would require monitoring, maintenance, treatment or any other ongoing land management activities after closure.

Rubbish / general waste

There will be no ongoing requirement to manage rubbish and general waste post closure in association with extractive industry activities, with the Rehabilitation Plan preparing the site for a return to general farming, including the removal of any redundant / discarded plant and equipment. Therefore, no relevant risks will be posed to the environment, members of the public, or to land, property or infrastructure in the vicinity of the rehabilitated land that would require monitoring, maintenance, treatment or any other ongoing land management activities after closure.

Fire

While fire is still possible on the site post closure, it will not be because of the past extractive industry on the site, sharing the same risk as the surrounding properties. All landowners / land managers have an obligation to manage the risk of fire, and the rehabilitated landform does not introduce any new or additional risk that requires any additional control measures beyond that set out in the Risk Management Plan that apply up to site closure.

There will be no legacy of the extractive industry related activity that poses a post closure risk of fire on the rehabilitated land. Therefore, no relevant risks will be posed to the environment, members of the public, or to land, property or infrastructure in the vicinity of the rehabilitated land that would require monitoring, maintenance, treatment or any other ongoing land management activities after closure.

Loss of soil biological activity

The biological activity of the soil stored in stockpiles will be maintained as much as possible to assist in achieving rehabilitation objectives, with the Rehabilitation Plan preparing the site for a return to general farming. There will be no ongoing soil storage post closure, with all stored soil used in the site rehabilitation. Therefore, no relevant risks will be posed to the environment, members of the public, or to land, property or infrastructure in the vicinity of the rehabilitated land that would require monitoring, maintenance, treatment or any other ongoing land management activities after closure.

Vehicle sediment transport

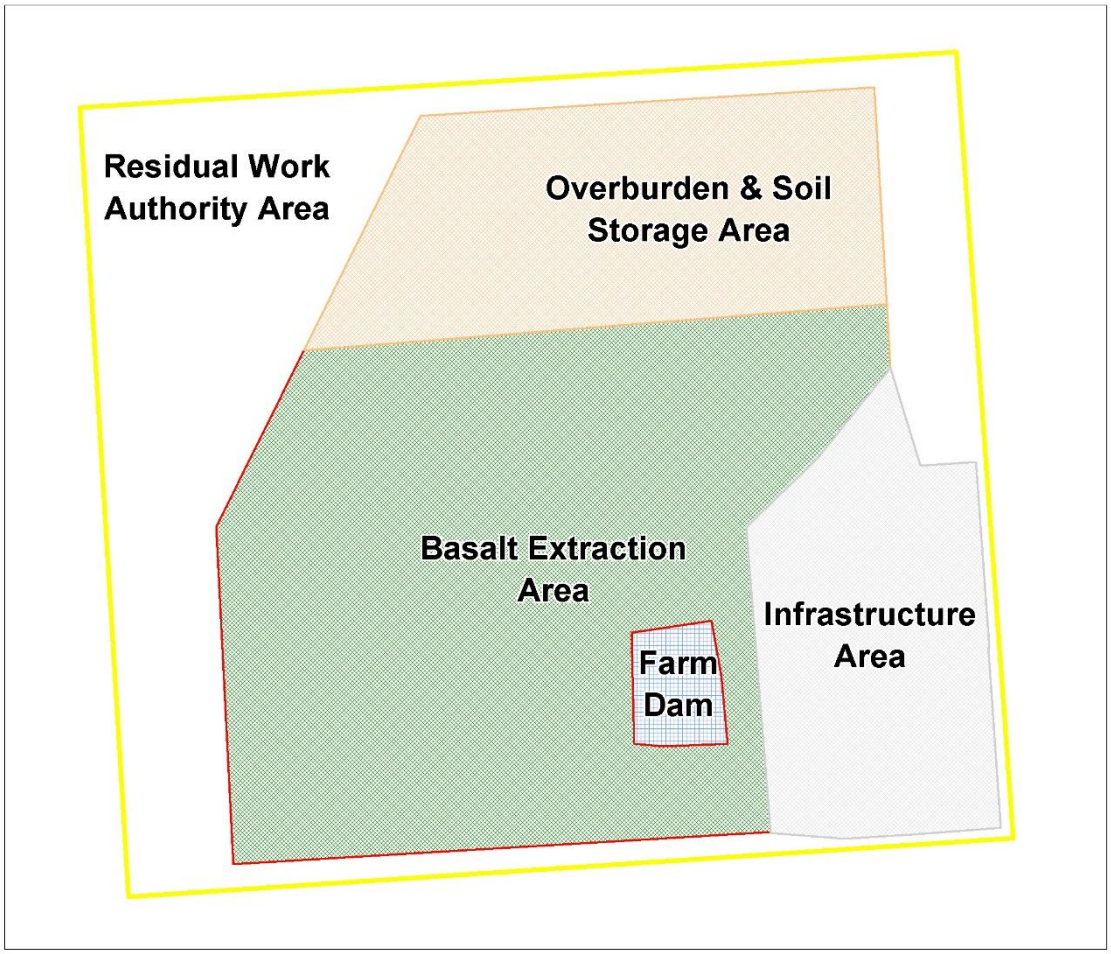
There will be no ongoing truck or vehicle movements post closure in association with the quarry, with the Rehabilitation Plan preparing the site for a return to general farming, so there will be no legacy of the extractive industry related activity that poses a post closure risk due to vehicle sediment transport from the rehabilitated land. Therefore, no relevant risks will be posed to the environment, members of the public, or to land, property or infrastructure in the vicinity of the rehabilitated land that would require monitoring, maintenance, treatment or any other ongoing land management activities after closure.

5. REHABILITATION DOMAINS

5.1. Rehabilitation Domains Plan

List of Rehabilitation Domains:

- Infrastructure Area
- Basalt Excavation Area
- Overburden and Soil Storage Area
- Farm Dam
- Residual Work Authority Area



REHABILITATION DOMAINS PLAN

5.2. Infrastructure Area

Domain: Infrastructure Area

Objective: At closure quarry infrastructure has been decommissioned and removed, with associated areas fully rehabilitated and suitable for use for general farming and animal husbandry, to the landowner's satisfaction; except the infrastructure to be explicitly retained for farm use or rural industry use

Subdomain	Rehabilitation / Closure Criteria	Elements to be Monitored	Monitoring Frequency
Site Huts and Buildings	**Closure**: Site Huts, amenities, weighbridge, all small buildings, light vehicle parking infrastructure and surrounding areas will be rehabilitated to viable pasture / crops. Min 90% vegetation establishment (for pasture). No bare patches greater than $10m^2$.	Record / photograph any redundant or derelict buildings. Record / photograph any weed infestation Visual estimate of pasture establishment (ground cover) General description of pasture / crop vitality Record / photograph any bare patches	**Post Rehabilitation Phase** Final decommissioning and removal of administration buildings Annually review adequate completion of decommissioning works. Pasture / crop establishment Y1 - 3 Monthly Y2 - 6 Monthly Y3 - 12 Monthly (and further, if required)
Workshops, Crushing Plant and Hardstand Area	**Closure**: Any Workshops, stores processing plant and any associated infrastructure will be decommissioned and removed from site. No contaminated land remains on site. Workshop, fuel stores, oil and grease stores, and all associated buildings, containers and hardstands, including surrounding areas, will be rehabilitated to viable pasture / crops. Min 90% vegetation establishment (for pasture) No bare patches greater than $10m^2$.	Record / photograph any redundant or derelict plant or infrastructure Presence of any contamination of land, remedial works undertaken, if necessary. Visual estimate of pasture establishment (ground cover) General description of pasture / crop vitality Record / photograph any bare patches Record / photograph any weed infestation	**Post Rehabilitation Phase** Final decommissioning and removal of infrastructure Annually review adequate completion of decommissioning works. Pasture / crop establishment Y1 - 3 Monthly Y2 - 6 Monthly Y3 - 12 Monthly (and further, if required)
Product Stockpile Area(s) and any Associated Hardstands	**Closure**: All stockpiles removed and any hardstand areas rehabilitated to viable pasture / crops Min 90% vegetation establishment (for pasture) No bare patches greater than $10m^2$.	Visual estimate of pasture establishment (ground cover) General description of pasture / crop vitality Record / photograph any bare patches Record / photograph any weed infestation	**Post Rehabilitation Phase** Final removal of stockpiles and hardstands. Annually review adequate completion of decommissioning works. Pasture / crop establishment Y1 - 3 Monthly Y2 - 6 Monthly Y3 - 12 Monthly (and further, if required)

Domain: Infrastructure Area

Objective: At closure quarry infrastructure has been decommissioned and removed, with associated areas fully rehabilitated and suitable for use for general farming and animal husbandry, to the landowner's satisfaction; except the infrastructure to be explicitly retained for farm use or rural industry use

Subdomain	Rehabilitation / Closure Criteria	Elements to be Monitored	Monitoring Frequency
Access Roads / Tracks	**Closure**: All redundant roads and tracks rehabilitated to viable pasture / crops. Min 90% vegetation establishment (for pasture). No bare patches greater than $10m^2$.	Visual estimate of pasture establishment (ground cover) General description of pasture / crop vitality Record / photograph any bare patches Record / photograph any weed infestation	**Post Rehabilitation Phase** Final removal of roads and tracks that are not to be retained. Annually review adequate completion of road / track decommissioning works. Pasture / crop establishment Y1 - 3 Monthly Y2 - 6 Monthly Y3 - 12 Monthly (and further, if required)
Groundwater monitoring infrastructure removed post closure (see Sec 3.1)	**Closure**: Groundwater monitoring bores to be removed prior to closure and decommissioned in accordance with the rural water authority licences. Area rehabilitated to viable pasture Min 90% vegetation establishment (for pasture)	Record / photograph condition of groundwater monitoring bores.	**Post Rehabilitation Phase** Pasture / crop establishment Y1 - 3 Monthly Y2 - 6 Monthly Y3 - 12 Monthly (and further, if required)
Infrastructure Area (Erosion)	**Closure**: No erosion channels greater than 50mm deep and/or wide on any rehabilitated infrastructure areas. No more than 5 erosion channels greater than 20mm deep and/or wide within a 20m wide area on any rehabilitated infrastructure areas. Any necessary remedial rehabilitation undertaken as soon as practicable	Visual inspection for erosion channels, recording depth, width and number of any channels and photographed for follow up.	**Post Rehabilitation Phase** Y1 - 2 Monthly Y2 - 3 Monthly Y3 - 6 Monthly (and further, if required) Additional inspections after significant rainfall events.

Domain: Infrastructure Area

Objective: At closure quarry infrastructure has been decommissioned and removed, with associated areas fully rehabilitated and suitable for use for general farming and animal husbandry, to the landowner's satisfaction; except the infrastructure to be explicitly retained for farm use or rural industry use

Subdomain	Rehabilitation / Closure Criteria	Elements to be Monitored	Monitoring Frequency
Infrastructure Area (Surface Water Controls)	**Closure**: Surface water flows satisfactorily controlled to prevent erosion in infrastructure areas. No turbid water leaving any rehabilitated infrastructure areas. All retained swale drains in place and functioning to manage surface water flows and do not require maintenance.	Visual inspection for turbidity, water quality specific monitoring as per Surface Water Management Plan Water quality in accordance with Water Quality for Farm Water Supplies as per Agriculture Victoria's recommendations (based on Australian and New Zealand Guidelines for Fresh and Marine Water Quality (Primary Industries)), or specific CMA requirements	**Post Rehabilitation Phase** Y1 - 1 Monthly Y2 - 6 Monthly Y3 - 12 Monthly (and further, if required) Additional inspections after significant rainfall events.

5.3. Overburden and Soil Storage Area

Domain: Overburden and Soil Storage Area

Objective: At closure all soil, overburden, waste rock stockpiles have been removed or reshaped / reprofiled with associated areas fully rehabilitated and suitable for farming use, to landowner's satisfaction, or as otherwise required for rural industry use.

Subdomain	Rehabilitation / Closure Criteria	Elements to be Monitored	Monitoring Frequency
Soil Stockpiles	**Closure**: All soil stockpiles removed and reprofiled for use in rehabilitation and land rehabilitated to a stable landform with viable pasture / crops. Min 90% vegetation establishment (for pasture) No bare patches greater than $10m^2$.	General description of soil stockpiles Record / photograph soil stockpiles Visual assessment of reprofiled areas, looking for presence / absence of landform slumping, cracks or movement Record / photograph condition of reprofiled areas. Visual estimate of pasture establishment (ground cover) General description of pasture / crop vitality Record / photograph any bare patches Record / photograph any weed infestation	**Post Rehabilitation Phase** Upon completion of rehabilitation landforming works. Review compaction of reprofiled areas Y1 - 1 Monthly Y2 - 3 Monthly Y3 - 6 Monthly (and further, if required) Pasture / crop establishment Y1 - 3 Monthly Y2 - 6 Monthly Y3 - 12 Monthly (and further, if required)
Overburden Stockpiles	**Closure**: All overburden stockpiles removed and reprofiled for use in rehabilitation and land rehabilitated to a stable landform with viable pasture / crops. Min 90% vegetation establishment (for pasture) No bare patches greater than $10m^2$.	General description of overburden stockpiles Record / photograph overburden stockpiles Visual assessment of reprofiled areas, looking for presence / absence of landform slumping, cracks or movement Record / photograph condition of reprofiled areas. Visual estimate of pasture establishment (ground cover) General description of pasture / crop vitality Record / photograph any bare patches Record / photograph any weed infestation	**Post Rehabilitation Phase** Upon completion of rehabilitation landforming works. Review compaction of reprofiled areas Y1 - 1 Monthly Y2 - 3 Monthly Y3 - 6 Monthly (and further, if required) Pasture / crop establishment Y1 - 3 Monthly Y2 - 6 Monthly Y3 - 12 Monthly (and further, if required)

Domain: Overburden and Soil Storage Area

Objective: At closure all soil, overburden, waste rock stockpiles have been removed or reshaped / reprofiled with associated areas fully rehabilitated and suitable for farming use, to landowner's satisfaction, or as otherwise required for rural industry use.

Subdomain	Rehabilitation / Closure Criteria	Elements to be Monitored	Monitoring Frequency
Waste Rock Stockpiles / Imported Materials Stockpiles	**Closure**: All waste rock stockpiles, including any associated hardstands, removed or used in rehabilitation and land rehabilitated to a stable landform with viable pasture / crops. Any stockpiles of imported materials, including any associated hardstands, removed or used in rehabilitation and land rehabilitated to a stable landform with viable pasture / crops. Min 90% vegetation establishment (for pasture) No bare patches greater than $10m^2$.	General description of waste rock stockpiles and any imported materials stockpiles Record / photograph waste rock stockpiles and any imported materials stockpiles Visual estimate of pasture establishment (ground cover) General description of pasture / crop vitality Record / photograph any bare patches Record / photograph any weed infestation	**Post Rehabilitation Phase** Upon completion of rehabilitation landforming works, then annually. Pasture / crop establishment Y1 - 3 Monthly Y2 - 6 Monthly Y3 - 12 Monthly (and further, if required)
Overburden and Soil Storage Area (Associated Tracks)	**Closure**: All tracks associated with overburden storage areas rehabilitated to viable pasture / crops. Min 90% vegetation establishment (for pasture) No bare patches greater than $10m^2$.	Visual estimate of pasture establishment (ground cover) General description of pasture / crop vitality Record / photograph any bare patches Record / photograph any weed infestation	**Post Rehabilitation Phase** Final removal of access tracks for overburden storage area. Annually review adequate completion of track decommissioning works. Pasture / crop establishment Y1 - 3 Monthly Y2 - 6 Monthly Y3 - 12 Monthly (and further, if required)
Overburden and Soil Storage Area (Erosion)	**Closure**: No erosion channels greater than 50mm deep and/or wide on any rehabilitated overburden storage areas. No more than 5 erosion channels greater than 20mm deep and/or wide within a 20m wide area on any rehabilitated overburden storage areas.	Visual inspection for erosion channels, recording depth, width and number of any channels & photographed for follow up.	**Post Rehabilitation Phase** Y1 - 2 Monthly Y2 - 3 Monthly Y3 - 6 Monthly (and further, if required) Additional inspections after significant rainfall events.

Domain: Overburden and Soil Storage Area

Objective: At closure all soil, overburden, waste rock stockpiles have been removed or reshaped / reprofiled with associated areas fully rehabilitated and suitable for farming use, to landowner's satisfaction, or as otherwise required for rural industry use.

Subdomain	Rehabilitation / Closure Criteria	Elements to be Monitored	Monitoring Frequency
Overburden and Soil Storage Area (Surface Water Controls)	**Areas of Completed Progressive Rehabilitation**: No turbid water leaving progressively rehabilitated overburden storage areas. Any necessary remedial rehabilitation undertaken as soon as practicable. **Closure**: Surface water flows satisfactorily controlled to prevent erosion in overburden storage areas. No turbid water leaving any rehabilitated overburden storage areas. All retained swale drains, diversion bunds and sediment traps in place and functioning to manage surface water flows and do not require maintenance. Retained sediment traps have adequate capacity (i.e. not filled with sediment).	Visual inspection for turbidity, water quality specific monitoring as per Surface Water Management Plan Water quality in accordance with Water Quality for Farm Water Supplies as per Agriculture Victoria's recommendations (based on Australian and New Zealand Guidelines for Fresh and Marine Water Quality (Primary Industries)), or specific CMA requirements	**Ongoing Progressive Rehabilitation** Monthly visual inspection. Additional inspections after significant rainfall events. **Post Rehabilitation Phase** Y1 – 1 Monthly Y2 – 6 Monthly Y3 - 12 Monthly (and further, if required) Additional inspections after significant rainfall events.

5.4. Basalt Extraction Area

Domain: Basalt Extraction Area

Objective: At closure the pit terminal batters and the pit floor form a safe, stable and sustainable landform that is suitable for farming use, to the landowner's satisfaction, or as otherwise required for rural industry use.

Subdomain	Rehabilitation / Closure Criteria	Elements to be Monitored	Monitoring Frequency
Terminal Batters (Design and Construction)	**Areas of Completed Progressive Rehabilitation:** Backfilled batters not steeper than 1V:4H (approx. 14 degrees) in progressively rehabilitated areas. Terminal batters backfilled in compacted layers (not > 1m), working up from base, to achieve compaction of minimum 4 blows per 100mm (DCP test) for progressive rehabilitation Viable pasture initially established on backfilled surfaces, as soon as practicable, in progressively rehabilitated areas. Min 90% vegetation establishment (for pasture) on progressively rehabilitated areas. No bare patches greater than $10m^2$ on progressively rehabilitated areas. Any necessary remedial rehabilitation undertaken as soon as practicable. **Closure**: Backfilled batters not steeper than 1V:4H and backfilled in compacted layers (not > 1m), working up from base, to achieve compaction of minimum 4 blows per 100mm (DCP test). Rehabilitated batters established in accordance with the Rehabilitation Plan, are stable and likely to remain stable in the long-term. Crest and Batter swale drains functioning to manage surface water flows and do not require maintenance. Backfilled terminal batters rehabilitated to viable pasture / crops. Min 90% vegetation establishment (for pasture). No bare patches greater than $10m^2$.	Effectiveness of surface water cut off drains, batter swale drains and bunding at extraction crest. Visual assessment of rehabilitated terminal batters, looking for presence/absence of landform slumping, cracks or movement Effectiveness of any temporary fencing to control stock and feral animals until vegetation established Visual estimate of pasture / crop establishment (ground cover) and visual impact remediation General description of pasture / crop vitality Record / photograph condition of surface water cut off drains, batter swale drains. Record / photograph condition of rehabilitated terminal batters. Record / photograph any bare patches Record / photograph any weed infestation Rehabilitated landform constructed in accordance with the Rehabilitation Plan	**Ongoing Progressive Rehabilitation** Annually review for any terminal faces that could be rehabilitated. 3 Monthly following completion of earthworks until initial grasses established and erosion limited. Then 6 monthly until long-term vegetation fully established and erosion minimised. Additional inspections after significant rainfall events until vegetation fully established. **Post Rehabilitation Phase** Y1 - 3 Monthly Y2 - 6 Monthly Y3 - 12 Monthly (and further, if required) Additional inspections after significant rainfall events.

Domain: Basalt Extraction Area

Objective: At closure the pit terminal batters and the pit floor form a safe, stable and sustainable landform that is suitable for farming use, to the landowner's satisfaction, or as otherwise required for rural industry use.

Subdomain	Rehabilitation / Closure Criteria	Elements to be Monitored	Monitoring Frequency
Pit Floor (Design and Construction)	**Areas of Completed Progressive Rehabilitation**: Pit floor backfilled to above groundwater level covered with 100mm of soil, progressively rehabilitated areas. Internal drains in place and operational for progressively rehabilitated areas Viable pasture / crop established on progressively rehabilitated areas. Any necessary remedial rehabilitation undertaken as soon as practicable. **Closure**: Pit floor rehabilitated in accordance with the Rehabilitation Plan, is stable and likely to remain stable in the long-term for all pits. Pit floor backfilled to above groundwater level covered with 100mm of soil, progressively rehabilitated areas. Internal drains in place and operational for all rehabilitated pits and do not require maintenance. Pit floor rehabilitated to viable pasture / crops for all rehabilitated pits. Min 90% vegetation establishment (for pasture) on pit floor. No bare patches greater than $10m^2$ on pit floor.	Visual assessment of rehabilitated pit floor, looking for presence/absence of subsidence or cracks Effectiveness of internal drains on rehabilitated pit floor. Visual estimate of pasture / crop establishment (ground cover) General description of pasture / crop vitality Record / photograph any bare patches Record / photograph any weed infestation Groundwater re-charge Rehabilitation landform constructed in accordance with the Rehabilitation Plan	**Ongoing Progressive Rehabilitation** Annually review for any unutilised pit floor areas that could be rehabilitated. 3 Monthly following completion of earthworks until initial grasses established erosion limited. Then 6 monthly until long-term vegetation fully established and erosion minimised. Additional inspections after significant rainfall events until vegetation fully established. **Post Rehabilitation Phase** Y1 - 3 Monthly Y2 - 6 Monthly Y3 - 12 Monthly (and further, if required) Additional inspections after significant rainfall events.
Pit (Erosion)	**Closure**: No erosion channels greater than 50mm deep and/or wide on any rehabilitated pit batters or the pit floor. No more than 5 erosion channels greater than 20mm deep and/or wide within a 20m wide area on any rehabilitated pit batters or the pit floor.	Visual inspection for erosion channels, recording depth, width and number of any channels and photographed for follow up.	**Post Rehabilitation Phase** Y1 - 2 Monthly Y2 - 3 Monthly Y3 - 6 Monthly (and further, if required) Additional inspections after significant rainfall events. Annually review for any need to remediate areas of erosion.

Domain: Basalt Extraction Area

Objective: At closure the pit terminal batters and the pit floor form a safe, stable and sustainable landform that is suitable for farming use, to the landowner's satisfaction, or as otherwise required for rural industry use.

Subdomain	Rehabilitation / Closure Criteria	Elements to be Monitored	Monitoring Frequency
Pit (Surface Water Controls)	**Areas of Completed Progressive Rehabilitation**: No turbid water leaving progressively rehabilitated extraction areas. Surface water cut off drains functioning to divert surface water flows away from progressively rehabilitated extraction areas. Sumps / sediment dams retained in pit converted farm dams, reshaped to remove steep sides, retaining capacity of less than 2m depth, for progressively rehabilitated extraction areas. Any necessary remedial rehabilitation undertaken as soon as practicable. **Closure**: No turbid water leaving any rehabilitated extraction areas. Surface water cut off drains functioning to divert surface water flows away from all rehabilitated extraction areas and do not require maintenance. Pit floor not steeper than 1V:15H, directing all surface water flows within rehabilitated extraction areas to a retained sumps in pit. Sumps / sediment dams retained in pit converted to farm dams, reshaped to remove steep sides, retaining capacity of less than 2m depth.	Visual inspection for performance of diversion drainage, batter swale drains, specific monitoring as per Surface Water Management Plan Water quality in accordance with Water Quality for Farm Water Supplies as per Agriculture Victoria's recommendations (based on Australian and New Zealand Guidelines for Fresh and Marine Water Quality (Primary Industries)), or specific CMA requirements	**Ongoing Progressive Rehabilitation** Visual inspections of surface water controls for progressively rehabilitated areas Y1 - 1 Monthly Y2 - 6 Monthly Y3 - 12 Monthly (and further, if required) Additional inspections after significant rainfall events. **Post Rehabilitation Phase** Visual inspections of surface water controls Y1 - 1 Monthly Y2 - 6 Monthly Y3 - 12 Monthly (and further, if required) Additional inspections after significant rainfall events.

5.5. Farm Dam

Domain: Farm Dam

Objective: At closure the sump / sediment basin in the pit floor converted to a Farm Dam to a safe, stable and sustainable form that is suitable for farming use, to the landowner's satisfaction, or as otherwise required for rural industry use.

Subdomain	Rehabilitation / Closure Criteria	Elements to be Monitored	Monitoring Frequency
Farm Dam (Sump) All retained post closure (see Sec 3.1)	**Areas of Completed Progressive Rehabilitation**: Any necessary modification to retained water storage dam to ensure long-term stability (after closure), e.g. overflow structures, will be implemented prior to water extraction ceasing for quarry purposes. Temporary water dams and groundwater monitoring bores to be removed prior to closure decommissioned in accordance with the rural water authority licences. **Closure**: Diversion bunding, water tanks, pipelines, water pumps, surplus water dams and water supply bores removed at closure. Retained swale drains and bunds functioning to adequately manage runoff water for end land use and do not require maintenance. Retained water storage dam has functioning overflow structure and accessible by stock. Retained water storage dam has adequate capacity of about 2m depth. Retained water storage dam and water supply bores licenced for end land use. Retained groundwater bores remain functional, in accordance with rural water authority requirements, and do not require maintenance, or otherwise decommissioned in accordance with rural water authority licences.	Visual inspection for stability and signs of erosion in water storage dam. Sedimentation within water storage dams. Visual inspection for condition of diversion bunding, swale drains, water tanks, pipelines, water pumps, water supply bores and groundwater monitoring bores. Record / photograph condition of dams. Record / photograph condition of diversion bunding, swale drains, water tanks, pipelines, water pumps, water supply bores and groundwater monitoring bores.	**Ongoing Progressive Rehabilitation** Annually review for any need to modify the water dams, particularly if it is planned to cease water extraction from that dam for quarry purposes. Annually review for any need to remove water dams, water supply bores or groundwater monitoring bores as quarry develops or prior to closure. **Post Rehabilitation Phase** Y1 - 3 Monthly Y2 - 6 Monthly Y3 - 12 Monthly (and further, if required) Additional inspections after significant rainfall events.

5.6. Residual Work Authority Area

Domain: Residual Work Authority Area

Objective: At closure site fencing, weeds, pest animals and surface water flows in the remainder of the Work Authority will have met required standards and will not be adversely affected by past quarry operations and associated rehabilitation works.

Ongoing farming uses at closure continue without adverse impacts due to past quarry operations.

Subdomain	Rehabilitation / Closure Criteria	Elements to be Monitored	Monitoring Frequency
Residual Area (Site Fencing) All retained post closure (see Sec 3.1)	**Areas of Completed Progressive Rehabilitation**: Integrity / suitability for purpose of Work Authority perimeter fencing and paddock fencing. Any necessary remedial rehabilitation undertaken as soon as practicable. **Closure**: Not required for site security. The site perimeter fence will be retained upon closure, by agreement with the landowner, and must be to landowner's satisfaction / must be suitable for end land uses. Integrity / suitability at closure for end land uses, without requiring maintenance.	Condition and effectiveness of fencing (paddock fencing and perimeter fencing) in preventing access while works are still being undertaken, and while vegetation is being established. Condition and suitability of security / perimeter fencing, paddock fencing, and associated drains, bunds and screening vegetation, for end land uses.	**Ongoing Progressive Rehabilitation** Annually review for any need to remediate site fencing. **Post Rehabilitation Phase** Annually review for suitability for end land uses.
Residual Area (Perimeter Drains, Swale Drains) Retained post closure (see Sec 3.1)	**Areas of Completed Progressive Rehabilitation**: Surface water management structures in place and functioning to manage surface water flows for progressively rehabilitated areas. Surface water flows satisfactorily controlled to prevent erosion for progressively rehabilitated areas. Any necessary remedial rehabilitation undertaken as soon as practicable. **Closure**: All retained perimeter drains, swale drains, diversion bunds and sediment traps in place and functioning to manage surface water flows and do not require maintenance. Retained sediment traps have adequate capacity (i.e. not filled with sediment). Surface water flows satisfactorily controlled to prevent erosion across the site.	Visual inspection for performance of surface water drains and sediment control structures to ensure that no sediment is leaving the site, specific monitoring as per Surface Water Management Plan. Record / photograph condition of surface water drains and sediment control structures.	**Ongoing Progressive Rehabilitation** Visual inspections of surface water drains and sediment control structures for progressively rehabilitated areas Y1 - 1 Monthly Y2 - 6 Monthly Y3 - 12 Monthly (and further, if required) Additional inspections after significant rainfall events. **Post Rehabilitation Phase** Visual inspections of surface water drains and sediment control structures Y1 - 1 Monthly Y2 - 6 Monthly Y3 - 12 Monthly (and further, if required) Additional inspections after significant rainfall events.

Domain: Residual Work Authority Area

Objective: At closure site fencing, weeds, pest animals and surface water flows in the remainder of the Work Authority will have met required standards and will not be adversely affected by past quarry operations and associated rehabilitation works.
Ongoing farming uses at closure continue without adverse impacts due to past quarry operations.

Subdomain	Rehabilitation / Closure Criteria	Elements to be Monitored	Monitoring Frequency
Residual Area (Weeds)	**Areas of Completed Progressive Rehabilitation**: Weeds less than 5% total ground cover within any specific progressively rehabilitated areas Any necessary remedial rehabilitation undertaken as soon as practicable. **Closure**: Weeds less than 5% total ground cover within any specific areas	Visual estimate of weed coverage Record / photograph any weed infestation	**Ongoing Progressive Rehabilitation** 6 monthly inspections for any weeds within the Work Authority area. **Post Rehabilitation Phase** 6 monthly
Residual Area (Pest Animals)	**Areas of Completed Progressive Rehabilitation:** Pest animals controlled in accordance with local guidelines for progressively rehabilitated areas No visible impact of pest animals on land for any progressively rehabilitated areas Any necessary remedial rehabilitation undertaken as soon as practicable. **Closure:** Local guidelines are met for control of pest animals No visible impact of pest animals on land	Evidence of pest animals (photograph) Assessment of numbers (if possible)	**Ongoing Progressive Rehabilitation** 6 monthly inspections for any pest animals within the Work Authority area. **Post Rehabilitation Phase** 6 monthly

6. REHABILITATION MANAGEMENT

6.1. Roles and Responsibilities

The Work Authority holder will have the responsibility to ensure compliance with this Rehabilitation Plan throughout the life of the quarry and period of rehabilitation monitoring until the closure criteria are met and the rehabilitation bond is returned.

This responsibility will be delegated to the Quarry Manager (or their nominated representative) who will be responsible for managing the implementation of the Rehabilitation Plan, including:

- Delegating tasks associated with this Rehabilitation Plan where necessary.
- Providing adequate resources to implement this Rehabilitation Plan; and
- Providing adequate training to employees and contractors regarding their obligations under this Rehabilitation Plan.

6.2. Documentation

All monitoring outcomes, including any visual inspection, worksheets / reports, any testing or analysis, any specialist reports, etc., will be recorded and retained at the offices of Hexham Wind Farm Pty Ltd for periodic review. Where appropriate or as required this information will be available to the Earth Resources Regulator or other relevant authorities.

6.3. Review

The purpose of a review is to ensure that the Rehabilitation Plan adequately addresses the current requirements of the community and the Earth Resources Regulator The operational life of this quarry is in the order of two years, significantly less than the usual 4-5 yearly periodic review. A review of this Rehabilitation plan is therefore considered unnecessary.

Regardless, if required, the Rehabilitation Plan will be revised prior to resource extraction ceasing and may initiate a Work Plan variation, or other approval process as deemed appropriate at that point in time. The developing extent of progressive rehabilitation will also be presented at the community engagement meetings.

The Rehabilitation Plan reviews will take into consideration any changes that may have occurred on site, the results of any monitoring, advice from any specialist, the effectiveness or otherwise of any progressive rehabilitation and any directives from the Earth Resources Regulator.

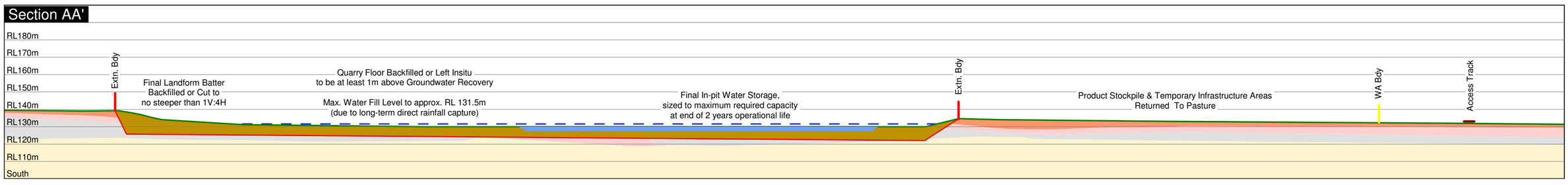
LEGEND

- WORK AUTHORITY BOUNDARY
- WIND FARM BOUNDARY
- TITLE BOUNDARY (White)
- LANDOWNER PARCELS
- EXTRACTION LIMIT
- DISTURBANCE AREA
- WATER WAYS
- RETAINED SOIL BUNDS
- SWALE DRAIN
- FENCE
- CONTOUR (1m Interval)
- SPOT HEIGHTS (RLm)

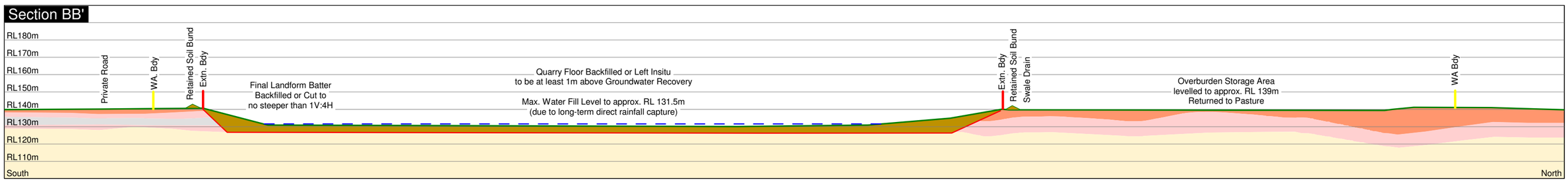
WIND FARM INFRASTRUCTURE

- WTG LOCATIONS
- WTG HARDSTANDS
- WTG ACCESS ROADS
- OVERHEAD CABLING
- POWER POLE
- UNDERGROUND CABLING

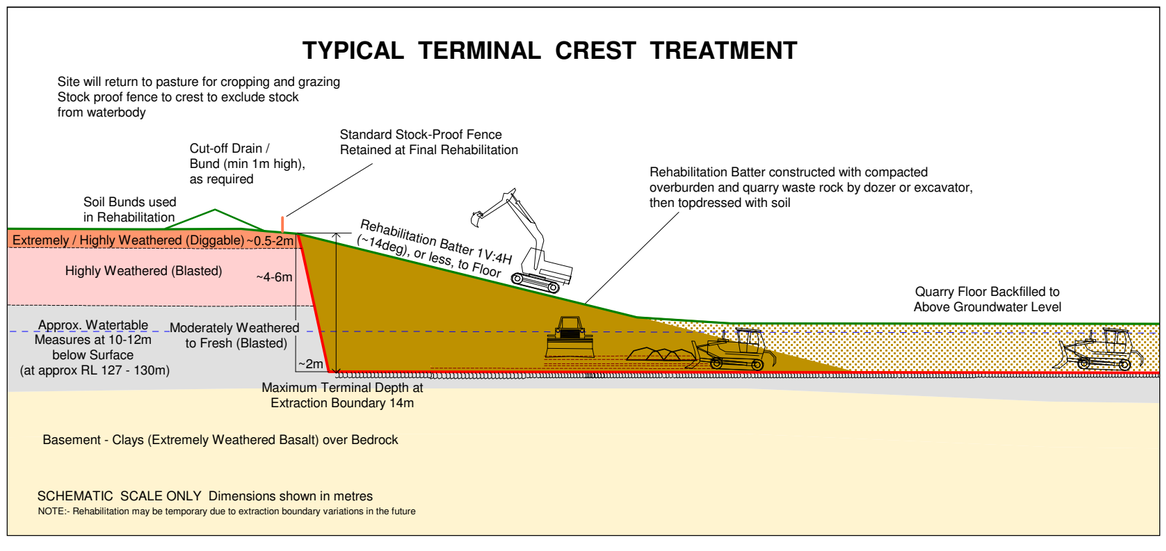
Section AA'



Section BB'



TYPICAL TERMINAL CREST TREATMENT



SECTION LEGEND

- WORK AUTHORITY BOUNDARY
- EXTRACTION LIMIT
- OVERBURDEN / CLAY
- HIGHLY TO MODERATELY WEATHERED BASALT
- MODERATELY WEATHERED TO FRESH BASALT
- BEDROCK / BASEMENT
- BACKFILL

WIND PROSPECT

Hexham Wind Farm Pty Ltd

Extractive Industry Work Authority No: WA00####

HEXHAM

REHABILITATED LANDFORM PLAN

Author: CLB, MS Date: 30 Oct 2025	Drawing: NS-DRAFT G Revision: 0
Survey Source: LIDAR from Wind Prospects	Contours: 1metre Vertical Datum: AHD
Orthophoto Date : Wind Prospects - 17 Jun 2020	**Project No: W10_001**
Projection: MGA Zone 54 (GDA94)	**Figure: 4**
Figure4_RehabilitationPlan.WOR	

BCA CONSULTING
EARTH RESOURCES
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admin@bcaconsulting.com.au www.bcaconsulting.com.au

REGISTER SEARCH STATEMENT (Title Search) Transfer of Land Act 1958

VOLUME 09148 FOLIO 149

Security no : 124119081669G
Produced 16/10/2024 03:12 PM

LAND DESCRIPTION

Lots 1,2,3,4,5,6 and 7 on Title Plan 161627P.
PARENT TITLE Volume 03946 Folio 199
Created by instrument F835458 01/09/1975

REGISTERED PROPRIETOR

Estate Fee Simple
Sole Proprietor
ANTHONY CHARLES WILSON KELLY of 460 FOUR MILE ROAD CARAMUT VIC 3274
AU797418T 10/09/2021

ENCUMBRANCES, CAVEATS AND NOTICES

CAVEAT AK645409H 09/10/2013
Caveator
HEXHAM WIND FARM PTY LTD
Grounds of Claim
LEASE WITH THE FOLLOWING PARTIES AND DATE.
Parties
THE REGISTERED PROPRIETOR(S)
Date
25/03/2013
Estate or Interest
LEASEHOLD ESTATE
Prohibition
ANY INSTRUMENT THAT AFFECTS MY/OUR INTEREST
Lodged by
WIND PROSPECT PTY LTD
Notices to
HEXHAM WIND FARM PTY LTD of SUITE 10 19-35 GERTRUDE STREET FITZROY VIC 3065

Any encumbrances created by Section 98 Transfer of Land Act 1958 or Section 24 Subdivision Act 1988 and any other encumbrances shown or entered on the plan set out under DIAGRAM LOCATION below.

DIAGRAM LOCATION

SEE TP161627P FOR FURTHER DETAILS AND BOUNDARIES

ACTIVITY IN THE LAST 125 DAYS

NIL

----------END OF REGISTER SEARCH STATEMENT----------

Additional information: (not part of the Register Search Statement)

ADMINISTRATIVE NOTICES

NIL

REGISTER SEARCH STATEMENT (Title Search) Transfer of Land Act 1958

eCT Control 18386W TAITS LEGAL MANAGEMENT PTY LTD
Effective from 08/10/2021

DOCUMENT END

Imaged Document Cover Sheet

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Document Type	**Plan**
Document Identification	**TP161627P**
Number of Pages (excluding this cover sheet)	**1**
Document Assembled	**16/10/2024 15:12**

TITLE PLAN		EDITION 1	TP 161627P

Location of Land

Parish:	QUAMBY NORTH	
Township:		
Section:	6	7
Crown Allotment:	2	1, 2, 3
Crown Portion:		
SUBDIVISION	A	A & B
Last Plan Reference:		
Derived From:	VOL 9148 FOL 149	
Depth Limitation:	NIL	

Notations

ANY REFERENCE TO MAP IN THE TEXT MEANS THE DIAGRAM SHOWN ON THIS TITLE PLAN

Description of Land / Easement Information

THIS PLAN HAS BEEN PREPARED FOR THE LAND REGISTRY, LAND VICTORIA, FOR TITLE DIAGRAM PURPOSES AS PART OF THE LAND TITLES AUTOMATION PROJECT
COMPILED: 23/09/1999
VERIFIED: EWA

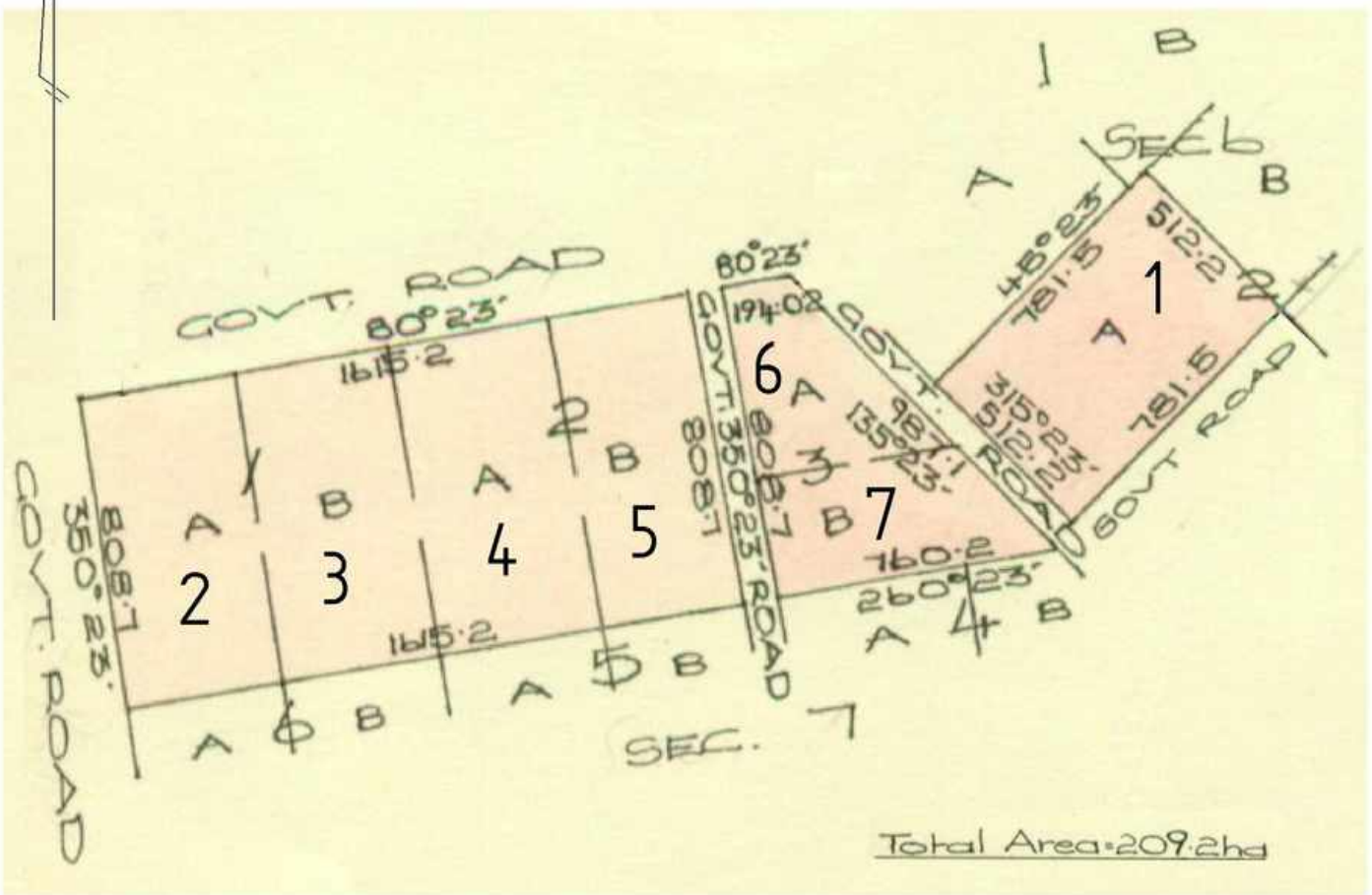


TABLE OF PARCEL IDENTIFIERS
WARNING: Where multiple parcels are referred to or shown on this Title Plan this does not imply separately disposable parcels under Section 8A of the Sale of Land Act 1962
PARCEL 1 = SUBDIVISION A OF CA 2 SECTION 6
PARCEL 2 = SUBDIVISION A OF CA 1
PARCEL 3 = SUBDIVISION B OF CA 1
PARCEL 4 = SUBDIVISION A OF CA 2 SECTION 7
PARCEL 5 = SUBDIVISION B OF CA 2
PARCEL 6 = SUBDIVISION A OF CA 3
PARCEL 7 = SUBDIVISION B OF CA 3

LENGTHS ARE IN METRES	Metres = 0.3048 x Feet Metres = 0.201168 x Links		Sheet 1 of 1 sheets

PLANNING PROPERTY REPORT

Environment, Land, Water and Planning

From www.planning.vic.gov.au at 02 June 2023 04:02 PM

PROPERTY DETAILS

Lot and Plan Number:	**Lot 4 TP161627**
Address:	**BARWIDGEE ROAD CARAMUT 3274**
Standard Parcel Identifier (SPI):	**4\TP161627**
Local Government Area (Council):	**MOYNE** www.moyne.vic.gov.au
Council Property Number:	**502223 (Part)**
Planning Scheme:	**Moyne** Planning Scheme - Moyne
Directory Reference:	**Vicroads 90 A2**

This parcel is one of 7 parcels comprising the property. For full parcel details get the free Property report at Property Reports

UTILITIES

Rural Water Corporation:	**Southern Rural Water**
Urban Water Corporation:	**Wannon Water**
Melbourne Water:	**Outside drainage boundary**
Power Distributor:	**POWERCOR**

STATE ELECTORATES

Legislative Council:	**WESTERN VICTORIA**
Legislative Assembly:	**SOUTH-WEST COAST**

OTHER

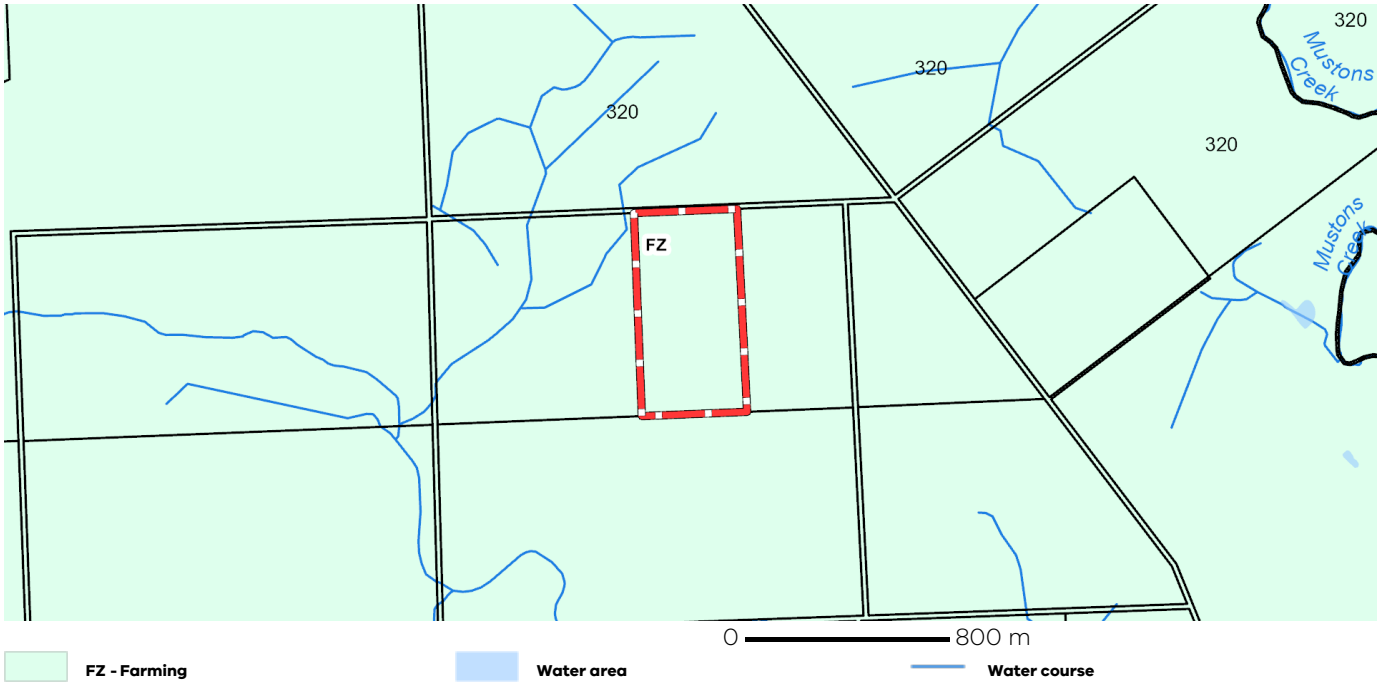
Registered Aboriginal Party:	**Eastern Maar Aboriginal Corporation**

View location in VicPlan

Planning Zones

FARMING ZONE (FZ)

SCHEDULE TO THE FARMING ZONE (FZ)



FZ - Farming Water area Water course

Note: labels for zones may appear outside the actual zone - please compare the labels with the legend.

Planning Overlays

No planning overlay found

PLANNING PROPERTY REPORT

Areas of Aboriginal Cultural Heritage Sensitivity

All or part of this parcel is an 'area of cultural heritage sensitivity'.

'Areas of cultural heritage sensitivity' are defined under the Aboriginal Heritage Regulations 2018, and include registered Aboriginal cultural heritage places and land form types that are generally regarded as more likely to contain Aboriginal cultural heritage.

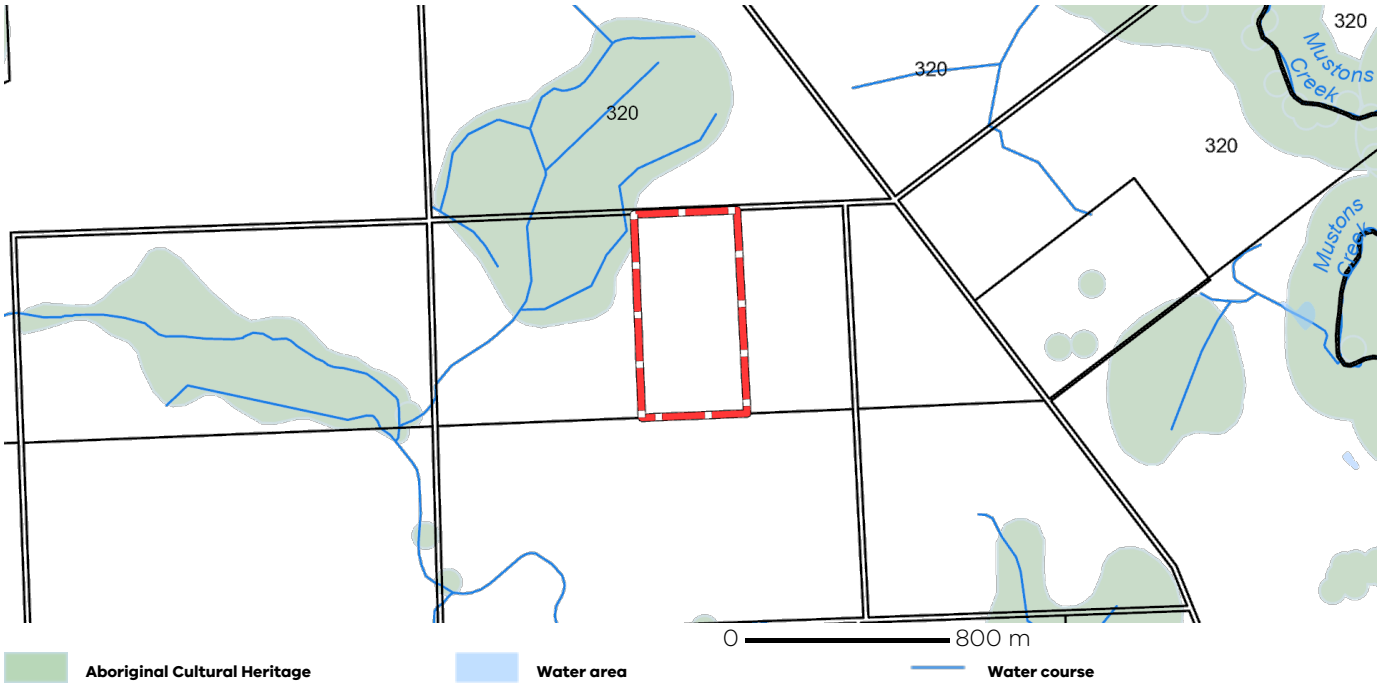
Under the Aboriginal Heritage Regulations 2018, 'areas of cultural heritage sensitivity' are one part of a two part trigger which require a 'cultural heritage management plan' be prepared where a listed 'high impact activity' is proposed.

If a significant land use change is proposed (for example, a subdivision into 3 or more lots), a cultural heritage management plan may be triggered. One or two dwellings, works ancillary to a dwelling, services to a dwelling, alteration of buildings and minor works are examples of works exempt from this requirement.

Under the Aboriginal Heritage Act 2006, where a cultural heritage management plan is required, planning permits, licences and work authorities cannot be issued unless the cultural heritage management plan has been approved for the activity.

For further information about whether a Cultural Heritage Management Plan is required go to http://www.aav.nrms.net.au/aavQuestion1.aspx

More information, including links to both the Aboriginal Heritage Act 2006 and the Aboriginal Heritage Regulations 2018, can also be found here - https://www.aboriginalvictoria.vic.gov.au/aboriginal-heritage-legislation



PLANNING PROPERTY REPORT

Further Planning Information

Planning scheme data last updated on 1 June 2023.

A **planning scheme** sets out policies and requirements for the use, development and protection of land.
This report provides information about the zone and overlay provisions that apply to the selected land.
Information about the State and local policy, particular, general and operational provisions of the local planning scheme that may affect the use of this land can be obtained by contacting the local council or by visiting https://www.planning.vic.gov.au

This report is NOT a **Planning Certificate** issued pursuant to Section 199 of the ***Planning and Environment Act 1987.***
It does not include information about exhibited planning scheme amendments, or zonings that may abut the land.
To obtain a Planning Certificate go to Titles and Property Certificates at Landata - https://www.landata.vic.gov.au

For details of surrounding properties, use this service to get the Reports for properties of interest.

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For other information about planning in Victoria visit https://www.planning.vic.gov.au

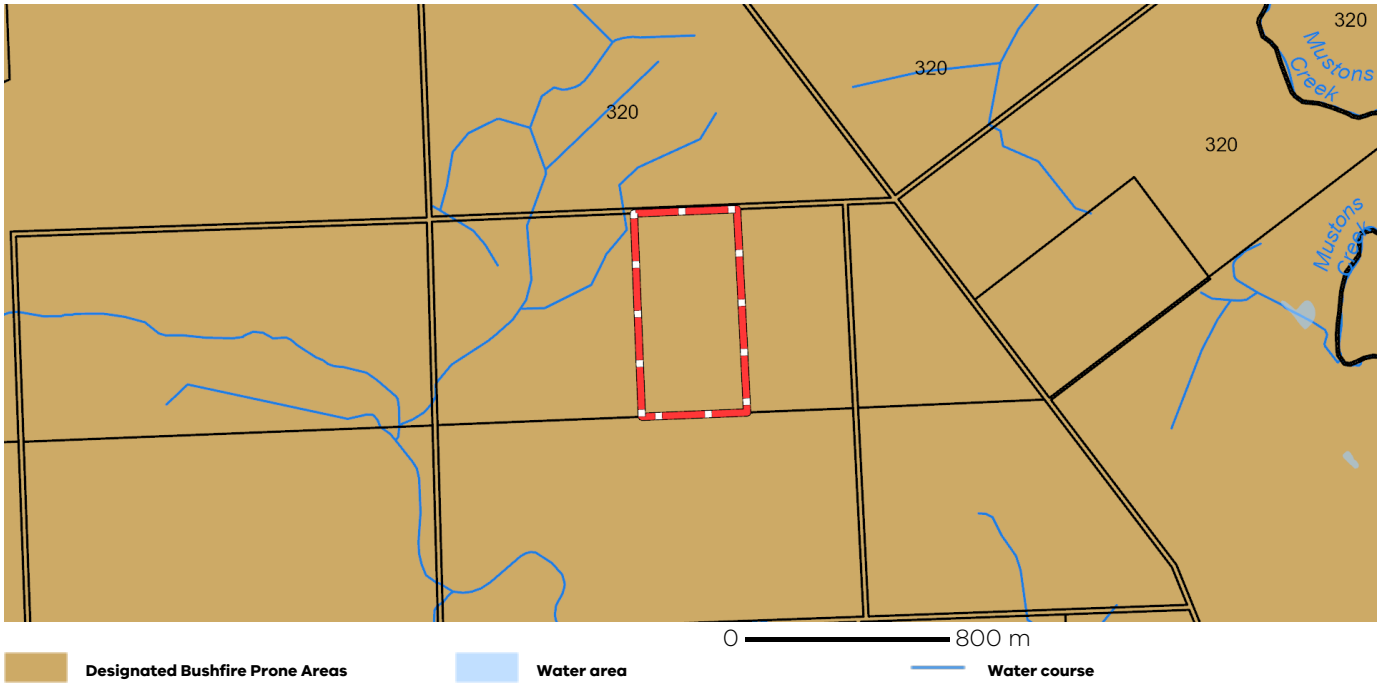
PLANNING PROPERTY REPORT

Designated Bushfire Prone Areas

This parcel is in a designated bushfire prone area. Special bushfire construction requirements apply to the part of the property mapped as a designated bushfire prone area (BPA). Planning provisions may apply.

Where part of the property is mapped as BPA, if no part of the building envelope or footprint falls within the BPA area, the BPA construction requirements do not apply.

Note: the relevant building surveyor determines the need for compliance with the bushfire construction requirements.



Designated BPA are determined by the Minister for Planning following a detailed review process. The Building Regulations 2018, through adoption of the Building Code of Australia, apply bushfire protection standards for building works in designated BPA.

Designated BPA maps can be viewed on VicPlan at https://mapshare.vic.gov.au/vicplan/ or at the relevant local council.

Create a BPA definition plan in VicPlan to measure the BPA.

Information for lot owners building in the BPA is available at https://www.planning.vic.gov.au.

Further information about the building control system and building in bushfire prone areas can be found on the Victorian Building Authority website https://www.vba.vic.gov.au. Copies of the Building Act and Building Regulations are available from http://www.legislation.vic.gov.au. For Planning Scheme Provisions in bushfire areas visit https://www.planning.vic.gov.au.

Native Vegetation

Native plants that are indigenous to the region and important for biodiversity might be present on this property. This could include trees, shrubs, herbs, grasses or aquatic plants. There are a range of regulations that may apply including need to obtain a planning permit under Clause 52.17 of the local planning scheme. For more information see Native Vegetation (Clause 52.17) with local variations in Native Vegetation (Clause 52.17) Schedule

To help identify native vegetation on this property and the application of Clause 52.17 please visit the Native Vegetation Information Management system https://nvim.delwp.vic.gov.au/ and Native vegetation (environment.vic.gov.au) or please contact your relevant council.

You can find out more about the natural values on your property through NatureKit NatureKit (environment.vic.gov.au)

PLANNING PROPERTY REPORT

From www.planning.vic.gov.au at 02 June 2023 04:01 PM

PROPERTY DETAILS

Lot and Plan Number:	**Lot 5 TP161627**
Address:	**BARWIDGEE ROAD CARAMUT 3274**
Standard Parcel Identifier (SPI):	**5\TP161627**
Local Government Area (Council):	**MOYNE** www.moyne.vic.gov.au
Council Property Number:	**502223 (Part)**
Planning Scheme:	**Moyne** Planning Scheme - Moyne
Directory Reference:	**Vicroads 90 A2**

This parcel is one of 7 parcels comprising the property. For full parcel details get the free Property report at Property Reports

UTILITIES

Rural Water Corporation:	**Southern Rural Water**
Urban Water Corporation:	**Wannon Water**
Melbourne Water:	**Outside drainage boundary**
Power Distributor:	**POWERCOR**

STATE ELECTORATES

Legislative Council:	**WESTERN VICTORIA**
Legislative Assembly:	**SOUTH-WEST COAST**

OTHER

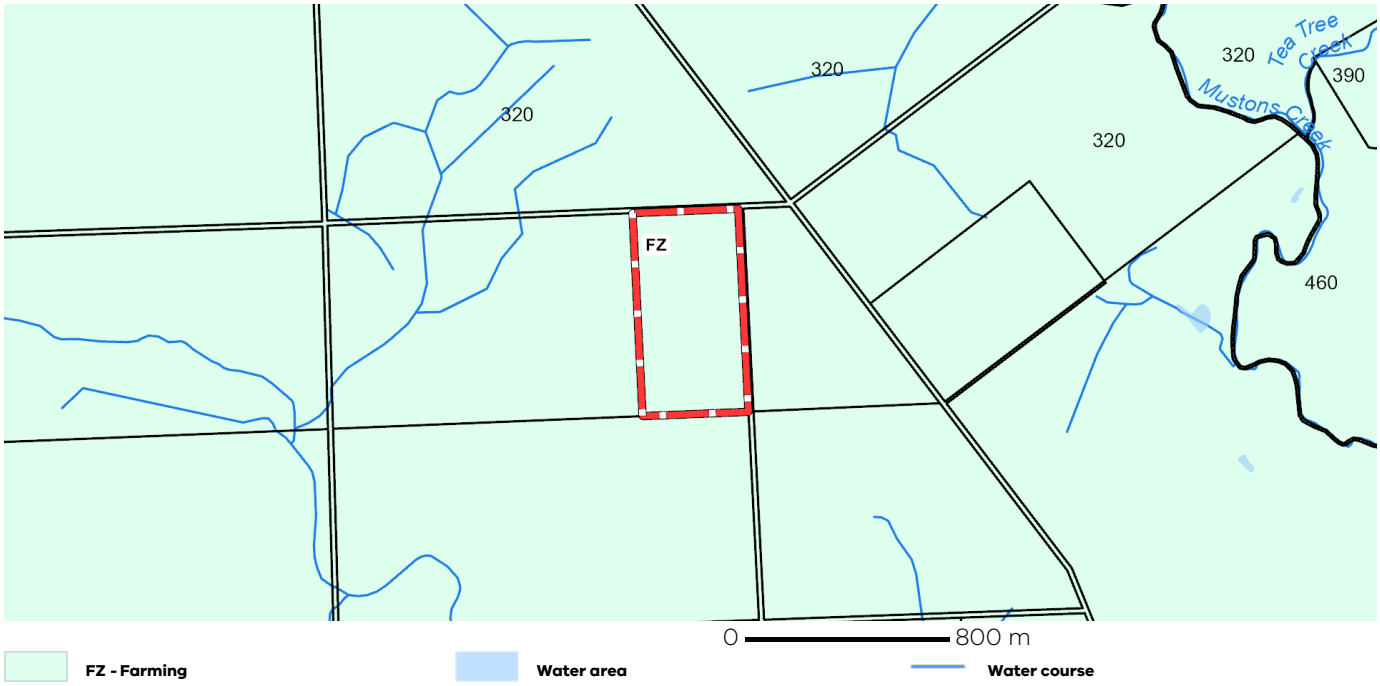
Registered Aboriginal Party:	**Eastern Maar Aboriginal Corporation**

View location in VicPlan

Planning Zones

FARMING ZONE (FZ)

SCHEDULE TO THE FARMING ZONE (FZ)



FZ - Farming Water area Water course

Note: labels for zones may appear outside the actual zone - please compare the labels with the legend.

Planning Overlays

No planning overlay found

PLANNING PROPERTY REPORT

Further Planning Information

Planning scheme data last updated on 1 June 2023.

A **planning scheme** sets out policies and requirements for the use, development and protection of land.
This report provides information about the zone and overlay provisions that apply to the selected land.
Information about the State and local policy, particular, general and operational provisions of the local planning scheme that may affect the use of this land can be obtained by contacting the local council or by visiting https://www.planning.vic.gov.au

This report is NOT a **Planning Certificate** issued pursuant to Section 199 of the ***Planning and Environment Act 1987.***
It does not include information about exhibited planning scheme amendments, or zonings that may abut the land.
To obtain a Planning Certificate go to Titles and Property Certificates at Landata - https://www.landata.vic.gov.au

For details of surrounding properties, use this service to get the Reports for properties of interest.

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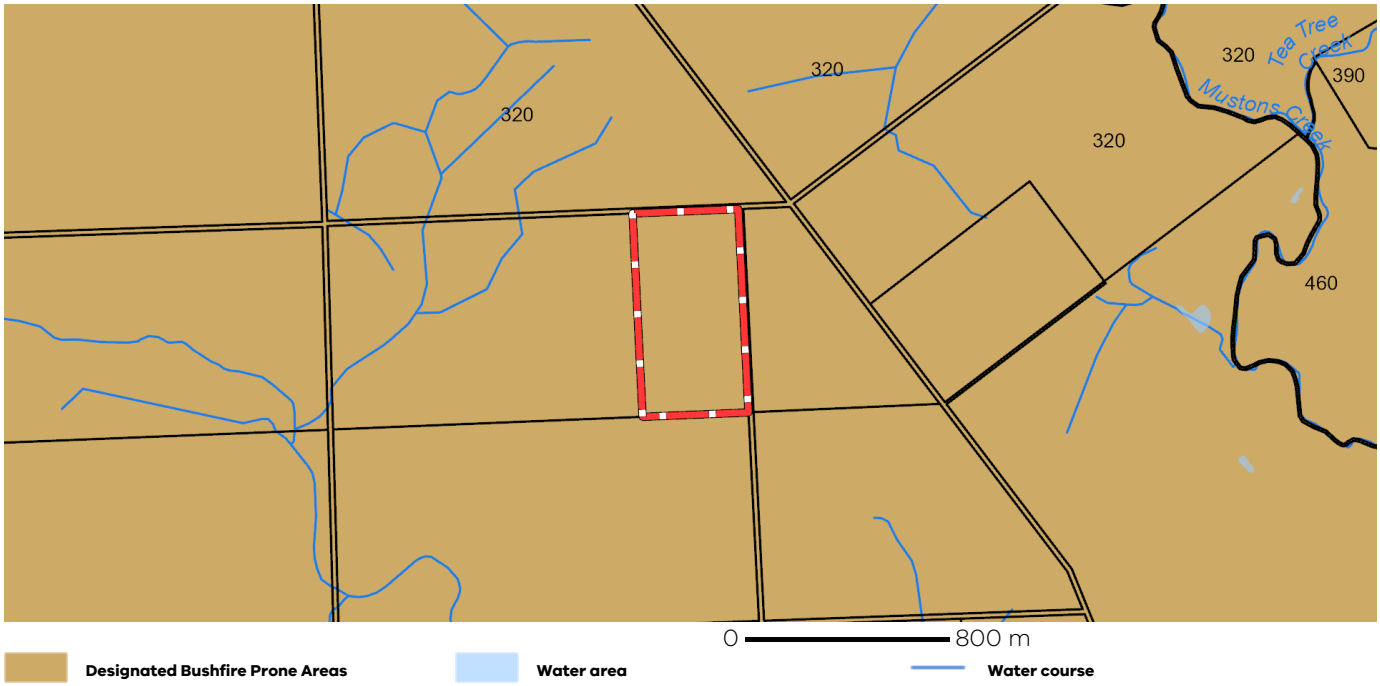

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Dust containing crystalline silica in the extractive industry

Last updated 27-07-2021

Identifying hazards and controlling the risks of exposure to dust containing crystalline silica in the extractive industry.

What is crystalline silica?

Silica is an abundant mineral found within most rocks and soils. Silica can occur in either crystalline or non-crystalline (amorphous) forms. The crystalline form of silica poses the biggest risk to health, as it can damage your lungs when it is inhaled.

The most common form of crystalline silica occurs as the mineral quartz. The amount of silica found within different types of rocks and soils can vary, with some common examples listed below:

- granite: 25% to 60%
- shale: 22%
- sandstone: 70% to 90%

While geological surveys can give some indication of the potential silica content of a resource to be extracted, a petrographic analysis is more accurate in determining the crystalline silica content of a material and should be undertaken.

Silica dust

Dust containing respirable crystalline silica particles is commonly called silica dust. Silica dust is made up of particles of different sizes. The smallest particles are known as respirable crystalline silica, which can be released when you drill, blast, excavate, load, transport, crush, package, dump or simply disturb materials that contain crystalline silica.

Health risks

Crystalline silica dust can be harmful when it's inhaled into your lungs over a long period of time at low to moderate levels, or short periods at high levels.

When crystalline silica dust is inhaled it can cause silicosis, a scarring of the lungs. Silicosis is a serious and incurable disease, with symptoms including shortness of breath, coughing, fatigue and

weight loss. In severe cases, the damage caused to the lungs by silicosis can require a lung transplant or may lead to death.

Breathing in silica dust can also cause other serious diseases, such as:

- lung cancer
- kidney disease
- autoimmune disease, such as scleroderma

Exposure standard

Safe Work Australia publishes exposure standards for airborne contaminants in the workplace.

The exposure standard for respirable crystalline silica dust (listed under Quartz (respirable dust)) is 0.05 mg/m3 as a TWA (time-weighted average) airborne concentration over 8 hours.

An 8-hour time-weighted average exposure standard is the average airborne concentration of a particular substance permitted over an 8-hour working day and 5-day working week.

The workplace exposure standard for respirable crystalline silica is based on the levels found in a person's breathing zone, outside of any respiratory protective equipment that may be in use.

Employers are required to ensure employee exposure does not exceed this standard.

WorkSafe Victoria recommends that employees are not exposed to levels above 0.02 mg/m3 as an eight hour TWA. This is a precautionary measure to prevent silicosis, and to minimise the risk of lung cancer.

Exposure limits need to be adjusted for non-standard work cycles typical in the extractive industry. See the table below, adapted from one produced by the Queensland Department of Natural Resources.

Table 1 - Adjustment factor to respirable crystalline silica occupational exposure limit for typical non-standard work cycles in mining, assuming an exposure standard of 0.05 mg/m3 as a TWA

Roster work cycle	shifts worked in roster	number of days break in roster	hours per day	number of days in work cycle	number of hours worked per cycle	aver-age number of hours per week	adjustment factor	shift-adjusted OEL (mg/m3)
10 hour days, 5 day work week	5	2	10	7	50	50	0.8	0.04

Roster work cycle	shifts worked in roster	number of days break in roster	hours per day	number of days in work cycle	number of hours worked per cycle	aver-age number of hours per week	adjustment factor	shift-adjusted OEL (mg/m3)
14 on / 7 off	14	7	12	21	168	56	0.71	0.03
4 on / 3 off – 12 hour days	4	3	12	7	48	48	0.83	0.04
7 on / 7 off – 12.5 hour days	7	7	12.5	14	87.5	43.75	0.91	0.04
8 on / 6 off – 12.5 hour days	8	6	12.5	14	100	50	0.8	0.04
short work week	4	3	7.2	7	28.8	32.4	1	0.05

Extractive industry tasks and exposure

Exposure to crystalline silica can occur during common quarrying tasks where dust is generated, such as:

- drilling, blasting and rock breaking
- excavation, grading and site preparation
- crushing, screening and bulk handling
- maintenance and cleaning
- mobile plant movement on unsealed roads
- laboratory testing or product sampling

If employees are regularly exposed to material that contains crystalline silica without controls in place, it is likely that the exposure standard will be exceeded.

Controlling the risk of exposure

Employers must control the risk associated with exposure to crystalline silica by applying the hierarchy of control in Part 4.1 of the Occupational Health and Safety Regulations 2017 (OHS Regulations).

An employer must, so far as is reasonably practicable, eliminate the risk associated with exposure to crystalline silica in their workplace (for example by using non silica-containing products).

If it is not reasonably practicable to eliminate a risk associated with crystalline silica, the employer must reduce the risk so far as is reasonably practicable by:

- substitution (for example using materials which have a lower silica content)
- isolation (for example ensuring operator cabins are isolated from dust sources)
- engineering (eg wet suppression, positive pressure cabins, dry cyclone filtration systems)
- a combination of any of the above risk control measures

If the risk of exposure still remains, administrative controls (eg housekeeping, work practices) must be used to reduce the risk so far as is reasonably practicable. If a risk remains, personal protective equipment (such as respiratory protective equipment) must be used.

Controlling the generation of airborne respirable crystalline silica dust at the source is the most effective way to reduce exposure during the extractive process. It is much more effective than trying to control the exposure of employees after the dust has become airborne.

It may not be possible to completely eliminate crystalline silica from an extractive process, due to the presence of silica within the rock or soil itself. Employers must, so far as is reasonably practicable, apply controls at each stage in the process to reduce the risk of exposure. Examples of appropriate controls include:

1. **Drilling, blasting and secondary breaking (rock breaking)**
    - Wet suppression or dry cyclone filtration systems for drilling.
    - Wetting down of access roads and work areas (where appropriate).
    - Doors and windows of equipment are closed at all times.
    - Well maintained cabins that are regularly cleaned to avoid dust accumulating during entry and exit.
    - Air conditioning within equipment cabins is filtered with high capacity filters suitable for the dust loading of the operating environment.

2. **Excavation, grading and site preparation**
    - Ensure operator cabins are isolated from dust sources (as above).
    - Regular wetting down of work areas and operating faces.
    - Planning activities around weather conditions.
    - Minimise vehicle movements.
    - Reduce onsite vehicle speeds, particularly in dry and windy conditions.
3. **Crushing, screening and bulk handling**
    - Use water sprays, foams or foggers to prevent or suppress airborne dust.
    - Dust extraction ventilation.
    - Enclose dust-generating sections of plant within purpose built enclosures.
    - Isolate operators from generated dust.
    - Minimise the fall height of material at stackers and transfer points.

4. **Maintenance and cleaning**
    - Clean down equipment prior to performing maintenance work.
    - Avoid accumulation of dust in work and administration areas.
    - Ensure any vacuums in use are fitted with HEPA filters.

- Do not clean up with dry brushes or compressed air – use wet methods instead.
- Provide boot washes at entrances to amenity or office areas.

5. **Laboratory testing**
   - Employ wet cleaning methods when cleaning down equipment.
   - Dust extraction ventilation for dust generating equipment.
   - Provide a clean air supply through filtered ventilation.
   - Isolation of the laboratory from adjacent dusty areas.

6. **Respiratory protective equipment (RPE)**
   When engineering controls don't adequately control exposure to dust, respiratory protective equipment (RPE) may be required.
   RPE needs to comply with AS/NZS 1716 – *Respiratory protective devices*. Check the product information to make sure RPE is AS/ NZS 1716 compliant. If you're not sure, ask your supplier or contact the manufacturer.
   RPE needs to have at least a P2 filter and be tested for each person to ensure it fits correctly. RPE that requires a facial seal, such as half-face respirators, should not be used by people with beards or even facial stubble. Where facial hair interferes with the fit of the RPE, a powered air purifying respirator (PAPR) that does not rely on a facial seal needs to be used.
   RPE needs to be selected, used and maintained in accordance with AS/NZS 1715 – *Selection, use and maintenance of respiratory protective equipment*. Employers must provide employees with information, instruction and training in RPE use and maintenance.

7. **Training**
   Employers must provide their employees with any necessary information, instruction, training and supervision to enable them to do their work safely. For example, training needs to be provided on:
   - crystalline silica hazards and health risks
   - how to effectively use controls
   - use and maintenance of RPE
   - how to dispose of waste
   - methods for personal decontamination.

   The structure, content and delivery of the training needs to take into account any special requirements of the employees being trained. For example, information, instruction and training may need to be provided in a language other than English. Refresher training should be provided regularly.

Air monitoring

By law, employers must carry out air (atmospheric) monitoring for crystalline silica dust generated at their workplace where:

- there is uncertainty about whether the exposure standard is or may be exceeded, or
- air monitoring is necessary to determine whether there is a risk to employee health, and therefore if health monitoring is required.

Air monitoring and the interpretation of results (including comparison with the exposure standard) needs to be conducted by a competent person (such as an occupational hygienist) to determine employee exposure to crystalline silica. Results of air monitoring must be shared with employees who have been, or may have been, exposed. Where possible, air monitoring results should be shared with medical practitioners who are conducting health monitoring for employees.

Health monitoring

Employers must provide health monitoring if exposure to crystalline silica is likely to have an adverse effect on employees' health. This is particularly important where lower level control measures, such as RPE, are relied on to reduce exposure.

Health monitoring is required for employees who are exposed to silica dust at levels likely to exceed the exposure standard.

Health monitoring must be undertaken by a registered medical practitioner. It needs to be carried out by an occupational physician who is a fellow of the Australasian Faculty of Occupational and Environmental Medicine (AFOEM), with expertise in respiratory and silica exposure health monitoring. A list of practitioners can be found on the Royal Australasian College of Physicians website at (link below). Employers should speak to the occupational physician to ensure they have experience with silicosis and other silica dust diseases.

Where health monitoring is required, it should be completed when an employee is hired with a new employer (before they start work), regularly while they are in the job and when they finish working for that employer.

For more information on health monitoring see Crystalline silica health assessments.

- **Crystalline silica health assessments**

  https://www.worksafe.vic.gov.au/crystalline-silica-health-assessments

Providing information to customers

Under the Occupational Health and Safety Act 2004 (OHS Act), operators extracting and supplying materials containing crystalline silica are required to provide information to customers about how to safely use the product they are supplying. For example, information should be provided in a safety data sheet (SDS), including the percentage of crystalline silica in the material being supplied, the hazardous properties and risks to health of respirable crystalline silica and risk controls that need to be used when processing the silica-containing material.

References

Queensland Department of Natural Resources, Mines and Energy, 2018: Guideline for management of Respirable Crystalline Silica in Queensland Mineral Mines and Quarries.

Related information

- **Crystalline silica: Safety basics**

  https://www.worksafe.vic.gov.au/crystalline-silica-safety-basics

- **Crystalline silica health assessments**

  https://www.worksafe.vic.gov.au/resources/crystalline-silica-health-assessments

- **AIOH: Adjustment of Workplace Exposure Standards for Extended Work Shifts'**

  https://www.worksafe.vic.gov.au/resources/aioh-adjustment-workplace-exposure-standards-extended-work-shifts

- **CCAA: Industry guide: Safety data sheets for products containing respirable crystalline silica**

  https://www.worksafe.vic.gov.au/resources/ccaa-industry-guide-safety-data-sheets-products-containing-respirable-crystalline-silica

- **CCAA: Workplace health and safety guideline management of respirable crystalline silica in quarries**

  https://www.worksafe.vic.gov.au/resources/ccaa-workplace-health-and-safety-guideline-management-respirable-crystalline-silica

- **AIOH: Find an occupational hygienist**

  https://www.worksafe.vic.gov.au/resources/aioh-find-occupational-hygienist

- **RACP: Find an AFOEM consultant**

  https://www.worksafe.vic.gov.au/resources/racp-find-afoem-consultant

1 Malop Street Geelong VIC 3220
PO Box 279 Geelong VIC 3220
Telephone 03 4243 7000 Fax 03 4243 9321
www.worksafe.vic.gov.au

27 May 2022

Dear extractive industry member,

I write to provide clarification regarding basalt material and its relationship with the new silica regulations.

Silica Regulations summary

On 15 Nov 2021 the Victorian Government introduced Part 4.5 Crystalline Silica to the Occupational Health and Safety Regulations. These regulations contain general silica duties for all workplaces which come in to force on the 15th of May 2022. These general regulations include broad requirements for any workplace which manufacturers, supplies, or processes crystalline silica materials.

Crystalline silica is the crystalline form of silicon dioxide, or silica, a naturally occurring mineral that forms a major component of most rocks. A crystalline silica substance is defined in the Regulations as a substance which contains greater than 1% crystalline silica.

Information for Basalt quarries

While basalt may contain between 45% and 63% silica it is predominantly amorphous not crystalline. The crystalline silica component of Basalt is known to be less than 1% (WorkSafe website). As such the specific regulations regarding crystalline silica substances (such as analysis of material, provision of information to customers, provision of information to employees/job applicants) does not apply to extracting, processing, and selling basalt from quarries.

More information regarding silica in quarrying can be found;

- in the WorkSafe guidance document ‘Dust containing crystalline silica in the extractive industry’ available at www.worksafe.vic.gov.au
- CMPA Respirable Crystalline Silica Dust (RCSD) Management Guideline found at https://cmpavic.asn.au/publications/support-sheets/
- CCAA Industry guide 'Workplace Health & Safety Guideline - Management of Respirable Crystalline Silica in Quarries' available at https://www.ccaa.com.au/ > Publications > Industry Guidelines

Kind regards,

Ben Wright

Benjamin Wright
Manager of Earth Resources and Silica

Email Benjamin_wright@worksafe.vic.gov.au

CIVIL
MINE &
QUARRY
GEOTECHNICS

Hexham Windfarm Quarry

Geotechnical Competent Persons Letter

Hexham Windfarm Pty Ltd

22 January 2025

Civil Mine & Quarry Geotechnics Pty Ltd

ABN: 74 673 357 170

Address: 46 Paige Avenue

Traralgon, Victoria 3844, Australia;

Level 21, 459 Collins Street

Melbourne, Victoria 3000, Australia

Email: admin@cmqgeotechnics.com.au

Website: www.cmqgeotechnics.com.au

Document Details

Project Number	HEX0001
Project Name	Hexham Windfarm
Document Title	Hexham Windfarm Geotechnical Competent Persons Letter
Document Number	HEX0001-RPT-0-Geotechnical Competent Persons Letter

Revision History

Date	Revision	Author		Reviewer	
		Name	Signature	Name	Signature
22/01/2025	0	Kevin Kuang		Sanjive Narendranthan	

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1. Introduction

1.1. General

CMQ Pty Ltd (CMQ) was commissioned by Mr Cameron Black of BCA Consulting Earth Resources (BCA Consulting) (the client) on behalf of Hexham Windfarm Pty Ltd (Hexham), to undertake a Competent Persons Letter (CPL) and preliminary geotechnical assessment of the proposed Hexham Windfarm Quarry (the site), in Hexham, Victoria.

CMQ understands that the primary objective of Hexham is to obtain a Work Authority (WA) to extract basalt resources from the site to support its proposed Wind Farm Development.

1.2. Scope of Work

The scope of this geotechnical assessment is to:

- Conduct a desktop review of available information pertinent to the site area.
- Determine whether the proposed development is “intermediate” or “complex” as defined by the Department of Jobs, Precincts and Regions (DJPR) Geotechnical Guideline for Extractive Industries (2020).
- Prepare a ‘Competent Persons’ letter (this letter) outlining the findings from the above, in sympathy to the geotechnical guidelines (herein referred to as the geotechnical guidelines).

1.3. Limitations

This report has been prepared by CMQ for the exclusive use of BCA Consulting Pty Ltd and may only be relied upon by BCA Consulting Pty Ltd for the purposes outlined in Section 1.2 of the report. CMQ disclaims any responsibility to any other party in connection with this report. CMQ also excludes implied warranties and conditions, to the extent legally permissible.

The services provided by CMQ in preparing this report were limited to those specifically outlined in the report and are subject to the scope restrictions mentioned therein.

The opinions, conclusions, and recommendations presented in this report are based on the conditions observed and the information available at the time of its preparation. CMQ has no obligation to update the report in response to subsequent events or changes that occur after the report's preparation.

The opinions, conclusions and any recommendations in this report are based on assumptions made by CMQ described in this report. CMQ disclaims liability arising from any of the assumptions being incorrect.

This report is based on information provided by BCA Consulting Pty Ltd and other sources, including government authorities, which CMQ has not independently verified or checked beyond the agreed scope of work. CMQ does not accept liability for any unverified information or for any errors or omissions in the report that stem from inaccuracies in the provided information.

1.4. Information Relied Upon

The following sources of information were relied upon for the development of the preliminary geotechnical assessment of the proposed Hexham Windfarm Quarry site, detailed further within this report:

- BCA Consulting. (2023). Hexham Windfarm Pty Ltd – DrillLogs.
- BCA Consulting. (2023). Hexham Wind Farm Temporary Quarry – WA Rehabilitated Landform Plan, dated 8 August 2023.
- BCA Consulting. (2024). Hexham Windfarm Pty Ltd – Extractive Industry Work Authority, dated October 2024.
- BCA Consulting. (2024). Hexham Windfarm Pty Ltd – Hexham Windfarm Temporary Quarry Locality Plan (Draft E), dated 14 October 2024.
- BCA Consulting. (2024). Hexham Wind Farm Temporary Quarry – WA Rehabilitated Landform Plan, dated 12 Nov 2024.

- BCA Consulting. (2025). Hexham Wind Farm Temporary Quarry – WA Site Layout Plan, dated 20 Jan 2025.

2. Competent Persons Statement

The information presented in this letter is based on information compiled by Dr Sanjive Narendranathan of CMQ. Sanjive is registered to practice as a geotechnical engineer in the State of Victoria (RPEV #7032), and is accredited by the Australasian Institute of Mining and Metallurgy (AusIMM) and FIEAUST (registration number: 2259630) as a Chartered Professional (CP) in the discipline of Mine Geotechnical and Civil Engineering respectively.

3. Project Description

The site is currently a greenfield site located between in south-west Victoria, within the Moyne Shire Council. The site is approximately 42 km NW to the major suburb Warrambool, 60 km SE to the major suburb Hamilton, and 200 km west to Melbourne, as shown in Figure 1.

Hexham plans to develop a quarry at the site for the purpose of basalt resource extraction for use in the construction material supply for the windfarm road network and lay down areas, while the current use of grazing livestock and other agricultural purposes will be maintained for a period of time. The proposed extraction area is over 21.5 hectares (ha), comprises up to 108 turbines and associated access tracks. The quarry site address of the Work Authority is Barwidgee Road, Caramut, but is expected to be accessed via the landowner's property at 460 Four Mile Road.

The proposed method of extraction is likely to include traditional soft rock excavation (free dig) using an excavator/dozer to remove soil, overburden and highly weathered basalt and drill and blast methods to extract the fresher, harder basalt.

Further details of the geological setting are presented in the work plan. CMQ understands that the likely intended end land use is to include a waterbody with surrounding grazing land. Figure 2 below presents the draft work Authority (WA) pit development plan.

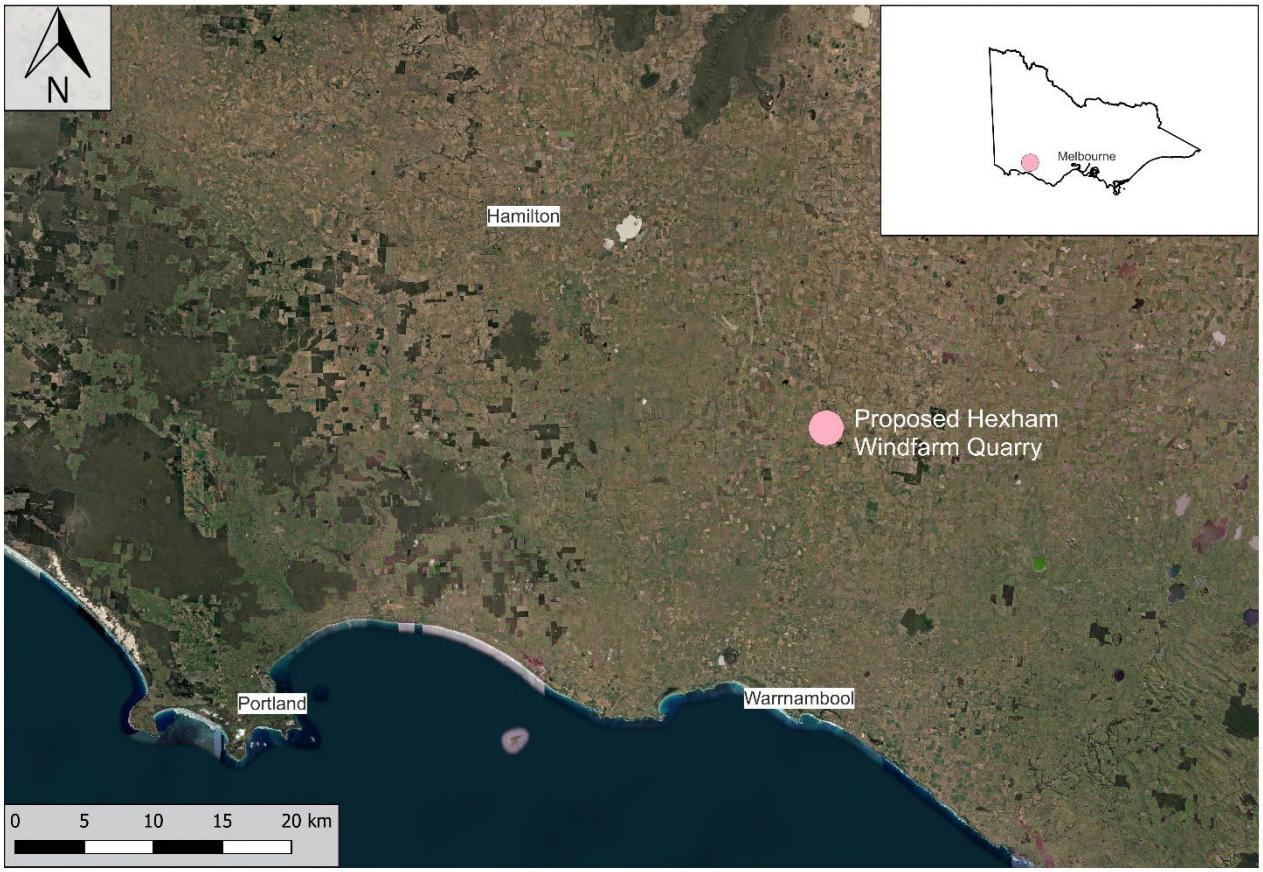

Figure 1 A regional scale location plan of the proposed Hexham Windfarm Quarry. Aerial sourced from ESRI Word Imagery (18/12/2024).

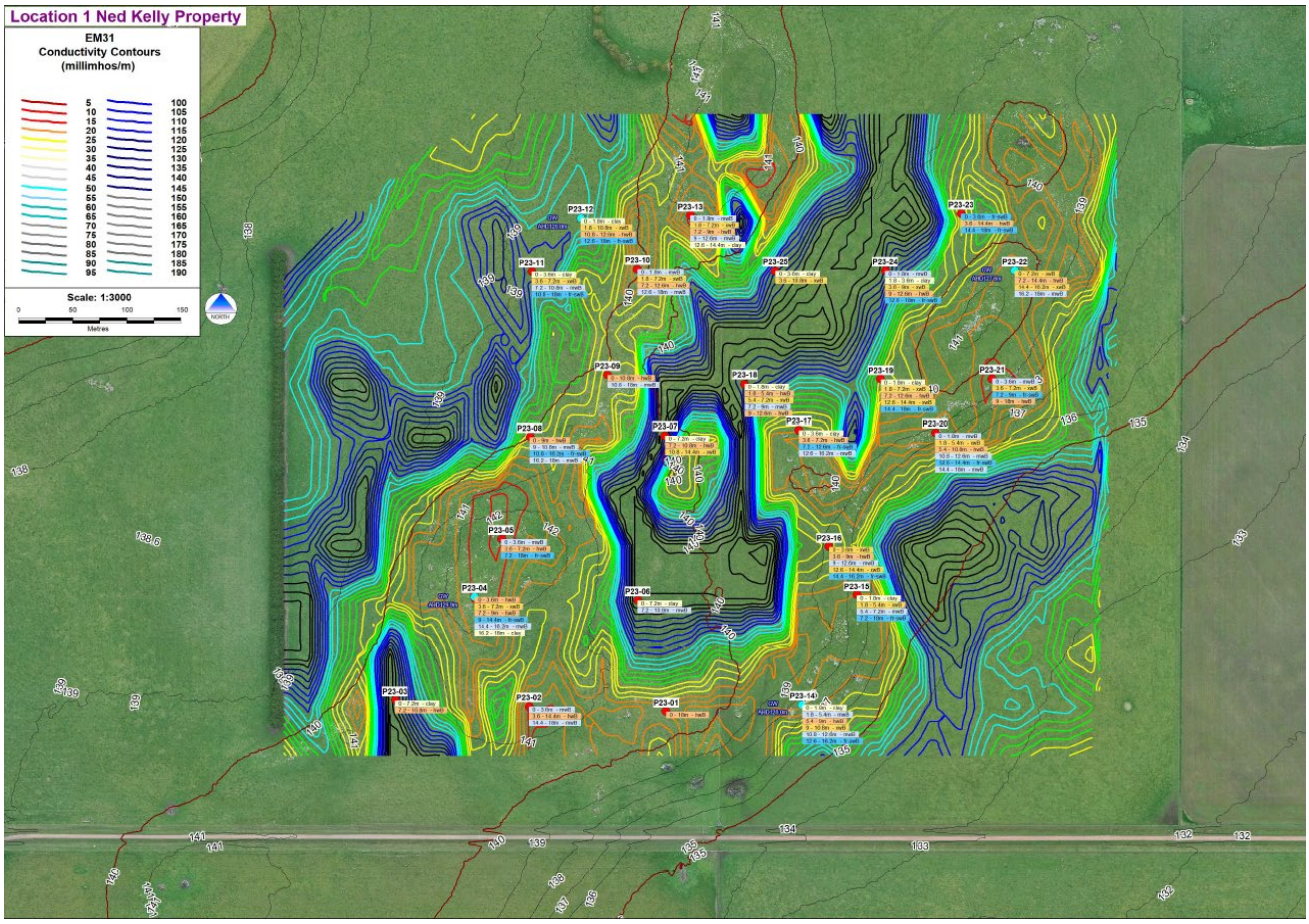

Figure 2 Location of proposed Hexham Windfarm Quarry, showing conductivity contours (BCA, 2024).

4. Desktop Study

As per the geotechnical guidelines, a preliminary literature review was undertaken; covering the geology, geomorphology, landslide hazards, plus the location and examination of relevant borehole and report data that was (borehole logs) provided to CMQ by BCA Consulting Earth Resources.

4.1. Regional Geology

Alongside the Victorian 1:250 000 Seamless Geology dataset (Geoscience Victoria), the area in the vicinity of the Hexham Windfarm Quarry boundary plays host to the following three geological units (from youngest to oldest):

- Quaternary Alluvium (*Qa1*)
- Quaternary Swamp and Lake Deposits (*Qm1*)
- Newer Volcanic Group (*Neo*)

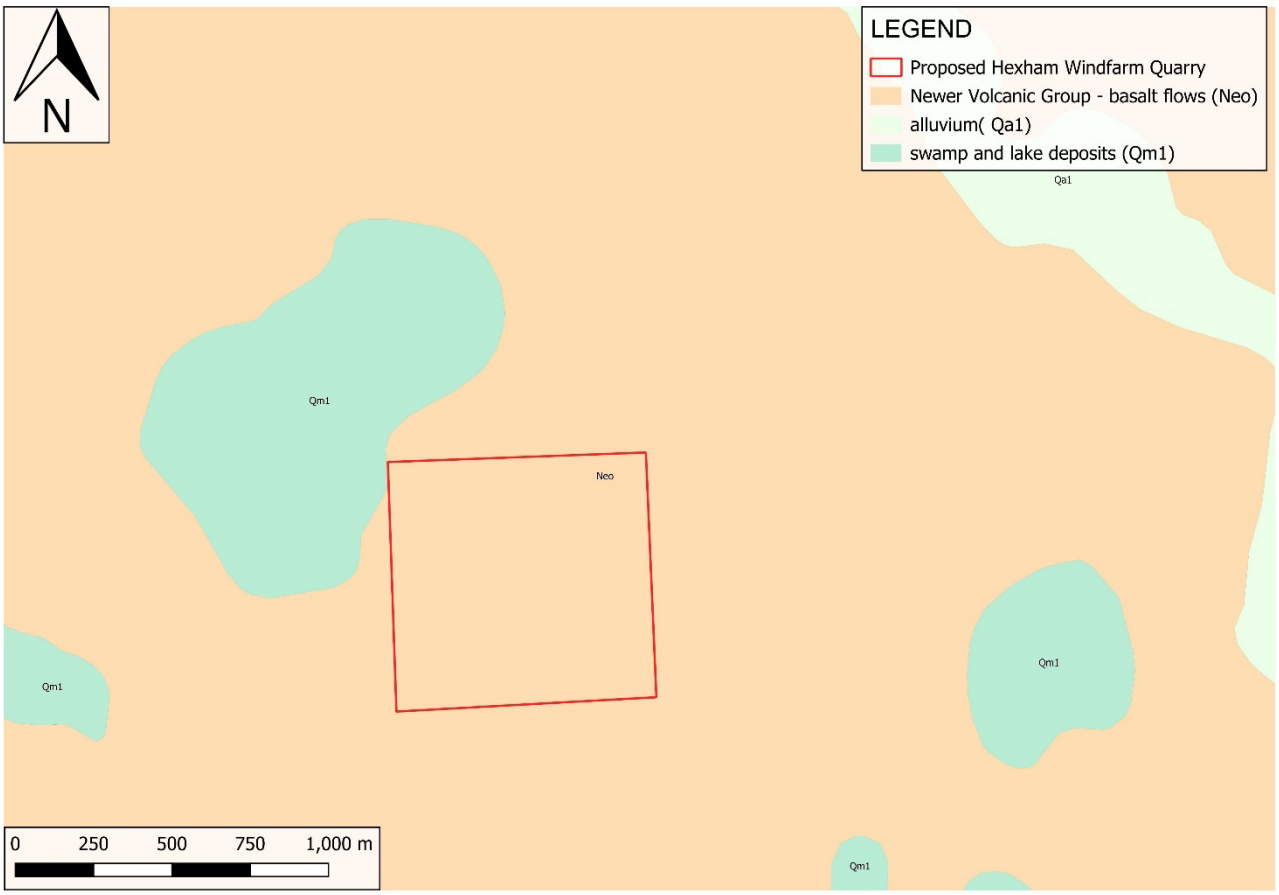

Figure 3 Outcrop geology of the proposed Hexham Windfarm Quarry.

Quaternary Alluvium (*Qa1*)

The youngest geological unit found within proposed quarry area is Quaternary aged alluvial sediments (GeoVic, 2014), associated with the Mustons Creek, tributary creeks and unnamed agricultural drains. These alluvial sediments are defined as generally unconsolidated, variably sorted silt, sand and gravel, deposited within the Hopkins River Catchment, which has been incised into the Newer Volcanic Basalt. The Quaternary Alluvium is generally restricted to the river channel, and as such, is not found within the proposed quarry footprint, however, implies the potential of surface flow.

Quaternary Swamp and Lake Deposits (*Qm1*) – Geomorphology

These deposits are typically grey to black, consisted of mud, silt, evaporites and limestone, with minor sand and peat. They are generally unconsolidated and very recent (approximately 1.5 My or younger) and have not undergone modification from geological processes.

The Quaternary Swamp and Lake Deposits are found at the northwest corner of the area, but not within the proposed quarry footprint. This geological unit could be as young as the Quaternary Alluvium, depending on the formation process at the site.

Newer Volcanic Group (*Neo*)

The Newer Volcanic Group basalts were formed primarily by mafic lava flows during the Pliocene to the Holocene, and was erupted from various eruption centres across Western Victoria, which are mostly present as isolated peaks amongst the basalt plains (Hare & Cas, 2005). The basalt plains are generally comprised of dark grey, tholeiitic olivine basalt, and is moderately to well vesiculated (Morand & Wohlt, 2003).

Eruption centres of the Newer Volcanic Group generally take the form of cinder cones, which is composed of scoria, a light and porous rock formed by ejection from a volcano as a molten blob and cooled in the air to form discrete grains. The eruptions that created these cones were typically short-lived and localised, resulting in the accumulation of scoria around the vent. Over time, these deposits have solidified into the cones observed today.

The Newer Volcanic Province is an extensive extrusive basalt deposit, extending approximately 410 km from Melbourne to the Mt Burr Range in Southeastern South Australia, covering the Hexham Windfarm Quarry site.

4.1.1. Major Structures

No major structures are located within 10 km of the proposed Hexham Windfarm Quarry. However, the nearest structure of significance is the Woorndoo Fold Scarp, which is a ~27.6 km long neotectonic fault scarp, with up to 15 m of apparent vertical displacement within the present day tectonic stress regime, potentially displacing some Newer Volcanic Group basalts dated 1.5 Ma (Figure 4).

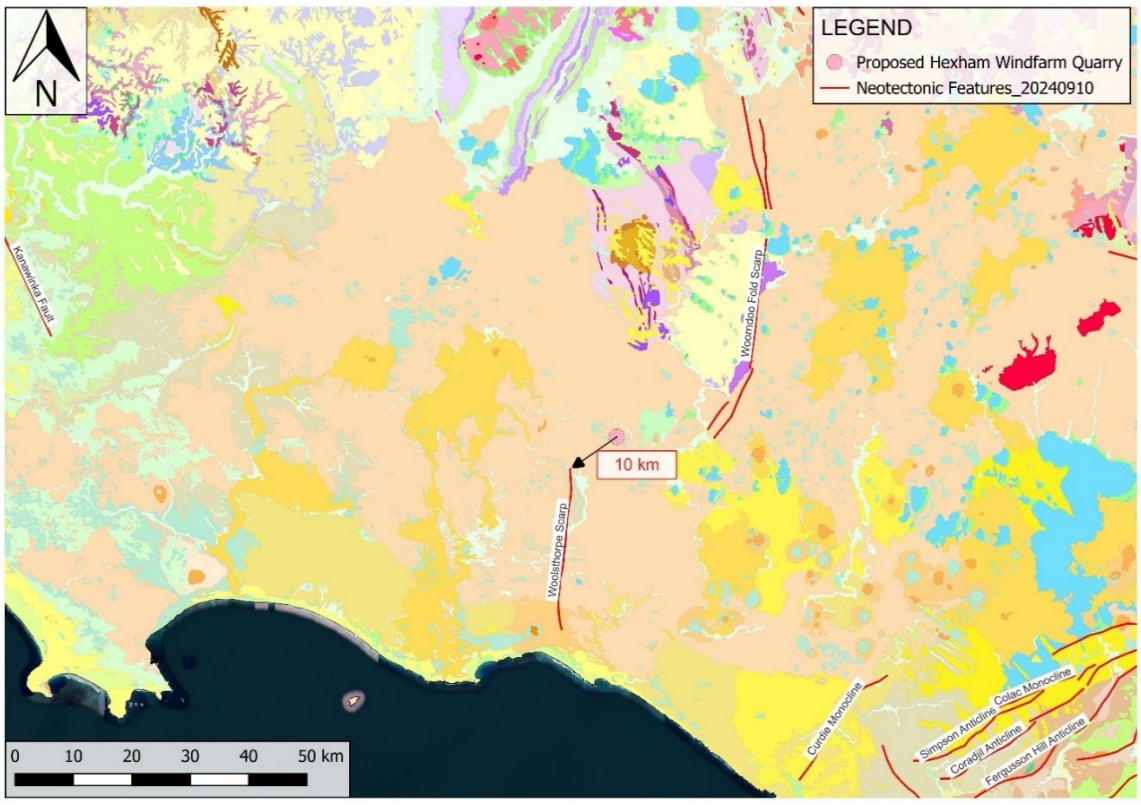

Figure 4 A geological map of the proposed Hexham Windfarm Quarry and the underlying surface geology, showing the nearby fault structures.

4.1.2. Seismology

The proposed Hexham Windfarm Quarry is located adjacent to single potential fault scarp and lies within an area classed as low to medium seismic risk in Australia by Geoscience Australia. A review of the Geoscience Australia Earthquakes@GA Database (accessed on 20/12/2024) indicates that only few earthquakes have been recorded in the vicinity of the proposed quarry site, since 1980 (Figure 5). The largest earthquake, with a magnitude of 3.1, had its epicentre near Lake Bolac, Victoria, approximately 44 km northwest of the site.

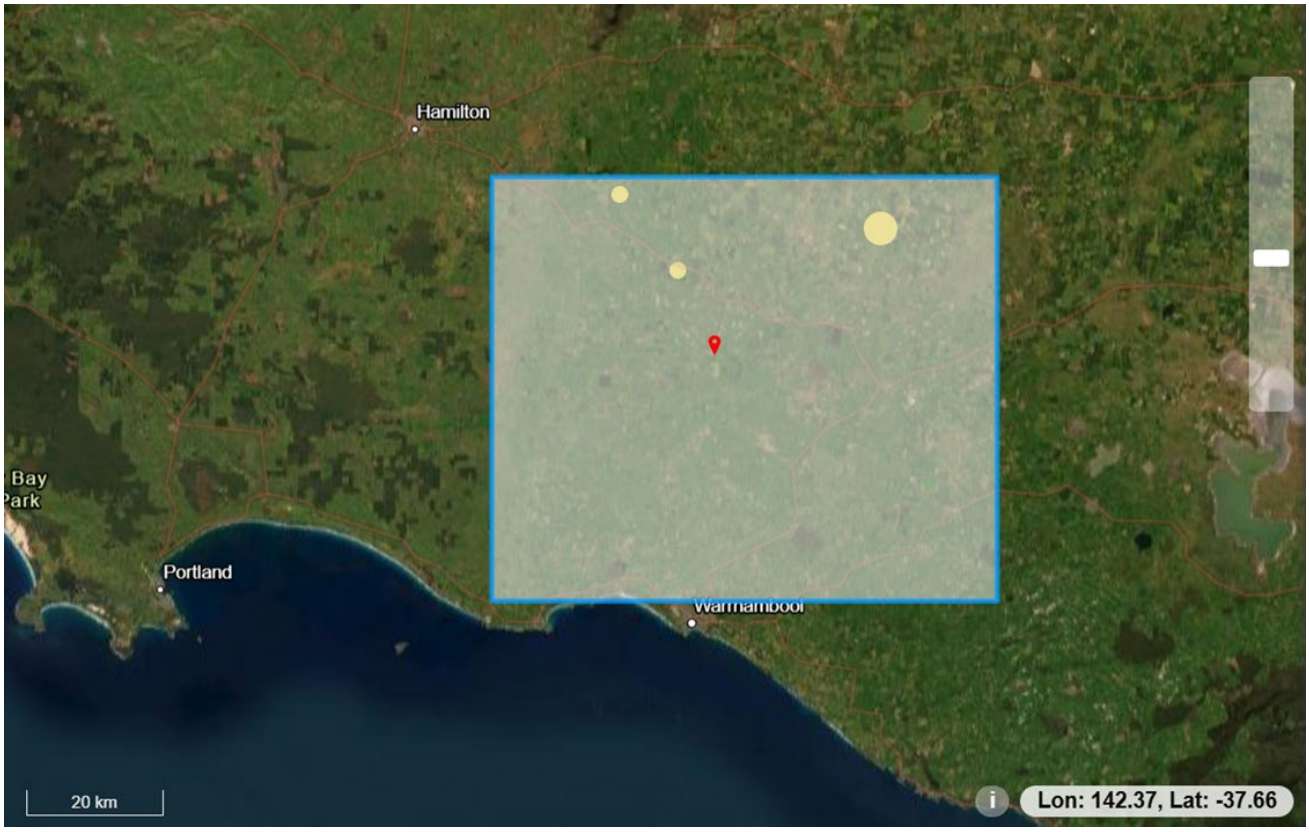

Figure 5 Location of the recorded earthquakes and their magnitudes within the vicinity of the proposed Hexham Windfarm Quarry (red) (Geoscience Australia, 2024).

4.2. Site Geology and Geomorphology

The site geology of the proposed Hexham Windfarm Quarry is based off the resource definition drilling borehole logs provided by BCA Consulting. The borehole logs indicate that the site is comprised of basalt of varying weathering grades, with a thin regolith or alluvial deposits on from the ground surface. The general weathering profile within the basalt follows a uniform grade from extremely weathered (XW) at the surface, to slightly weathered (SW) or fresh (FR) at depth (Figure 7, Table 1). In some instances, zones of increased weathering can be found (e.g. a zone of HW material within generally fresh material). The thickness and depth of each weathering grade does vary between borehole locations, and is best displayed within the cross-sections contained within Section 5.

Table 1 An example of typical sub-surface rock units and depth at borehole P23-15.

Depth from (m)	Depth to (m)	Rock Units
0	5.4	Extremely Weathered (XW) Basalt / Clay
5.4	7.2	Highly /Moderately Weathered (HW / MW) Basalt
7.2	18	Slightly Weathered / Fresh (SW / Fr) Basalt

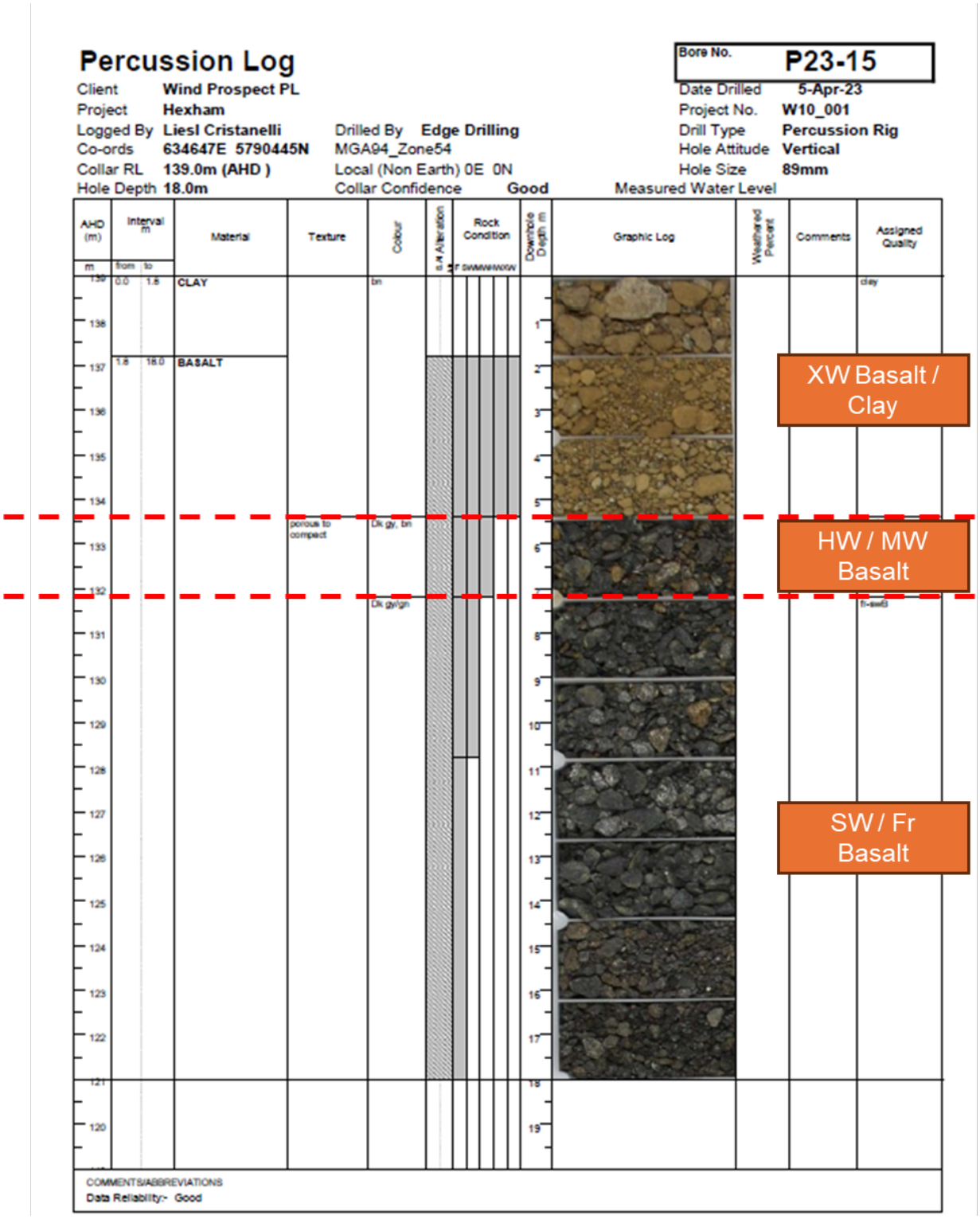

Figure 6 Borehole log depicting subsurface stratigraphy at borehole P23-15.

4.3. Surface and Groundwater Considerations

The hydrology at the proposed Hexham Windfarm Quarry consists of Hopkins River catchments, Mustons Creek, Tea Tree Creek, Station Creek, Spring Creek, and several unnamed agricultural drains. Accordingly, the management of surface water inflows will be a critical aspect during extractive operations. It is envisaged that surface water will be captured through a series of peripheral contour drains and channelled into an in-pit sump (See Figure 8).

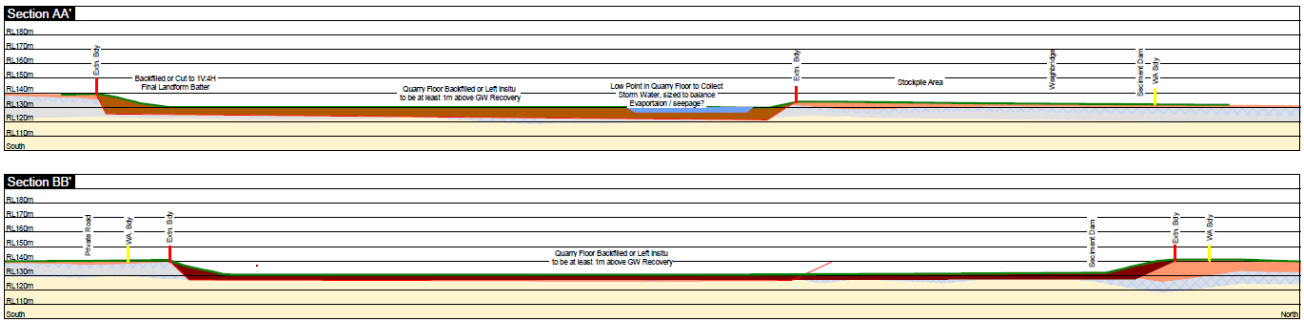

Figure 7 Schematic of cross sections AA' and BB', showing groundwater and stormwater considerations (BCA, 2024).

A search of the Visualising Victoria's Groundwater (VVG) database (FedUni, 2015) indicated variable depth to groundwater across region, ranging from 5 m to 10 m depth below natural ground (Figure 9). As a regional data, it broadly aligns with the water table measurement provided by BCA consulting in their draft version of the final landform drawing (2023), at approx. RL 130 m.

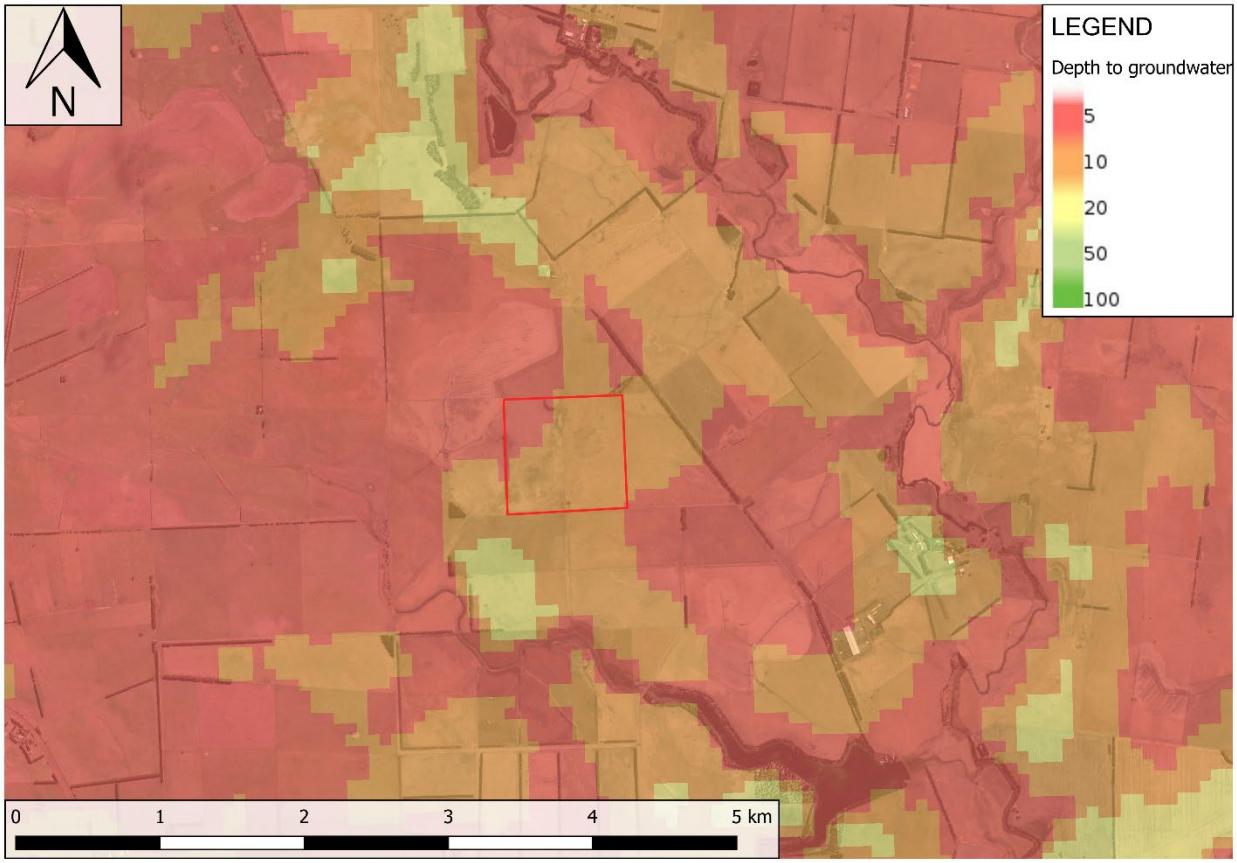

Figure 8 The hydrogeology of the proposed Hexham Quarry site and the surrounding area, showing depth to groundwater in meters (FedUni, 2019).

5. Interpretation of Geological Cross Section

The floor conditions of the proposed pit were broadly investigated and logged as part of the resource definition drilling program conducted by BCA Consulting (Figure 11). Along with the conductivity contours presented in Figure 2, borehole logs, core photos and publicly available geological data, CMQ interpreted the subsurface geological conditions, and material strength parameters, with the geological cross-sections for the proposed quarry generated using Rocscience's RSLog software.

Four geological cross sections have been interpreted, as presented in Figure 11:

- Northern Section: consists of BH P23-20, P23-19 and P23-24.
- Eastern Section: consists of BH P23-15, P23-16 and P23-07.
- Southern Section: consists of BH P23-14, P23-15 and P23-16.
- Western Section: consists of BH P23-08, P23-07 and P23-17.

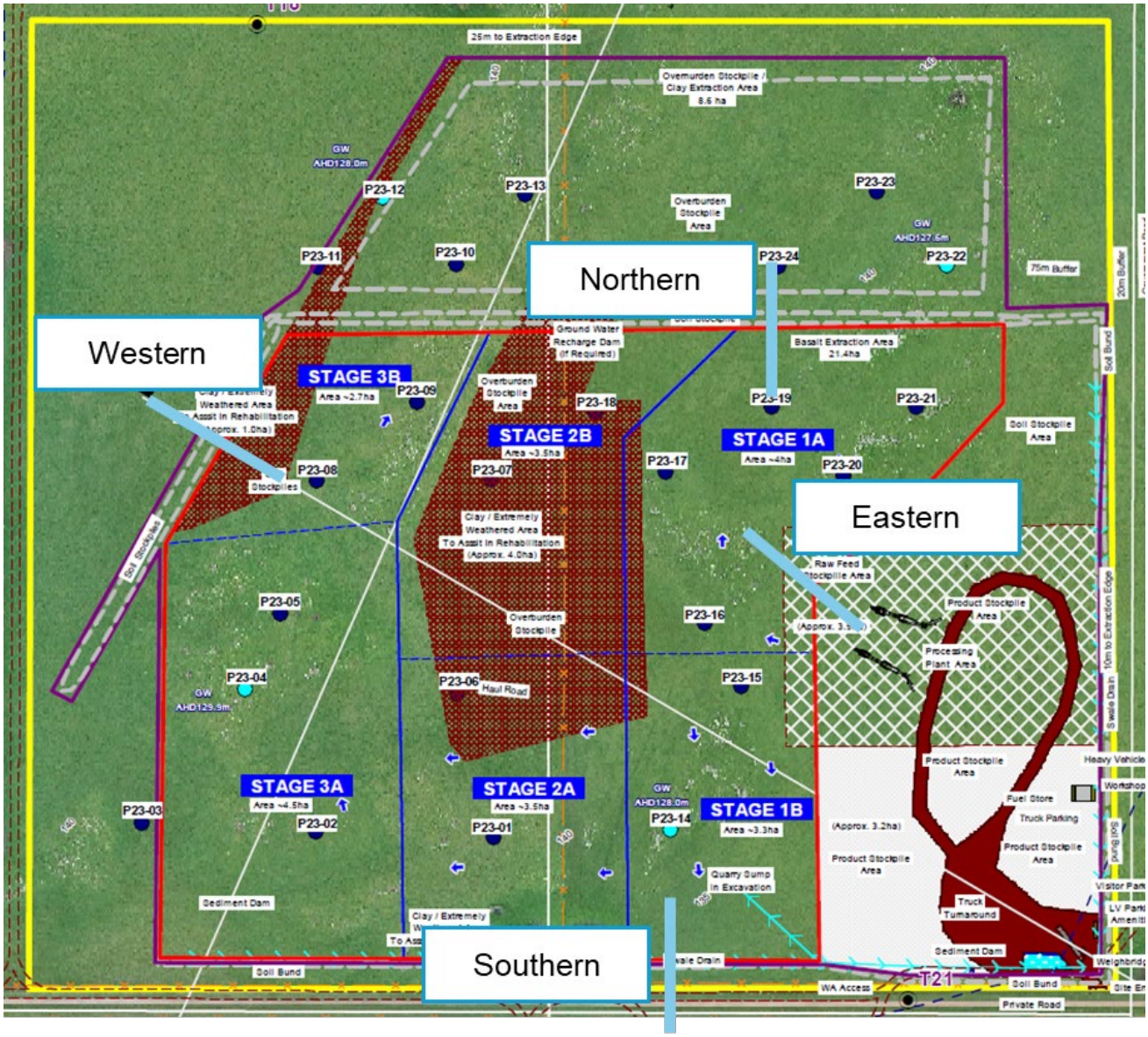

Figure 9 A diagram showing locations of four interpreted geological cross sections for each of the four quadrants (modified from BCA, 2025).

Northern Section

Figure 12 presents the inferred geological cross section in the northern quadrant, showing the following layers:

- XW Basalt / Clay: Relatively thick, with the thinnest at BH P23-20 (~5 m), and the most extensive at BH P23-24 (~9 m), increasing in thickness towards the towards the North.
- HW / MW Basalt: Thickest at BH P23 -20 (~13 m), gradually tapering towards the North.
- SW / Fr Basalt: A thick layer is inferred underneath BH P23-20, gradually thickening towards the North and becoming relatively uniform from BH P23-19 to BH P23-24 and beyond.
- Inferred Basement: Composed of sandstone.

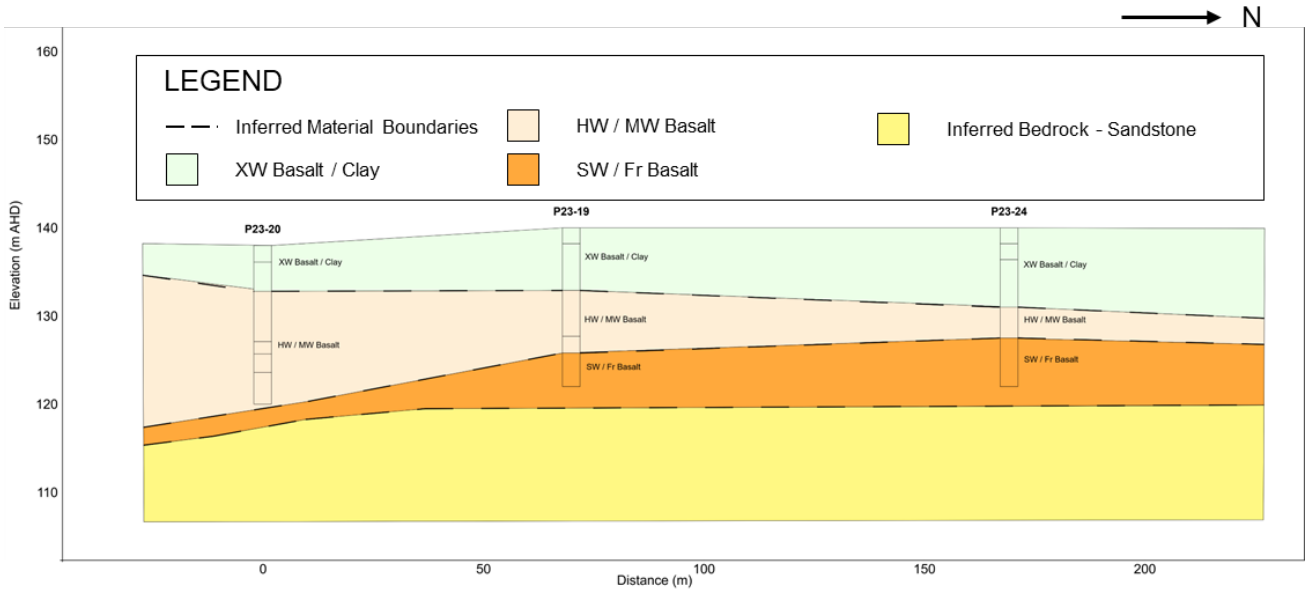

Figure 10 Inferred northern geological cross section.

Eastern Section

Figure 13 presents the inferred geological cross section in the eastern quadrant, showing the following layers:

- XW Basalt / Clay: thicknesses ranging from ~3.6 m (at BH P23-15) to ~7 m (at BH P23-07).
- HW / MW Basalt: ranging from ~2 m to over ~11 m towards the North West.
- SW / Fr Basalt: Reaching a maximum thickness of ~11 m at BH P23-15, tapering towards the North West.
- Inferred basement: Comprised of sandstone.

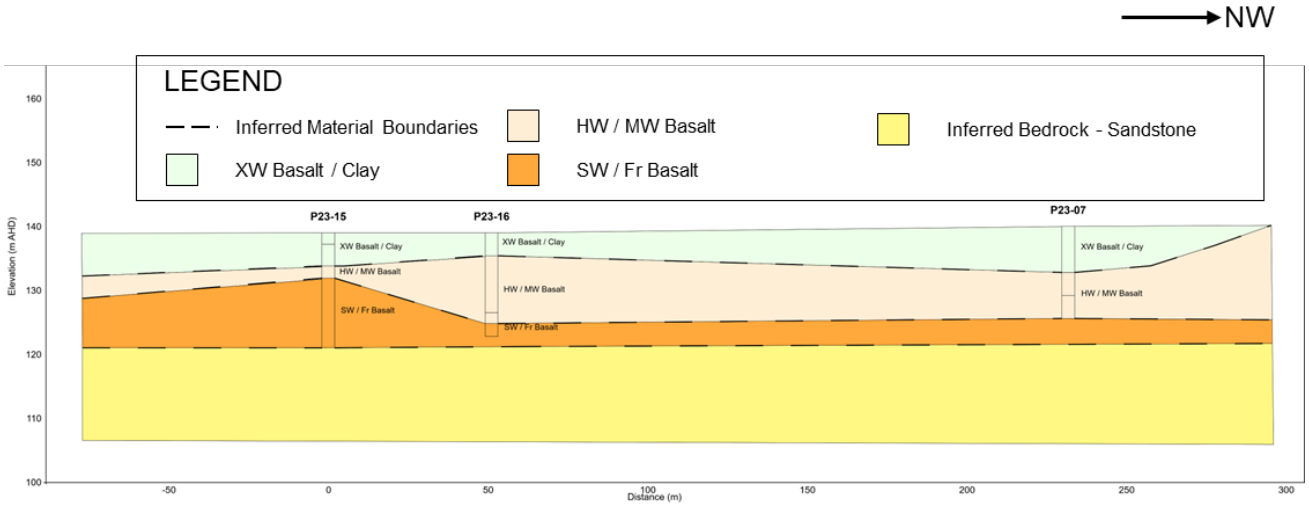

Figure 11 Inferred eastern geological cross section.

Southern Section

Figure 14 presents the inferred geological cross section in the southern quadrant, showing the following layers:

- XW Basalt / Clay: Up to ~5 m thick in thickness.
- HW / MW Basalt: ranging from ~2 m to over ~12 m in thickness.
- SW / Fr Basalt: Reaching a maximum thickness of ~11 m at BH P23-15, tapering towards the S and N.
- Inferred basement: Comprised of sandstone.

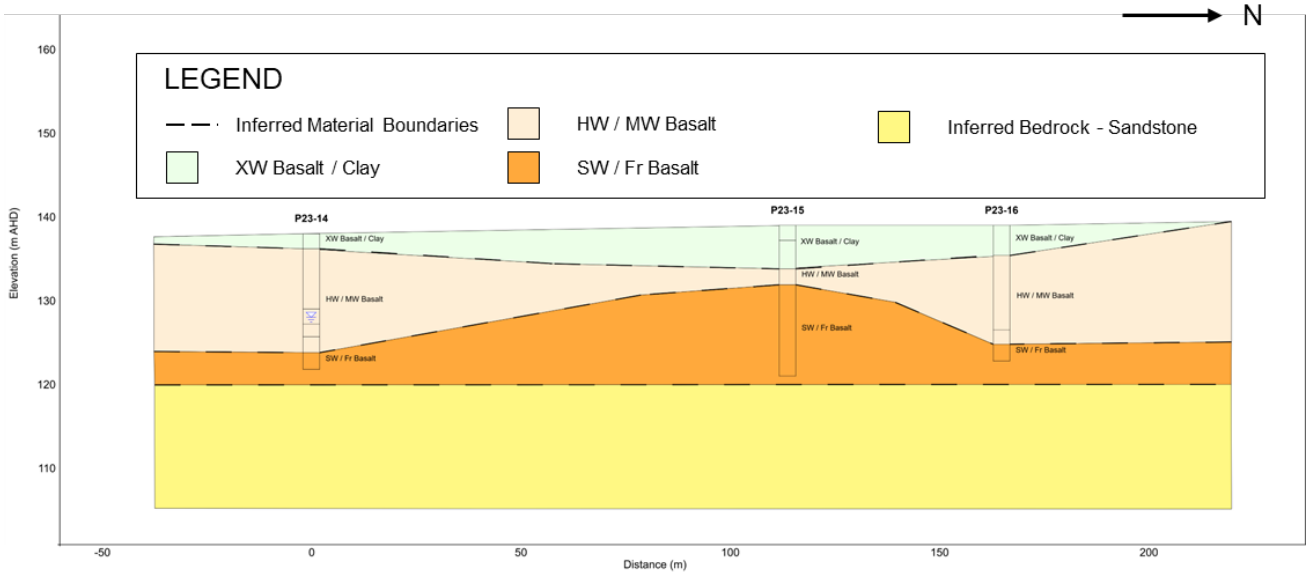

Figure 12 Inferred southern geological cross section.

Western Section

Figure 15 presents the inferred geological cross section in the western quadrant, showing the following layers:

- XW Basalt / Clay: Up to ~7 m in thickness at BH P23-07, gradually thinning towards the NW and SE.
- HW / MW Basalt: Greater than 7 m in thickness.
- SW / Fr Basalt: Reaching a maximum thickness of ~7 m at BH P23-08, gradually thinning towards SE.
- Inferred basement: Comprised of sandstone.

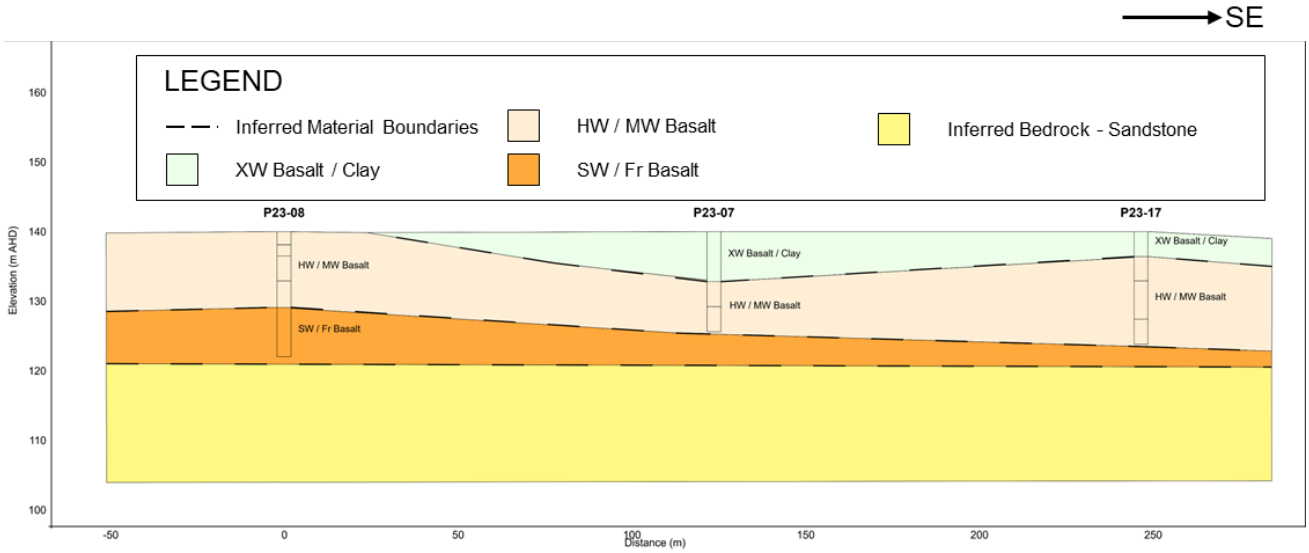

Figure 13 Inferred western geological cross section.

The **Northern geological cross section** has been identified as the critical section due to the presence of the deepest weathering profile within the extremely weathered Basalt / Clay. The preliminary geotechnical assessment (Section 6) has been carried out for this critical cross section to ensure the analysis conservatively captures the most challenging ground conditions anticipated at the proposed site.

6. Preliminary Geotechnical Assessment

6.1. Overview

Two-dimensional Limit-equilibrium stability analyses have been undertaken using Rocscience's Slide2 modelling software to determine:

- The stability performance of the proposed pit design geometry for:
    - The terminal batters: a single face with 14 m high slope, excavated with an 80˚ batter face angle.
    - The rehabilitated batters: a single face with 14 m high batter constructed using backfill to an overall slope of 1V:4H (14˚).
        - Two variations of the final landform has been put forward (BCA Consulting, 2023; BCA Consulting, 2024), with the most critical variation (featuring a pit lake) assessed as part of this CPL.

The following scenarios will be considered in the ensuring analyses:

- Expected conditions (i.e. stability models consideration the above outlined geometry without external loading)
- Sensitivity analysis
    - Pseudo static (seismic) loading analyses
    - Fully saturated conditions on the rehabilitated batters.

The outcomes of the stability analyses have been assessed against the nominated design acceptance criteria (DAC) requirements for the terminal and rehabilitation geometry outlined in the subsequent section.

6.2. Design Acceptance Criteria

6.2.1. General

The nomination of suitable acceptance criteria is a key part of the design and development of stability management protocols. This ensures quarry slopes are stable for the operational life of the quarry and through to rehabilitation. The 2020 Geotechnical Guidelines developed by the Department of Jobs, Precincts and Regions (DJPR) provide the basis to which slope stability is assessed with particular consideration of:

- Available data and its reliability
- Regulatory, stakeholder and industry acceptance criteria for the pit slopes
- Design based on conventional engineering methodologies and criteria

6.2.2. Data Uncertainty

In the context of quarry operations, data uncertainty arises from the challenges encountered when attempting to quantify the variability in properties and characteristics of the in-situ materials (rock / soil) that forms the quarry batters. The uncertainty associated with the materials that form the Hexham Windfarm quarry slopes can be broadly grouped into three categories, which are: geological uncertainty, material strength parameter uncertainty and model (geometry) uncertainty. In the context of most quarries, it is not uncommon for some level of data uncertainty to exist. Based on the proposed development and the available data, the level of geotechnical risk at the site has been evaluated as 'low'.

6.2.3. Design Acceptance Criteria

Design acceptance criteria (DAC) for the Hexham Windfarm quarry were nominated in line with accepted industry practice as outlined in DJPR's (2020) 'Geotechnical Guideline for Terminal and Rehabilitated Slopes', and published precedents, as outlined in CSIRO's 'Guidelines for Open Pit Slope Design', (eds. Read and Stacey, 2009). In nominating suitable design acceptance criteria, CMQ has utilised the Factor of Safey (FoS) criteria outlined in Table 2 of DJPR (2020) and Table 9-3 of Read & Stacey (2009).

Table 2 Factor of Safety Guidelines after DJPR (2020)

Consequence of failure	Examples	Minimum FoS
Not serious	Individual benches; small slopes (< 50 m), temporary slopes, not adjacent to haulage roads	1.3
Moderately serious	Any slope of a permanent or semi-permanent nature. Includes terminal slopes	1.6
Very serious	Medium sized (50-100 m) and high slopes (< 150 m) carrying major haulage roads or underlying permanent mine installations. Includes rehabilitation slopes	2.0

Distilling the above in specific relation to the proposed Hexham Windfarm pit design, Factor of Safety (FoS) criteria were nominated for the assessment in line with the instability scales assessed, as follows:

- Global scale instabilities:
  - Terminal batters – **FoS > 1.6**
  - Rehabilitation batters – **FoS > 2.0**

In addition to the above, DAC for short-term events were nominated as follows:

- Pseudo static (seismic) – **FoS > 1.1**
- Fully saturated conditions – **FoS > 1.1**

6.3. Slope Stability Analysis

6.3.1. Nominated Stability Section

The analysed geometry of terminal and rehabilitation design for the critical section, Northern batter, is depicted in Figure 16 and Figure 17 respectively.

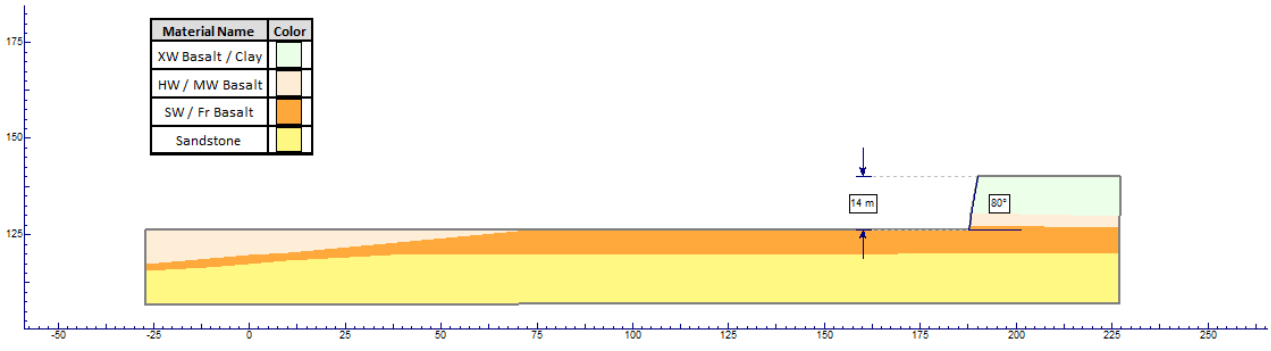

Figure 14 Schematic of terminal batter geometry: Northern Batter.

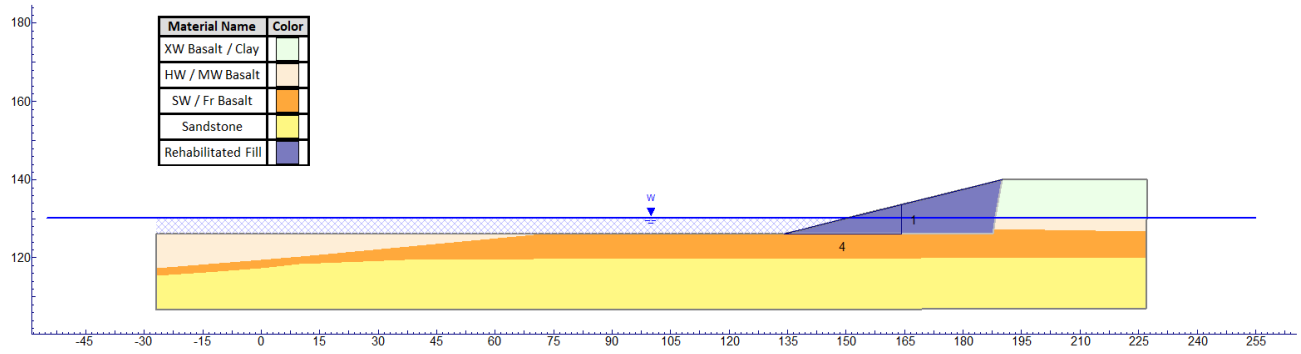

Figure 15 Schematic of rehabilitation batter geometry: Northern Batter.

6.3.2. Anticipated Failure Mechanisms

Non-Circular Failure Mechanisms

Based on the subsurface materials likely to be encountered at the site, CMQ considers that the primary slope instability mechanism is non-circular failure. The non-circular mechanism typically occurs in rock (e.g., basalt encountered at the proposed quarry) as a rock mass failure (see Figure 18) and is dependent upon the shear strength characteristics of the basalt materials, the slope angle of the cut face and the groundwater conditions within the weathered and fresh basalt.

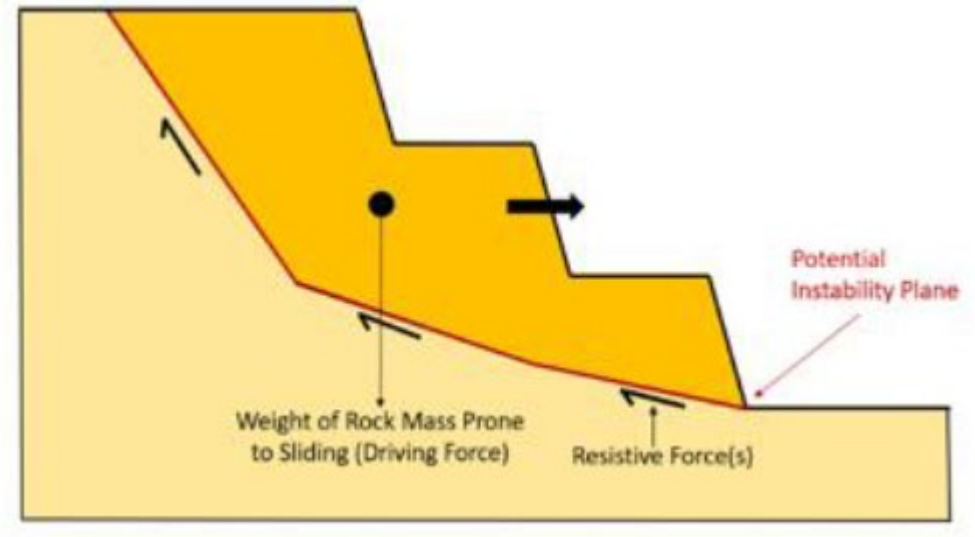

Figure 16 Schematic of a non-circular failure surface.

Circular Failure Mechanisms

The secondary failure mechanism identified for the quarry is circular failure, which typically occurs in poorly consolidated or unconsolidated materials, such as the backfill used in the rehabilitation design. This mechanism may also impact the stability of waste and product stockpiles. Circular failure is controlled by the shear strength parameters of the soil materials, slope angle, and phreatic conditions.

6.3.3. Material parameters

In absence of site-specific material strengths, the material parameters adopted for this assessment are based on geotechnical rock mass characterisation interpretations made based on the information (i.e. bore logs) provided by the client, relevant literature (Srithar, 2014) and CMQ's past experience on similar materials. It should be suggested for more testing to obtain site specific data. The interpretations have been undertaken using Rocscience's RSData to classify each material strength properties based on assumed material strength and proposed excavation methodology. Table 3 summarises the material parameters adopted for the slope stability analyses. A sandstone layer was incorporated into the model to represent the inferred stratigraphy

beneath the maximum drilled borehole depth (i.e. 18 m). It should be noted that the stability calculations depict the results of the effective stress analyses.

Table 3 Estimated material parameters for the Hexham windfarm quarry.

Shear strength curve (criterion) parameters					
Mohr-Coulomb Criterion					
Unit	Unit Weight (kN/m^3)	Cohesion (kPa)	Friction Angle (°)		
XW Basalt / Clay	18	8	28		
Rehabilitated Fill	17	5	26.5		
Generalised Hoek-Brown Criterion					
Unit	Unit Weight (kN/m^3)	UCS (MPa)	GSI	Mi	D
HW / MW Basalt	20	35	35	20	0.7
SW / Fr Basalt	28	200	70	25	0.7

6.4. Slope Stability Analysis Results

6.4.1. Base Case

The results of the global slope stability analyses for the base case scenarios are outlined in Table 4, with corresponding stability model outputs presented in Figure 19 and Figure 20.

Table 4 Summary of global stability analyses results – base case.

Section	DAC	Modelled FoS	Figure No.
Northern Batter	FoS>1.6	1.66	Figure 19
	FoS>2.0	2.11	Figure 20

The results of base case global stability analyses indicate:

- The stability performance of the critical section exceeded both the terminal DAC (FoS>1.6) and rehabilitation DAC (FoS > 2.0) at the overall slope scale.

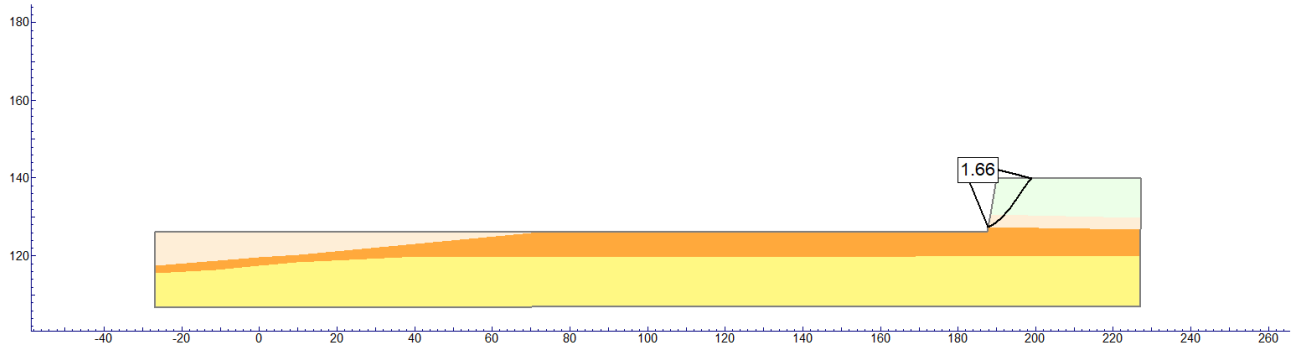

Figure 17 Stability model output - base case - terminal batter – Northern Batter.

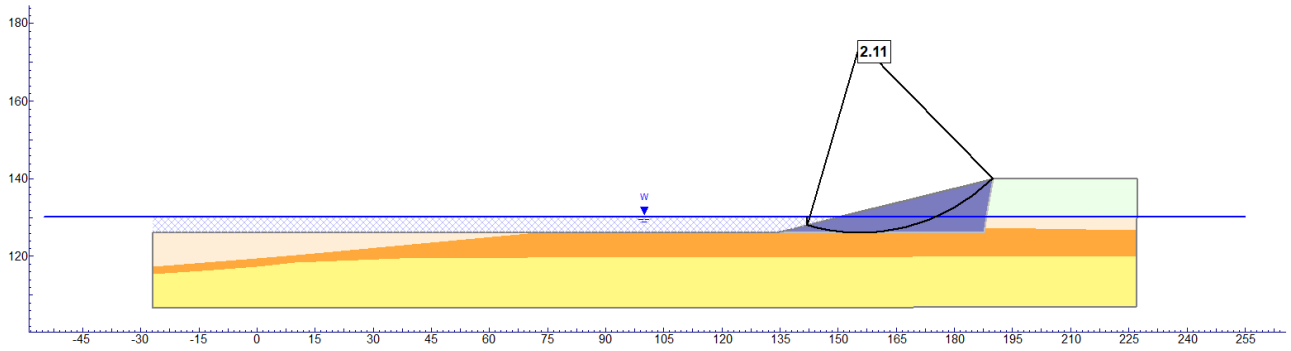

Figure 18 Stability model output - base case - rehabilitation batter – Northern Batter.

6.4.2. Seismicity

Sensitivity analyses were performed to assess the potential slope stability implication associated with a 1:500-year and 1:2500-year return event. A pseudo-static analysis approach was adopted in line with methodology derived by Hynes-Griffin and Franklin (1984), referred to as the United States Army Corps of Engineers (USACE) method, which assumes:

- Earthquakes can be modelled as a static force acting on the failed mass.
- No dynamic pore water pressures are generated.
- Materials show no significant loss of strength induced by cyclic loading.

When undertaking a pseudo-seismic analyses, Hynes-Griffin and Franklin (1984) recommend using a seismic coefficient equal to half the peak ground acceleration (PGA). According to Geoscience Australia's National Seismic Hazard Assessment 2024 (Allen et al., 2023), Figure 21 and Figure 22 below shows the peak ground acceleration with a 10% and 2% chance of exceedance in 50 years, respectively. Therefore, the PGA value for the 1:500-year and the 1:2500-year return event were 0.02-0.03 g and 0.06-0.08 g, respectively.

Table 5 Summary of seismic input parameters.

Return Interval	Peak Ground Acceleration (g)	Seismic Coefficient – H_Z
1:500	0.025	0.0125
1:2500	0.07	0.035

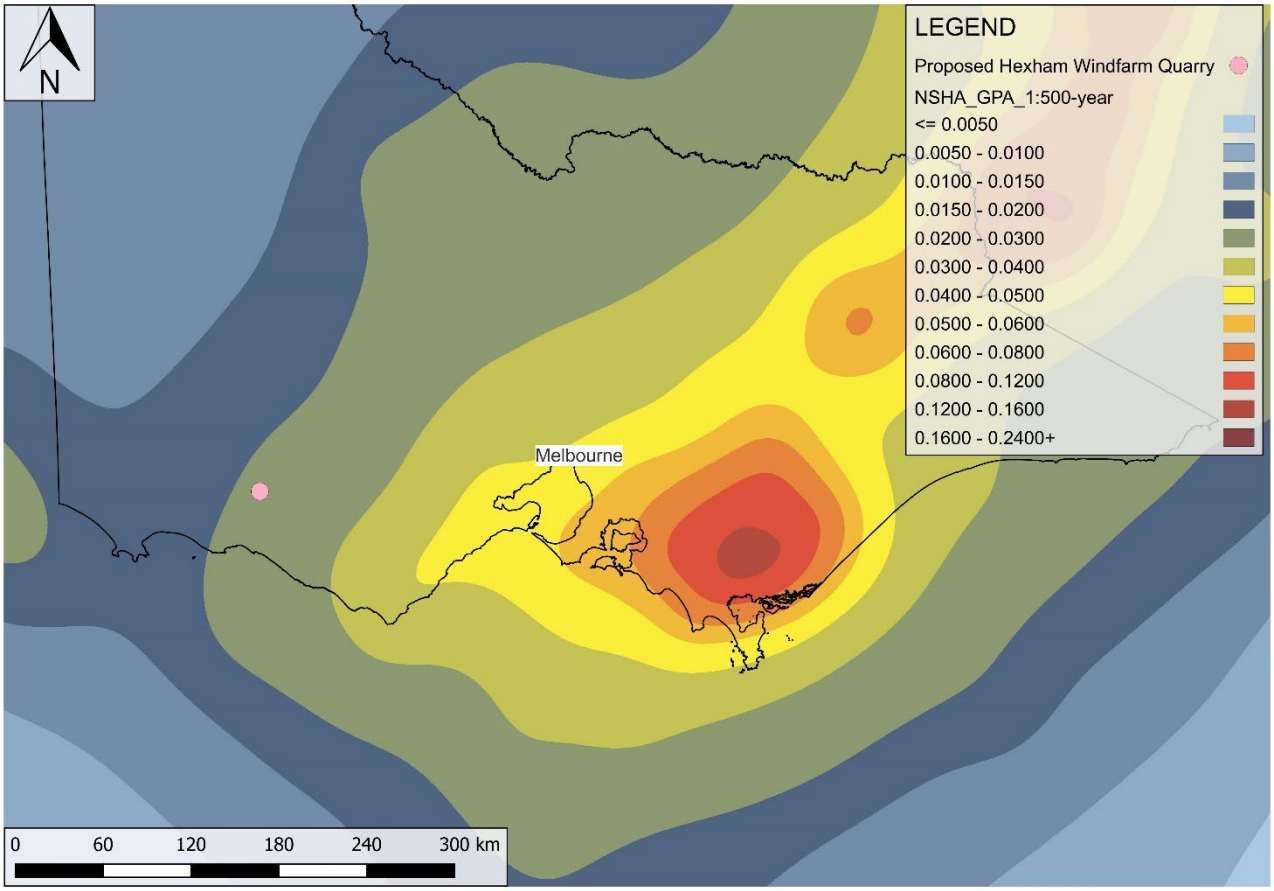

Figure 19 Location of the proposed quarry site on NSHA23 peak ground acceleration with a 10% chance of exceedance in 50 years overlay (Allen et al., 2024).

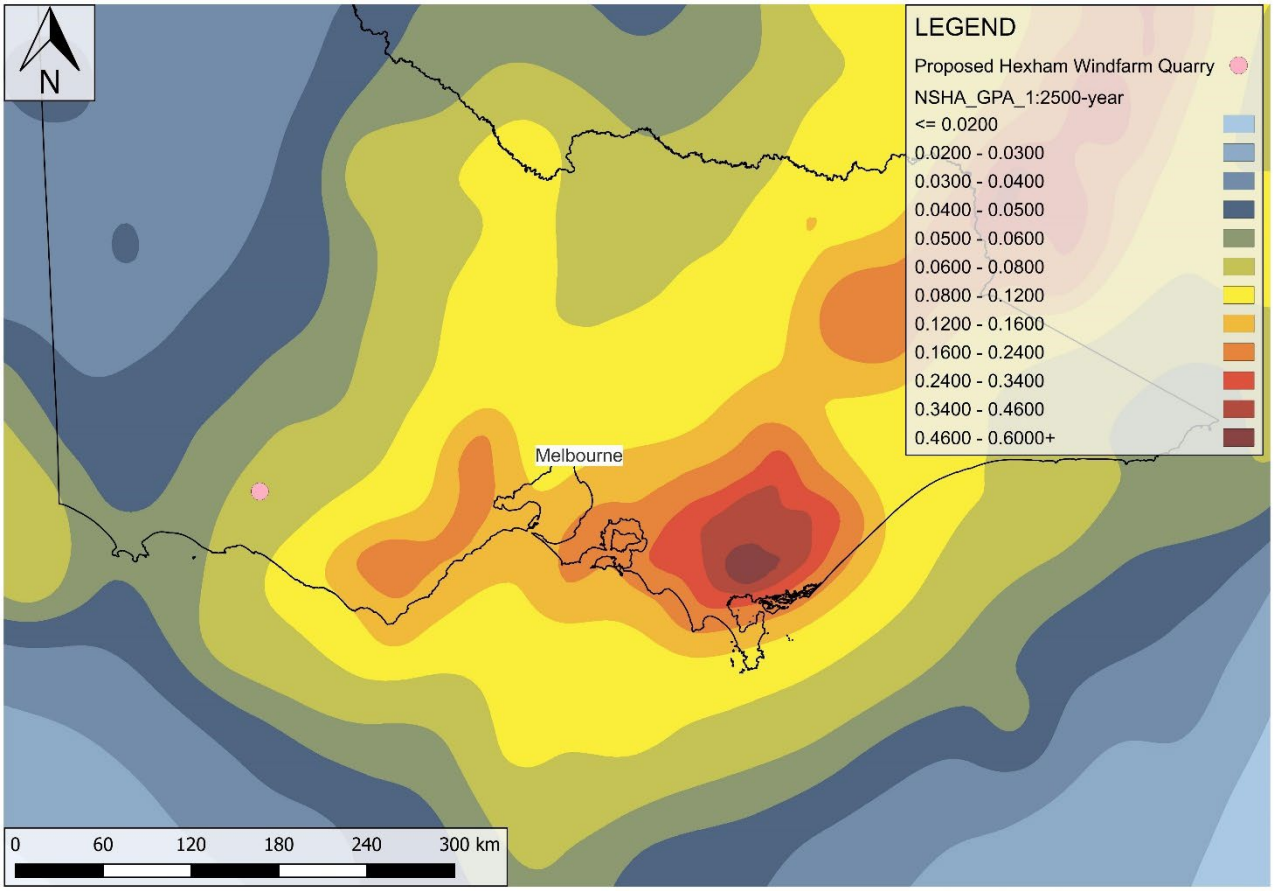

Figure 20 Location of the proposed quarry site on NSHA23 peak ground acceleration with a 2% chance of exceedance in 50 years overlay (Allen et al., 2024).

Table 6 summarises the results of the seismic loading sensitivity analyses with corresponding stability model outputs presented in Figure 23 and Figure 24.

Table 6 Summary of global stability analyses results – seismic loading.

Section	Return Interval	DAC	Modelled FoS	Figure No.
Northern Batter	1:500	FoS > 1.1	1.24	Figure 23
	1:2500		1.16	Figure 24

The results of seismic loading sensitivity analyses indicate:

- The stability performance of the critical section exceeded the requisite seismic DAC (FoS > 1.1) for both a 1:500-year and 1:2500-year return events.

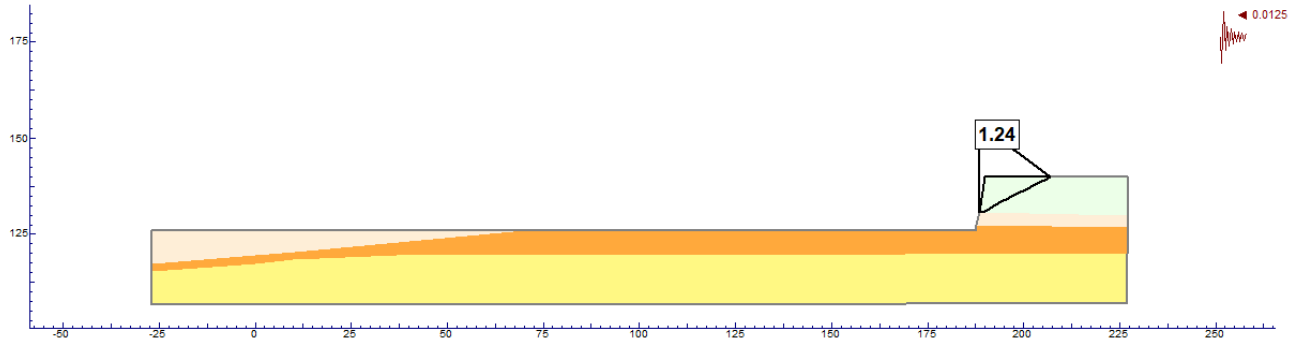

Figure 21 Stability model output – seismic analyses – 1:500-year - terminal batter – Northern Batter.

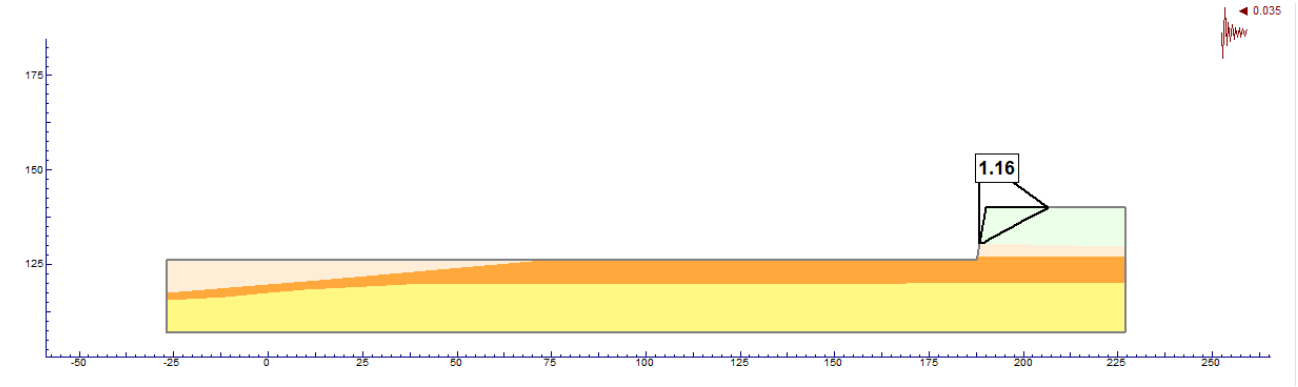

Figure 22 Stability model output – seismic analyses – 1:2500-year - terminal batter – Northern Batter.

6.4.3. Fully Saturated Conditions

Sensitivity analyses were performed to assess the potential slope stability implication associated with fully saturated batter conditions. Such conditions may reflect potential deficiencies in surface and groundwater management protocols during intense and / or prolonged rainfall events. However, it should be noted that fully saturated conditions are highly pessimistic and representative of a 'worst case' scenario. Table 17 summarises the results of the fully saturated sensitivity analyses with corresponding stability model outputs presented in Figure 25.

Table 7 Summary of global stability analyses results – seismic loading.

Section	DAC	Modelled FoS	Figure No.
Northern Batter	FoS > 1.1	1.23	Figure 25

The results of fully saturated sensitivity analyses indicate:

- The stability performance of the rehabilitation design of the critical section exceeded the requisite fully saturated DAC (FoS > 1.1).

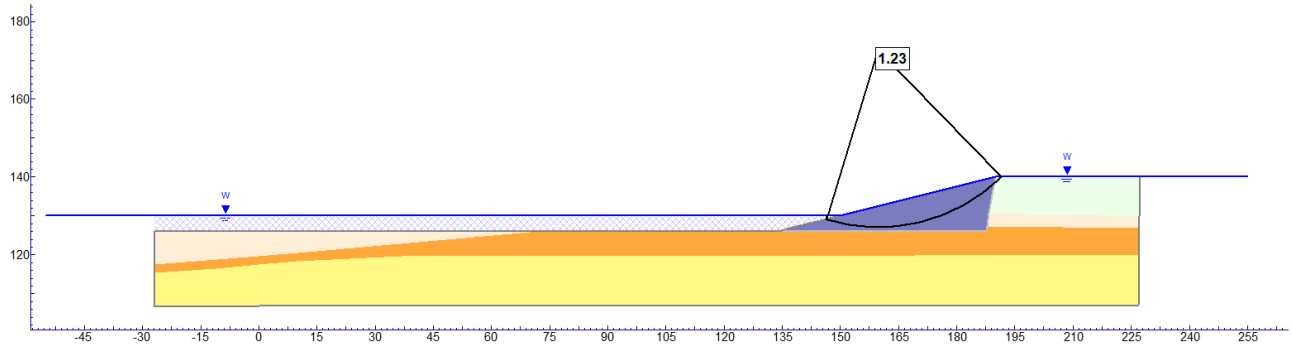

Figure 23 Stability model output – fully saturated conditions - rehabilitation batter – Northern Batter.

7. Rehabilitation Considerations

The following rehabilitation plan is proposed for the Hexham Windfarm Temporary Quarry:

- Two variations of the terminal crest treatment has been put forward (BCA Consulting, 2023; BCA Consulting, 2024), the former featuring a pit lake (at RL ~128-130 m AHD), and the latter featuring backfill to above the groundwater table.
- The terminal batters will be re-profiled using overburden and quarry waste material to a uniform 1V:4H slope. The slope will be topsoiled to 14 meters below the ground surface (approximately RL + 128 m)
- A stock proof fence will be established to an un-named private road on the southern boundary and along the access track to the waterbody.
- All plant, equipment, sheds, tanks, buildings and any other assets will be removed from the site.
- The swale drain and safety bund with a minimum height of 1.0 m constructed during the operational phase of quarrying will be removed and graded into the transitional zone to the batter, then a stock proof fence erected at the crest. Although none are currently planned nor required, any screening vegetation areas created for the operational stage may be retained post-closure as windbreaks for animal husbandry activities

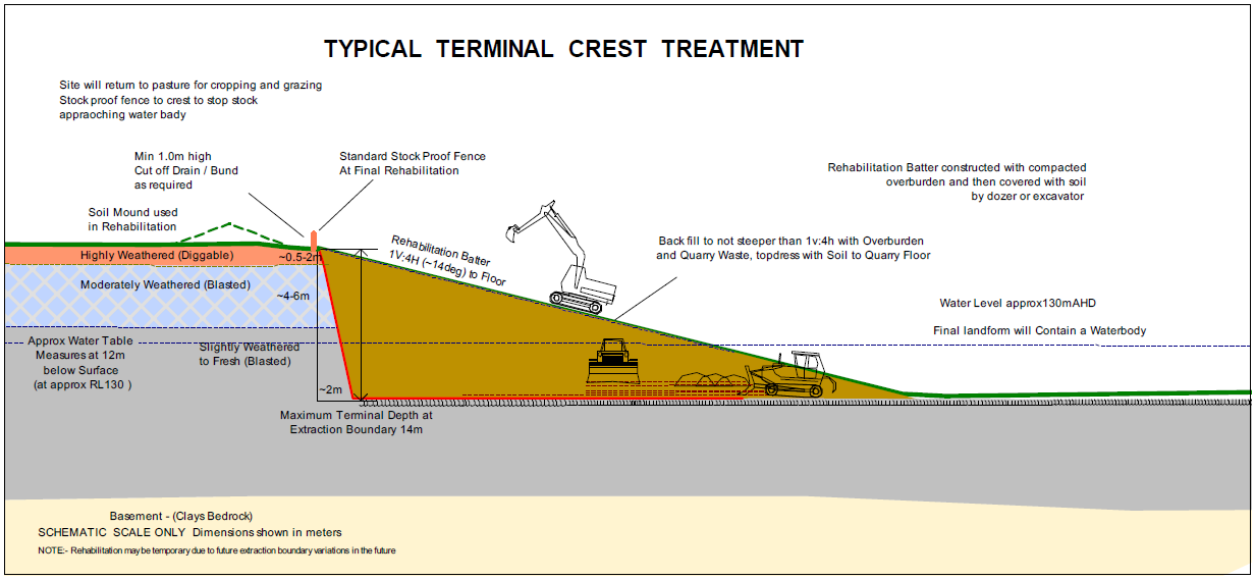

Figure 24 Terminal batter rehabilitation plan option featuring a pit lake (BCA, 2023).

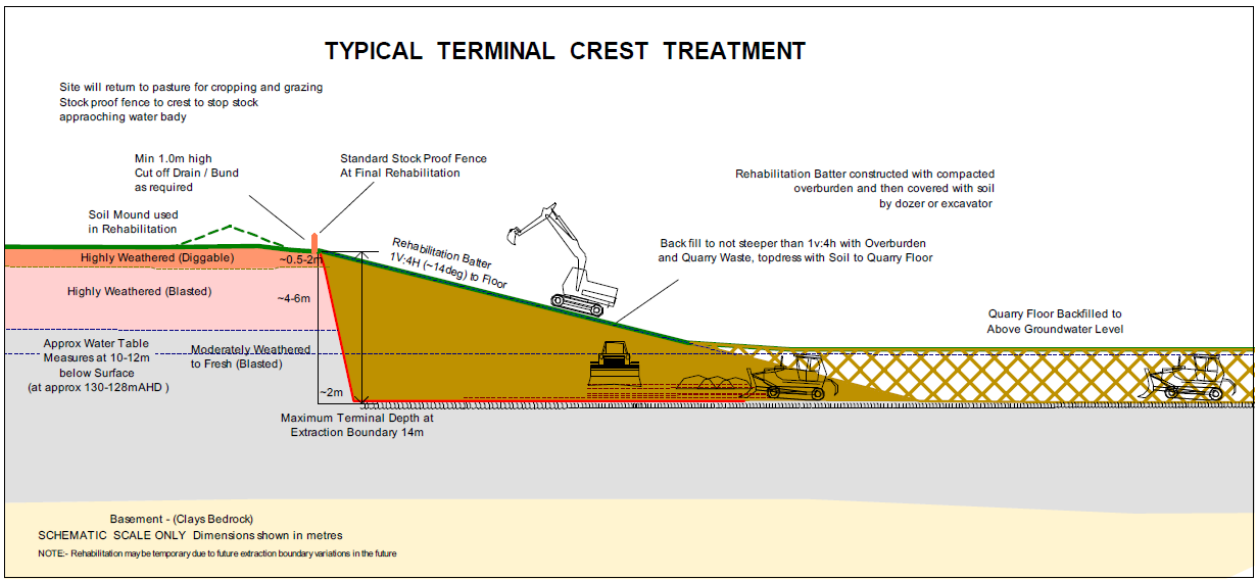

Figure 25 Terminal batter rehabilitation plan featuring backfill on the pit floor to above the groundwater table (BCA, 2024).

Erosion Management

Erosion is a key concern in the rehabilitation design, due to the presence of the final water level at AHD 130 m. It is therefore important to ensure that revegetate the slope as soon as possible to minimise long term erosion. Additionally, some localised rip rap / beaching rock may need to be placed along the shoreline of the pit lake.

Placement of Rehabilitation Fill

To ensure that the placed rehabilitation fill remains stable it is proposed that it is placed in uniform horizontal layers and shaped and compacted to minimise damage resulting from any overnight wet weather (significant rain event).

The proposed fill compaction lift heights and compaction requirements are summarised below:

- Maximum Lift Height: 1.0 m following compaction.
- Minimum compaction - 4 blows with the DCP per 100 mm of the 1.0 m lift.

To ensure adequate compaction at the edge of the slope, the construction workforce shall over-place and trim material at these edges to achieve the specified compaction requirements, including at the rehabilitated backfill edge.

8. Conclusions and Recommendations

The following conclusions are made based on the outcomes of the desktop study and preliminary slope stability analyses performed for both the terminal and rehabilitation batter geometry:

- Stability calculations were performed on critical instability mechanisms (i.e. non-circular rock mass failure and circular failure on the rehabilitation (fill batters)). In both cases, the resultant factors of safety exceeded the minimum design acceptance criteria.
- Sensitivity analyses were performed for scenarios incorporating seismic loading and fully saturated conditions. In both bases the design acceptance criteria was met.
- Localised batter instabilities may still manifest in the extremely weathered clay which will need to be closely monitored during development
- There is no evidence of structurally significant folding, shearing or fault displacement in the site area and whilst large scale instabilities are not expected, the excavated batter faces should be closely monitored and mapped during development.

The following recommendations are made:

- Ensure that the overall terminal batter geometry is constructed no steeper than the proposed geometry.
- Any flood levees and flood water (where present) should be kept at a safe distance from batter crest.
- Measures should be taken post closure to stabilise rehabilitated faces and manage surface water flows (to prevent or minimise the impact of erosion).
- Visual monitoring of the working batters, terminal and rehabilitated slopes should be at a maximum four-week interval and continue for at least six months following closure.
- If any visual signs of cracking, slumping, adverse groundwater conditions etc. manifest, a geotechnical engineer should be contacted in order to implement the necessary controls (where required).
- The client should develop specific safe operating procedures (SOP’s) so as to ensure slope stability is maintained during quarrying.
- The client should undertake a geotechnical assessment and erosion assessment of the proposed rehabilitation plan to ensure that the proposed end land use is safe, sustainable and stable.
- Management of surface water and groundwater is a key component of geotechnical risk management, as excess build-up of pore water pressures as a result of uncontrolled / excessive surface water ingress can trigger instability in otherwise stable batters. Where changes in ground and groundwater conditions are encountered, a geotechnical engineer should be contacted.
- A high-level overview of the Trigger Action Response Plan (TARP), detailing the actions to be monitored throughout the entire operation, is provided in Appendix A.

9. Determination

I, Sanjive Narendranathan of CMQ, as a Competent Person for the purpose of geotechnical assessments, consider that the risk of instability of terminal and rehabilitated slopes at the Site project is “Low”, as defined by the ERR risk rating matrix. The proposed excavation is therefore deemed “simple”, as defined by the Victorian Geotechnical Guideline for Extractive Industries.

Regards

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Appendix A Trigger Action Response Plan

Alert	Green	Yellow	Orange	Red
Condition of quarry slopes.	Potential for actual fretting, erosion, minor cracks, seepage or displacement (< 25 m^3 in volume).	Potential or actual fretting / erosion of batter face involving ≥ 25 m^3 volume (and < 100 m^3) Ground movement / displacement with cracks dilated > 5 mm and over 10 m length. Cracks dilated ≤ 20 mm and up to 20 m length. Pooled water ≤ 25 m^2 area.	Potential or actual fretting / erosion of batter face involving ≥ 25 m^3 volume (and < 100 m^3) Ground movement / displacement with cracks dilated > 20 mm and over 10 m length. Cracks dilated ≤ 40 mm and up to 20 m length. Pooled water > 25 m^2 area.	Potential or actual fretting / erosion of batter face involving ≥ 100 m^3 volume Ground movement / displacement with cracks dilated > 50 mm and over 10 m length. Uncontrolled water flow.
Person Responsible	**Responses**			
Quarry Manager	Monitor production activities.	Monitor situation as required.	Contact geotechnical consultant and notify personnel of orange alarm level.	Contact Emergency Response Committee, geotechnical consultant and notify personnel of red alarm level.
			Prepare to evacuate pit. Monitor situation as required.	Evacuate pit, agree on recovery plan, notify corporate, quarry inspectors, emergency services and monitor situation as required
		Monitor production activities. Communicate with quarry geotechnical consultant.	Liaise with shift supervisor, assess situation and inspect as required. Communicate with geotechnical consultant. Notify stakeholders as required.	Inspect area from outside the failure zone and report to quarry manager. Implement recovery plan once formulated (risk assessment required).
Shift / Production Supervisor	Report with daily production plan. Routine mapping and monitoring.	Monitor slope conditions throughout shift. Report any noticeable change in conditions to the quarry geotechnical engineer. Report any change of conditions or change in TARP level to the next shift.	Communicate with workforce that an orange level has been reached. Closely monitor slope conditions throughout shift. Report any noticeable change in conditions to the quarry manager. Report any change of conditions or change in TARP level to the next shift. Engage with a geotechnical consultant, as required.	Communicate with workforce that a red level has been reached and withdraw personnel and equipment to a safe location. Secure to prevent entry. Inspect area from outside the failure zone and report to superintendent and quarry manager immediately. Implement recovery plan once formulated (risk assessment required).
		Assess area. Determine frequency of inspections, monitoring and remedial work. Notify management of any change. Communicate with quarry workers the location, nature and expected conditions associated with the failure.	Evaluate the monitoring data and provide recommendation for TARP level advance. Assess area. Determine frequency of inspections, increased monitoring and remedial work. Notify management of any change.	Inspect, investigate and formulate recovery plan (formal risk assessment required). Report findings to quarry management
Quarry worker	Report with daily production plan	Become familiar with location and potential change in pit slope condition during shift. Report any significant change in conditions to shift supervisor. Report with daily production plan.	Elevate level of awareness and monitor pit slope conditions during shift and provide feedback on pit slope conditions.	Comply with emergency evacuation procedures and withdraw to a safe location

Procedure	Areas	Frequency	Activities	Personnel	Reporting and actions
Daily inspections	All current active mining areas, high- risk areas	Daily	Visual checks for cracking, dilation and scaling requirements	Production Supervisor	Wall inspection book / daily production reports, discussed at daily meeting, and quarry manager (if necessary). Batter and berm inspection forms to be filled and signed off at daily production meeting as required.
Periodic visual inspections of pit perimeter and berms	Pit perimeter and all accessible berms	Weekly to fortnightly and after heavy rainfall	Visual checks for tension cracking, other signs of slope movement	Production Supervisor	Walk over inspection form, slopes and design geometry overlay to pit plan, cracks to be painted and surveyed, advice quarry manager, issue hazard alert as appropriate at production meetings. Refer to Appendix A for inspection form example after CMPA (2016).
Slope Performance Audit	All portions of walls	Ongoing over pit life	6 monthly	Geotechnical Consultant	Geotechnical consultants audit report.
Slope failure records (hazard alert and incident reports)	Any portion of walls where a slope failure has occurred in the working area	As required	Complete hazard alert and incident report for the soil failure event	Quarry Manager	Management and senior mine operations personnel and regulatory agencies.

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HEXHAM WIND FARM PTY LTD

BLAST IMPACT ASSESSMENT FOR HEXHAM WIND FARM TEMPORARY QUARRY

September 2025

HEXHAM WIND FARM PTY. LTD.

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BLASTING TERMS AND ABBREVIATIONS

Airblast (Overpressure)	A sub-audible, low frequency (1-20 Hz) change of air pressure that radiates from blast sites, reducing at approximately 9 dBL with distance doubling, measured as Decibels Linear.
Blast Vibration	The combined effects of ground vibration and airblast.
dBL	Decibels Linear Peak (unweighted), being the standard measure of airblast overpressure.
Flyrock	Excessive throw of rock fragments from blasting.
Front Row Burden	The distance between a front row blast hole and the surface of a blast face.
Ground Vibration	Elastic waves that radiate from a blast site through the ground, reducing with distance as logarithmic decay
Inter-row Burden	The separation distance between blast hole rows (perpendicular to the face)
MIC (Maximum Instantaneous Charge)	The maximum mass of explosives that detonates at an instant of time (i.e. 'charge mass/delay' or 'charge mass/hole').
Newer Volcanics	A geological region extending west of Melbourne to the South Australian border, characterised by near-surface basalt flows from volcanic activity.
Powder Factor	Mass of explosives (kg) required to fragment $1m^3$ of rock.
PPD (Peak Particle Displacement)	The peak, non-permanent displacement of a surface particle from the passing of elastic ground vibration waves.
PPV (Peak Particle Velocity)	The peak velocity a surface particle reaches from passing ground vibration waves, measured in terms of millimetres per second (mm/s), i.e. "ground vibration".
Spacing	The separation distance between blast holes along a blast row (parallel to the face).
Stemming	Stone aggregate material used to provide confinement above an explosives column.

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HEXHAM WIND FARM PTY. LTD.

BLAST IMPACT ASSESSMENT FOR HEXHAM WIND FARM TEMPORARY QUARRY

1 INTRODUCTION

Terrock Consulting Engineers was engaged by Hexham Wind Farm Pty. Ltd. to assess the environmental impacts of blasting at a proposed hard rock quarry at Caramut, Victoria. The quarry would be located on a host property within the proposed Hexham Wind Farm (HWF) and provide an onsite source of aggregate and road base material needed for wind farm construction.

The proposed quarry overlies Newer Volcanics basalt that can be extracted by conventional drill and blast techniques and processed onsite. The proposal is for a temporary operation with an anticipated production phase of 2-3 years. Many wind farms in Australia and overseas have onsite quarries to provide construction and maintenance materials and the land uses are compatible. Regional examples include the Stockyard Hill Wind Farm, Ararat Wind Farm and Golden Plains Wind Farm.

Approval of the quarry is not directly related to Hexham Wind Farm approvals and is undertaken as a standalone process under the *Mineral Resources (Sustainable Development) (Extractive Industries) Regulations 2019* and broader regulatory framework for extractive industries in Victoria. However, the impacts of blasting at the proposed quarry are to be considered as part of the Environmental Effects Statement required for regulatory approval of the wind farm.

The primary blasting risks, effects and impacts assessed in this report are:

- Blast vibration (ground vibration and airblast overpressure)
- The throw of rock fragments from blast sites including the risk of flyrock.
- Effect of blasting on local amenity
- Impact to native fauna and domestic animals
- Risks to wind farm infrastructure.

The topics of geotechnical risk, air quality and audible noise from whole quarry operations (including blasting) are largely outside the writers' experience and may be addressed by qualified consultants in these fields.

2 QUARRY LOCATION AND SURROUNDS

The proposed quarry site is addressed at Barwidgee Road within the Shire of Moyne, approximately 6.5 km south of the township of Caramut and 14 km west of Mortlake. The proposed Work Authority is wholly within privately-owned property on lease to the proponent.

Quarry operations would be undertaken within a 52.3 hectare Work Authority (yet to be designated) including a 21.5 hectare extraction area wherein blasting would occur. Development plans produced by BCA Consulting show a minimum buffer of 20m between the north and south extraction limit and Work Authority boundary, and wider minimum buffers of 75m are shown east and west. The minimum separation between the extraction limit (i.e. the limit of blasting) and closest neighbouring property outside the quarry's title is the Schwartz property located 128m north of the proposed work authority boundary and 350m from the extraction area.

The surrounding area consists of broadacre farmland primarily used for livestock grazing. Access to the quarry is by private roads leading from Keilors Road in the distant south or Four Mile Road from the east, the route to be determined after wind warm EES decision. The closest public road reserve is Saleyards Road located northwest at a minimum distance of 1.7 km. There are no publicly accessible areas in the vicinity of the proposed quarry.

Preliminary project plans show 18 wind turbines would be constructed within a 2 km radius of the extraction (blasting) area, the closest turbine footing being 65m southeast of the extraction limit. Other nearby infrastructure includes overhead power cabling located 160m west of the extraction area, and buried cables located 65m south. Construction activities near the quarry would occur during (or after) the final stages of operations though the precise schedule is not yet known.

A site plan showing the proposed Work Authority, extraction/blasting area, proposed wind farm infrastructure and surrounding land areas is shown as **Appendix 1**. The locations of the closest sensitive sites (occupied residences) are also shown.

3 SITE GEOLOGY AND PROPOSED EXTRACTION METHOD

Exploratory drilling shows Newer Volcanics basalt with highly variable weathering underlies the site. The depths of overburden (near-surface clay soils and highly weathered material) range from 0.5m to floor level, this material being extracted by mechanical methods and stockpiled for site rehabilitation works. Blasting with commercial grade explosives would be required to extract rock with moderate to low weathering that occurs at variable depths across the site.

Design plans show a terminal pit floor depth of 13-14m below existing surface level. In areas with hard rock near the surface, blasting would be conducted on a single bench with a maximum height of 13m. In areas with more variable weathering or greater depths of overburden, the single bench may be split or reduced to 6-7m benches to assist with material quality control. A cross section showing the proposed extraction depth and methods (produced by BCA Consulting) is presented as **Figure 1**.

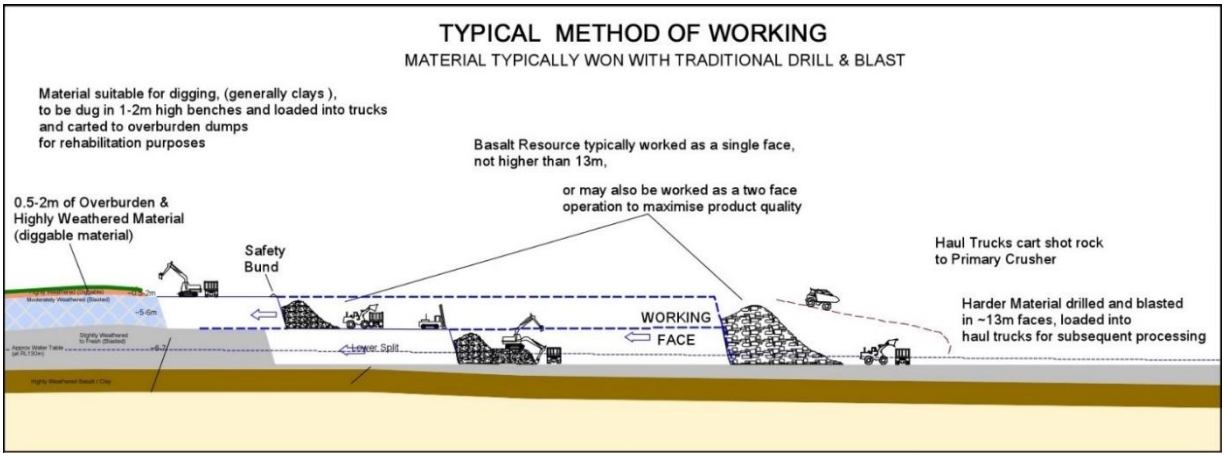

Figure 1 - Cross section of proposed extraction method (courtesy of BCA Consulting)

The total quantity of the resource is estimated at up to 2.1 million tonnes of fresh to moderately weathered rock subject to blasting, and 1.6 million cubic metres of soil and weathered/clayey material for mechanical excavation. Fragmented rock would be processed onsite with mobile crushing and screening plants. Extraction is proposed to occur in six stages progressing from east to west. Highly weathered rock and clay occurs to terminal depth in the central north and northwest corner with limited or no blasting required in these areas.

An average-sized blast with 100 blast holes would yield approximately 20,000-30,000 tonnes of hard rock with around 70-100 blasts indicated for the life of the quarry and an average of 42 blasts per year (i.e. near-weekly blasting). The total number of blasts required would ultimately depend on bench heights, the number of blast holes loaded per blast, the depth and extent of overburden encountered and wind farm construction schedules. Production rates and blast frequency would be highest during the early HWF construction phase (years 1-2).

4 SENSITIVE SITES (RECEPTORS)

The proposed quarry site is remote from "sensitive sites", defined by the Earth Resources Regulator as *"…any land within 10 metres of a residence, hospital, school, or other premises in which people could reasonably be expected to be free from undue annoyance and nuisance caused by blasting*." The nearest sensitive site is the residence of the proposed quarry's title property holder located 2,350m east of the extraction limit. More distant residences are located north, northeast, south and southwest at distances of 2.4 km or greater. The separation between sensitive sites and the proposed quarry is substantial and would result in minor or imperceptible blasting effects at the closest residences.

5 ASSESSMENT CRITERIA

The transport, handling and use of explosives at Victorian quarries are highly regulated activities that must be undertaken in accordance with Australian Standards and State and Federal codes, regulations and guidelines. Site-specific conditions may also apply as detailed in a quarry's Work Plan, Planning Permit or Work Authority conditions. Blasting regulations and other conditions must be observed to maintain a high level of safety for quarry personnel and the public, minimise blasting impacts, and protect private property and infrastructure from blast-induced damage. Blast vibration limits also apply at dwellings to help minimise disturbance and annoyance to residents from excessive levels of ground vibration and airblast.

Standards, guidelines and regulations that apply to quarry blasting operations in Victoria include;

- *Dangerous Goods (Explosives) Regulations 2011* [State of Victoria]
- Australian Standard AS2187.2-2006: *Explosives – Storage and Use, Part 2: Use of Explosives*
- *Ground Vibration and Airblast Limits for Blasting in Mines and Quarries, Environmental Guidelines* (Earth Resources Regulator, Department of Energy, Environment and Climate Action)
- *Occupational Health and Safety Act 2004* (OHS Act)
- *Environmental Effects Act 1978 (Victoria),* including the '*General Environmental Duty*'
- *Australian Code for the Transport of Explosives by Road and Rail-3rd Edition (2009)*
- *Mineral Resources (Sustainable Development) (Extractive Industries) Regulations 2019.*

Key criteria that would apply to blasting at the proposed Hexham Wind Farm Quarry are detailed in the following sections.

5.1 Blast vibration limits for sensitive sites

Ground vibration and airblast overpressure from mine and quarry blasting is regulated by the Earth Resources Regulator (ERR), a sub-branch of Resources Victoria within the Department of Energy, Environment and Climate Action (DEECA). Limits for sensitive sites (e.g. occupied residences) are detailed in the *ERR Guidelines and Codes of Practice; Ground Vibration and Airblast Limits for Blasting in Mines and Quarries*, being;

Ground Vibration:	**5 mm/s** PPV (95% of all blasts within a 12-month period) **10 mm/s** PPV (all blasting)
Airblast Overpressure:	**115 dBL** (95% of all blasts within a 12-month period) **120 dBL** (all blasting)

The upper limits of 120 dBL and 10 mm/s are provided as an allowance for the occasional, unexpected exceedance of the lower (95%) limits. However, compliance with the lower limits is the performance target for all blasting. Exceedances of the limits are subject to investigation and failure to maintain compliance or improve outcomes may result in penalties for quarry operators.

The ERR limits are based on human comfort considerations and are set well below levels at which damage to light-framed, residential type buildings is known to occur. Further information about the risk of blast-induced damage to residential buildings can be found in **Section 8.5**.

5.2 Blast firing times

Most quarries are restricted to firing blasts on business days (Monday-Friday) between 10am and 4pm to help minimise disturbance at sensitive sites. This standard time window is appropriate for the proposed quarry and would most likely be included in Work Plan conditions. Blasting is prohibited at Victorian quarries on weekends and public holidays.

5.3 Ground vibration limits for infrastructure

Blasting conditions including ground vibration (PPV) limits for infrastructure are at the discretion of asset owners. PPV limits commonly observed for Australian infrastructure are shown in **Table 1**.

Table 1 – PPV limits observed by some infrastructure asset owners

Structure/item	PPV limit
- Cured, reinforced concrete (ref. Tennessee Valley Water Authority)	300-500 mm/s
- Buried comms/fibreoptic and electricity transmission cables (Telstra, Powercor, Ausnet, wind farms operators)	≥ 200 mm/s
- Railway infrastructure – tracks, culverts, bridges and signals (Australian Rail Track Corporation)	100-200 mm/s
- HV transmission (suspension) towers (Transgrid assets, Hunter Valley coal fields)	125 mm/s
- *Unoccupied structures of reinforced concrete or steel construction* (AS2187.2-2006 Table J4.5B) - High Voltage transmission towers (Ausnet & Powercor, Victoria) - Wind turbines & meteorology masts (Ararat and Stockyard Hill WF) - Concrete and timber communications and electricity service poles (Telstra, Powercor, Ausnet)	100 mm/s
- HV transmission (tension) towers (Transgrid, Hunter Valley coal fields)	60 mm/s
- Concrete drains, culverts, etc. (Melbourne Water, Yarra Valley Water)	50-100 mm/s
- Earthen dam walls and bunds (Melbourne Water, Camberwell coal mine) - Timber, concrete and steel transmission poles with transformers (Energy Australia, Powercor) - Industrial and heavy commercial-type buildings – cosmetic damage threshold at all frequencies >4 Hz (AS2187.2-2006)	50 mm/s
- Substations, transformers, batteries and computer servers (US MIL-STD-167-1, various Australian sites and owners)	25-50 mm/s

Airblast overpressure from quarry-scale blasting does not present a risk of damage to infrastructure and limits rarely apply. The only exception may be if a facility contains glass window panes that can be sensitive to high overpressure. AS2187.2-2006 suggests a conservative damage limit of 133 dBL while noting that "*window damage at levels below 140 dBL is improbable*".

5.3.1 Wind turbines and meteorology masts

A PPV limit of 100 mm/s measured at the footings of wind turbines and meteorology masts has been adopted by several Victorian wind farm operators based on manufacturer's recommendations. While the structural responses of turbines and masts from quarry blasting are not known to have been subject to detailed studies, Terrock considers the 100 mm/s limit to be appropriate and conservative in consideration of the low natural frequencies of tall structures and significant environmental loading turbines and masts are designed to withstand. Numerous wind farms have onsite quarries without reported adverse impacts. A 100 mm/s limit is also recommended in AS2187.2-2006 for "*unoccupied structures of reinforced concrete and steel construction*".

5.3.2 Overhead power poles and lines

A PPV limit of 100 mm/s also applies to high voltage transmission towers, and electricity and communications poles in Victoria under order of asset owners (Ausnet, Powercor, Telstra, etc.). Studies undertaken for the Australian Coal Association Research Program (ACARP C14057) show poles and towers exhibit relatively minor structural responses and deflections that are a small fraction of the working strains of poles and lines.

5.3.3 Underground cables and conduits

Buried cables and plastic conduits have high flexibility and are effectively impervious to damage from elastic vibration waves. Limits of 200-300 mm/s have previously been observed by Telstra as a precaution for buried fibre-optic cabling.

5.4 Control of Flyrock

It is the responsibility of shotfirers and quarry operators to ensure rock fragments thrown from blast sites are fully contained within the boundaries of a Work Authority or the quarry's title property at all times. Flyrock is prevented by adherence to regulations, standards and industry-standard procedures including good blast design, laser face profiling, blast hole (Boretrak) surveying, and accurate hole loading practices. The residual risk presented by flyrock (where rock fragments are thrown well beyond anticipated distances) is mitigated by establishing wide clearance zones at blast times. Quarry operators may be required to provide evidence to WorkSafe Victoria and ERR that flyock is controlled and appropriate risk mitigation practices are in place. Details of the nature and risk of flyrock, and blast clearance requirements are presented in **Section 8.4**.

5.5 Quarry Buffer Zone (EPA)

EPA Victoria recommends a minimum separation (buffer) distance of 500m between quarries and sensitive sites/receptors in accordance with *EPA Guideline 1518: Recommended Separation Distances for Industrial Residual Air Emissions (2013).* The guideline is in consideration of air quality impacts (e.g. dust and odour) from industrial sites including quarries with blasting. There are no sensitive sites within 500m of the proposed quarry.

6 BLAST DESIGN SPECIFICATIONS

The nominated blast design specifications (**Table 2)** used for this assessment are within the standard range used at numerous single-bench basalt quarries in western Victoria. Two designs are shown in consideration of the maximum potential face height of 13m, and reduced face heights of 7m for areas with deep overburden or quality control purposes.

Table 2 – Standard blast design specifications

	Single bench	Split bench
Face height (max.)	13m	7m
Sub-drill	1.0m	0.5m
Blast hole length (max.)	14.0m	7.5m
Blast hole diameter	89mm	89mm
Blast hole angle	10°	10°
Front row (face) burden	3.0m	3.0m
Inter-row burden	2.7m	2.7m
Spacing	3.0m	3.0m
Stemming height (min.)	3.0m	3.0m
Explosive column length (max.)	11m	4.5m
Linear Charge mass	7.5 kg/m*	7.5 kg/m*
Max. Instantaneous Charge (MIC)	82.5 kg/delay	33.8 kg/delay
Powder Factor (approx.)	0.7-0.8 kg/m^3	0.5-0.6 kg/m^3

**based on bulk explosives density of 1.2 sg*

Designs for individual blasts may be modified by shotfirers as needed to maintain compliance with blast vibration limits, minimise blasting impacts, mitigate the risks of flyrock or improve blast performance (fragmentation and heave).

7 BLAST VIBRATION AND FLYROCK ASSESSMENT

The levels of ground vibration and airblast overpressure from blasting can be modelled using predictive formulae and blast design specifications as inputs. The following models have been developed from formal studies, monitoring and observations by Terrock and other researchers over many years. The models have proven reliable and are used to guide numerous mining, quarrying and other blasting operations across Australia and overseas.

7.1 Ground Vibration Levels

Ground vibration from blasting is measured in terms of the Peak Particle Velocity (PPV) of the wave motion, as recorded in units of millimetres per seconds. PPV levels increase with increasing charge mass and reduce over distance as logarithmic decay. Geological structure and ground conditions between blast sites and receptors also influence the transmission of vibration. A reliable model commonly used to predict ground vibration from blasting is the Scaled Distance Site Law developed by Nicholls et al. (1971).

$$PPV = k_v \left(\frac{\sqrt{m}}{D}\right)^{1.6} \quad [1]$$

Where: PPV = Peak Particle Velocity (mm/s)
m = Charge mass-MIC (kg)
D = Distance (m)
k_v = A site constant

The model's site constant (k_v) represents local ground conditions that influence the transmission of ground vibration. Australian Standard AS2187.2-2006 Appendix J recommends a site constant of 1,140 for "*average field conditions*" though this value provides results with a 50% probability of exceeding predicted levels. Because the proposed quarry is a greenfield site, no local blast monitoring data is available for analysis. However, monitoring data and previous assessments from similar operations show that values of 1,500-1,700 provide ≥95% confidence for predicting maximum PPVs. A higher value of 1,800 is adopted for this assessment as a more conservative approach to account for variable ground conditions.

The PPV models for standard blasts are;

Single Bench (13m face)

$$PPV = 1{,}800\left(\frac{\sqrt{82.5}}{D}\right)^{1.6} \quad [2]$$

Split bench (7m face)

$$PPV = 1{,}800\left(\frac{\sqrt{33.8}}{D}\right)^{1.6} \quad [3]$$

If required, blast monitoring data from early operations can be used to validate the model or calibrate the site constant to more accurately reflect local conditions. However, a site constant of 1,800 is sufficient for planning purposes noting that actual PPVs would be somewhat lower than predicted levels.

From the Site Law models [2] and [3], the distance to milestone PPV levels from standard blasts are shown in **Table 3.** The attenuation of PPV levels over distance is also presented graphically in the regression analysis, **Figure 2**.

Table 3 – Distance from blast sites to milestone PPV levels

	Distance from Blast (m)	
PPV (mm/s)	**13m face (MIC 82.5 kg)**	**7m face (MIC 33.8 kg)**
100*	**55**	**35**
50	85	55
20	151	97
10	233	149
5*	**360**	**230**
2	638	408
1	984	630
0.5	1,517	971

**Industry PPV limit for wind turbines, met masts, poles and pylons*
***ERR PPV limit for sensitive site (95% of blasts)*

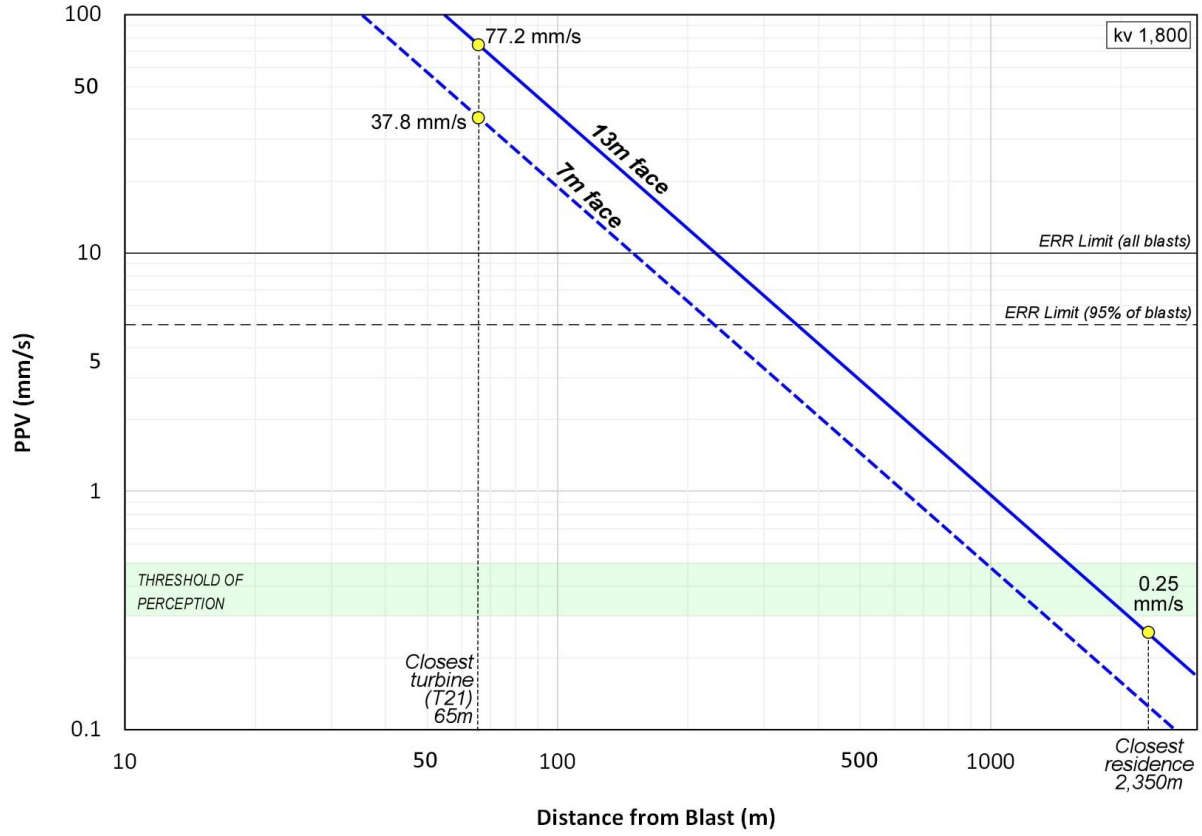

Figure 2 – Regression analysis of maximum PPV levels over distance

Maximum PPV levels at the closest sensitive site are 0.25 mm/s (13m face) and 0.12 mm/s (7m face). The threshold of blast vibration perception for people inside buildings is considered as 0.3-0.5 mm/s and it is most likely that vibration effects will not be felt at sensitive sites from any blast. Compliance with the ERR 5 mm/s limit for human comfort is assured due to the scale of blasting and substantial separation distances between the proposed quarry and sensitive sites.

The closest proposed wind turbine (T21) is located 65m southeast of the extraction limit. Maximum PPV levels at this distance are 77.2 mm/s (13m face) and 37.8 mm/s (7m face). Both levels are below the 100 mm/s limit typically observed for wind turbines, noting that 7m faces would be most likely for terminal blasts at the extraction limit.

The closest overhead transmission lines and poles are near the southwest corner of the proposed Work Authority at an approximate distance of 165m from the extraction limit. The maximum PPVs at this distance are 17.4 mm/s (13m faces) and 8.5 mm/s (7m faces). Both levels are well-below the 100 mm/s limit that typically applies to transmission poles and pylons.

The closest underground cables are approximately 65m from the southeast corner of the proposed extraction limit. Maximum surface PPVs are 77.2 mm/s (13m face) and 37.8 mm/s (7m face). However, PPV levels underground are typically 40-60% lower than surface levels because movement is constrained by the mass of surrounding ground. The maximum (surface) PPVs are below limits of 200-300 mm/s observed for buried cables by other asset owners.

This assessment shows the maximum potential ground vibration levels from the proposed quarry to be below relevant limits for infrastructure, and well below the ERR human comfort limits that apply at sensitive sites.

7.2 Airblast overpressure

Airblast (overpressure) is a low frequency (<20Hz) , sub-audible fluctuation of air pressure that occurs as explosives energy radiates from a blast site through the surrounding atmosphere. Overpressure is measured as decibels Linear (dBL), a separate measure to the audible component of airblast (i.e. blast noise). Overpressure is subject to ERR limits because at high levels can cause structural responses resulting in disturbance to people inside buildings.

The Terrock Airblast Model (Richards & Moore, 1993) has been developed and refined over many years of research and considers the confinement of explosives in blast holes. The peer-reviewed model is broadly conservative and is used to guide blast design requirements at numerous quarry and mining operations around Australia and overseas. The model used in this assessment predicts the distance from a blast site to the 115 dBL level (i.e. the ERR limit for sensitive sites).

$$D_{115} = \left(\frac{k_a \times d}{B \text{ or } SH}\right)^{2.5} \cdot \sqrt[3]{m} \qquad [4]$$

Where:
- SH = Stemming height (mm)
- B = Front Row Burden (mm)
- m = Charge mass-MIC (kg)
- D_{115} = Distance to 115 dBL level (m)
- d = Blast Hole diameter (mm)
- k_a = Site constant(s);
  - 250 (front of face)
  - 190 (behind/side of blast)

Airblast attenuates at an approximate rate of 9 dBL with doubling of distance. The highest emissions occur directly in front of free-face blasts because airblast energy is projected horizontally through the face. Behind and to the sides of a blast, emissions are lower because most energy is projected vertically into the atmosphere with lower dBL levels at ground level. Airblast levels in front of blasts is controlled by front row/face burden provisions. Behind and to the sides of a blast, levels are controlled by stemming height specifications.

From standard blast design specifications (Table 2) the airblast models used in this assessment are;

Front of Face - Single Bench (13m)

$$D_{115} = \left(\frac{250 \times 89}{3{,}000}\right)^{2.5} \cdot \sqrt[3]{82.5} \qquad [5]$$

Behind/side of Blast - Single Bench (13m)

$$D_{115} = \left(\frac{190 \times 89}{3{,}000}\right)^{2.5} \cdot \sqrt[3]{82.5} \qquad [6]$$

Front of Face - Split Bench (7m)

$$D_{115} = \left(\frac{250 \times 89}{3{,}000}\right)^{2.5} \cdot \sqrt[3]{33.8} \qquad [7]$$

Behind/side of Blast - Split Bench (7m)

$$D_{115} = \left(\frac{190 \times 89}{3{,}000}\right)^{2.5} \cdot \sqrt[3]{33.8} \qquad [8]$$

The airblast model assumes flat terrain around a blast site without barriers to transmission that may be provided by landforms such as hills and gullies (i.e. topographic shielding). Because the surrounding terrain is flat the effects of topographic shielding would negligible. However, a modest degree of shielding could be provided by overburden stockpiles and bunds around the extraction area.

From the models [5-8], the predicted distances to milestone airblast levels under standard blast design specifications are shown in **Table 4**.

Table 4 – Distances to milestone airblast levels

	13m face (MIC 82.5 kg)		7m face (MIC 33.8 kg)	
Airblast (dBL)	**Front of face (m)**	**Behind/side of blast (m)**	**Front of face (m)**	**Behind/side of blast (m)**
120	**652**	**328**	**484**	**244**
115*	946	476	702	354
110	1,371	690	1,018	513
105	1,988	1,001	1,477	744
100	2,881	1,444	2,140	1,073

**ERR Airblast Limit (95% of blasts)*

The reduction of airblast levels over distance is shown in the regression analysis **Figure 3**.

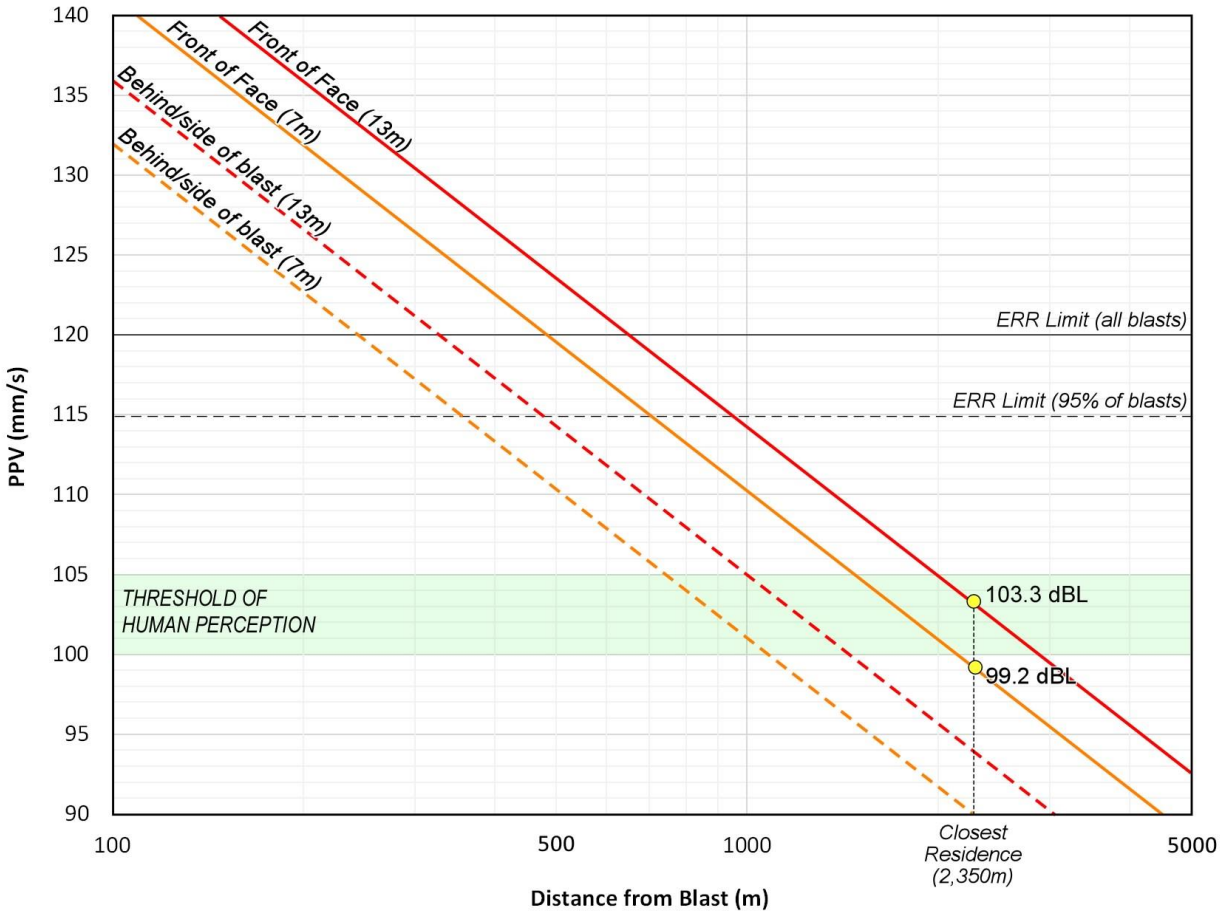

Figure 3 – Airblast Regression Analysis (13m and 7m face)

This assessment shows compliance with the ERR 115 dBL airblast limit for sensitive sites would be met for all standard blasts regardless of face height or direction, with maximum levels of 103.3 dBL to 103.3 dBL at the closest receptor. The threshold of airblast perception is considered 100-105 dBL and the effects would be imperceptible at more distant sensitive sites, though low-level blast noise may be occasional heard at distant locations depending on weather conditions at blast times.

7.3 Flyrock

The maximum throw of rock fragments under a blast's design specifications can be calculated using the Terrock Flyrock Model. The model has proven useful for helping determine minimum clearance distances around blast sites and is used for blast planning at numerous quarries and mines around Australia. The model is conservative by design and provides an allowance for minor inconsistencies in face structure and minor errors that may occur during blast hole loading. The model was reviewed in 2007 by Dr. Peter Lilly (former CSIRO Chief Officer of Exploration and Mining) who concluded "*Terrock's flyrock model greatly simplifies what is dynamically a very complex in physics. However, the algorithm is likely yield broadly conservative outcomes and is therefore considered to be appropriate by the writer*."

The maximum throw in front of a blast face ($Lmax_f$) can be calculated by:

$$Lmax_f = \frac{{k_f}^2}{g}\left(\frac{\sqrt{m}}{B}\right)^{2.6} \quad [9]$$

Where:
- m = charge mass, kg/m
- B = front row burden (m)
- $Lmax_f$ = maximum throw in front of face (m)
- g = gravitational constant (9.8)
- k_f = a site constant (27 conservative)

Behind a blast, the maximum throw ($Lmax_r$) is calculated by:

$$Lmax_r = \frac{{k_f}^2}{g}\left(\frac{\sqrt{m}}{SH}\right)^{2.6} Sin\ 2\emptyset \quad [10]$$

- SH = stemming height (m)
- $Lmax_r$ = maximum throw behind blast (m)
- Ø = launch angle = hole angle from horizontal + a dispersal allowance of 10° (e.g. Hole angle + dispersal = 70° from horiz.)

As with airblast, flyrock is largely controlled by face burden and stemming height specifications. Throw measurements from hard rock quarries shows a site constant (k_f) of 27 to be a conservative generic value for the model and actual throws are normally well short of calculated distances. However, a cautious approach to flyrock and blast clearance is warranted due the high consequence of flyrock striking a person or property.

The models used in this assessment are;

Front of face throw

$$Lmax_f = \frac{27^2}{9.8}\left(\frac{\sqrt{7.5}}{3}\right)^{2.6} \quad [11]$$

$Lmax_f$ = **59m**

Behind/side of blast throw

$$Lmax_r = \frac{27^2}{9.8}\left(\frac{\sqrt{7.5}}{3}\right)^{2.6} Sin\ 2(70) \quad [12]$$

$Lmax_r$ = **38m**

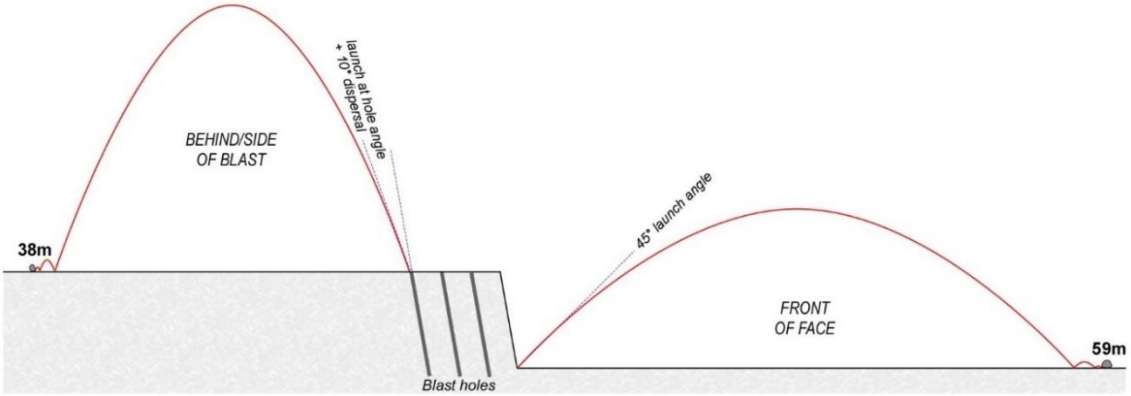

Figure 4 – Flyrock trajectory diagram (Front Row Burden & stemming = 3.0m)

Blasts approaching extraction limits face inwards towards the pit with shorter throws behind blast sites. The maximum throw of 38m exceeds the minimum buffer distance of 20m, though the consequence of a few rock fragments landing a short distance into the surrounding title property (within the blast's clearance zone) is negligible. While the calculations are conservative, stemming height can be increased for terminal blasts to reduce maximum throws if needed. Methods for reducing throw distance are shown in **Section 10.3**. A high level of flyrock safety is provided at the Schwartz property that is located a minimum 350m north of proposed blasting.

8 BLASTING RISKS AND CONTROLS

Well-controlled blasting operations that adhere to existing standards, regulations and best practice present a low risk to people, property and the surrounding environment. The risks to sensitive sites and nearby structures, and the control measures used to mitigate the risks are discussed in the following sections.

8.1 TRANSPORT, HANDLING AND USE OF EXPLOSIVES

Blasting at Victorian quarries is undertaken by qualified personnel who are trained and licensed to use blasting explosives in the State of Victoria. The use of commercial grade explosives must be conducted in accordance with National and State regulations, standards and guidelines including:

- *Victorian Dangerous Goods (Explosives) Regulations 2022,*
- Earth Resources Regulator (ERR) guidelines for quarries
- *Australian Standard AS2187.2-2006*
- *Occupational Health and Safety Act 2004*
- *Australian Explosives Code 3rd Edition*
- Work Authority conditions, as well as any site-specific blasting conditions that may apply as part of a quarry's approved Work Plan.

Blasts at the proposed Hexham Wind Farm Quarry would be designed, loaded and fired by a drill and blast contractor. It is the responsibility of shotfirers and all blast crew personnel to work to Victorian blasting regulations and relevant standards, site rules, and the procedures of an approved Blast Management Plan. It is the responsibility of quarry operators to ensure all blasts are fired in accordance with prescribed regulations, maintain site safety and security, and help coordinate the blast clearance procedure.

Specific risk control measures for explosives transport, onsite handling and security procedures can be found in the quarry's Blast Management Plan, Risk Assessments and Blast Plans for individual blasts, and Material Data Safety Sheets provided by the explosives supplier.

8.2 EXPLOSIVES STORAGE

In line with current industry practice, explosives products would not be stored at the proposed quarry. All explosives and accessories would be brought to site on blast day mornings by a licenced explosives supply company and unused products returned to the supplier's company's facility after each blast is loaded and all items are accounted for.

8.3 RISK TO WIND FARM INFRASTRUCTURE

Wind farm items of immediate interest are:

- Wind turbines within Hexham Wind Farm (during or after construction)
- Overhead transmission cables and poles
- Underground cables

8.3.1 Wind turbines

Wind turbine support towers are reinforced steel structures designed to withstand substantial loading from thermal expansion, strong winds and blade rotation. Tall structures have low natural frequencies (<2hz) that do not align with the higher wave frequencies from nearby blasting and structural responses are minimal. The short durations of quarry blasts are also insufficient to induce and build up strong resonant responses and deflections. While the structural responses of turbines to quarry-scale blasting are not known to have subject to formal studies, maximum PPV amplification factors of ~2 have been recorded on high voltage transmission pylons in the Hunter Valley coalfields and other tall structures, with maximum displacements of 2-3mm at upper sections (ACARP C154057).

Ground vibration waves from blasting are elastic and generate small displacements. Peak Particle Displacement (PPD) can be calculated with the formula;

$$PPD = \frac{PPV}{2\,\pi\,\mathrm{f}}$$

For a PPV reading of 100 mm/s with ground motion frequency of 10 Hz, the brief, non-permanent surface displacement is 1.59 mm over a wavelength of 220m, resulting in negligible differential movement of the turbine footings as shown in the schematic diagram **Figure 5**. Actual movement is less than indicated because turbine footings are mostly below surface level where lower PPVs occur. It is reasonably concluded that wind turbines and their components are not sensitive to blast vibration and Terrock is unaware of any instance of blasting operations at a nearby quarry causing adverse effects to turbines or other wind farm infrastructure.

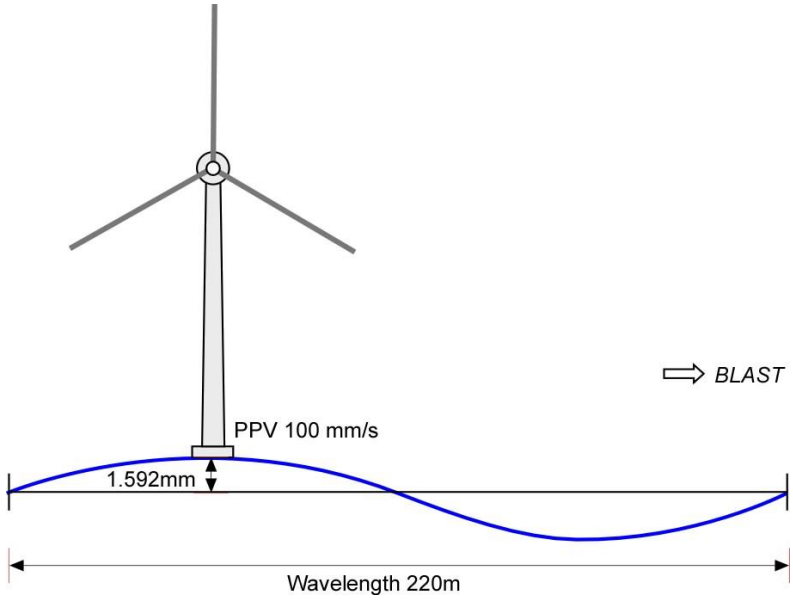

Figure 5 – Ground vibration wavelength and peak displacement at 100 mm/s PPV limit (not to scale)

8.3.2 Concrete footings

Concrete slabs and footings are highly resilient to elastic ground motions. Unlike free-standing structures, embedded concrete exhibits no amplification due to resonance and the only potential for vibration-induced damage is if ground strain from passing waves exceed the working strains of concrete. Experienced researcher Lewis L. Oriard states, "*During more than 50 years of observations, the writer has not personally seen a case where a concrete slab was damaged by elastic vibrations from blasting*". This is also the experience of Terrock personnel from monitoring, observing and researching the effects of blasting in Australia for over 40 years.

The working strain of ≥20 MPa reinforced concrete is conservatively calculated to be 118.5 microstrain (με) for flexural tension and ≥ 885 με for compression (ref. Australian Standard AS 3600-2018). Using ground strain approximation from plane wave strain theory proposed by Dowding (1986) the limiting PPV level to prevent cracking of reinforced concrete is a conservative 278 mm/s (ACARP C14057).

Evidence that a higher vibration limit may be applied to mass concrete is provided by Oriard (2002) who cites the Tennessee Valley Authority's application of the following criteria for their projects and assets.

Table 5 – TVA mass concrete damage criteria (after Oriard, 2002)

Concrete Age from Batching	Allowable PPV (mm/s)	Effective PPV (mm/s)	Distance Factor	
			DF	Distance (m)
0 – 4 hours	100 x DF	100	1.0	0 - 15
4 hours – 1 day	150 x DF	120	0.8	15 – 46
1 – 3 days	225 x DF	156	0.7	46 – 76
3 – 7 days	300 x DF	180	0.6	76+
7 – 10 days	375 x DF	225	-	-
10 or more days	500 x DF	300	-	-

The limits range from 100 mm/s for freshly poured concrete to 500 mm/s after 10 days of age. The distance-scale reduction recognises that high vibration frequencies occur at closer distances, but the low frequencies at greater distances result in higher strains and displacements with greater damage potential. The maximum PPV at the closest HWF turbine footing (T21) is conservatively predicted to be 77.2 mm/s for a 13m face blast at the extraction limit.

The only plausible mechanism for blast-induced damage to concrete slabs and footings is from 'block movement' where the supporting ground structure is directly and permanently displaced by explosive energy. In average ground conditions, block movement is limited to the normal fracture zone within a few metres from back row blast holes. Beyond the fracture zone, residual explosives energy converts to elastic waves that rapidly decay over distance.

8.3.3 Overhead transmission lines, towers and poles

A non-damaging PPV limit of 100mm/s also typically applies for blasting operations near steel transmission towers, and concrete steel and timber poles under the order of asset owners/managers such as AusNet Services, Powercor and Ausgrid. Poles in good condition have sufficient flexibility to accommodate strains from transport, erection, environmental loading, and ground vibration and seismicity. Studies have also shown timber and concrete poles in good condition exhibit no adverse effects from exposure to ground PPV levels as high as 240 mm/s. The closest overhead transmission lines poles are shown to be approximately 160m west of the extraction limit with maximum PPVs of 18 mm/s (13m face) and 9.5 mm/s (7m face).

8.3.4 Underground cables

Buried cables and their PVC conduits are effectively impervious to damage from ground vibration due to their high flexibility PPV levels up to 347 mm/s have been recorded with no adverse effects (ref. ACARP Study 14057). The only possible damage mechanism for buried cables and conduits is by permanent ground deformation, or "block movement". Such movement can only occur in rocky areas where rock blocks at the trench wall are forced through the bedding material and damage a cable by shearing or compression. However, the zone of permanent ground deformation from quarry-scale blasting is limited to a few metres from blast holes. PPV limits of 200-300 mm/s have been observed by Telstra and other wind farm operators.

The maximum surface PPV at the closest buried cables (65m from the southern extraction limit) is 77.2 mm/s (13m face), though actual levels at the depth of the cable would be somewhat lower.

8.4 FLYROCK RISK

The greatest blasting hazard to the safety of people and property is flyrock, where rock fragments from a blast are thrown well-beyond anticipated distances. Flyrock events at quarries have become uncommon due to improvements of blasting practice and no flyrock injury has been reported at a Victorian quarry for several decades. However, flyrock remains a possibility at all quarries and its prevention and risk mitigation is a critical consideration for shotfirers and quarry managers.

8.4.1 The nature of flyrock

Where blasts are conducted on benches with a free face, fragments of blasted rock heave forward and form a pile in front of the blast site from which they are transported for processing. Sometimes fragments are thrown beyond the pile and land at more distant locations. The furthest potential throws occur within a 90° arc perpendicular to the face and consists of 100-200mm diameter fragments launched at a 45° angle. Smaller fragments have reduced throw due to wind resistance and the throw of larger blocks and boulders is restricted by mass.

The furthest throws behind blast sites typically consist of small fragments of stemming material or loose collar rock that are launched at the blast hole angle and disperse by ~10°. If a blast hole is significantly under-stemmed, collar rock can break out at a 45° angle and be thrown further distances, an occurrence known as “cratering”. Generally, due to the smaller size of fragments, steep launch angles and lower velocities on landing, flyrock behind blast sites presents a lower risk of serious injury than flyrock thrown in front of the face.

8.4.2 Causes and prevention of flyrock

Excessive flyrock throw is the result of human error where insufficient face burden or stemming, overcharged blast holes or structural weaknesses in face rock are not identified prior to firing. The primary mechanisms for flyrock in front of the face are shown in the following cross section diagrams (**Figure 6a**).

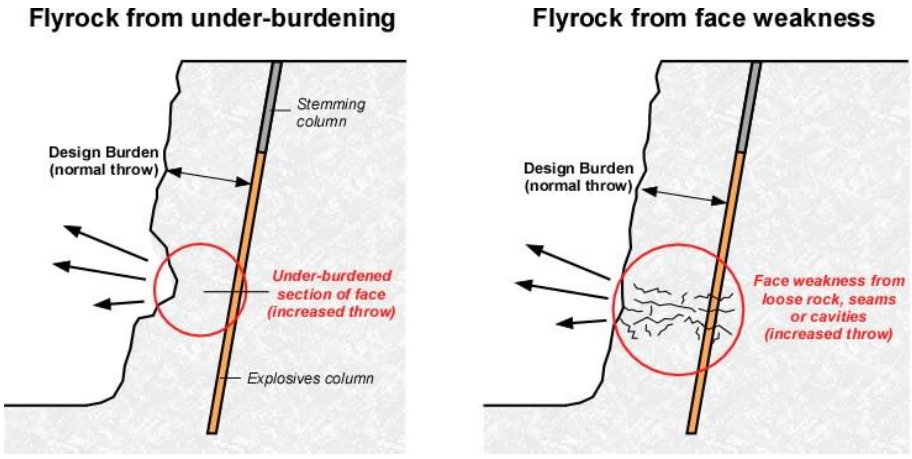

Figure 6a – Mechanisms for flyrock in front of a blast face

Under-burdening is identified by visual inspection, and laser face profiling and Boretrak survey techniques that measure the true burden between the face and front row blast holes, and the depth and deviation of each hole. Structural weakness in blast faces (e.g. wide clay seams and pockets of loose or naturally fragmented rock) are not detected by laser profiling but identified by review of driller’s logs and visual inspection of blast faces. If under-burdening or structural weakness is identified or suspected, affected holes must be loaded in a manner that prevents explosives being placed in under-confined sections.

Flyrock can also be caused when one or more blast holes are overcharged and normal design burden and stemming provisions are insufficient to confine the additional energy. As a rule of thumb, the quantity of explosives loaded into every blast hole should not exceed 10% of the design charge mass. The mechanisms for flyrock behind and to the sides of a blast are shown graphically in **Figure 6b**.

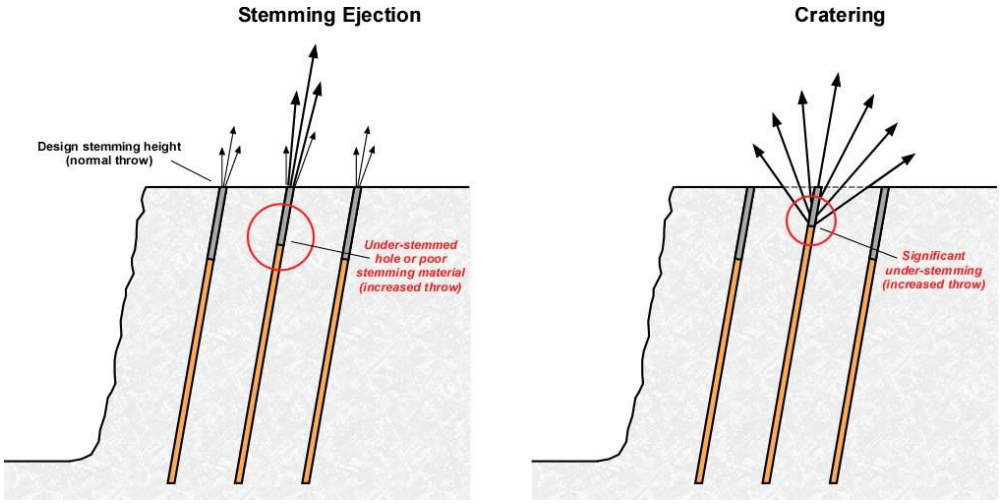

Figure 6b – Mechanisms for flyrock behind and to the sides of a blast

Flyrock behind blast sites is prevented by ensuring an adequate length of stemming is loaded into each hole through careful loading practices and accurate record keeping. The optimum stemming material for 89mm holes is 10-14mm stone aggregate. To prevent cratering, the minimum length of the stemming column should be at least 20 x the blast hole diameter (being 1.8m for 89mm diameter holes). The minimum nominated stemming height of 3.0m is sufficient to prevent cratering.

In summary, flyrock is successfully prevented by review of driller's logs and blast hole survey results, inspection of face structures, careful attention to hole loading practices, and accurate record keeping and review.

8.4.3 Risk of flyrock to infrastructure

If nearby turbines are constructed during the life of the quarry, the risk of rock fragments striking the structures is low. The maximum throw of 38m behind blasts is approximately half the distance to the nearest turbine. A safety factor of 2 (2 x maximum throw) is commonly observed by quarry operators to protect onsite infrastructure from flyrock damage. This safety factor can be increased with additional stemming or front row burden for nearby blasts to reduce maximum throws as guided by observation of the behaviour of rock under blasting.

The only plausible scenario in which rock could strike the closest turbine is if a significant flyrock event such as cratering was to occur due to blast design or loading errors though this is unlikely with industry-standard practices in place. The likelihood of flyrock striking more distant turbines or other wind farm infrastructure is negligible.

8.4.4 Blast Clearance Zone

With standard controls in place, the residual risk presented by flyrock is mitigated by establishing wide clearance zones around blast sites to account for the possibility of increased throw due to human error. Clearance zones are established immediately prior to blast times and are lifted when the shotfirer gives the "all clear" signal after a brief post-blast inspection. The zone is secured by blast guards positioned on access tracks with a clear view of the surrounding area. No blast may be fired until the shotfirer receives confirmation from every guard that the clearance area and pit remains free of people and it is safe to fire the blast.

A recommended approach for determining minimum blast clearance distances is to observe safety factors based on throw calculations. This approach is used at numerous mines and quarries around Australia and has proven effective to protect people and property at blast times. The minimum safety factors Terrock recommends for blast clearance at quarries are;

- Safety Factor 2 – Quarry Plant, Equipment & Wind Farm Infrastructure
- Safety Factor 4 – Quarry Personnel and Public

Under this approach the minimum blast clearance distances for standard blasts at the proposed quarry are:

Table 6 – Minimum blast clearance distances from flyrock model safety factor approach

	Front of Face	***Behind Blast***
Maximum Throw	(59m) **60m**	(38m) **40m**
S.F. 2 – Plant & Equipment	120m	80m
S.F. 4 – Quarry Personnel & Public	240m	160m

The footprint of the clearance zone is formed by combining front and behind distances (**Figure 7**). This can be produced as a scaled transparent overlay to be used with site maps during blast planning if required.

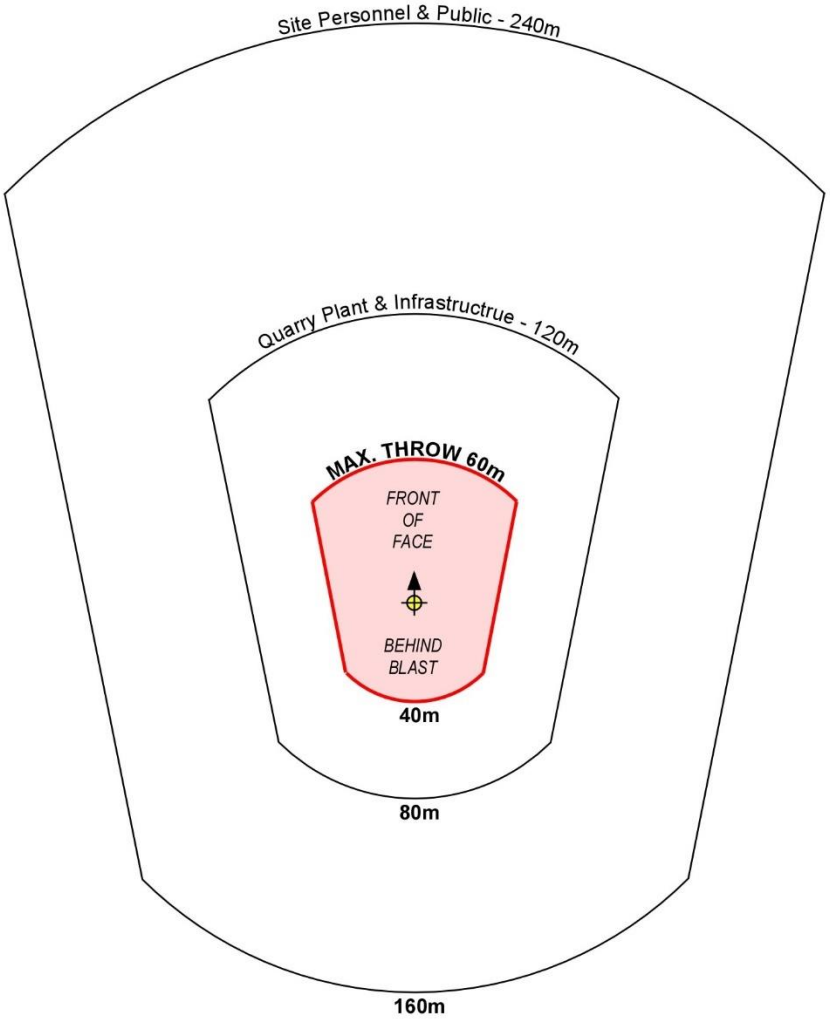

Figure 7 – Recommended Minimum Blast Clearance Distances (Standard Specification Blasts)

The clearance distances above are strictly minimum and can be used to determine safe locations for shotfirers and blast guards. It is recommended that all other quarry and wind farm personnel be evacuated to more distant locations, particularly from areas directly in front of the face. The clearance zone falls entirely within the proposed quarry's title properties and clearance on neighbouring properties (min. 350m) is not warranted. Due to the limited number of people that would be within the quarry or adjacent land areas at blast times, wider clearance areas within the title property would be relatively easy to establish and secure. Effective coordination of activities around the quarry would be relatively straightforward given the working relationships between the title property holder, wind farm management and quarry operator. It is also recommended that any livestock close to blast sites be moved outside the minimum clearance area as a precaution.

Establishing adequate clearance around blast sites is ultimately the responsibility of shotfirers and quarry managers. Clearance distances around individual blasts may be increased by order of the shotfirer at any time on consideration of a blast's design, blast hole survey results, modified hole loadings, localised rock structure and previous throw observations. For example, if true front row burden is shown to be less than the design specification of 3.0m, the minimum clearance in front of the face should be increased accordingly.

Details of blast clearance and firing procedures to be followed (including the quarry's emergency assembly areas and procedures) should be specified in the quarry's Blast Management Plan and relevant information included in documentation pertaining to individual blasts such as Risk Assessments, blast plans, SWMS, etc.

8.5 RISK OF DAMAGE TO BUILDINGS

The risk of blast vibration-induced damage to closest buildings such as residences is negligible due to the remoteness of the quarry and low or imperceptible PPV levels that would occur in distant areas. The risk of damage to building s can be assessed using criteria from in AS2187.2-2006 Appendix J that includes a guide from British Standard BS7385.2-1993 (**Figure 8a)**. For light-framed, residential type buildings the minimum threshold of cosmetic damage is 15 mm/s for 4 Hz vibration waves. The maximum PPV of 0.25 mm/s at the nearest house is less than 2% of the cosmetic damage threshold.

TABLE J4.4.2.1

TRANSIENT VIBRATION GUIDE VALUES FOR COSMETIC DAMAGE (BS 7385-2)

Line	Type of building	Peak component particle velocity in frequency range of predominant pulse	
		4 Hz to 15 Hz	15 Hz and above
1	Reinforced or framed structures. Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	
2	Unreinforced or light framed structure. Residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

NOTES:

1 Values referred to are at the base of the building.

2 For line 2, at frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) should not be exceeded.

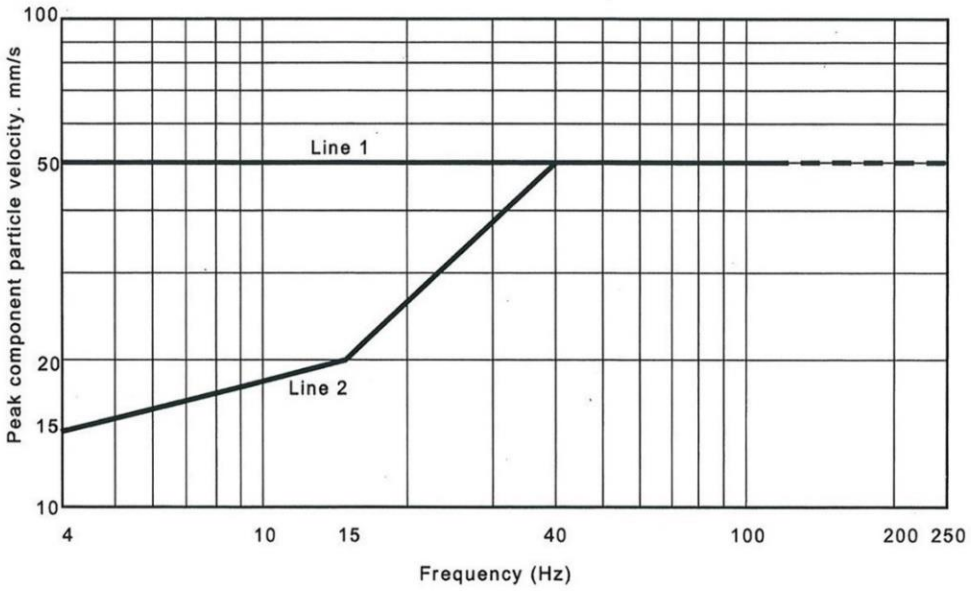

FIGURE J4.4.2.1 TRANSIENT VIBRATION GUIDE VALUES FOR COSMETIC DAMAGE (BS 7385-2)

Figure 8a – Threshold/cosmetic damage criteria from AS2187.2-2006 (source: BS7385.2-1993)

Damage classifications to be used with the guideline are shown as **Figure 8b**. The threshold for minor-type damage is 2 x the cosmetic damage values, and major/structural may occur above 4 x the cosmetic values.

TABLE J4.4.2.2

BS 7385-1:1990—DAMAGE CLASSIFICATION

Damage classification	Description
Cosmetic	The formation of hairline cracks on drywall surfaces or the growth of existing cracks in plaster or drywall surfaces; in addition, the formation of hairline cracks in the mortar joints of brick/concrete block construction
Minor	The formation of cracks or loosening and falling of plaster or drywall surfaces, or cracks through bricks/concrete blocks
Major	Damage to structural elements of the building, cracks in support columns, loosening of joints, splaying of masonry cracks etc.

Figure 8b – Damage classifications from AS2187.2-2006 (source: BS7385.1-1990)

The damage criterion is conservative by design and the values denote PPV levels, "*above which there is an increasing possibility of damage*". There is consensus among researchers (Oriard, Dowding, etc.) that damage is rare below 50 mm/s and Australian research into the effects of blasting has shown PPV levels below 70 mm/s to be wholly non-damaging to common brick-veneer type houses (ACARP C9040).

8.6 RISK TO LOCAL AMENITY & PUBLIC HEALTH

The impact of blasting on the amenity of the surrounding area would be low because the combined effects of ground vibration and airblast have short durations of around 2-5 seconds per event and PPV and airblast levels at the closest sensitive sites are anticipated to be very low or imperceptible. In addition, blasting would be limited to weekdays during business hours when people are less likely to be inside houses, would occur once or twice per month, and the proposed quarry has a short lifespan.

While unlikely, blast related concerns or complaints raised by residents can be addressed by blast monitoring at sensitives sites and engaging with community members to provide blasting information. Another effective method to alleviate concerns and prevent potential startling is by providing residents with personal notifications of impending blasts. Notifications may be required under Work Plan conditions and can be provided by SMS, email or phone call. A register of complaints must also be maintained by operators.

Blast vibration at regulated levels does not cause physiological harm to humans. While the effect of dust on human health is outside Terrock's qualifications, dust loads from blasting are short-lived and present a small fraction of potential loads from whole quarry operations and nearby agricultural activities. There is likely to be substantial dissipation of dust loads from blasting over the significant separation distance between the quarry and closest receptors.

Blasting also produces NOx (nitrogen oxide) fumes that with high concentrations and prolonged exposure can be harmful to human health. NOx is also produced by common fuel burning processes such as wood fires and combustion engines. High levels of NOx from blasting are typically produced by a reaction between some explosives products and water in blast holes, or when inadequate mixing of ammonium nitrate and sensitising agents occurs during hole loading from bulk delivery systems. The presence of high NOx levels from a blast can be identified by the bright yellow-orange fumes produced. High concentrations of NOx from quarry blasting have become uncommon due to improvements in explosives products and equipment. As a precaution, shotfirers are required to wait a few minutes after blast times to allow NOx to dissipate before inspecting the blast site.

8.7 EFFECT OF BLASTING ON NATIVE FAUNA AND DOMESTIC ANIMALS

Most quarries are located in rural or semi-rural areas with livestock, pets and native animal habitat on adjacent properties and reserves. To date, Terrock is unaware of any confirmed case of quarry blasting affecting the health or wellbeing of an animal species.

8.7.1 Native Fauna

Many native species reside within active work authorities and adjacent land areas. Wallabies, koalas, wombats and lizards can be found in bushland areas in and close to some Victorian quarries. Eastern grey kangaroos can be found at quarries throughout eastern Australia. Their presence indicates that native animals acclimatise to quarry operations and are not deterred by brief ground vibration and airblast events on blast days.

The behaviour of birds near blast sites has been observed by Terrock over many years. Birds located within a few hundred metres of a blast typically fly away in response before returning to the area after a few minutes when the perceived danger has passed. Many quarries have populations of waterbirds residing in dams and ponds on pit floors. At an active, single-bench, basalt quarry near Colac,

populations of native waterbirds can be found on the quarry's dams, and swallows are known to nest on terminal faces of worked out areas. Raptors also frequent many quarries, preying on small mammals and other bird species.

While Terrock is unaware of any formal studies of the effect of airblast from quarries on animal physiology and behaviour, comparison can be made with the effects of other noise and overpressure sources. Lightning generates high levels of noise and overpressure that animals have evolved to tolerate, and other common noise sources in rural areas including bird scarers and occasional gunshots are also considered. It can be reasonably concluded that an occasional, brief airblast event has little to no lasting impact to animals in surrounding areas.

8.7.2 Domestic Animals

Regular observations around quarries taken over many years show that quarry blasting presents a negligible risk to the health and wellbeing of domestic animals including livestock. Many Victorian quarries have cattle and horses on neighbouring properties and the typical response of livestock near a blast site is to briefly raise their heads and look around for a few seconds before resuming grazing. Livestock located within 100m of blast sites may walk a short distance away from the source of the disturbance, through spooking or obvious distress has not been observed. As with birds, the impact of airblast to livestock on adjacent land can be likened to the response from a distant thunderclap.

Horse agistment, studs and riding clubs can be found on the properties neighbouring some Victorian quarries with no reported adverse effects from blasting. Cows on dairies neighbouring quarries and mines in Victoria and NSW are routinely exposed to PPV levels up to 10mm/s and airblast levels around 120 dBL with no reported effect on animal wellbeing or milk production.

Some dogs have been observed becoming excitable and bark or howl around blast times, though this is typically in response to a quarry warning siren that is sounded before and after each blast is fired. While individual animals may have particular environmental sensitivities, there is no evidence that blasting causes significant distress to pets and other animals.

9 RISK ASSESSMENT

The primary blasting risks from the previous section are rated in accordance with a Risk Matrix (**Figure 9**) provided by ERR in the document *Preparation of Work Plans and Work Plan Variations – Guideline for Extractive Industries* (December 2020). Risks are rated as Low, Medium, High or Very High in accordance with their likelihood and potential consequences. The risks and controls associated with transport, storage and handling of explosives products are detailed in a quarry's Blast Management Plan, documentation for individual blasts, and information provided by the explosives supplier.

Likelihood	Insignificant	Minor	Moderate	Major	Critical
Almost Certain	Medium	High	Very High	Very High	Very High
Likely	Medium	Medium	High	Very High	Very High
Possible	Low	Medium	Medium	High	Very High
Unlikely	Low	Low	Medium	High	High
Rare	Low	Low	Medium	Medium	High
	Consequence				

Figure 9 – ERR Risk Matrix

The inherent risks of blasting, control measures to be observed, and residual risks (after controls are in place) are rated in accordance with the matrix in **Table 7**. Most controls are not specific to the proposed quarry and are standard industry practice. Further details of the controls to be observed by the quarry operator can be found in the site's Blast Management Plan.

Important note on flyrock risk

The risk presented by flyrock requires special consideration due to limitations of the ERR matrix definitions. While flyrock events are rare and the probability of a person being struck by a rock fragment is extremely low, the consequence of flyrock strike is critical and therefore the risk is rated high. In reality, the risk posed by flyrock from well-controlled quarry blasting with wide, secure clearance zones in place is low.

Table 7 – Risk ratings and required control measures

RISK	INHERENT RISK RATING	RISK CONTROL MEASURES	RESIDUAL RISK RATING
FLYROCK (AREAS WITHIN THE QUARRY)	**VERY HIGH** Likelihood **POSSIBLE** Consequence **CRITICAL**	- Laser Face Profiling & Boretrak survey conducted for all blasts. - Visual inspection of blast site/face and review of drillers log and survey results to identify structural weaknesses and guide individual hole loading requirements. - Ensure minimum stemming heights are loaded into each blast hole. - Review hole loading records including treatment methods used for under-confined blast holes. - Blasts inspected and signed off by authorised persons in accordance with regulations. - Clearance Zone (min. 240m front and 160m behind/side of blasts) established inside quarry and adjacent title property areas. - All site personnel evacuated from pit to more distant locations or assembly area. - Blast guards positioned at access tracks leading to pit and blast site. - All onsite and nearby offsite personnel to be accounted for prior to commencing the firing procedure. - ***No blast may be fired until the shotfirer receives confirmation from all blast guards that the clearance area is free of people and it is safe to fire the blast.*** - Flyrock observations and video recording of blasts conducted for performance review and to guide any blast design modifications required for further blasting.	**HIGH** Likelihood **RARE** Consequence **CRITICAL**
FLYROCK (NEIGHBOURING PROPERTIES AND LAND AREAS)	**HIGH** Likelihood **POSSIBLE** Consequence **MAJOR**	- Observe standard flyrock prevention and risk controls (see above). - Prior notification and blast/clearance information provided to wind farm management, contractors and title property owner.	**MEDIUM** Likelihood **RARE** Consequence **MAJOR**
DAMAGE TO WIND FARM INFRASTRUCTURE AND BUILDINGS	**MEDIUM** Likelihood **POSSIBLE** Consequence **MODERATE**	- Maintain appropriate blast design and accurate hole loading practices. - Observe standard flyrock prevention and risk controls (see above). - Record rock throw observations and modify blast designs if or where required. - Undertake blast monitoring at the footings of infrastructure located close to blasts (<100m). - Modify blasts if PPV levels near or exceed limits or maximum predicted levels.	**LOW** Likelihood **RARE** Consequence **MINOR**

Table 7 (continued)

IMPACT TO LOCAL AMENITY	**MEDIUM** Likelihood **POSSIBLE** Consequence **MINOR**	- Maintain Compliance with ERR Ground Vibration & Airblast Limits at sensitive sites: PPV 5 mm/s (95% of blasts) 10 mm/s (all blasts) Airblast 115 dBL (95% of blasts) 120 dBL (all blasts) - Assess compliance with occasional blast monitoring as needed at or or near closest sensitive site(s). - Provide notifications of scheduled blasts to subscribing residents. - Blasts only fired within quarry's approved firing time window (10am-4pm Monday-Friday only). - Details of all blast-related complaints to be recorded in a Complaints Register. - Individual complaints and concerns to be followed up by quarry management in a timely manner. - Investigate damage claims in a timely manner. - Engage with community to provide general information about quarrying, regulations, and blast performance.	**LOW** Likelihood **RARE** Consequence **MINOR**

10 REDUCING BLAST IMPACTS

Ground vibration levels, airblast levels and flyrock are primarily controlled by blast design specifications. For efficient blasting at quarries, design parameters fall within a standard range of specifications that may be adjusted, where needed, to reduce PPV levels, airblast levels, flyrock, or improve blast performance. Shotfirers must therefore use designs that will achieve efficient blast outcomes while minimising blast impacts and maintaining compliance with regulatory and in-house requirements.

Significant changes to standard blast design specifications may greatly increase production costs from reduced blast efficiency, where blasts result in poor fragmentation, low heave and increased crushing and secondary breaking requirements. Where over-confinement occurs from excessive face burden or stemming, blasting may produce large, oversize blocks cannot be moved without secondary breaking. Oversize rock also presents a significant hazard to quarry personnel, particularly loader operators, as blocks may roll unexpectedly during muck pile digging.

All blast designs used at the proposed quarry must be guided by the following considerations;

- Maintaining compliance with ERR ground vibration and airblast limits at sensitive sites.
- Achieving compliance with PPV limits that apply at nearby infrastructure.
- Preventing flyrock and minimising the normal throw distance of rock fragments.
- Achieving adequate blast performance (good fragmentation and heave, viable drill and blast costs, minimal secondary breaking and overall efficiency).

If ground vibration levels, airblast levels or rock throw distance need to be further reduced at any stage, some of the following measures may be adopted.

10.1 Reducing Ground Vibration Levels

The ground vibration levels from blasting are primarily a function of a blast's MIC, distance from the blast site, and the characteristics of underlying geology. Therefore, PPV levels may only be lowered by reducing a blast's MIC. This can be achieved by;

- Reducing bench height and/or blast hole depths
- Increasing stemming height or reducing sub-drill , thereby reducing the length and mass of the explosives column
- 'Deck loading' of blast holes, where each hole contains two separate charges separated by a column of inert material and fired with a separate delay.
- Reducing blast hole diameter

Note that deck loading and the use of hole diameters < 89mm may result in increased blasting costs and should only be considered where PPV levels could exceed allowable tolerances.

The relationship between MIC and the distance to the 5 mm/s ($D5_{mm/s}$) and 100 mm/s ($D100_{mm/s}$) level (the ERR limit and wind turbine/fresh concrete limit respectively) are shown in **Table 9.** This information may be used as a guide for blast designers if ground vibration levels need to be reduced at sensitive sites or HWF infrastructure at any stage.

Table 8 – Charge mass (MIC) vs Distance to 5mm/s and 100 mm/s levels (k_v 1,800)

Charge Mass/MIC (kg)	$D5_{mm/s}$ (m)	$D100_{mm/s}$ (m)
100	396	61
82.5*	360	55
75.0	343	53
50.0	280	43
33.8#	230	35
25.0	198	30

**Standard MIC for 13m face*
#Standard MIC for 7m face

10.2 Reducing Airblast Levels

Airblast levels are a function of a blast's MIC and the confinement of explosives energy provided by front row burden and stemming height. If required, airblast levels can be reduced by;

- Additional confinement i.e. increasing standard front row burden and stemming height
- Charge mass reduction (see previous section)
- Configuring blasts/benches to face away from sensitive sites

Airblast levels are most effectively reduced by increasing the front row (face) burden and stemming height. Increasing the length of the stemming column also provides a charge mass reduction that results in a modest decrease of PPV levels.

The sensitivity of airblast levels to changes in burden and stemming is shown in **Figure 10.** It should be noted that front row burden and stemming heights greater than 3.5m typically result in reduced blast performance (i.e. oversize rock and reduced heave) and are not recommended unless needed to meet compliance with regulatory limits.

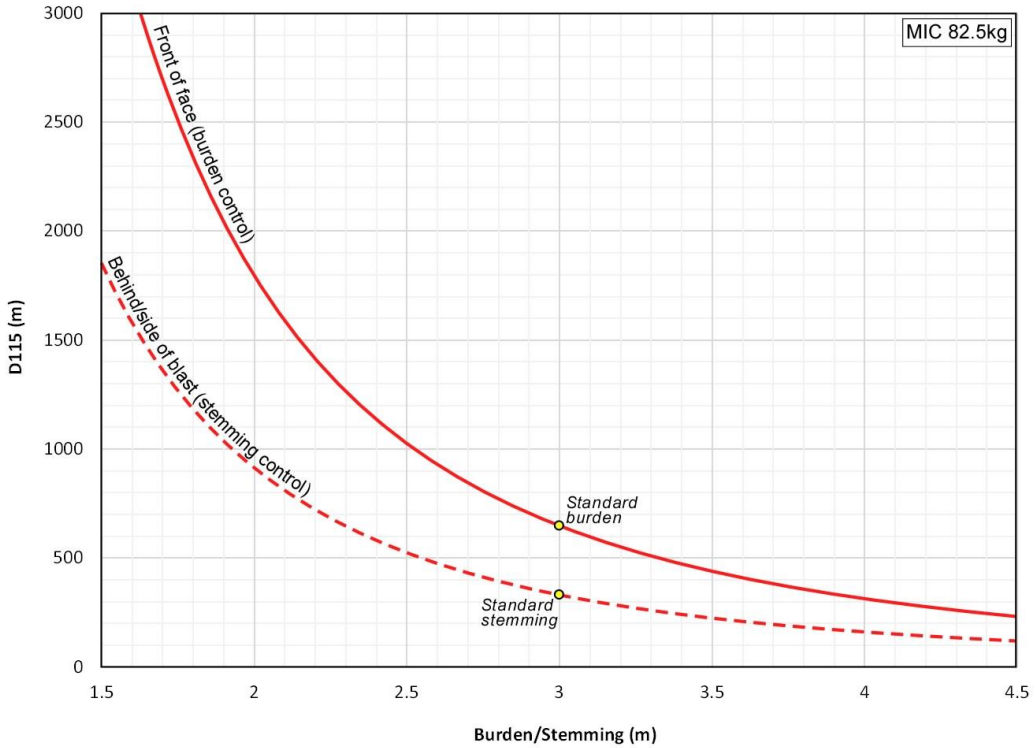

Figure 10 – Relationship of D115 to burden/stemming provisions (13m face only)

10.3 Reducing Throw Distance of Rock Fragments

The throw distance of rock fragments is primarily a function of charge mass (per linear metre of explosives column), front row burden (throw in front of a blast) and stemming height (throw behind and to the sides of a blast). Linear charge mass (kg per metre) is fixed by blast hole diameter and increasing confinement is therefore the primary method to reduce throw distance.

The relationship between maximum throw distance and blast hole confinement (front row burden and stemming) is shown in **Figure 11**.

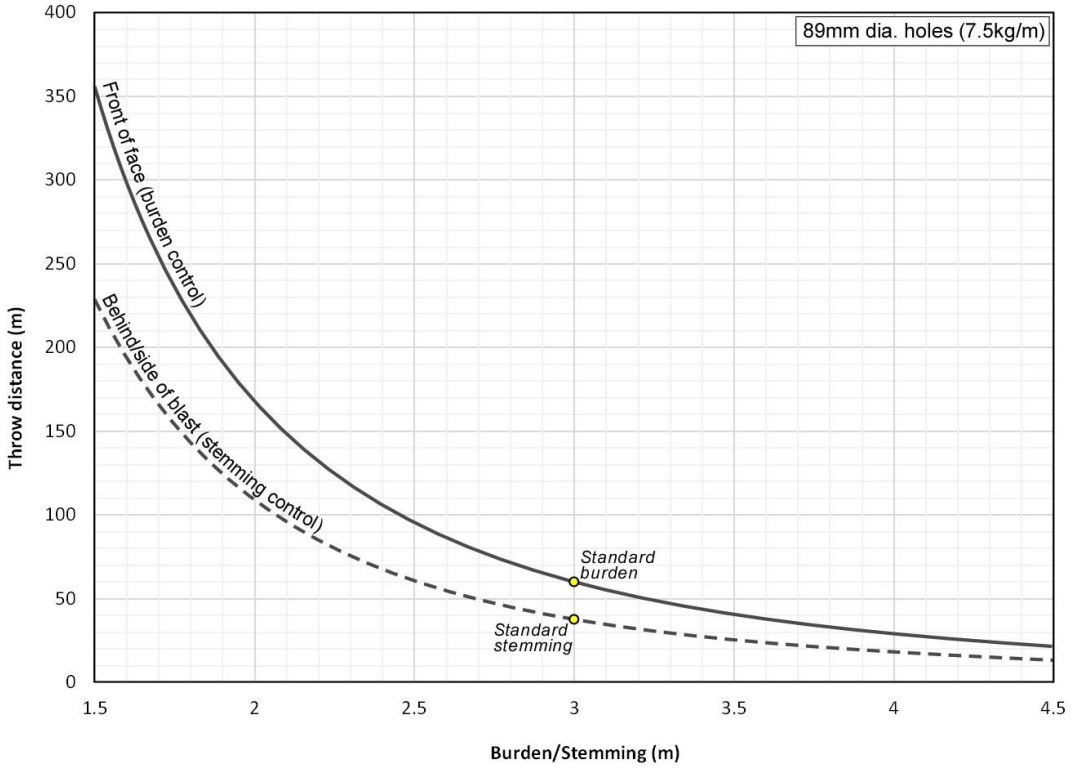

Figure 11 – Relationship of maximum throw distance to hole confinement provisions

While the throw calculations are conservative, stemming height could be increased for blast holes less than 38m from Work Authority boundary to reduce the potential for rocks being thrown onto the adjacent title property. While the minimum flyrock safety factor of 2 at the location of the closest turbine is adequate, the safety factor can be increased by increasing stemming for the closest few blasts. However, the need to reduce the normal throw of fragments should ultimately be guided by ongoing observations of the behaviour of localised rock under blasting.

11 BLAST MANAGEMENT

11.1 Blast Management Plan

Control measures for mitigating the risks and impacts posed by blasting are contained in a Blast Management Plan (BMP) that forms part of a quarry's approved Work Plan. A BMP must detail the procedures and controls required to conduct blasting operations safely and achieve compliance with standards and thresholds set out in regulations, policies and guidelines. Guidance on the requirements of a BMP can be taken from Australian Standard AS 2187.2 (2006) *Appendix A - Blast Management Plan and Records.* A BMP must include (but is not limited to) details of;

- Roles and responsibilities of personnel involved with blasting operations.
- Considerations that inform blast design, including the locations of sensitive sites and structures.
- Details of the Risk Assessments procedure required for every blast.
- Blast site access and security controls.
- PPE requirements and site communications systems.
- Blast hole loading procedures, including treatment methods for under-confined holes and weak rock structure.
- Blast clearance and firing procedures.
- Emergency contacts and emergency assembly areas.
- Misfire procedures.
- Blast monitoring and reporting requirements.
- Blast notifications system and complaints register.
- Record keeping requirements.

11.2 Record Keeping

A detailed record of all blasting operations to be retained by quarry management. This record assists with the planning of future blasts, identifies any design modifications that may be required for further blasting, and provides essential information for investigating exceedances of ERR limits, flyrock events and complaints. Records may include;

- Names, contact details and roles of all blast crew personnel.
- Blast design and drill plans, signed off by shotfirer & blast crew/technician.
- Laser face profile and Boretrak survey reports.
- Driller's logs.
- Risk Assessments for individual blasts.
- Details of modified hole loadings.
- Cart notes showing quantity of explosives used.
- Blast performance observations (e.g. fragmentation, heave, oversize, flyrock).
- Blast video files.
- Blast monitoring reports.

11.3 Blast Monitoring

Routine blast monitoring is usually required at quarries with sensitive sites less than 500m from blasting operations to assess compliance with regulatory blast vibration limits. Due to the remoteness of the proposed quarry, routine blast monitoring is not warranted though some monitoring is recommended should complaints or concerns be raised by a resident. While routine monitoring may not be warranted, ERR may request some monitoring be conducted if complaints are raised with the authority or to validate the findings of this assessment during early operations.

The need for blast monitoring at nearby wind farm infrastructure is at the discretion of the wind farm owner (Hexham Wind Farm Pty Ltd). If infrastructure is installed during the life of the quarry it is recommended that monitoring be undertaken at the footing of the closest item for the initial few blasts or closest future blasts to validate the modelling in this assessment. Monitoring could be undertaken by the drill and blast company or independent contractor with portable installations installed on blast days.

Video recording of blasts should also be taken and retained. Such recordings are essential for investigating high airblast and flyrock events, and can be used to guide modifications of blast designs to improve performance, efficiency and control.

12 CONCLUDING COMMENTS

This assessment demonstrates that blasting operations at the proposed Hexham Wind Farm Temporary Quarry can be undertaken with a high degree of safety, comply with prescribed regulatory criteria for quarry blasting, and with low or minimal impacts to the amenity of surrounding areas and the environment. Ground vibration and airblast overpressure levels would be largely imperceptible at the closest sensitive sites due the remoteness of the quarry, though low-level blast noise may be occasionally heard by residents.

Ground vibration modelling also shows maximum PPV levels at the locations of proposed wind farm infrastructure that are below conservative damage limits typically observed. Blast monitoring is suggested for the initial few blasts (or the closest future blasts to nearby wind farm assets) to help determine the need for an modification of standard blast designs. Monitoring of all blasts may not be necessary if early results show low PPV levels and confirm low-level impacts at the closest sensitive site(s).

Rock fragments can be contained with the proposed Work Authority boundary though a modest stemming height increase may be required for terminal blasts at the southern and northern extraction limit to achieve this. The quarry's title property provides a wide buffer between blasting and the closest neighbouring properties with a minimum flyrock safety factor of 9 (i.e. 9 x maximum throw) for the closest blasts. Blast clearance outside the Work Authority is limited to adjacent areas of the title property and would be relatively easy to establish. Minimum blast clearance distances of 240m (front of face) and 160m (behind and side of blast) are recommended for standard blast design though increased clearance should be provided for non-blast personnel. Clearance procedures including details of communications required between the quarry operator, wind farm management and the title property holder should be specified in the quarry's Blast Management Plan.

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Terrock Pty Ltd

29 September 2025

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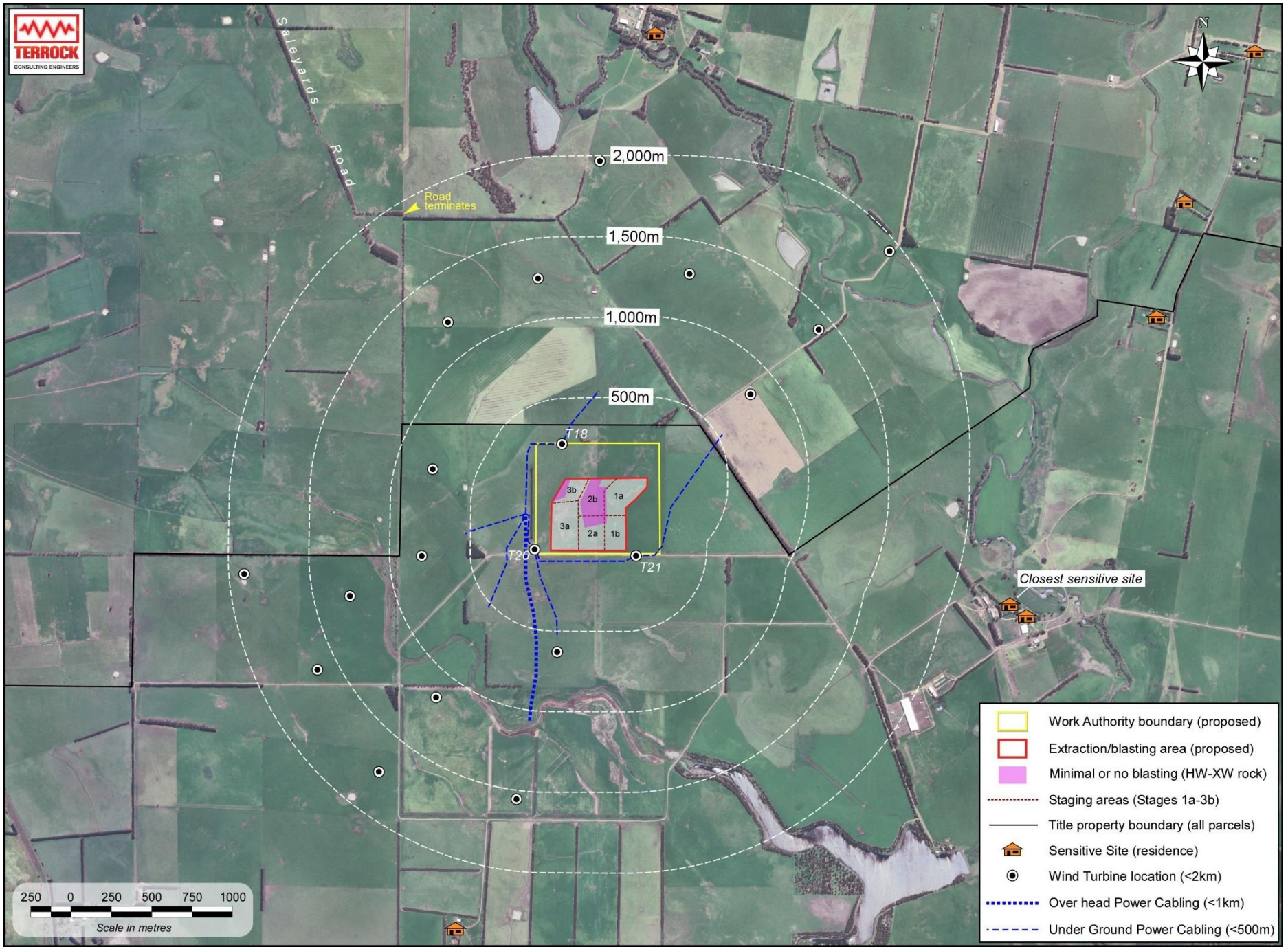
TERROCK
CONSULTING ENGINEERS
Saleyards Road
Road terminates
2,000m
1,500m
1,000m
500m
T18
T20
T21
3b
2b
1a
3a
2a
1b
Closest sensitive site
N
250 0 250 500 750 1000
Scale in metres
Work Authority boundary (proposed)
Extraction/blasting area (proposed)
Minimal or no blasting (HW-XW rock)
Staging areas (Stages 1a-3b)
Title property boundary (all parcels)
Sensitive Site (residence)
Wind Turbine location (<2km)
Over head Power Cabling (<1km)
Under Ground Power Cabling (<500m)