

EXCAVATION and REHABILITATION MANAGEMENT PLAN

Lot 102 Beelerup Road, Beelerup

Shire of Donnybrook - Balingup



Donnybrook Sandstone Supplies

July 2024

Donnybrook Sandstone Supplies

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SUMMARY

The excavation of Donnybrook Sandstone from Lot 102 Beelerup Road, Beelerup has operated for many years since 1992 but in the past the operations have been intermittent. A 20 year planning approval was provided in 2004 and is to be renewed in 2024.

The site is being developed by Donnybrook Sandstone Supplies who are highly experienced in the industry and have invested significantly in the project and the promotion of Donnybrook Stone.

This management plan updates the documentation for the site to support the 2024 application for Planning Approval.

Currently the pit and processing operations are being upgraded to produce better quality stone to supply the approved cutting facilities which have been recently installed on site.

No changes are expected to the size and scale of the operation.

Donnybrook Sandstone is restricted to a small portion of the local area, and within that area only certain areas are suitable for extraction because of the quality and hardness of the rock. The resource lies within Shire of Donnybrook Balingup Special Control Area SCA4 Established Donnybrook Stone Precinct, for the protection and staged use of Donnybrook Sandstone.

The resource on Lot 102 is a high quality deposit that contains a number of resource materials that can provide a wide range of cut blocks, pavers and other construction and decorative materials.

Almost the whole of Lot 102 is covered by pine plantation remnant/regrowth. At this stage the proposed final land form will be a rural land use, although the exact use has not been determined, and will depend on the form of the quarry at the end of excavation.

The quarry will be filled in, rehabilitated and sculptured into the landscape with minimum 20 trees per hectare.

Excavation will use a rubber tyred loader or excavator and cutting saws. The annual volumes produced are anticipated to be small with road transport to continue to be direct to Beelerup Road.

Hours of operation will continue at 7.00 am to 5.00 pm Monday to Saturday inclusive, excluding public holidays.

Transport is anticipated to continue to be around one laden truck leaving site every 1 – 2 two days. The truck transport will be timed not to conflict with school bus times.

A 20 year Planning Approval and Extractive Industries Licence is applied for.

Table 1 Project Summary

ASPECT	PROPOSAL CHARACTERISTIC	
Location	<ul style="list-style-type: none"> Lot 102, Beelerup Road, Beelerup 	<ul style="list-style-type: none"> No change
Setbacks	<ul style="list-style-type: none"> The nearest dwellings are over 400 metres away to the east and south east of the processing shed, and over 500 metres from the pit, separated by landform and tree vegetation and north which complies with EPA Generic Buffer Guidelines. 	<ul style="list-style-type: none"> No change
End Use	<ul style="list-style-type: none"> The quarry will be filled in, rehabilitated and sculptured into the landscape with minimum 20 trees per hectare as being suitable for future rural land uses. 	<ul style="list-style-type: none"> No change

ASPECT	PROPOSAL CHARACTERISTIC	
EXCAVATION		
Resource applied for	<ul style="list-style-type: none"> Donnybrook Sandstone 	<ul style="list-style-type: none"> No change
Total area of excavation applied for, including the land already open	<ul style="list-style-type: none"> 1.5 ha ancillary activities approx. Continuation of the current northern pit of 1.0 ha. See Figure 9 for future resource areas Processing shed and support facilities (approved) 	<ul style="list-style-type: none"> No change
Rate of excavation based on average anticipated volumes.	<ul style="list-style-type: none"> Up to 5,000 tonnes per year. 	<ul style="list-style-type: none"> No change
Life of project	<ul style="list-style-type: none"> 20 years 	<ul style="list-style-type: none"> No change
Area cleared – opened annually	<ul style="list-style-type: none"> No clearing required 	<ul style="list-style-type: none">
Dewatering requirements	<ul style="list-style-type: none"> Nil 	<ul style="list-style-type: none"> No change
Maximum depth of excavations	<ul style="list-style-type: none"> 1 - 8 metres cutting back into the hill, but depends on the nature of the rock and bedding. 	<ul style="list-style-type: none"> No change
PROCESSING		
Resources	<ul style="list-style-type: none"> Cutting the sandstone with wire, and rotational saws in dedicated processing shed approved and recently constructed on site. Waste rock will occasionally be crushed using mobile gear brought to site in campaigns for one week around once per year. 	<ul style="list-style-type: none"> No change
Water requirements	<ul style="list-style-type: none"> Small amounts of water to cool the cutting saws and mitigate dust. 	<ul style="list-style-type: none"> No change
Water supply source	<ul style="list-style-type: none"> Existing on site farm supply that has always been used. 	<ul style="list-style-type: none"> No change
INFRASTRUCTURE		
Total area of plant and stock	<ul style="list-style-type: none"> Processing shed approved and recently constructed on site. 	<ul style="list-style-type: none"> No change
Area of settling ponds	<ul style="list-style-type: none"> Minimal water use, directed into the pit and any overflow directed to pasture ground cover. Water from processing in the shed is recycled through a small sediment settlement sump. 	<ul style="list-style-type: none"> No change
Fuel storage	<ul style="list-style-type: none"> Small double skinned fuel storage. Refuelling from mobile tankers to small tanks to supply cutting equipment and plant 	<ul style="list-style-type: none"> No change
TRANSPORT		
Truck movements	<ul style="list-style-type: none"> One laden truck every 1 – 2 days, unless a large contract is required for excess bulk rock. 	<ul style="list-style-type: none"> No change
Access	<ul style="list-style-type: none"> Beelerup Road. 	<ul style="list-style-type: none"> No change
WORKFORCE		
Construction	<ul style="list-style-type: none"> Renewal – already in operation. 	<ul style="list-style-type: none"> No change
Operation	<ul style="list-style-type: none"> 1 – 3 persons 	<ul style="list-style-type: none"> No change
Hours of operation	<ul style="list-style-type: none"> Hours of operation, will be 7.00 am to 5.00 pm Monday to Saturday inclusive, excluding public holidays for transport, processing and excavation. 	<ul style="list-style-type: none"> No change

MANAGEMENT OF THE OPERATIONS

Safety Management

All quarries operate under the provisions of the *Work Health and Safety Act and Work Health and Safety (Mines) Regulations 2022*. These are administered by the Department of Energy Mines Industry Regulation and Safety.

Officers from the Safety Division of the DEMIRS will regularly inspect the operations in relation to health and safety.

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1.0 INTRODUCTION

1.1 Background and Proposal

Quarrying of Donnybrook Stone has been carried out intermittently since 1992, during which an Extractive Industries Licence was held over the site, Wellington Locations 2392 and 389, Beelerup Road, Donnybrook.

Parts of these Locations have been combined into Lot 102, which is the subject of this application.

During that period the operations have been intermittent as some operators were not experienced with this type of stone and the methods of excavation were not always satisfactory.

The site is being developed by Donnybrook Sandstone Supplies who are highly experienced in the industry and have invested significantly in the project and the promotion of Donnybrook Stone.

1.2 Proponent

Donnybrook Sandstone Supplies
250 Carabooda Road WA 6033

Peter Henderson Phone 0438 124 428
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1.3 Location and Ownership

Lot 102
Plan D098528
Land ID Number 4549750
Beelerup Road
Beelerup

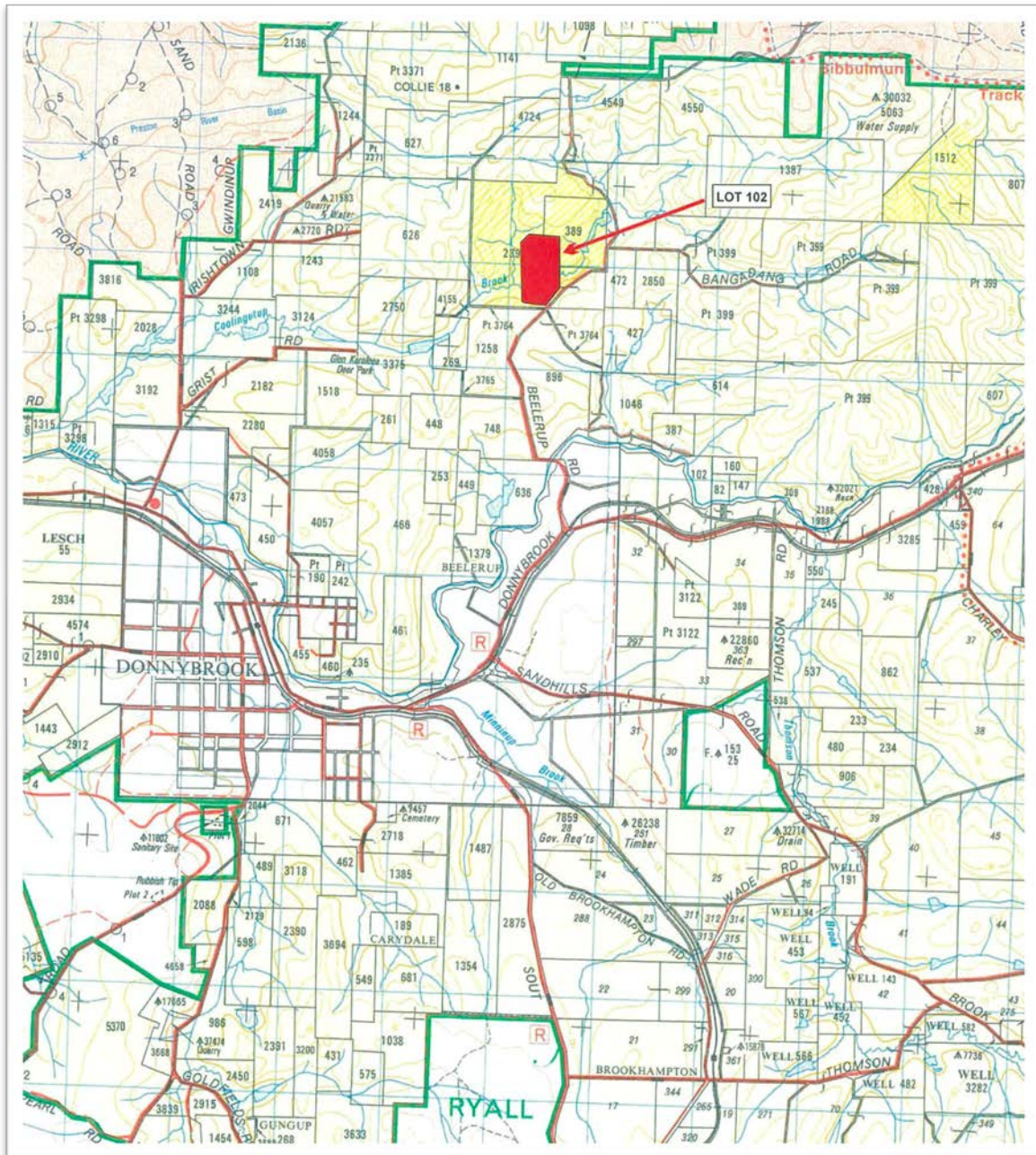


Figure 1 Location of Lot 102

1.4 Project Objectives

The proposal is to continue to provide a source of Donnybrook Sandstone for the domestic market as some of the other operating pits have now closed.

1.4.1 Importance and Rationale

The significance of Donnybrook Sandstone to the State of Western Australia is recognised in *Fetherstone J M, 2007, Dimension Stone in Western Australia, Mineral Resources Bulletin No 23, Department of Mines and Petroleum (DEMIRS)*.

The sandstone has been used widely in Government and private buildings such as the old Perth General Post Office. The operations seek to maintain the availability of the rock for which Donnybrook is widely known.

The site is recognized by the Geological Survey of Western Australia as a Significant Geological Resource under State Planning Policy 2.4 Basic Raw Materials.

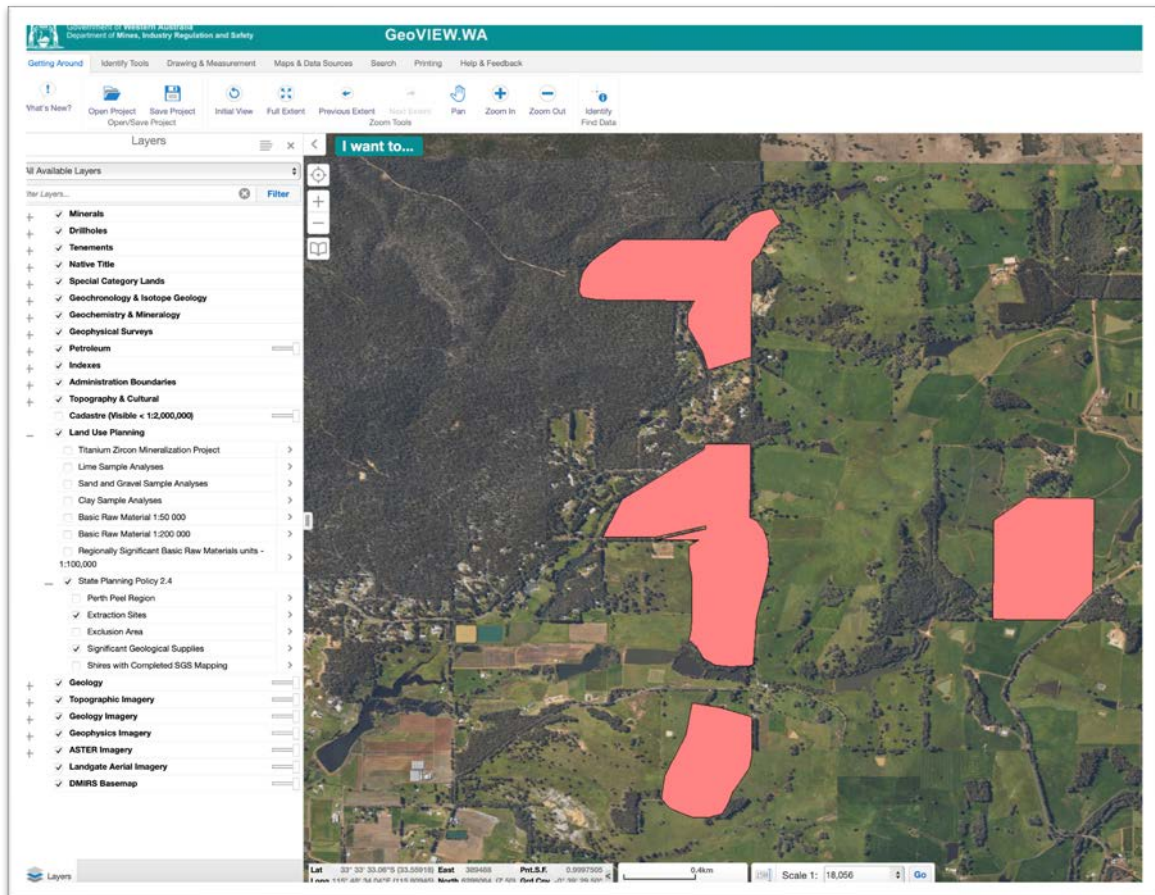


Figure 2 Regionally Significant Geological Supplies (Geoview)

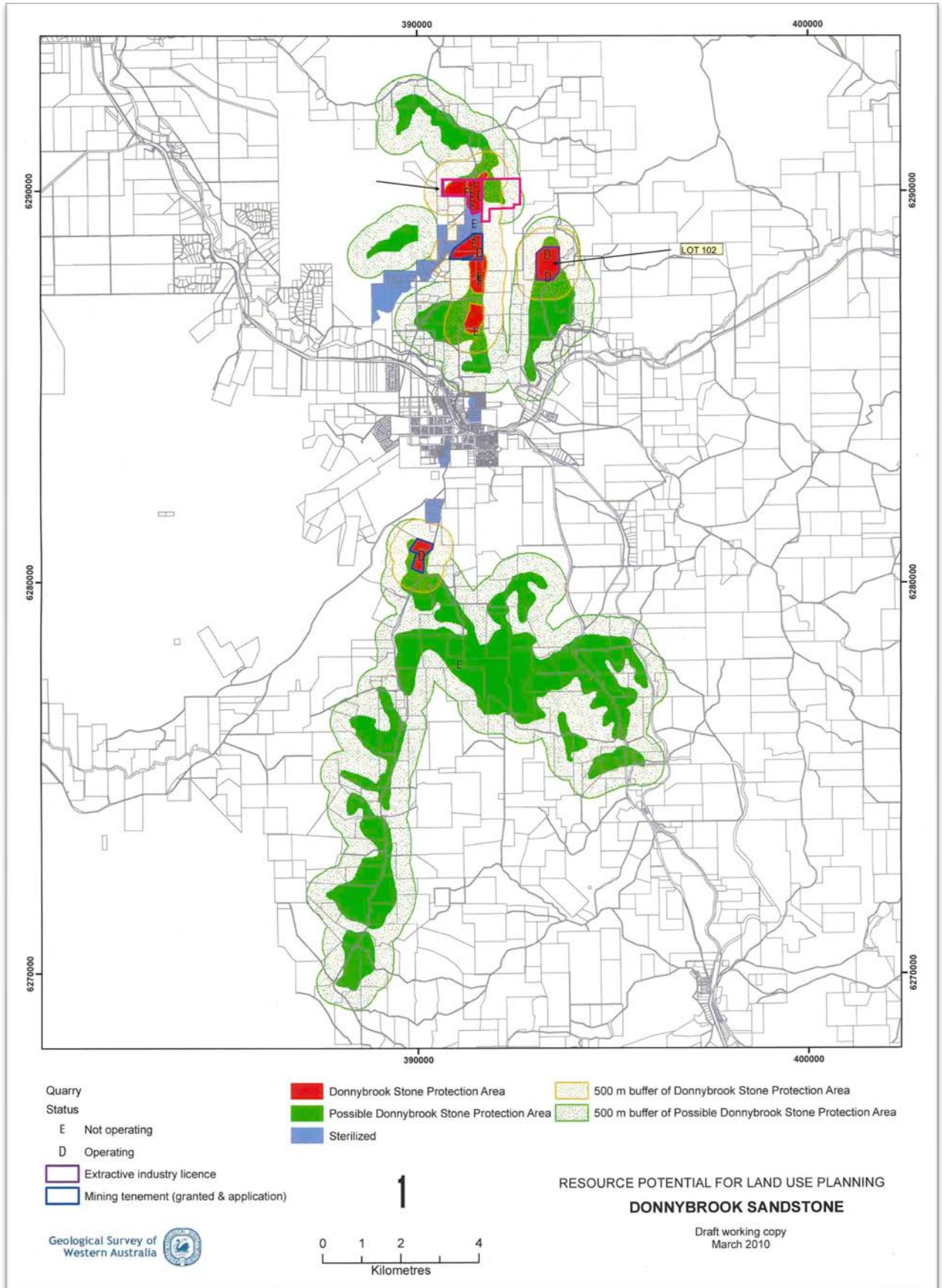


Figure 3 Location of Donnybrook Sandstone and protected areas in "red" which includes Lot 102

2.0 PLANNING ASSESSMENT

2.1 Current Land use

The site was used as a pine plantation with most of the pines being removed several years ago. There has been some self seeding of the pines and regrowth, which in turn are being harvested and sold for usable timber.

Donnybrook Sandstone has been used on a number of prominent buildings in Perth such as The Perth GPO, Commonwealth Bank, Forrest Place, WA Museum, Government Stores, Winthrop Hall at the University of Western Australia and State Library James Street.



Figure 4 Overview of the pit from the south

2.2 End Use

The quarry will be filled in, rehabilitated and sculptured into the landscape with a minimum 20 trees per hectare as being suitable for future rural land uses.

2.3 State Government Policies

2.3.1 State Government Policies and Planning Schemes

State Planning Policy 1.0, State Planning Framework Policy

The State Planning Policy Framework provides for the implementation of a planning framework through the recognition and implementation of Regional Planning Policies above Local Planning Schemes and Policies.

Within each layer of planning there are a number of key policies and strategies to provide guidance to planning and development to enable sustainable communities to develop, expand and prosper without compromising the environment and future generations.

Planning is governed under the *Planning and Development Act 2005*. This Act enables Government to introduce State and Regional Planning Schemes, Policies and Strategies to provide direction for future planning. The State and Regional Schemes sit above Town Planning Schemes and Strategies introduced by Local Government.

Strategies and Policies provide guidance on how planning is to be undertaken and how proposed developments are to be considered. These Strategies and Policies are at the State, Regional and Local levels.

Schemes are gazetted documents that provide for consideration and approval of proposed developments. These are normally at the Regional and Local Level.

In addition to the documents produced under the *Planning and Development Act 2005*, the *Local Government Act 1995* provides Local Governments with a mechanism to prepare Local Laws to manage issues of local significance.

With respect to the supply of sand and gravel, the overarching document is the;

State Planning Policy 1.0 State Planning Framework.

A number of State Policies have been released under the State Planning Framework Policy.

- State Planning Policy 2.0, Environment and Natural Resources Policy
- State Planning Policy 2.4, Basic Raw Materials
- State Planning Policy No 2.5, Agricultural and Rural Land Use Planning
- State Planning Policy No 4.1, State Industrial Buffer Policy

These are considered in turn.

A number of other key State Government Policies are also relevant to the local regional planning such as the *State Planning Strategy 2050* released in 2014.

State Planning Strategy, 2050 (2014)

State Planning Strategy 2050 comprises a range of strategies, actions, policies and plans to guide the planning and development of regional and local areas in Western Australia and assists in achieving a coordinated response to the planning challenges and issues of the future by State and Local Governments.

The approach in the strategy considers Basic Raw Materials as listed below.

Table 2: State Planning Strategy BRM Supply

ELEMENT	2050 OUTCOMES	MEASUREMENT	ASPIRATIONS
Basic raw material (BRM) supply	Accessible and affordable supplies of BRM are available close to demand	The cost of supplying basic raw materials to the building and construction industry	<ul style="list-style-type: none"> ➤ Appropriate policies are in place to manage existing and future BRM supplies over the long term. ➤ BRM are optimally used for their highest purpose. ➤ The securing of BRM sites is managed through robust strategic sequential land use planning and development control prior to final land use ➤ Demand for BRM is partly managed through compact settlement structures that contain high-density built form.

The environmental management of the quarry has been developed to minimise short and long term impacts on the local community and environment.

The operations have been designed to continue to provide good environmental management that minimises environmental change and enables continued rural land uses.

State Planning Policy 2.0, Environment and Natural Resources Policy

This policy provides for the protection of all natural resources under a number of sections;

- 5.1 *General Measures*
- 5.2 *Water Quality including stormwater and wetlands*
- 5.3 *Air Quality*
- 5.4 *Soil and Land Quality*
- 5.5 *Biodiversity*
- 5.6 *Agricultural Land and Rangelands*
- 5.7 *Minerals Petroleum and Basic Raw Materials*
- 5.8 *Marine Resources and Aquaculture*
- 5.9 *Landscape*
- 5.10 *Greenhouse Gas Emissions and Energy Efficiency.*

In addition to recognising the importance of protecting air quality, soil and land quality, water and wetlands and landscapes, the importance of Basic Raw Materials to the community is identified with reference to *SPP 2.4 Basic Raw Materials, State Gravel Strategy 1998* and *State Lime Strategy 2001*. See Section 2.1 of this management plan.

Section 5.7 of SPP 2.0, deals with Minerals, Petroleum and Basic Raw Materials.

Part of Section 5.7 states;

Basic raw materials include sand, clay, hard rock, limestone and gravel together with other construction and road building requirements. A ready supply of basic raw materials close to development areas is required in order to keep down the cost of land development and the price of housing.

Planning strategies, schemes and decision making should:

Identify and protect important basic raw materials and provide for their extraction and use in accordance with State Planning Policy No 10 (2.4); Basic Raw Materials.

Support sequencing of uses where appropriate to maximise options and resultant benefits to community and the environment.

The other factors of the natural environment are provided with the best protection possible, by this management plan, by selection of the site, operational staging and footprint and rehabilitation, bearing in mind the constraints of excavating and processing the resource.

State Planning Policy No 2.5, Rural Planning, 2016

SPP 2.5 Agricultural and Rural land Use Planning predominantly deals with the continued rural use of suitable land and its protection for the future. The policy was updated in December 2016 and provides strong measures to identify, protect and use basic raw materials.

SPP 2.5 does reiterate the need to protect and use basic raw materials, although SPP 2.4 (2021) is Statewide and now supersedes SPP 2.5 with respect to Basic Raw Materials.

Basic Raw Materials are included in the definitions as;

Sand (including silica sand), clay, hard rock, limestone (including metallurgical limestone), agricultural lime, gravel, gypsum, and other construction materials. The materials may be of State, regional or local significance depending on the resource location, size, relative scarcity, value and demand for the product.

Amongst seeking to protect agricultural values, Policy Objective 4 (c) states:

Outside the Perth and Peel Planning regions, secure significant basic raw material resources and provide for their extraction.

Section 5.9 deals with Basic Raw Materials and seeks to achieve the following in an environmentally acceptable manner;

Protect the resources until the resource is extracted (5.9.a)

Identify significant basic raw materials on sub-regional and local planning strategies, region and local planning schemes (5.9.b, 5.9.c, 5.9.d)

The extraction of basic raw materials should not be generally prohibited (5.9.e)

Provide for sequential land use (5.9.f)

Limit sensitive land uses to locations demonstrated to not limit existing or potential extraction of basic raw materials (5.9.g)

Provide for the consideration of native vegetation or significant biodiversity values and may require retention and protection of vegetation and environmental assets (5.9.h)

Have regard for the potential impacts of fragmentation and connectivity of native vegetation (5.9.i)

Maintain adequate buffers to protect water quality in public drinking water source areas (5.9j).

SPP 2.5 also supports preventing conflicting land uses (5.12.1), supports the generic buffers recommended by other Government documents such as the EPA Guidelines for separation distances (5.12.3), and seeks to restrict subdivision from impinging on basic raw material resources.

Policy SPP 2.5 is also supported by Guidelines that seek to protect the Landscape and secure transport routes.

State Planning Policy No 2.4, Basic Raw Materials, 2021

The updated Basic Raw Materials policy now covers the State and takes over the functions relating to BRM from SPP 2.5. The Policy seeks to identify and protect Regionally Significant Basic Raw Materials in addition to local basic raw materials quarries that are operating or resources that have been identified.

The support for Basic Raw Materials also considers the various planning and environmental matters and considerations with establishing and operating quarries. The proposed renewal of planning approval recognizes the staged use of an identified resource in line with the Policy.

State Planning Policy No 4.1, State Industrial Buffer Policy

SPP 4.1 discusses the need to consider adjoining land uses when locating buffers but does not prescribe set buffers for operations such as this. The development and processing of the resource has been designed to maintain maximum buffer distances. In situations where the buffers are less, actions such as the provision of perimeter bunding to provide visual and noise management, tree planting and operational procedures are used to mitigate and reduce impacts.

2.4 Local Government Policies and Schemes

2.4.1 Local Government Policies and Planning Schemes

Shire of Donnybrook - Balingup Local Planning Scheme 7

The location is zoned General Agriculture in the Shire of Donnybrook - Balingup Local Planning Scheme 7.

The objectives of the Scheme are;

The local government's objectives in managing and guiding land use, development and subdivision within the General Agriculture zone are –

- (i) encourage the protection of rural infrastructure and agricultural land resources;*
- (ii) encourage the use of rural land for commercial agricultural production including grazing, cropping, agro forestry, tree plantations, and intensive agriculture (where permitted);*
- (iii) seek to protect the economic viability of the area;*
- (iv) seek to encourage developments which will improve the Shire's population base;*
- (v) recognise the aesthetic and tourism importance of the scenic landscape, realise the need to retain the rural scenic character of a site and of the district by ensuring through siting and landscaping provision that any development does not detrimentally change the scenic rural character;*
- (vi) recommend support for subdivision where it provides for boundary adjustments, realignments and farm restructuring and new lot creation which promotes effective land management practices, environmental and landscape enhancement and infrastructure provision;*
- (vii) support non-rural uses where they are compatible with adjacent and nearby rural and other uses, and where environmental, landscape and servicing considerations are appropriately*

addressed;

(viii) support the retention and protection of portions of land within that zone that are not cleared of remnant vegetation and that are valuable to the rural and natural landscape values and ecological systems of the district; and

(ix) encourage and promote appropriate bush fire risk management.

Even though the objectives do not specify Extractive Industries, Clause 3.5.2 (vii) allows for an extractive industry to be approved as an “A” use.

The subject land lies within **SCA4 Established Donnybrook Stone Precinct** of the Local Planning Scheme.

The objective of the Established Donnybrook Stone Precinct is to ensure that land use and development within the Special Control Area is consistent with the precinct’s continued extraction of Donnybrook Sandstone.

All proposed developments and subdivision are required to be referred to the Department of Energy Mines Industry Regulation and Safety for comment.

Shire of Donnybrook Balingup – Local Planning Strategy (DRAFT) 2024

The current (2014) and Draft (2024) Local Planning Strategy provides guidance on a number of aspects of land use within the Shire, that may be related to sandstone extraction and basic raw materials. The 2024 Strategy has the following provisions.

RESOURCE MANAGEMENT				
<p>20.0. Basic Raw Materials</p> <p>The Shire contains a range of basic raw materials (BRM) which are generally located within rural localities. The Shire will need to consider new proposals, giving due regard to the associated impacts</p>	<p>20.1. Establish a balanced position that recognises the importance of basic raw materials and provides an adequate level of protection to existing resources whilst facilitating growth and development of townsites and rural living areas (in appropriate locations).</p>	<p>20.1.1. Identify land for future Residential / Rural Residential development that will not compromise identified BRM resources (e.g. within SCA4 or equivalent in LPSB)</p>	<p>The Shire needs to balance the protection of existing BRM resources with facilitating growth of townsites. This is particularly the case with SCA4 in LPS7 being in close proximity to the Donnybrook townsite and constrains growth in this direction.</p> <p>There are currently alternative development areas available in close proximity to townsites which do not contain strategic BRM materials</p>	<p>Medium term</p>
<p>including the potential for land use conflict.</p>			<p>and can cater for the future growth of Donnybrook in the medium term.</p>	
		<p>20.1.2. Review Scheme provisions relevant to SCA4 (or equivalent) including investigating opportunities for small scale subdivision of existing Rural Residential zoned land within SCA4 (or equivalent), subject to suitable notifications being placed on the Title(s).</p>	<p>The provisions of LPS8 should be reviewed relevant to SCA4 (or equivalent) to determine the ongoing relevance. In some cases, small-scale subdivision may be able to be supported subject to appropriate checks in place to protect existing and future landowners as well as the existing resource operators.</p>	<p>Short term</p>
	<p>20.2. Provide clarity and direction to proponents for the development of extractive industries that also provide suitable protections to the surrounding area.</p>	<p>20.2.1. Review general development provisions within the Scheme and develop a comprehensive LPP to incorporate contemporary guidelines and outline development expectations.</p>	<p>The Shire has a Local Law governing extractive industries however would benefit from increased guidance when assessing and determining development proposals.</p> <p>Proponents, landowners, and the community would benefit from improved guidance, particularly relating to context-based assessment, amenity impacts, road contributions etc. when considering proposals to ensure development is appropriate and decision-making is consistent.</p>	<p>Medium term</p>
<p>20.3. Protect existing Priority Agriculture from potential BRM activities and prioritise this land for traditional agricultural activities.</p>	<p>20.3.1. Review the land use permissibility for extractive industries within the Priority Agriculture zone and consider as an 'A' use.</p>	<p>The use of Priority Agriculture land for agricultural purposes is considered the highest and best use of such land. It should therefore be protected from extractive operations that may restrict the ability of the land to be used for agricultural purposes.</p>	<p>Short term</p>	

Shire of Donnybrook - Balingup Local Law – Extractive Industries

The Local Law Basic Raw Materials Policy provides direction to Council on Basic Raw Materials and their control.

Extractive Industries are normally issued with Planning Consent and an Extractive Industries Licence.

Table 3 Legislative Framework

Relevant Legislation	Environmental Factor Regulated/Affected	Relevant Approval/Requirement to Closure
<i>Planning and Development Act 2005</i>	The <i>Mining Act 1978</i> prevails over Planning legislation.	No planning approvals are required. The Shire of Donnybrook – Balingup has been involved with discussions relating to the use of the quarry and with the local people.
<i>Shire of Donnybrook Balingup Local Planning Scheme 7</i>	Lot 102 lies within SCA4 Established Donnybrook Stone Precinct which seeks to prevent new land uses from inhibiting or restricting continued access to Donnybrook Sandstone	The continued extraction of sandstone from Lot 102 complies with the Local Planning Scheme 7 and Special Control Area SCA4.
Shire of Donnybrook – Balingup Local Planning Strategy 2014 and (Draft) 2024.	Seeks to prevent the intrusion of developments that inhibit or restrict continued access to Donnybrook Sandstone.	The continued extraction of sandstone from Lot 102 complies with the Strategies.
Shire of Donnybrook - Balingup Local Law – Extractive Industries	Regulates the extraction of Basic Raw Materials.	The continued extraction of sandstone from Lot 102 complies with the Local Law – Extractive Industries.
<i>Native Title Act 1993</i>	The land predates Native Title which is extinguished.	Noted
<i>Aboriginal Heritage Act 1972</i>	No sites are listed on Department of Aboriginal Affairs database	If any heritage is found any conditions will be placed on the tenement or closure obligations. Any aboriginal heritage found during excavation and any ensuing conditions will be complied with.
<i>Environmental Protection Act 1986</i> <i>Part V – DWER Licence</i>	There is currently no proposed screening or processing of sandstone. If screening or even a crushing plant is to be used in excess of 5 000 tonnes per year it will require a Department of Water Environment Regulation Licence.	No DWER Licence is required as the operations do not exceed 5,000 tonnes per year of crushing and screening.
<i>Environmental Protection (Clearing of Native Vegetation) Regulations 2004</i>	Clearing Permit under the <i>Environmental Protection (Clearing of Native Vegetation) Regulations 2004</i> is required <i>under the Regulations</i> .	As the site is operational the cleaning of exotic pines, pasture and self seeding will not require a clearing permit. The proposed operations are located within the past disturbed and excavated areas. However clearing defined patches of native vegetation and native plants outside the previously operated and disturbed areas will require a clearing permit.
<i>Contaminated Sites Act 2003</i>	Contaminated materials that may arise from excavation or be used in excavation and processing.	No site conditions currently trigger the Contaminated Sites Act, but the legislation may apply if there was a significant pollution event.
<i>Biodiversity Conservation Act 2016</i>	The legislation seeks to protect and manage biodiversity in all its forms through regulation, conservation and restoration.	This legislation is considered if clearing permits are required.
<i>Conservation and Land Management Act 1984</i>	No matters of significance that would trigger this legislation have been	Noted

Relevant Legislation	Environmental Factor Regulated/Affected	Relevant Approval/Requirement to Closure
	identified.	
<i>Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)</i>	The potential presence of Black Cockatoos and suitable habitat may require referral to the Commonwealth under the EPBC Act 1999.	This will apply if clearing of native vegetation impacts EPBC listed matters at levels above the Commonwealth referral trigger guidelines.
<i>Health Act 1911</i>	No matters of significance that would trigger this legislation have been identified.	Waste disposal and health are noted and will be addressed during the operation of the site. No waste materials will be disposed of on site. The existing facilities have an approved septic toilet system.
<i>Rights in Water and Irrigation Act 1914</i>	There are watercourses on site which are not impacted.	There are no proposed activities that will impact watercourses. There will be no additional impacts.
<i>Work Health and Safety Act 2020 and Work Health and safety (Mines) Regulations 2022.</i>	Compliance with the Project Management Plan when it is submitted and approved.	The site is registered under the SRS and a Mine Safety Management System
<i>Department of Water Environment Regulation WPQN 15, Basic Raw Materials Extraction (2019).</i>	WQPN 15 is a Guideline and not a statutory requirement. It relates to general mining and water quality management	The continued extraction of sandstone is compliant with Guideline WPQN 15.

2.5 Aboriginal Heritage

The databases of the Department of Planning Land and Heritage were searched. No sites are listed.



Figure 5 DPLH heritage database search July 2024

2.6 Complaints Mechanism

The following complaints mechanism is proposed.

- The contact details will be displayed at the entrance to the operations.
- A complaints book is maintained.
- Upon receipt of a complaint it will be investigated and action taken if the complaint is determined to be legitimate.
- When a complaint is found to be legitimate, any reasonable actions to mitigate the cause of the complaint will be taken, to prevent a recurrence of the situation in the future.
- Details of any complaints, the date and time, means by which the complaint was made, the nature of the complaint, the complainant, investigations and any resulting actions and the reasons, will be recorded in the Complaints Book.
- The Shire of Donnybrook – Balingup (operations) or the Shire of Bridgetown - Greenbushes (transport), as applicable, will be informed of any complaint or any other report provided to a Government Department within 3 working days.
- The complaints book will be made available for viewing or requested details made available to the Shire or any other official upon request.



Figure 6 Overview of the new processing shed in the south

3.0 BUFFERS

There are no proposed changes to the scale and nature of the excavations. The access points and intensity of excavation will not change.

3.1 Consideration of nearby sensitive premises

The quarry has been designed to maximise the setbacks to the closest sensitive premises and maintain visual screening using the available landform.

3.2 Policies

State Government

A number of Government Policies relate to buffer distances and the protection of basic raw materials. *State Planning Policy No 4.1, State Industrial Buffer Policy, (draft July 2004)* discusses the need to consider adjoining land uses when locating buffers but does not prescribe set buffers for operations such as this.

SPP 4.1 discusses the need to provide buffers both on site and offsite with respect to industry including extractive industries. It notes that site specific studies should be prepared that will demonstrate that the extractive industry can operate in a manner compatible with nearby sensitive premises.

State Industrial Policy 4.1 notes that buffers are to be based on “scientific study” and are flexible. It further specifies the buffers by reference to other documentation such as the Environmental Protection Policies, EPA and DWER standards and DPLH Generic Industrial Buffer Guidelines; that is the EPA generic buffer used in SPP 2.5 that are used in the absence of supporting or scientific studies and information.

EPA Guidance 3 “*Separation Distances between Industrial and Sensitive Land Uses*”, June 2005 lists the generic buffers for quarries, not blasting, on a case by case basis. In this situation, sandstone excavation is close to the extraction of limestone in terms of excavation and processing. The generic buffer for limestone is 300 – 500 metres which complies with this proposal in the absence of supporting information and or studies.

The EPA issued *Draft Generic Buffer Guidelines 2015*, which includes a draft category of generic buffer for other rock quarrying, blasting, grinding and milling works, - material processed by grinding, milling or separated by sieving, aeration etc with a generic buffer of 1 000 metres. This draft buffer has been withdrawn in favour of retaining the 2005 Guidance.

A generic buffer relates to the distance at which there are unlikely to be any impacts without further investigations. It does not mean that smaller buffers are not acceptable. EPA Guidance for the Assessment of Environmental Factors No 3, June 2005, provides for a case by case separation, based on the potential impacts.

The buffer referred to can be both on site and offsite although in this case only on site buffers are required.

SPP 2.5 supports preventing conflicting land uses (5.12.1), supports the generic buffers recommended by other Government documents such as the EPA Guidelines for separation distances (5.12.3), and seeks to restrict subdivision from impinging on basic raw material resources.

The Policy SPP 2.5 is also supported by Guidelines that seek to protect the Landscape and secure Transport Routes.

Local Government

The subject land lies within **SCA4 Established Donnybrook Stone Precinct of the Shire of Donnybrook – Balingup Local Planning Scheme**. The objective of the Established Donnybrook Stone Precinct is to ensure that land use and development within the Special Control Area is consistent with the precinct's continued extraction of Donnybrook Sandstone.

All proposed developments and subdivision in the control area are required to be referred to the Department of Energy Mines Industry Regulation and Safety for comment. Further the **Shire of Donnybrook Balingup – Local Planning Strategy (DRAFT) 2024** provides guidance on a number of aspects of land use within the Shire, that may be related to sandstone extraction and basic raw materials.

Both sets of controls provide guidance and controls on the setbacks and visual management of any potential conflicting landuses.

Management

The issue of appropriate buffers is a matter of the distance and protection measures to prevent impact on adjoining land users. This applies mainly to noise, dust and visual impact, all of which are treated separately.

The walls of the pit, perimeter bunding and nature of the ridge landform will be used to reduce noise transmission.

The pits are located on the western side of a large steep hill, with the landform and tree vegetation providing protection to the closest dwellings.

The processing shed is located low down in the valley at the south of Lot 102 where landform and trees provide good protection.

The closest dwellings are located 400 metres east and 550 metres south east from the processing area but over 500 metres to the pit which is protected by landform and trees. Other dwellings are located 600 and 900 metres away to the north.

The set backs to dwellings complies with the EPA Generic Buffer Guidelines and the Planning Guidelines Separating Agricultural and Residential Land Uses and Local Government Planning Schemes and Strategies.

The sandstone appears to be a fluvial deposit, but does occasionally contain small spherical cobbles of what appear to be claystone or shale, that seem to occur in the interbedded shales. The origin of these is unknown because they are anomalous to the grain size of the enclosing sediments.

There are several sets of joints one of which dips west at 75° in the south swinging to south west at 60° in the north with another north striking set of joints dipping north at 45 to 60°. The northern dipping set of joints has slicken sides with movements of up to 1 metre indicated.

Age of the sandstone is interpreted stratigraphically to be Cretaceous (Wilde S A and I W Walker, 1982, Collie 1 : 250 000 Geological Series, WA Geol Surv.).

The sandstone overlies the granitic basement which outcrops on part of the ridge on the adjoining property. The contact between the rock types is either an unconformity across a undulating basement or has a small faulted component.

See the attached documents for further information.

Fetherstone J M, 2007, *Dimension Stone in Western Australia*, Mineral Resources Bulletin No 23, Department of Mines and Petroleum.

Ormsby W R, 2006, *Field Inspection of the Donnybrook Sandstone on Lot 301, Shire of Donnybrook Balingup*, Geological Survey of Western Australia.

Wyatt, B A undated, *Report on the Sandstone Deposits of Donnybrook*, Geological Survey of Western Australia.



Figure 8 Existing pit face

A series of diamond drill holes have been drilled on the site in two groups; an earlier set of vertical holes east-west across the resource and another set on the ridge to the north.

The location of these drill holes is available in the south, as are the drill cores, lying on the ground. The drill cores for the northern holes are also available off site, but the location of the holes is less distinct. The later drill holes to the north formed part of a geological investigation of the site conducted by Kimminco Pty Ltd a joint venture with the early owners, Hollis Nominees Pty Ltd.

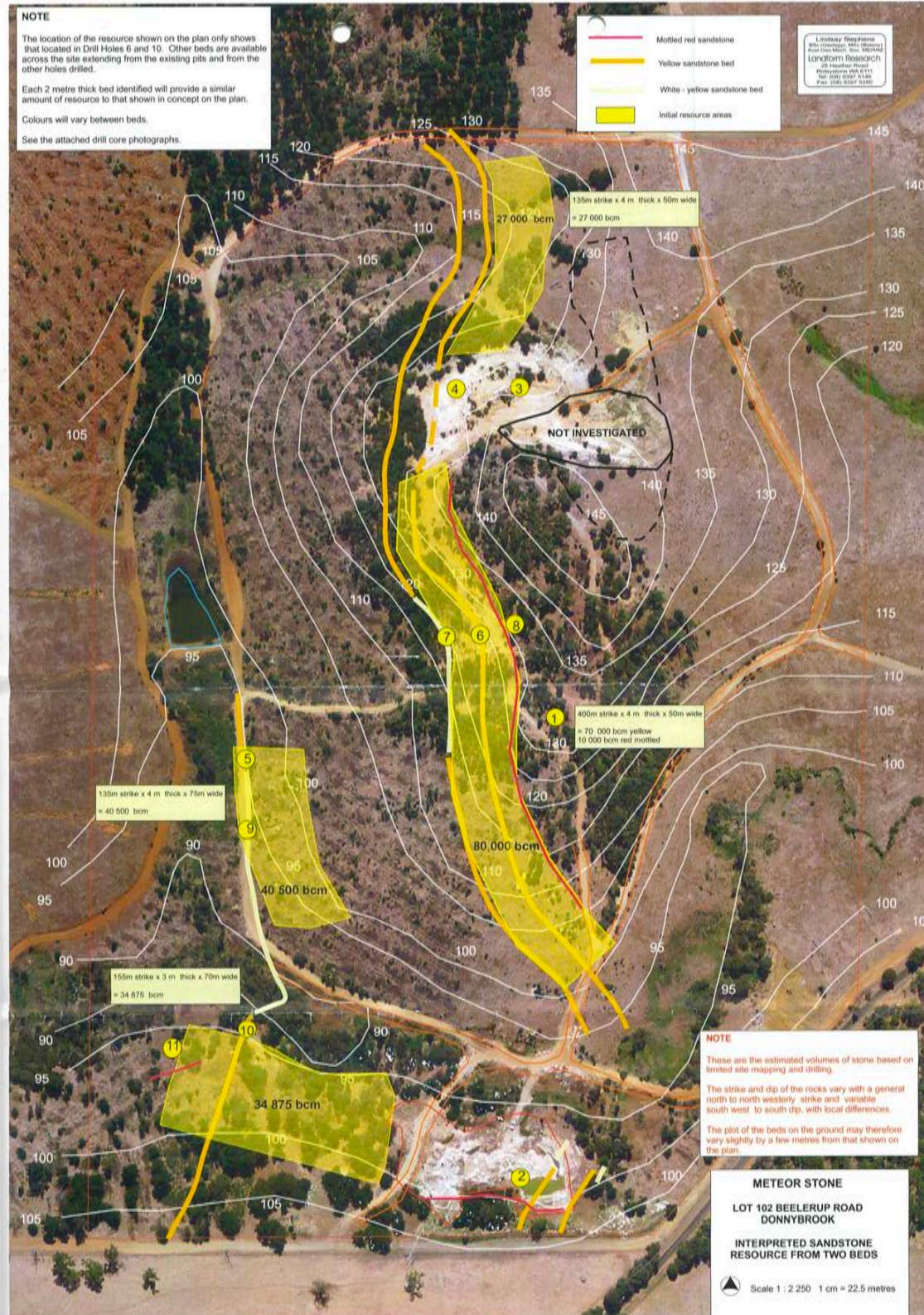


Figure 9 Target and current resource on site and the drill hole locations

The geological investigation was written up in a report titled "*Beelerup Sandstone, Donnybrook, July 1992*". In that report drilling and geological mapping showed that the Donnybrook Sandstone formed a pod between granitic and basic gneisses probably separated by faulted contacts on the basis of the age of the rock units.

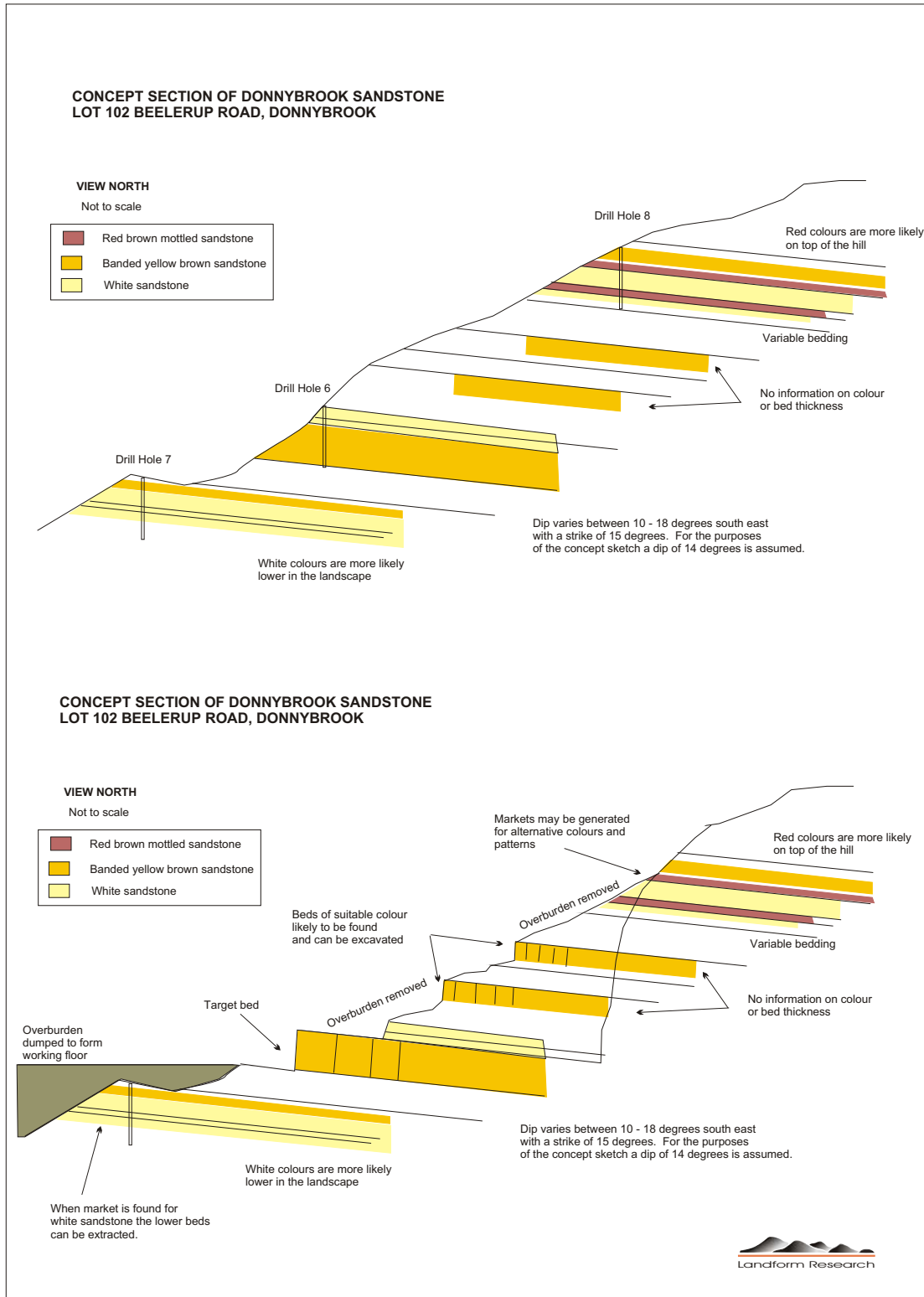


Figure 10 Geological sections



Figure 11 Diamond drill core

4.2 Regolith and Soils

The soils are shallow pale yellow loams and sandy loams over sandstone at shallow depth. The soil at the top of the hill is laterised.

Acid Sulfate Conditions

The sandstone is elevated with relatively steep sides and very free draining. The soils and jointed rock are permeable and free draining with brown oxidation colouration. It lies well above the groundwater elevation, which is located at creek level and therefore the resource is not subject to reducing conditions and does not therefore contain pyrite. As such there is no risk of acid sulfate conditions.

This compares to materials at risk under reducing conditions which are normally grey in colour or have been grey with no brown or red brown iron oxides. Where exposed to the atmosphere the at risk minerals, such as sulfides, oxidise and change to brown iron oxides, with yellow jarosite and other alteration minerals that are distinctive.

Further, as discussed in Nattaporn-Prakongkep, R J Gilkes, B Singh and S Wong, 2011, such materials have to occur below the water table under reducing conditions and then be exposed to the oxidising processes of the atmosphere.

The soils and geology are not the correct geological environment for these processes in the regolith to hold sulphides. The soils are highly oxidised and carry extensive iron oxides, with the site lying well above the water table. Soils of this type have no risk of sulphides and no risk of developing acidic conditions.

This concurs with the conditions and findings of Nattaporn-Prakongkep, R J Gilkes, B Singh and S Wong, 2011, for the formation of acid sulfate conditions.

4.3 Climate

The climate of the area is classified as Mediterranean, with dry warm summers and cool wet winters.

Climate data is recorded at Donnybrook. Annual precipitation is 969.9 mm per annum, of which most falls in the months May to September inclusive, with rain in all months except January and February.

Average maximum temperature reaches 30.0 degrees Celsius for the hottest months, January and February, and falls to around 16 – 17 degrees Celsius in winter. Average minima for the coldest months is around 5 - 6 degrees Celsius.

In summer wind blows from the east and south east and from the north west and north and north west in winter at 9.00 am.

In winter wind directions are south west to south east in summer at 3.00 pm and north to north west in winter at 15.00 pm. (Bureau of Meteorology).

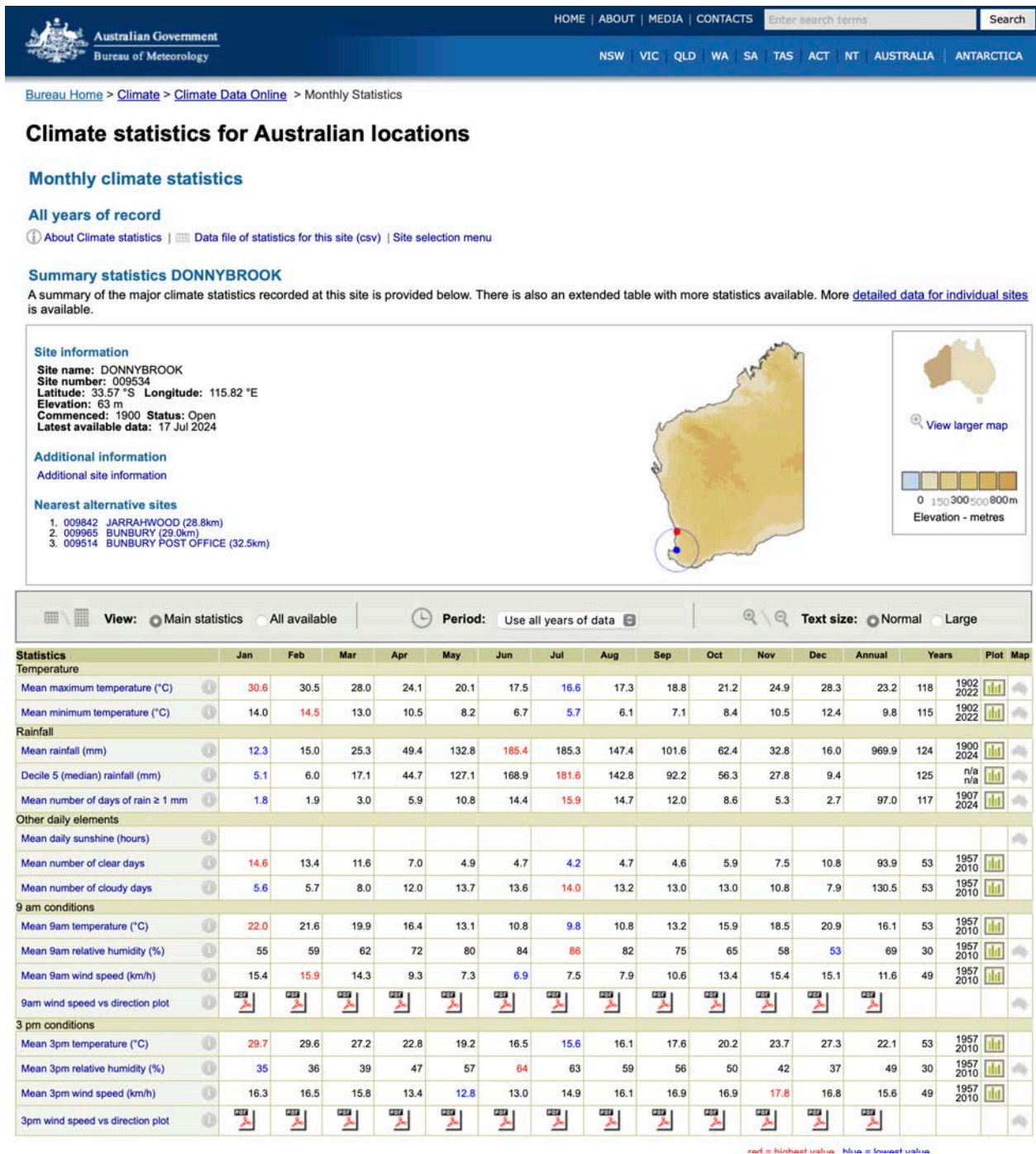


Figure 12 Climate data Donnybrook

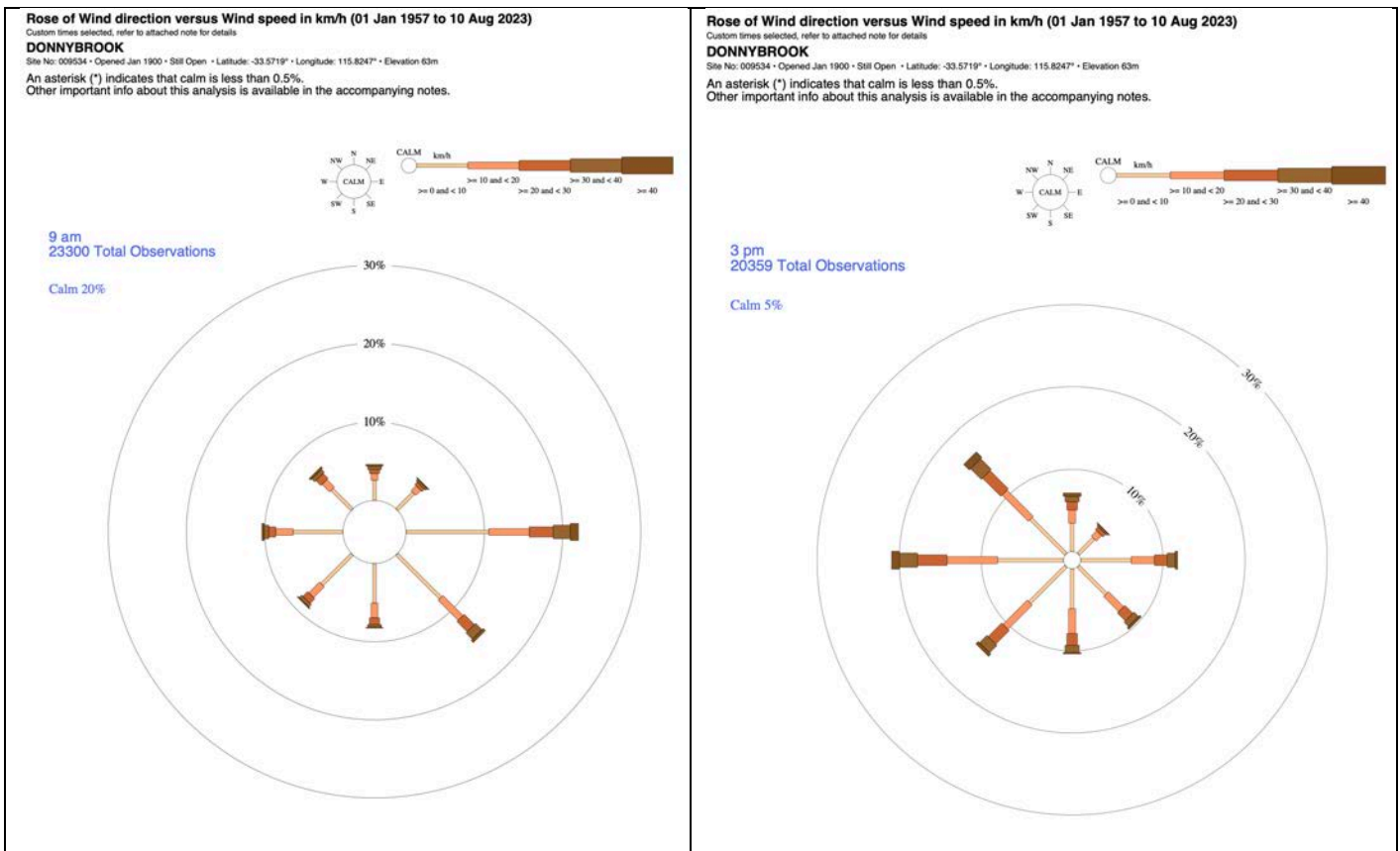


Figure 13 Wind data Donnybrook

4.4 Hydrogeology

Surface Water

The site straddles Coolingutup Brook to the south of the processing area. A small tributary runs north-south along the western side of the operating pit.

The northern portion of the beds are high above the level of the creek and well above water table level.

Excavation is proposed to be set well back from Coolingutup Brook, and at least 50 metres if the pit is extended south. The northern excavations are dry.

Coolingutup Brook ultimately travels to the Preston River at Donnybrook.

Surface storm water is fresh.

At the time of the site inspection on 24 March 2004, water quality in the pool was clear and slightly brackish with a salinity of 2255 mg/L. This may have been due to evaporation from the pool concentrating the dissolved salts, because water in the area is often in the range of less than 1 000 mg/L.

In July 2024 surface water was fresh after winter rainfall.

Groundwater

There is no groundwater to be intersected in the elevated northern pit which is over 20 metres higher than the

nearby creek.

In the southern deposit, south of the creekline, which is not at this stage proposed to be worked, and above creek level, seepages through the sandstone occur and thus the base of the beds are beneath perched local aquifers. These aquifers appear to form along the interbedded shale beds, with water infiltrating the porous sandstone and then travelling along the shale aquiclude to emerge as slow seepages where the local aquifers have been exposed. In one place in the south, water is seeping out from one of the diamond drill holes indicating that there is a small head of water related to at least one of the local aquifers.



Figure 14 Existing northern pit which is the main resource



Figure 15 Processing shed in the south showing the tree protection

5.0 PROJECT DESCRIPTION

5.1 Construction

There is no proposed construction. The shed and processing are approved and completed in the south.

The only opening and construction is the cleaning up of the existing disturbances to enable excavation to continue.

5.2 Excavation

Excavation

Small quantities of Donnybrook Sandstone have been cut as dimension stone blocks for over 100 years from the site for Government and private building and construction in Western Australia.

Excavation will be conducted to the:-

Work Health and Safety Act 2020 and Work Health and Safety (Mines) Regulations 2022 overseen by Department of Energy Mines Industrial Regulation and Safety.

The methods of operation have not changed but vary depending on the nature of the sandstone as it changes via horizontal benching and/or working to the natural beds.

The main extraction method used involves use of a large circular saw attached to an excavator cutting the vertical block cuts. The blocks are then prised off the floor/bench with forks attached to a loader or excavator.

Medium sized loader is used for general movement of material, blocks, earthworks and the like.

There is also potential to use a line of percussion drill holes when setting up a bench or quarry, but this method is not generally used. Blocks are normally broken out by lifting with prongs under the sandstone blocks.

Excavation creates a series of low benches 1 to 3 metres high or the thickness of the sandstone between the joints. Using this method blocks largely determined by the jointing can be extracted.

The methods use only low percussiveness to avoid shattering and cracking the rock and this reduces the potential noise generation.

Major equipment on site are one to two excavators, wire saw and loader. From time to time other equipment may be used on site such as a small truck to move blocks, bulldozer, backhoe, bobcat for small block handling, and other contract equipment as required for a particular purpose.

A bulldozer is used intermittently to push the faces down to reduce the elevation and increase the safety and for closure of faces.

Alternative methods used previously, which involved drilling a series of holes along two sides and the base of each block, and breaking the blocks out and a future wire saw, remain options. Frequently the basal cuts or holes are not required because the blocks break along flat horizontal joints/bedding planes.

If used a wire saw involves drilling two horizontal holes at right angles through the rock and feeding a wire through the holes. The wire contains embedded tungsten or other abrasive material. The wire is then linked to a pulley and mechanically rotated as the wire is tightened. This abrades the rock away and produces a smooth surface. The process is repeated in a vertical manner to break out the block.

All methods use water as a dust suppressant and coolant. This is sourced from the water in the base of the pit. The water is pumped to a tank at a higher elevation than the operational area and gravity fed to the work place.

The thrust of the excavation will be into the hill.

Once the blocks are broken out they are picked up by a loader.

Excavation will be in benches of 1.0 to 3.0 metres high depending on the jointing in the rock.

Processing

The blocks of stone, which can be up to two metres cubed, are classified into first or second grade and cut on site in the existing processing shed.

Computer controlled saws are normally used to cut the blocks into tile thickness for use in paving and facing applications. A wire saw is used to reduce the block sizes and cut blocks.

Apart from cutting the blocks and trimming them, there is no other processing of the sandstone.

The only stockpiles will be blocks waiting transport from site, subgrade blocks that are waiting for a market and subgrade sandstone at the pit which annually or as necessary will be crushed by a contracted mobile crusher to produce landscaping aggregates.

A rubber tyred loader is used to load each road truck.

5.3 Pit Design

Final Contours

The depth of the pit will be similar to that during the existing operations, at cuts and benches of 1 - 4 metres deep working into the side of the hill and in a sequence down the slope of the hill.

This minimises the amount of overburden that has to be managed and enables a sloping hillside to be created at the end of excavation.

Slopes will be 1 : 2 to 1 : 4 vertical to horizontal, replicating the natural hill slopes.

Staging and Timing

Sandstone excavation is worked in campaigns in fine weather. During fine weather blocks of the desired colour and size will be broken out of the pit and taken by truck to the processing area.

When conditions in the pit are not suitable, too wet, hot or windy, the blocks will be cut up by rock saw, in the processing shed.

5.4 Stockpiles

The method of working by alternating pit extraction with cutting in the processing shed will minimise the need for significant stockpiles of broken out blocks or bulk products.

The only stockpiles will be the broken and subgrade blocks at the pit which will be stored in small low dumps until broken up to aggregates once per year or as required.

5.5 Hours of Operation

The hours of operation applied for are the same as the existing operation;

7.00 am to 5.00 pm Monday to Friday with no work on Sundays or public holidays.

This time restricts the noisiest parts of the operations to the daytime hours to comply with the Noise Regulations and minimise external noise.

5.6 Access, Transport and Security

Access will be directly to Beelerup Road through locked gates.

There is anticipated to be approximately one laden truck leaving site every 1 to 2 days.

5.7 Equipment

Table 4 Operational plant

Activity Reference	Item	Discussion
PIT	Bulldozer	Bull dozer is used to push prepare excavation sites and push down slopes at closure.
	Loader - Excavator	An excavator or loader is used to excavate and reform the land surface for closure. With the cutting saw attached cut and excavate the sandstone. With the grinding heads to remove subgrade rock and prepare working surfaces.
	Mobile crusher	Used to reduce subgrade rock to landscaping aggregates approximately once per year.
PROCESSING - STOCKPILES	Stockpiles	Stockpiles of excavated and blended materials
Processing Area	Site office/lunchroom/ ablutions	A mobile site office/lunchroom is maintained on site for the management and security of small items.
	Toilet system	A serviced portable system is installed when the site is in operation.
	Processing shed	The approved processing shed is located on site and is already in use. It is used to reduce the large sandstone blocks to stone tiles and pavers and other construction items. A range of minor maintenance items during excavation campaigns can be completed at the hardstand adjoining the processing shed.
	Fenced compound	A fenced compound may be used for the storage of mobile plant when operating. Currently the site has locked gates on the access road to Beelerup Road.

Activity Reference	Item	Discussion
FUEL STORAGE FACILITY	Fuel storage	Vehicles are refuelled from mobile tankers or and from a mobile fuel tank self banded facility.
ACCESS ROAD	Security	Locked gate at Beelerup Road, signage and fencing as appropriate where public access is likely.

5.8 Water Use

Water is mainly used for dust suppression and cooling the cutting equipment.

Water requirements will not change and are sourced from the farm supply on site.

Drinking water will be available at the processing shed using rainwater or brought to site as required.

5.9 Workforce

The workforce will vary, depending on the level of operation and market demands, but usually only the owner/operator will be working on site, excluding any additional truck drivers. That is 1 - 3 person will be on site at any one time.

5.10 Geotechnical Design Implications

Working faces and final slopes will comply with the *Work Health and Safety Act 2020 and Work Health and Safety (Mines) Regulations 2022* overseen by Department of Energy Mines Industrial Regulation and Safety.

5.11 Safety

Safety operates under the *Work Health and Safety Act 2020 and Work Health and Safety (Mines) Regulations 2022* overseen by Department of Energy Mines Industrial Regulation and Safety through the Mine Safety Management System.

Site Safety

Vehicles will have two way radio capability and phone capability. All vehicles are within line of site as the pit is relatively small. Trucks hauling sandstone are also in radio and phone contact.

Personal protection is worn by all persons on site, with a minimum of hi – viz, safety boots, long clothing, hearing and eye protection and helmets when near the face or operating machinery.

Road trucks are separated from the excavation operations. Site warning signs and directions will be installed as required to maintain safety.

Safety bunds or temporary fences are used above any active vertical faces as deemed necessary, although the land is privately owned and perimeter fenced with security and locked gates..

Warning signs are maintained as required.

Where applicable Safe Operating Procedure Sheets are made available for hazards. Workers and staff on all sites are trained in the use of the procedures and all employees provided with site induction and training as necessary prior to commencing work on the site.

Fire Management

The excavation area will form a natural firebreak; the access road will also assist. Water available on site can be used for fire fighting.

Western Australian Planning Commission Planning Bulletin 111/2016 provides for an exemption of a bushfire plan requirement because there will be no structures that will burn and the open ground will form a fire break. It also provides for an exemption where the proposed activity is a continuation of existing activities.

This applies to this continuation of sandstone extraction. The only at risk structure is the processing facilities which will have addressed fire management and risk during the design and approval stages of the development.

The management actions that are used to minimise fire risk are summarised below.

- Vehicles will be restricted to operational area, particularly on high fire risk days.
- Diesel rather than petrol powered vehicles are used.
- Perimeter fire breaks will be maintained for Lot 102.
- The mobile plant on site will be available to assist with emergency fire management when safe to do so.
- Fire risk is addressed and maintained through the site Safety Management Procedures (Project Management Plan)
- Water supplies will be drawn from existing farm supplies.
- The site is secured from unauthorised access by maintaining the existing fencing and locked gates.
- Public access will not be permitted.
- An emergency muster area is provided.
- On site communications and worker induction and training will be provided.
- The site is within mobile phone range, the surrounding area is relatively flat and any bushfire smoke will readily be noticed.

6.0 ENVIRONMENTAL MANAGEMENT – AIR QUALITY

6.1 Aesthetics

As noted under setbacks the visual amenity is considered and managed by the landform and tree vegetation.

The WAPC Visual Landscape Planning in Western Australia has been viewed and the project considered against that document.

Guidance on visual impact is also contained in *Department of Planning, 2007, Visual Landscape Planning in Western Australia (DoP 2007)*. Guidance can also be found in *Forest Commission of Victoria, undated, Landscape Types of Victoria*.

There are no changes to the aesthetics and visual management required on site or to the surrounding land uses. There are no new dwellings. As noted above the pits are located on the western side of a large steep hill, with the landform and tree vegetation providing protection to the closest dwellings.

The processing shed is located low down in the valley at the south of Lot 102 where landform and trees provide good protection. The location was chosen because it is located in the original southern pit which is now closed.

The closest dwellings are located 400 metres east and 550 metres south east from the processing area but over 500 metres to the pit which is protected by landform and trees. Other dwellings are located 600 and 900 metres away to the north.

In addition the following is used.

- The location has been chosen to minimise or mitigate the visual impacts from sensitive premises.
- Excavation will be limited below the brow of the plateau remnant to ensure that excavation does not impact the skyline and provides visual protection to the west and north.
- Topsoil will be pushed into low bunds 2 metres high along the other edges of the excavation area where visual management may be required.
- Progressive rehabilitation of all completed, excavated or disturbed areas will be implemented where possible.
- The pit is to be worked on the floor, below natural ground level and behind the perimeter bunding.
- Operations are to be staged, and the components located appropriately to minimise visual exposure.
- The components of the operations will be located in positions where they are less visible, where possible, such as behind stockpiles or bunds and towards the east at a slightly lower elevation to provide better visual protection.
- Good house cleaning practices such as orderly storage and removal of disused equipment or waste will be practised.
- Screening trees will be retained where they do not present a safety hazard.

Light Overspill

The facility does not operate at night. The only lighting that might be required at night could be security lighting. Security lighting if required will be located to minimise light visibility from adjoining land.

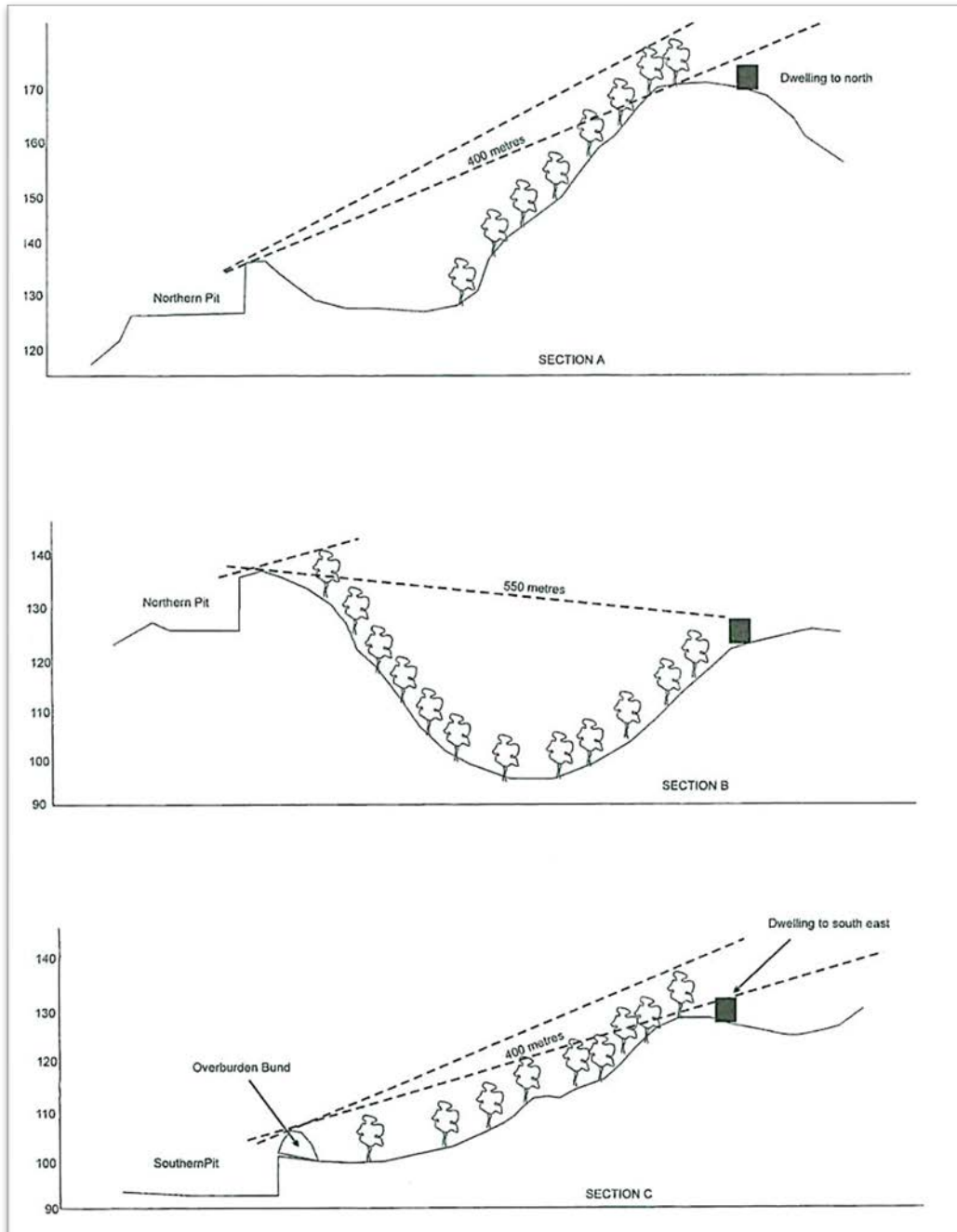


Figure 16 Sketch sections to the close dwellings

6.2 Dust

6.2.1 *Nature of Quarry Dust*

Most dust on a quarry site is generated;

- During vehicle movements on hard surface such as internal roads and hardstand.
- From cutting sandstone.
- From dust lift off by wind, mainly from hardstand and vehicle movements.

The greatest proportion of dust in quarries is visible dust. Dust during quarrying operations is only a problem when there is inadequate management of the dust risk. Most management consists of wetting down the products and keeping them moist, with other management being the use of screens and curtains on processing plant.

Commonly called "dust," scientists and regulators refer to the term particulate matter (or PM) to describe the range of particles that exists in the air or in air breathed in.

Particulate matter exists naturally in the atmosphere, eg sea-salt spray and pollens. Small sized PM can be increased due to human activities such as vehicle exhaust, industrial processes, power stations, mining, farming and wood heaters, or smoke from bushfires.

Exposure to small sized PM can be associated with health and amenity impacts if the exposure is excessive.

The likely risk of these impacts depends on a range of factors including the size, structure and composition of the PM. The various dust particle size is explained in DEC (DWER) 2011 Guideline for Managing the Impacts of Dust and Associated Contaminants from Land Development Sites, Contaminated Sites Remediation and other Related Activities. This Guideline supersedes the 1996 Guideline.

Particulate matter needs to be suspended in the air to carry any distance, and will only carry short distances if the grains are too large to move. The particles that are able to be suspended are called Suspended Particulate Matter and the total amount of that is referred to as TSP.

Quarry Dust Composition

There is data specifically from mining, (predominantly coal) from New South Wales (NSW Health) where particulate levels have been measured to be;

PM <2.5 microns as 2 – 5% of emissions (One micron is 1 / 1000 of 1 mm).

PM < 2.5 are invisible and called "fine particles". They are the main health issue and are caused by vehicle emissions whether they are along roads or on private land. Vehicle emissions will not occur at night or at other times when the site is not active.

PM 2.5 – PM10 microns as 15 – 45%

PM 10 (particles between 2.5 and 10 microns) are invisible and called "coarse particles". They can be breathed in, but are removed by alveoli and mucous. (NSW Health). This dust may be generated when land is cleared and topsoil disturbed or the site is subject to traffic in summer.

PM >10 microns as 50 – 70%

PM >10 is visible dust and will, based on the resource, be the vast majority of the particles.

The percentages above provide an indication of the dust component for sandstone quarrying and excavation but cannot be directly compared to coal mining.

Normally all sizes of dust are generated together, and there will be visible dust being generated when invisible dust is being formed. Therefore any visible dust present is a good sign and an early indicator of a dust risk. A summary of the sources and proportions of dust is shown in; NSW EPA and NSW Ministry of Health Environmental Health Branch 2015, Review of the health impacts of emission sources, types and levels of particulate matter air pollution in the ambient air in NSW.

This is backed up by occupational monitoring through the Department of Energy Mines Industry Regulation and Safety. Unpublished data from operating quarries shows quarries are compliant or can readily be made compliant with the health and safety and community standards through normal dust management practices, particularly with wetting down of at risk areas.

Sandstone Quarrying and Processing

The sandstone quarrying is low risk because of the small volumes created and the need to cut wet to keep the cutting saws cool. The water therefore decreases dust risk with the risks developing if that generated “cutting mud” from the sawing is at some point in the future is dry and broken up and powdered. Mostly that “cutting mud” cakes and hardens to fix and prevent future dust generation.

The main dust particles on site are large sand sized grains which are not mobilised to the atmosphere and cannot be breathed in.

6.2.2 Dust Standards

Visible Dust Trigger

In 2011 the DWER released Dust Management Guidelines that acknowledged the NEPM standards but rely on visual dust management. Visual dust management is the norm for quarries in Western Australia and in DWER Licences because it has been found to be the most effective, with mechanical monitoring found not to offer any advantage.

The problem with all mechanical monitoring such as the NEPM or depositional measurements is that they do not separate dust from other sources. NEPM does not separate organic particles from inorganic and are all retrospective as the dust has to move from the source to trigger an exceedance, even much later and often too late to determine the source. The NEPM relates to contaminants and Health Risk.

In the DWER Dust Guidelines 2021 (Draft) acknowledged the use of depositional dust gauges and standards which have been widely used and accepted in the eastern states and elsewhere for many years. Depositional standards are more applicable to quarries and can provide very good dust monitoring if required.

Measurements are made under AS/NZS 3580.10.1 Methods for sampling and analysis of ambient air Determination of particulate matter – Deposited matter – Gravimetric Method. The limits are provided in the table below.

Pollutant	Criteria	Source	Impact
Deposited dust	4 g/m ² /30 days (maximum)	NSW EPA 2016	Amenity
	2 g/m ² /30 days (above background)	NZ MfE 2016	

The assessment of dust is contained in DEC (DWER) 2011 Guideline for Managing the Impacts of Dust and Associated Contaminants from Land Development Sites, Contaminated Sites Remediation and other Related Activities which is used below to assess the dust risk on site and is used for most quarries when commencing.

At most quarries and mine sites it has been found that the most practical trigger and measure of dust is visible dust as its appearance is instantaneous and the source is obvious. The other two methods have time delays and do not always make it easy to pinpoint the actual dust source retrospectively.

6.2.3 Dust Risk

Dust management is an integral part of the extraction and processing of any basic raw material.

The dust risk assessment is based on the DEC (DWER) 2011 Guideline for Managing the Impacts of Dust and Associated Contaminants from Land Development Sites, Contaminated Sites Remediation and other Related Activities.

DEC (DWER) 2011 Guidelines provide for dust risk assessments to be conducted, management proposed and implemented and a visual monitoring procedure and complaints mechanism to be used.

The Guidelines are for uncontrolled sites or for sites to determine what management of dust might be necessary. Therefore two scores have been used in the risk assessment.

From the assessment of the setbacks of the proposed operations and prevailing winds, the main risk is from the easterly winds on mornings, especially in summer when the soils, hardstand and stockpiles are at their driest.

Note that the dust risk methodology assesses the dust risk at the closest sensitive premises.

Table 5 Dust Risk Assessment (DWER 2021)

PART A Number	Item	Score	Score
		Cutting sandstone in the pit. Dust management applied.	Processing and cutting sandstone in the shed. Dust management applied
1	Nuisance potential of the material	Low when treated with wetting down - 2.	Low when treated with wetting down - 2.
2	Topography and vegetation screening	Sheltered and screened -1	Sheltered and screened -1
3	Area of site activities	Less than 1 hectare - 1	Less than 1 hectare - 1
4	Type of work being undertaken	Equivalent to roads and shallow sewers - 1	Equivalent to roads and shallow sewers - 1
	Summer total without dust measures	Maximum = 5	Maximum = 5

PART B Number	Item	Score	Score
		Crushing, screening and general operations without dust management , located > 500 metres from sensitive premises.	Crushing, screening and general operations with dust management , located > 500 metres from sensitive premises
1	Distance to premises	Premises between 500 – 1000 metres – 6.	Premises < 500 metres but enclosed in a shed – 6.
2	Effect of prevailing wind	Premises Isolated land uses affected by one wind direction only - 6	Premises Isolated land uses affected by one wind direction only - 6
	Total Part B	Maximum Premises = 12	Maximum Premises = 12

Activity	Calculated Score Part A x Part B	Allocated Risk of Dust
All activities	Maximum Premises A and B = 19 x 12 = 60	Classification 1 Negligible Risk, No recommended actions or contingencies required for the dwellings. Dust management will be required for pit best practice and worker environment.

The dust risk assessment based on the DEC (DWER) 2011 shows a Negligible risk when normal dust management is provided. That is confirmed by on site observations of the current operations.

6.2.4 Tree Belts and Buffer Management

The sandstone operations comply with the EPA Generic Buffers for excavation of this type.

The setbacks provide effective dust management and comply with the EPA generic buffer guidelines.

Dust particles are readily stopped by tree belts and distance, with which the site complies. Tree belts slow the wind and allow the dust to settle. See *Planning Guidelines Separating Agricultural and Residential Land Uses, Department of Natural Resources Queensland 1997(Pages 65 – 111)* and *Department of Health WA, 2012, Guidelines for Separation of Agricultural and Residential Land Uses which uses the same criteria (Pages 112 – 118).*

The Queensland Guidelines predominantly relate to agricultural spray drift, but based on particle size also relate to dust. They are based on field studies and demonstrate the effectiveness of tree belts and distance in providing screening against particulate travel.

The Guidelines provide for a buffer of 300 metres for open agricultural land, dropping down to 40 metres where an effective tree belt is in place. The Western Australian Department of Health also uses the same guidelines.

The operations comply with the Department of Health buffer recommendations, with landform screening, tree belts and in excess of 400 metres of separation distances with tree belts and landform between.

6.2.5 Monitoring of Excessive Dust

When visual dust trigger conditions are detected and/or alerted, relevant action is taken. This can include additional water suppression, modification of procedure, delay until more favourable conditions are present, use of alternative equipment etc.

Human monitoring can detect potential dust risks prior to, and take action prior to, significant dust being generated. They notice dust immediately, whereas machine monitoring has to rely on significant dust being generated, travelling to the boundaries of the premises and triggering an alarm. The operators would be negligent if they let the dust get to that level of impact prior to taking action.

Human monitoring can detect potential dust risks prior, and take action prior, to significant dust being generated. They notice dust immediately such as from tyres. The research by Sairanen M and O Selonen, 2018, *A Review of dust emission dispersions in rock aggregate and stone quarries, International Journal of Mining, Reclamation and Environment*, demonstrates that visual assessment of dust agrees with the measured concentrations of dust.

All operators on site are instructed to be vigilant to dust generation and management and report any excessive dust or potential dust management issues.

6.2.6 Occupational Dust

Occupational Dust is managed under the *Work Health and Safety Act 2020 and the WorkSafe and Safety (Mines) Regulations 2022* overseen by Department of Energy Mines Industry Regulation and Safety.

6.2.7 Actions and Management

Table 6 Dust Management Actions

Activity	Dust Management
Objectives	<ul style="list-style-type: none"> ➤ Minimal dust moving on site and no offsite dust ➤ No visible dust to cross the boundary of Lot 102. ➤ No dust impact on sensitive premises.
Legislation and Guidelines	<ul style="list-style-type: none"> ➤ WQPN 15 Extractive Industries near sensitive water resources (2019) ➤ DEC (DWER) 2011 Guideline for Managing the Impacts of Dust and Associated Contaminants from Land Development Sites, Contaminated Sites Remediation and other Related Activities
Construction - Clearing	<p>Land Clearing - Opening</p> <ul style="list-style-type: none"> • This involves removing the topsoil for use in revegetation and construction of the screening bunds, followed by removal of the overburden. • Clearing and reinstating soil and overburden will be confined to a time when the soils are moist, which is most of the year.
Operation	<p>Excavation</p> <ul style="list-style-type: none"> • Similar excavation methods to past activities. • Cutting saws and blades need to be wetted to prevent overheating and dust. • Excavation will be undertaken as low in the pit as permitted by the quarry planning to provide maximum shelter for dust protection. • Trafficked roads and hard stand will be wetted down as required.

Activity	Dust Management
	<ul style="list-style-type: none"> • The loading and hard stand will be watered as required to suppress dust. • Internal roads and hardstand surfaces will be maintained in good condition (free of potholes, rills and product spillages) and with suitable grades. • A water truck will be retained or available for wetting down as applicable. • Misting is a contingency for the loading and tipping areas using a moderate mobile misting machine, but has not previously been required. • If winds are sufficiently strong, or other weather conditions are unacceptable and negate the effects of dust management, operations will cease until conditions improve and compliance can be achieved. <p>Processing</p> <ul style="list-style-type: none"> • All cutting of blocks is conducted inside the enclosed processing shed. There will be no increase in the risk of dust from the processing. • Treatment with water will be used where required. • Sprinklers or wetting down of internal roads, traffic and loading areas as required. • All crushing and screening plant will be located on the pit floor below natural ground. • Water sprays, mists and additives to crushing and screening cycles will be added with screens covers and misters at drop points as required. • The mobile plant will be screened and shielded where possible and treated with misters and other dust control at other points. • If conditions are sufficiently unfavorable, or other weather conditions are unacceptable to negate the effects of dust management, operations will cease until conditions improve and compliance can be achieved. <p>Stockpiles and Loading</p> <ul style="list-style-type: none"> • Cut sandstone blocks carry no dust risk during loading and transport. <p>Unattended Site</p> <ul style="list-style-type: none"> • A sign will be erected at the entrance to the pit with details and contacts of the operator who can be contacted if excess dust is generated. • The operator contacts will be provided to the closest dwellings to enable contact if excess dust is generated. • If dust becomes an issue when unattended during summer months dust suppression will be maintained which could include the use of a water cart, sprinkler systems on stockpiles, windbreak materials, surface stabilisation sprays and other measures as required.
<p>External Transport</p>	<p>Access and Road Transport</p> <ul style="list-style-type: none"> • Beelerup Road is sealed. • All loads for transport outside the pit are required to be covered. If they are not sandstone blocks or tiles. • All trucks will be required to be dust free and not carrying pebbles and other materials outside the tray. • The hardstand is to be maintained in good condition (free of potholes, rills and product spillages). • Trucks are to be inspected by their drivers prior to leaving the site and brushed down as necessary to remove loose materials.

Activity	Dust Management
<p>Occupational Dust</p>	<p>On Site Health and Amenity</p> <ul style="list-style-type: none"> • A readily auditable trigger of no visible dust to cross the property boundary or no significant dust generation in line with DWER Licence and best practice in WA. • The trigger for dust management is the generation of visual dust. • On site operators will be instructed to visually monitor dust, report and treat any visible dust. <p>Mines Safety and Inspection Act – Work Health and Safety (Mines) Regulations</p> <ul style="list-style-type: none"> • Occupational dust associated with the quarrying processes falls under the <i>Mines Safety and Inspection Act 1994</i> and <i>Work Health and Safety (Mines) Regulations 2022</i> overseen by the DEMIRS who regularly inspect the site. Included in the program are personal dust monitoring assessments. If on site dust is managed offsite dust risk is also managed. • All PPE equipment will be available and worn. • Operations will cease if conditions are not favourable or when visible dust is crossing the boundary. • The latest weather conditions to increase the awareness of dust risk. • On site induction training will include observation and mitigation where possible of all dust emissions.
<p>Rehabilitation</p>	<p>Rehabilitation</p> <ul style="list-style-type: none"> • Scheduled activities such as ripping, overburden and topsoil spreading are to be undertaken at times when the materials are moist. • If winds are sufficiently strong, or other weather conditions are unacceptable and negate the effects of dust management, operations will cease until conditions improve and compliance can be achieved.
<p>Monitoring</p>	<p>Monitoring</p> <ul style="list-style-type: none"> • The most effective dust monitoring is the sighting of visible dust. Dust can be detected as soon as it leaves the wheels of vehicles or from cutting equipment. • The auditable condition is visible dust crossing the boundary of the premises; the lot boundary. <p>Complaints</p> <ul style="list-style-type: none"> • A complaints procedure is in place. All complaints relating to dust are to be investigated immediately on receipt of a complaint. • A record of all dust complaints is to be maintained together with the mitigation measures to be used to reduce the dust impacts. See the example below.

6.3 NOISE MANAGEMENT

6.3.1 Regulatory Framework

Noise can originate from a number of operations and may impact on onsite workers, or travel offsite and impact on external sensitive premises. Both potential noise impacts are addressed by reducing the noise generated from the quarrying and processing operations.

Offsite noise is governed by the Environmental Protection (Noise) Regulations 1997.

The Noise Regulations, require that sensitive premises including dwellings in non industrial and rural areas, are not subjected to general noise levels (excluding blasting), during the hours 7.00 am to 7.00 pm Monday to Saturday that exceed 45 dBA. Allowable noise to 55 dBA is permitted for up to 10% of the time and to 65 dBA for 1% of the time. Noise levels are not to exceed 65 dBA during normal working hours.

Between 9.00 am and 7.00 pm on Sundays and Public Holidays, and between 7.00 pm and 10.00 pm on all days, the base level is 40 dBA.

At night, between 10.00 pm and 7.00 am Mondays to Saturday, and before 9.00 am on Sundays and Public Holidays the permitted level drops to 35 dBA.

The 10% and 1% “time above” allowances apply at night and on Sundays and Public Holidays as well.

There are penalties for tonality of 5 dB, modulation 5 dB and 10 dB for impulsiveness, that are added to the permitted levels. That is, if the noise is tonal or modulated the permitted levels drop by 5 dB. Impulsiveness is not likely to be relevant for the quarry under normal circumstances.

The Noise Regulations provide for Construction Noise exemptions to enable construction of the site such as the building of the screening bund and opening the pits.

Influencing factors that raise the allowable noise levels are activities such as external industrial noise, some nearby land uses and busy roads. These are not relevant to this site.

Under Schedule 1 of the Noise Regulations the premises on which the extraction of basic raw materials are extracted, is classified as Industrial Land for the purposes of calculating influencing factors. This was defined as the whole cadastral boundaries in State Administrative Tribunal decision {2013} WASAT 139, Bushbeach v City of Mandurah. In this case the premises is quite small and approximates the area of disturbance and will have little impact on the influencing factors.

At a distance greater than 15 metres from the sensitive premises (eg dwelling), and commercial premises, a base level of 60 dBA applies at all times, with the 10% time permitted to be up to 75 dBA and the 1% permitted to be up to 80 dBA. For industrial premises the base level is 65 dBA at all times with the 10% time permitted to be up to 80 dBA and the 1% permitted to be up to 90 dBA.

The closest sensitive premises are the two dwellings which are protected by the landform at over 500 metres from the proposed excavations and 400 metres from the processing shed.

6.3.2 Environmental Noise Management

The types of equipment proposed to be used are listed below. Not all plant will be on site at any one time and that provides for contingencies to reduce the operational noise on site if necessary at certain times.

There are no proposed changes to the operations with the current management to be continued.

Table 7 Noise Management Actions

General Noise	Management
Objectives	<ul style="list-style-type: none"> ➤ The Operations will comply with the <i>Environmental Protection (Noise) Regulations 1997</i>.
Legislation and Guidelines	<ul style="list-style-type: none"> ➤ <i>Environmental Protection (Noise) Regulations 1997</i>. ➤ DWER Works Approval and Licence under <i>Part V of the Environmental Protection Act 1986</i> to be applied for in relation to crushing and screening of gravel in excess of 5,000 tonnes per year.
Operational Management	<p>Noise Regulations</p> <ul style="list-style-type: none"> • The operator is committed to compliance with the Noise Regulations. <p>Site Selection</p> <ul style="list-style-type: none"> • The site operational locations have been selected based to maximise the setbacks and noise impacts to the closest sensitive premises. • The access road and crossover are already in place. <p>Close Sensitive Premises</p> <ul style="list-style-type: none"> • The excavation is located over 500 metres from the closest sensitive premises and the processing plant 400 metres ,with both protected by landform and vegetation.
Excavation Management	<p>Quarry Operations</p> <ul style="list-style-type: none"> • The mobile crushing and screening will take place in a location provided with landform screening or the floor of the pit approximately once per year. • All plant will be maintained in good condition with efficient mufflers and noise shielding. • Lights or low frequency frog beepers are to be used, rather than high pitched beepers, to restrict noise intrusion. • No blasting is proposed. • Excavation is to be conducted using tungsten tipped saws. • All equipment is fitted with noise shields and efficient silencers. <p>Processing</p> <ul style="list-style-type: none"> • Processing consists of cutting down the large sandstone blocks in the processing shed to maximise noise screening when road base is being produced. The solid walls of the shed provide significant noise attenuation to the closest dwellings. <p>Truck Movements</p> <ul style="list-style-type: none"> • Transport is to Beelerup Road which is sealed. • The crossover to Beelerup Road is to be repaired.

	<ul style="list-style-type: none"> • Truck movements along internal roads are restricted to the existing hardstand and access road. • Transport on Public Roads is exempt from the Noise Regulations. • Internal roads are to be maintained in good condition to minimise the banging of trays and other potential noise impacts. <p>Contingencies</p> <ul style="list-style-type: none"> • Shutdown will be used to save fuel and maintenance costs in addition to noise minimisation. • There is good flexibility to plan the equipment use to reduce noise levels further even though that is not necessary for compliance with the Noise Regulations. This can include the location of the plant, number and type of plant operating at any one time, use of bunding or shielding, changing the mobile plant, providing better silencing etc. <p>Operating Hours</p> <ul style="list-style-type: none"> • Quarrying and processing operations are to be conducted during normal working hours between 7.00 am to 5.00 pm, Monday to Saturday excluding Public Holidays.
<p>Monitoring</p>	<p>Complaints</p> <ul style="list-style-type: none"> • A complaints recording and investigation procedure is maintained. • All complaints are recorded, investigated and, if substantiated, action taken to correct the issue raised. • Where possible the complainant will be contacted to explain the procedures and actions taken to resolve the issue.

6.3.3 Occupational Noise

The management of occupational noise is normally handled by providing all necessary hearing protection, as well as conducting worker inductions and educational programs for all staff, and hearing tests which are required. Regular site audits of quarry and mining operations are normally conducted by the Department of Energy Mines Industry Regulation and Safety.

7.0 WATER QUALITY MANAGEMENT

7.1 Water Quality Protection Guidelines

The Department of Water Environment Regulation (DWER) *WQPN 15, Water Quality Protection Note "Extractive Industries near sensitive water resources 2009"*, provides guidelines for quarries within catchments, and the operation complies with that guideline.

All facilities and procedures on site are designed to comply with the DWER – DEMIRS Water Quality Protection Guidelines for Mining and Mineral Processing and are all complied with;

- Minesite stormwater
- *WQPN 15 Extractive Industries near sensitive water resources*
- Department of Water *South West Region Guidelines Water Resource Considerations for Extractive Industries* provides guidance for extraction from rural areas.
- *WQPN 28 Mechanical servicing and workshop (2006)*

7.2 Surface Water

The site straddles Coolingutup Brook to the south of the processing area. A small tributary runs north-south along the western side of the operating pit.

The northern portion of the beds are high above the level of the creek and well above water table level.

Excavation is proposed to be set well back from Coolingutup Brook and at least 50 metres if the pit is extended south. Coolingutup Brook ultimately travels to the Preston River at Donnybrook.

There are no seepages in the northern pit. A small detention basin will be created to collect runoff from this pit. The basin being located in porous sandstone will provide sediment trapping facilities but will allow the water to gradually seep into the natural soils.

Apart from lubricants, excavation methods are very clean with no chemicals used. The pools in the base of the southern pit and next to the pit, prior to Coolingutup Brook, act as detention and sediment settlement basins for any material carried in surface water. All water collected from rainfall will continue to soak into the porous rock and be directed to the pools on site.

On closure the surface will be internally drained to create one or more pools. These might overflow during wetter months and flow across the 50 metre Coolingutup Brook buffer.

All servicing of vehicles will be conducted off site.

Locked gates will be maintained to prevent illegal dumping.

Water from roads and hard surfaces is managed by detaining features, lined gutters and other structures to slow the flow of water and provide detention and time for sediment management. The hardstand areas are mainly storage areas and little different to normal gravel roads and are not large sources of sediment.

7.3 Groundwater

There is no groundwater to be intersected in the elevated northern pit which is over 20 metres higher than the nearby creek.

In the southern deposit south of the creekline, above creek level, seepages through the sandstone occur and thus the base of the beds are beneath perched local aquifers. These aquifers appear to form along the interbedded shale beds, with water infiltrating the porous sandstone and then travelling along the shale aquiclude to emerge as slow seepages where the local aquifers have been exposed. In one place in the south, water is seeping out from one of the diamond drill holes indicating that there is a small head of water related to at least one of the local aquifers.

7.4 Wetlands

There are no defined wetlands near the resource area.

The local watercourses do carry wetland species in the riparian vegetation associated with the creeks. As the sandstone is porous, and the streams do not flow all year, the wetland type riparian vegetation is restricted.

There are buffers and setbacks to the creeklines that have been in place for the duration of the current workings.

7.5 Dewatering

No dewatering is proposed or has been required.

7.5 Recharge

When the farm was first cleared the removal of the vegetation will have increased the recharge. The increased water has led to increase surface water runoff and greater local stream flows.

As the pasture is to be returned there will be no significant changes to the current level of recharge on site as a result of excavation.

Table 8 Water Management Actions

Surface Water Management	
Objectives	➤ <i>There will be no significant change to the quality or quantity of surface or groundwater.</i>
Legislation and Guidelines	<ul style="list-style-type: none"> ➤ <i>Minesite stormwater</i> ➤ <i>WQPN 15 Extractive Industries near sensitive water resources (2019)</i> ➤ <i>DWER 2003, Mine Void Water Resource Issues in Western Australia, Water and Rivers Commission (DWER) Report Hydrogeological Record Series Report HG 9.</i> ➤ <i>Read J and P Stacey, 2009, Guidelines for Open Pit Slope Design, CSIRO, CRC.</i> ➤ <i>Stormwater Management Manual for Western Australia, Department</i>

Surface Water Management	
	<i>of Environment WA, 2004.</i>
Management	<p>Water Management on Closure</p> <ul style="list-style-type: none"> • At the end of excavation the land surface will be similar to the pre-mined surface except the pit area will be several metres lower in some locations. The reconstructed soils will be planted to parkland pasture. • Overall the water balance at closure is anticipated to be similar to the pre-mine condition. <p>Refuelling</p> <ul style="list-style-type: none"> • Extraction of sandstone and the cutting of that sandstone is a clean operation with no previous pollution incidents. • Refuelling will use self contained mobile tankers and double skinned fuel facility. <p>Fuel Spill Management</p> <ul style="list-style-type: none"> • Diesel fuel will be transported to site as required by mobile tanker. • Soils and sandstone roadbase hardstand such as those on this site are adsorptive. The main risk of contamination is the minor drips that occur during the removal of hoses etc especially if these occur on clayey soils. Minor spills are quickly degraded by soil microbial matter. • Refuelling and lubricating activities are only to be used in designated areas. Equipment for the containment and clean-up of spills is to be provided in these areas. • Any potential spillage will be contained in plant and working areas by shutting down plant or equipment if the plant or equipment is the source of the spill (provided it is safe to do so). • In the event of a spill or adverse incident, activities will be stopped in that area until the incident is resolved. • Spills will be contained by the excavation or processing area. A fluid spill emergency response kit will be located at the refuelling area. For larger spills soil and resource will quickly be placed around the spill to contain it in as small an area as possible. When contained, the contaminated aggregate/loam soils will be scooped up and removed to an approved landfill or other approved site. • All significant adverse incidents (such as a fuel spill of >5 litres) in one dump, will be recorded, investigated and remediated. A record is to be kept of incidents and the Shire of Donnybrook - Balingup and Department Water Environmental Regulation notified within 24 hours. <p>Servicing and Maintenance</p> <ul style="list-style-type: none"> • All major servicing of vehicles will be conducted off site. • Servicing plant and equipment is conducted in accordance with a maintenance schedule. • Lubricating and minor maintenance activities occur in designated areas in the processing area and pit. Equipment for the containment and clean-up of spills is to be provided. • Any potential spillage will be contained in plant and working areas by shutting down plant or equipment if the plant or equipment is the source

Surface Water Management

of the spill (provided it is safe to do so).

- Waste substances and chemicals will be stored in accordance with the Site Waste Guidelines.
- Self contained contractor service trucks are used that recover all waste liquids and solid materials for recycling and removal from site.
- Waste oil and other fluids derived from the routine maintenance of mobile machinery, are transported off site and disposed off at an approved landfill site. Grease canisters, fuel filters, oil filters and top-up oils are stored in appropriate containers and brought to the site as required.
- Vehicle washdown is not proposed.
- Regular inspections and maintenance of fuel, oil and hydraulic fluids in storages and lines are carried out for wear or faults during normal maintenance and daily inspections.
- Accidental spill containment and clean-up protocol will be implemented as necessary.
- Waste chemicals derived during routine maintenance activities will be stored in appropriate sealed containers within a designated storage area or taken from site and disposed of at an approved facility.
- Rubbish generated is to be recycled wherever possible and periodically disposed of at an approved landfill site.

General Wastes

- The site is maintained in a tidy manner by removing all rubbish regularly offsite. Old plant has been removed and the site has been tidied by the landholder.
- The potential for rubbish to be dumped relates mainly to unauthorised access from outside the site and is low as the site is set back from Beelerup Road and public areas. Access restrictions such as gates or barriers are installed when the site is unmanned and equipment retained on site.
- Any illegally dumped materials are removed promptly to an approved landfill or other suitable site, depending on the nature of the material. This has not been a problem during past operations.
- Non essential or old plant and materials will be removed from the site. Locked gates and the existing fences will be maintained to prevent illegal dumping and contamination of water.
- All solid domestic and light industrial wastes are stored in commercial waste storage containers and/or removed to an approved landfill facility. There will be no waste disposal on site. Waste storage containers will be sealed so that rainfall cannot enter, therefore preventing the formation of leachates.
- Wastes generated are recycled wherever possible and periodically disposed of at an approved landfill site.
- Regular inspections (at least weekly) are conducted to ensure no wastes, litter and the like are present in or around the excavation and processing area.

Wastewater Disposal

- An approved septic toilet system is located at the processing area.

Surface Water Management	
Monitoring	<ul style="list-style-type: none">• No monitoring is has been used in the past and with the low volumes to be produced is not considered to be required.
Actions	<ul style="list-style-type: none">• Maintain and upgrade as necessary the surface water management features.

8.0 BIODIVERSITY MANAGEMENT

8.1 Flora

The site is cleared and has been used for agricultural and pine plantation purposes for many years. Occasional scattered trees are across several patches on site, such as along creeklines and at the top of the hill.

As the site is operational the cleaning of exotic pines, pasture and self seeding will not require a clearing permit. The proposed operations are located within the past disturbed and excavated areas.

However clearing defined patches of native vegetation and native plants outside the previously operated and disturbed areas will required a clearing permit.



Figure 17 Northern pit showing the regrowth pines over pasture.

8.2 Fauna

The excavation area is covered by pasture with clumps of trees, which will be retained. The vegetation provides fauna habitat and food supplies but will only be impacted if clearing occurs.

A Clearing Permit will be applied for if native vegetation is required to be cleared to extend the resource.

8.3 Wetlands

There are no wetlands on the resource area with the water courses providing the wetland vegetation.

8.5 Weed Management

8.5.1 Weed and Introduced Species

Weeds can be Declared under the nomination, and control of weeds falls under the lists of Declared Pests under the *Biosecurity Agriculture Management Act 2007*, *Agriculture and Related Resources Protection Act 1976* or *Weeds of National Significance*, (*Commonwealth Biosecurity Act 2015*).

Exotic and weeds species have not been observed on site apart from near public roads, but may be introduced in the future through illegal dumping or other means.

The management of weeds is essentially similar to that for plant diseases. The impact of weeds is really the impact within the local area and the more they are controlled the better. It is desirable that the site does not become a haven for environmental weeds during operations and at closure and therefore a management and control program is warranted at all sites.

The management of weeds therefore is to ensure that weeds are controlled, that there are no Declared or Significant environmental weeds that compromise the existing vegetation and the rehabilitated native vegetation, and that weed levels are not sufficient to impede future conservation land uses.

8.5.23 Dieback – Plant Pathogens

Dieback of vegetation is often attributed to *Phytophthora cinamomi* even though there are other *Phytophthora* species and other diseases such as *Armillaria* and *Pythium* for example that can cause dieback like symptoms.

Phytophthora cinamomi is restricted to the areas greater than the 600 mm rainfall isohyets (EPA 2000 and may occur on this site. There is also potential for other plant pathogens to be brought to the local area. Plant diseases are more likely to be transported under moist soil conditions which will be avoided on site.

Microscopic soil-borne fungi of the genus *Phytophthora* kill a wide range of native plants and can cause severe damage to many vegetation types, particularly those from the families Proteaceae, Epacridaceae, Xanthorrhoeaceae and Myrtaceae.

No obvious evidence of dieback diseases have been observed by Landform Research in the vegetation on Lot 102. As it is unclear whether other pathogens already occur on site, as part of normal best practice, plant disease management actions are used and combined with Weed Management Practices.

Table 9 Weed and Dieback Management

WEED and DIEBACK MANAGEMENT	
Environmental Objectives	There will be no additional weed species or extensions or density of the existing loading of exotic plants.

WEED and DIEBACK MANAGEMENT			
Legislation and Guidelines	<p>Weeds <i>Biosecurity and Agriculture Management Act 2007.</i></p> <p>Dieback Department of Biodiversity Conservation and Attractions, 2020, <i>Phytophthora Dieback Management Manual FEM079.</i> <i>DBCA 2020, Dieback Management Manual.</i> <i>DBCA 2023 Procedure for the Auditing of Phytophthora Occurrence.</i> Dieback Working Group, 2021, <i>Best Practise Guidelines for Management of Phytophthora Dieback in Basic Raw Materials Industries</i> are used.</p>		
Item	Management	Timing	Area
Management of Weeds	<p>Weeds are most likely to impact on;</p> <ul style="list-style-type: none"> • Disturbed areas such as overburden dumps, topsoil stockpiles. • Edges of access roads and the stockpile and processing area. • Pasture where stock are removed. • Edges of firebreaks. <p>The main sources of weeds are likely to be;</p> <ul style="list-style-type: none"> • Weeds spread through the movement of topsoil during land clearing and construction earthworks which produces soft moist soils where weeds can gain a fast hold. • Spread of existing weeds currently on site. • Rubbish dumped by the public. • Materials or waste brought to site by employees. • Soil and seeds from vehicles arriving at site. This often applies to trucks that have carried something else such as grain, or vehicles to be used in earthworks. • Wind blown seed from surrounding land as would apply to Cotton Bush. • Birds and other vectors. This is more common than is often given credit for. eg Solanum species and Blackberries.. 		
	<p>Development and operation of the pit</p> <ul style="list-style-type: none"> • Conduct regular inspections to delineate weed impacted areas and devise a treatment method for each infestation. Preferably treat weeds prior to commencing earthworks. • All vehicles and equipment to be used on site, are required to be clean and free from soil or plant material when arriving at site. • Vehicles accessing the site, whether they be road trucks or light vehicles, are required to be clean prior to leaving 	Prior to clearing	Pit Haul road.

WEED and DIEBACK MANAGEMENT			
	<p>developed areas. Dirty vehicles are not be permitted to enter the site.</p> <p>Operations and Closure</p> <ul style="list-style-type: none"> No soil and vegetation will be brought to the site apart from that to be used in rehabilitation or normal farm operations and that material has to be weed free. A contingency of a dedicated sweep out and treatment location for trucks is designated where any weed germinations from the truck sweep out are able to be identified and dealt with by mechanical removal or spraying. Plants and seeds to be used in rehabilitation will be free from weeds. 	Operations	All areas
Monitoring of Weeds	<p>Monitoring</p> <ul style="list-style-type: none"> Inspections of clearing, disturbance activities, topsoil dumps prior to rehabilitation and revegetated areas are regularly conducted. The operational and adjoining areas and revegetation are visually inspected at least twice annually and will be inspected for at least three years following closure. These inspections will utilise experienced personnel or on site staff who have been trained in the identification of the weed species occurring on site. Inspections will included gutters, drains, access roads and surface water treatment areas where there is an increased risk of weed introductions. Edge vegetation, disturbed areas and areas of increased soil moisture are also regularly monitored and treated as appropriate. 	<p>Operations twice yearly. Prior to closure.</p> <p>Revegetation twice yearly for three years following closure.</p>	All areas
Actions	<p>Treatment of Weed Infestations</p> <ul style="list-style-type: none"> Any significant weeds or weed infestations are treated by mechanical means or sprays. Illegally dumped rubbish is a major source of weeds and is removed promptly. Weeds are sprayed with broad spectrum spray during normal farm management and prior to planting or seeding in weed affected soils and when they occur on pasture or in revegetation. Weed management will work from least affected areas to most affected. Declared weeds will be treated promptly by mechanical action or spraying until removal. 	<p>Prior to commencement of earthworks.</p> <p>When weeds are present and as a minimum twice yearly.</p>	All areas
Management of Dieback	<ul style="list-style-type: none"> Any topsoil and overburden storage is located in dry areas around the pit perimeter. Quarry traffic is restricted to the designated access roads, pit and stockpile areas apart from clearing land and maintaining fire breaks where possible. Vehicles used onsite or accessing the site to be clean and free from soil or plant material prior to arriving on site from an area known or thought to be dieback infected. Cleaning is to be conducted offsite and all drivers and 	All times	All areas

WEED and DIEBACK MANAGEMENT			
	<p>plant operators are to be made aware of the need to have clean trucks and plant when initially arriving on or accessing the site.</p> <ul style="list-style-type: none"> • The site is secured from unwanted access by maintaining the existing perimeter fencing, gates. • A hygienic site is maintained by not bringing any soil or plant material onto the site except for rehabilitation purposes or from known dieback free areas. • Illegally dumped rubbish or material is promptly removed from site. • Rehabilitated surfaces are free internally draining and not contain wet or waterlogged conditions. <p>The Weed Management Policy is complied with.</p>		
Monitoring of Dieback	<p>Monitoring</p> <ul style="list-style-type: none"> • Dieback monitoring is to be continued as needed based on contract and pit hygiene requirements. 	Annual review	All areas

9.0 CLOSURE

9.1 Discussion of Closure

Background

The materials remaining at closure from sandstone excavation are natural soil materials that do not produce any remaining or lingering environmental risk.

An audit of the potential materials that may be present from mining at closure is presented below.

The excavated area was pasture prior to excavation and will be returned to pasture with all clumps of trees retained and some clumps of native trees and shrubs added in strategic locations.

All the materials left on site are natural low risk. The soils and rock are natural and do not carry any environmental risk apart from physical risk such as soil erosion.

Closure Objectives

The closure and rehabilitation is developed from a set of closure objectives that are designed to provide a return to productive agricultural land.

The materials inventory is a checklist of the materials that might occur when extracting materials from the ground and does not necessarily indicate that such materials are present on site.

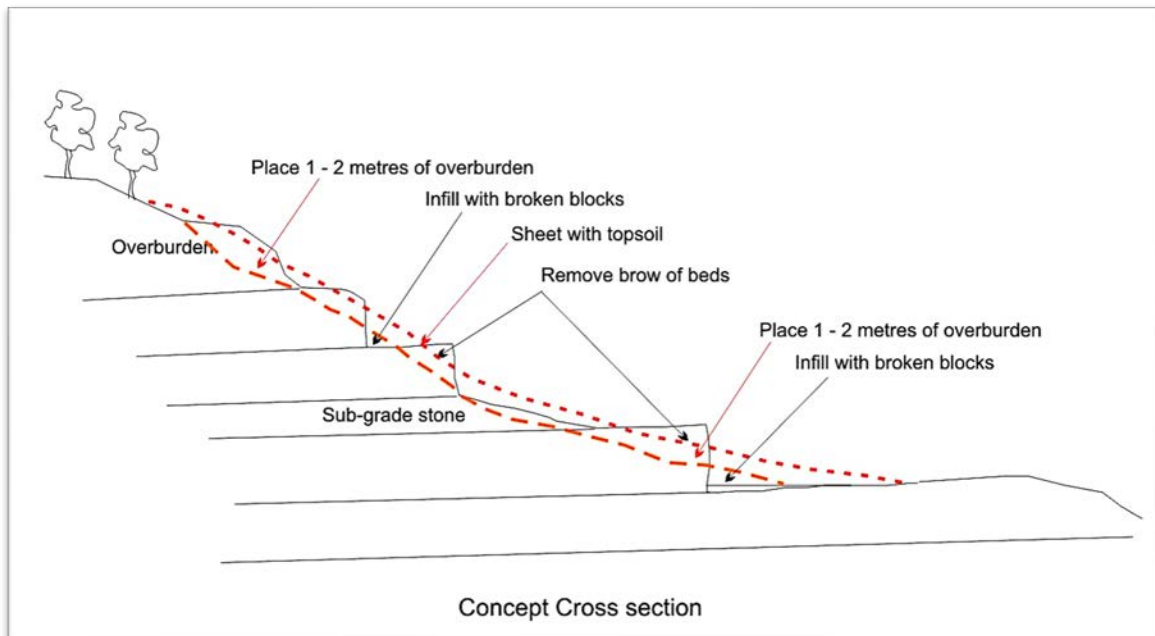


Figure 18 Concept closure landform

Table 10 Closure Materials

Type	Comment	Treatment	Reference
Soil	The soil and overburden is around 0.3 - 1 metres thick, of loam to loam clay soils on sandstone outcrop	All topsoil soil will be retained for rehabilitation.	
Subsoils Overburden	The subsoils and overburden will be removed prior to excavation.	Overburden and subsoils will be retained for use in rehabilitation.	
Surface water	The water quality is fresh.	No treatment necessary	
Ground water	The water quality is fresh.	No treatment necessary	
Acidic materials and drainage	Not present. The sandstone does not contain sulphides and there is no risk of acidic materials developing.	No treatment necessary.	Field geological examination by Landform Research
Sodic or dispersive materials	The water quality is fresh.	No treatment necessary.	Field geological examination by Landform Research
Asbestos asbestiform minerals	None present.	No treatment necessary.	Field geological examination
Radioactive materials	Not present		Published WA Geological Survey radiometric mapping
Metallic or chemical materials	Not present	No metallic or sulfidic materials or minerals are present in the gravel.	Field geological examination and experience and published information.
Tailings storage	Not required		
Ablutions waste		Serviced portable toilet system will be provided or on farm facilities used.	Water Management Section
Dangerous Goods and Hazardous Materials	None will remain on closure.	There are no hazardous materials used for sandstone extraction apart from fuel, and service items.	
	FUEL The various plant will be refueled from mobile tanker. None will remain on closure.	Any soil or other materials with drips and spills will be removed offsite to an approved waste site or location.	Water Management Section
	SERVICE MATERIALS Only minor lubrication will be conducted on site	Any wastes will be collected and removed from site promptly to	Water Management Section

	All major servicing will be conducted offsite. <i>None will remain on closure</i>	an approved recycling or waste disposal area. Only minor servicing will be conducted on site. All major servicing will be conducted offsite.	
General waste		Regularly removed from site to an approved disposal area	Water Management Section

9.2 Closure Implementation

The closure planning will be updated from time to time as the excavation progresses forwards. This will include both anticipated costs and procedures.

The following procedures are used for final closure and rehabilitation of the stages of excavation and on completion of the gravel pit.

Maintenance and monitoring is to be conducted until completion criteria is met. A three year cut off is provided for rehabilitated soils.

Unexpected or early closure will be completed in the same way as permanent closure below but the full rehabilitation of any completed area will be completed as one operation.

Closure Objectives

- Stable post-mining landscape, and the minimisation of wind and water erosion.
- Pasture cover with 20 trees per hectare
- Match slopes and landform to those of the surrounding local area.
- Maximum slopes of 1 : 4 vertical to horizontal are to be provided to the batter edges of the pit.
- Provide for the protection of the local groundwater resource in terms of both quality and quantity.
- Achieve weed species at levels not likely to threaten the parkland pasture end land uses.

Table 11 Site closure and Rehabilitation

Closure and Revegetation	
Steps in Rehabilitation and Revegetation	Activity - Specifications
	<i>To be completed as soon as site activities have been completed on any area and that area will not be required for future operations.</i>
Timing	<ul style="list-style-type: none"> Progressive rehabilitation is to occur as soon as possible following the end of excavation on each stage of pit floor and batter slope. This is to be completed progressively by the normal plant that operates on site during campaigns. Any disturbed areas that are no longer required will be rehabilitated using the methods listed below.
Site Clearance	<ul style="list-style-type: none"> Removal of all foreign items and potentially contaminated materials. All non natural inert materials associated with quarrying will be collected and removed from site unless required for internal roads. This includes plant, buildings and other structures or materials not required for future farming or other uses.
Land Clearing	<p>Vegetation</p> <ul style="list-style-type: none"> Vegetation fragments left over from land clearing will be spread on the revegetated land. A bulldozer or loader will be used to remove any vegetation by pushing it into windrows. Native logs and larger vegetation retained from land clearing will be redistributed on the land being restored. Smaller vegetation recovered from land clearing will be track crushed and directly transferred to areas under rehabilitation to assist soil and habitat generation. <p>Topsoil</p> <ul style="list-style-type: none"> Essentially all topsoil, vegetation fragments and any overburden recovered from land clearing will be used in rehabilitation; subject to weed management. The vegetation will be stored with the topsoil in low dumps <1 metre high around the perimeter of the pit. Weed management will be applied as required. <p>Overburden</p> <ul style="list-style-type: none"> Over or inter burden, as gravel, sandstone rubble silt from detention basins etc will be pushed/spread, normally by bulldozer, to form bunding around the active area. Weed management will be applied.
Landform Restoration	<p>Surface Restoration</p> <ul style="list-style-type: none"> Rehabilitation is to occur as soon as possible following the end of excavation on each stage of pit floor and batter slope. This is to be completed progressively by the normal plant that operates on site during campaigns. A loader, excavator or bulldozer will be able to undertake this. <p>Pit faces – Geotechnical</p> <ul style="list-style-type: none"> The pit will be prepared by pushing down, reducing and backfilling the active face with a loader, excavator or bulldozer. The batter slopes and pit faces will be left at a minimum of 1 : 4 vertical to horizontal, unless the Minister for Works requires certain faces to remain open for future supply of sandstone for the State. Such faces will be left in a stable condition protected by fencing, bunding and signage as required. Hardstand will be deep ripped in two directions. Waste blocks will be used to restore the land surface by use in fill or to stabilize batter slopes
Surface and Soil Restoration	<p>Surface restoration</p> <ul style="list-style-type: none"> The land surface will be formed to match the local natural landforms. Excavated areas, access road, hardstand and other processing areas will be removed and deep ripped. Roadbase, hardstand and any other inert materials left over or not required from the site operations will be scraped and recovered.

Closure and Revegetation	
	<ul style="list-style-type: none"> • Any sections of the pit that bottomed on sandstone will be deep ripped and covered by overburden. • Overburden will be spread over the reformed surfaces, followed by topsoil where available. • Overburden and topsoil will be smoothed ready for rehabilitation. • The final land surface will be formed at a separation of at least 2 metres to the water table. • Water erosion on the batter slopes is avoided by the form of those slopes and by leaving the surface soft, rough and undulating, with the undulations running along contour. The final machinery run should be along contour and not down slope. • Wet and damp areas are to be avoided.
Revegetation	<p>Weed Control</p> <ul style="list-style-type: none"> • Undertake Weed Management. • In May, or after significant rainfall events such as the first autumn rains, check for weed germination. • All species used in rehabilitation are to be local provenance species suited to local soils. <p>Dieback Management</p> <ul style="list-style-type: none"> • Undertake dieback management procedures. • Use dieback procedures for the use of mobile plant and land restoration. • Rehabilitation is to occur as soon as possible following the end of excavation on each stage of pit floor and batter slope. <p>Seed and Vegetation - Pasture</p> <ul style="list-style-type: none"> • Pasture will be normal agricultural species spread from topsoil or additional pasture seed. • Topsoil provides a useful source of seed for rehabilitation when the correct handling of the topsoil is used, stripped and replaced dry (autumn direct return). Maximum depth of 50 mm can be used to optimise revegetation of species-rich plant communities. However weed affected topsoil can create additional issues and may not be used. • The pasture species will be matched to the soil types and rainfall. The location falls into the “High Rainfall Coastal” planting regime with sandy soils. Suitable perennial legumes include Birdsfoot trefoil, Lucerne, Strawberry Clover, and Sulla. Perennial pasture includes Perennial Ryegrass, Phalaris, Cocksfoot, and Summer Active Tall Fescue, Kikuyu and Rhodes Grass. Annual pasture species include Italian Ryegrass, Serradella, subterranean clover. • The actual species used will be determined by the individual season, nature of the rainfall in the preceding months and stocking/hay production proposed by the landholder which may change from time to time. • Seeding rates are 2 – 5 kg/ha depending on the species used; for example Ryegrass is seeded at 3 kg/ha whereas Rhodes Grass is seeded at 4 kg/ha. <p>Seed and Vegetation – Native Species</p> <ul style="list-style-type: none"> • Trees will be added in clumps of 20 per hectare in clumps to form patches of native vegetation or to add to existing patches and corridors such as along the creeklines. • Trees/shrubs will be installed as tube plants during June - July in clumps on the rehabilitated land surface and will be provided with a 10 g tree fertiliser tablet placed beside the plant. The planting density will be 20 tube plants per hectare, planted in clumps. <p style="margin-left: 40px;"><i>Acacia saligna</i></p> <p style="margin-left: 40px;"><i>Banksia grandis</i></p> <p style="margin-left: 40px;"><i>Eucalyptus calophylla</i></p> <p style="margin-left: 40px;"><i>Eucalyptus marginata</i></p> <p style="margin-left: 40px;"><i>Eucalyptus megacarpa</i></p> <p style="margin-left: 40px;"><i>Eucalyptus patens</i></p> <ul style="list-style-type: none"> • Trees will be added as tube stock.

REFERENCES – READING

Basic Raw Materials Resource Protection Working Plan, prepared for the Department of Planning and Urban Development (DPUD, 1996).

Chamber of Commerce and Industry, 1995 and 1996, *Managing the Basic Raw Materials of Perth and the Outer Metropolitan Region*, Parts 1 and 2.

Department of Conservation and Land Management, 1980, *Atlas of Natural Resources of the Darling System*.

Department of Environment and Conservation, 2011 *Guideline for Managing the Impacts of Dust and Associated Contaminants from Land Development Sites, Contaminated Sites Remediation and other Related Activities*.

Department of Environmental Protection (1997b). *Environment Protection (Noise) Regulations 1997: Summary of the Regulations*. Department of Environmental Protection, Perth.

Department of Water Environment Regulation. Water Quality Protection Note 15: *Extractive industries near sensitive water resources*.

Department of Water Environment Regulation, Water Quality Protection Note 28: *Mechanical servicing and workshops*.

Department of Water Environment Regulation, Water Quality Protection Note 29: *Mobile Mechanical servicing and cleaning*.

Department of Health WA, 2012, *Guidelines for Separation of Agricultural and Residential Land Uses*.

Department of Biodiversity Conservation and Attractions, 2020, *Phytophthora Dieback Management Manual FEM079*.

Dieback Working Group, 2000, *Managing Phytophthora Dieback, Guidelines for Local Government*.

Dieback Working Group, 2021, *Best Practise Guidelines for Management of Phytophthora Dieback in Basic Raw Materials Industries*.

Environmental Risk Matrix is developed to the principles of AS/NZS ISO 14001:2004 (*Environmental Management Systems*) and AS/NZS ISO 19011:2014 (*Guidelines for auditing Management Systems*). The principles of AS/NZS 31000:2009 (Risk Management Guidelines) are also used when considering any risks.

Geological Survey of Western Australia, 1990, *Geology and Mineral Resources of Western Australia, Memoir 3*.

Hedde et al, 1980, *Vegetation Complexes of the Darling System, Western Australia in Atlas of Natural Resources, Darling System, Western Australia*, Department of Conservation and Environment.

Jones D N, L Bemede, A R F Bond, C Dexter and C L Strong, 2016, *Dust as a contributor to the road effect zone: a case study from a minor forest road in Australia*, Australian Journal of Environmental Management Volume 23, No 1 p 67 – 80

Oudwater S, 2017, *Modelling of dust emission in dimension stone quarry*, Aalto University School of Engineering, Finland.

Ormsby W R, 2006, *Field Inspection of the Donnybrook Sandstone on Lot 301, Shire of Donnybrook Balingup*, Geological Survey of Western Australia.

Planning Guidelines Separating Agricultural and Residential Land Uses, Department of Natural Resources

Queensland 1997 (Pages 65 – 111)

Playford, P E, A E Cockbain and G H Low, 1976, *Geology of the Perth Basin Western Australia, Geological Survey of Western Australia Bulletin 124.*

Read J and P Stacey ed, 2009, *Guidelines for Open Pit Design*, CSIRO.

Tille P J, 1996, Wellington – Blackwood Land Resources Survey, Natural Resources Assessment Group, Department of Agriculture and Food WA.

Western Australian Planning Commission, *State Planning Policy 1.0 State Planning Framework.*

Western Australian Planning Commission, *State Planning Policy 2.0, Environment and Natural Resources Policy.*

Western Australian Planning Commission, *State Planning Policy No 2.5, Agricultural and Rural Land Use Planning.*

Western Australian Planning Commission, State Planning Policy No 4.1, State Industrial Buffer Policy.

Western Australian Planning Commission 2000- 2002, *State Planning Policy 2.4, Basic Raw Materials.*

Wilde S A and I W Walker, 1982, *Geological Survey of Western Australia 1 . 250 000 geological Series; Collie.*

Wyatt, B Am undated, *Report on the Sandstone Deposits of Donnybrook*, Geological Survey of Western Australia.

Work Health and Safety (Mines) Regulations 2022.