2014_0000771355: Sand and Limestone extraction, Myalup

Map Version: 1.10
Date: 17/04/2014
OEPA GIS Section

LEGEND

- 2km_Buffer
- 2014_0000771355
- Roads (2013)

SIM Ref. Pt. (Decimal Degrees):
115.73, -32.88

SOURCE DATA
Landgate: Cadastre (2013), Roads (2013)
Aerial: Metro South Feb 2014 Mosaic

File No: 2014_0000771355, AC01-2014-0063
Location Path: I:\Projects\epasu\minor_projects\eia\20140417_2014_0000771355_Sand and Limestone Extraction Myalup

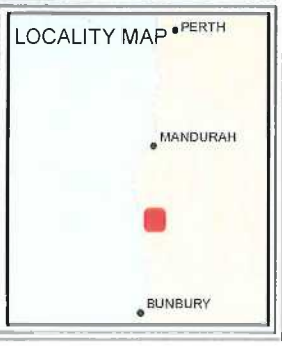
GOVERNMENT OF WESTERN AUSTRALIA
Office of the EPA

N

0 375 750 1,500
Metres

Projection: Map Grid of Australia Zone 50
Datum: Geocentric Datum of Australia, 1994
Scale: 1:30,000 at A4

LOCALITY MAP



Prepared by

Lindsay Stephens BSc Geology), MSc (Plant Ecology)
Mem Aus Geomechanics Soc – MEIANZ – FIQA

25 Heather Road Roleystone WA 6111
Tel 9397 5145, landform@iinet.net.au

SUMMARY AND COMMITMENTS

Mining Leases M70/1319 and M70/1320, were pegged over the top of Prospecting Licences P70/1538 and P70/1539.

The boundaries are the same.

P70/1538 and P70/1539 were used to explore for sand and limestone resources within part of the Myalup Pine Plantations.

Part of the investigations consisted of mapping and drilling the resources. That drilling identified that there was a large amount of sand on the site in addition to some limestone lenses.

Sand and limestone occur in the Spearwood Land System. The sand has variations that enable several product types to be produced: yellow fill sand, earthy yellow sand for maximisation of phosphate retention, brickies sand and white sand.

The limestone is mainly to be used for road construction. It may also be required for agricultural lime.

The resources of sand are large and are capable of supplying sand for 50 plus years as the Peel – Bunbury Regions Grow

The tenements are currently occupied by pine plantation grown by Forests Products Commission.

WA Limestone has held discussions with the FPC and will excavate sand and limestone within the normal operational rotations of the plantation and provide a substrate suitable for continued pine plantation.

The land surface will be lowered and the soils improved by the removal of the less capable soils and by the increased soil moisture.

Lake Clifton lies 1.4 km from the western edge of the Mining Tenements with the tenements extending between 1.4 and 3.0 km from the lake.

Consideration of the environmental factors does not reveal any significant impacts or changes that would adversely affect the conservation and biodiversity values of Lake Clifton.

1.0 BACKGROUND INFORMATION

1.1 Ownership

Mining tenements M70/1319 and M70/1320 are held by PMR Quarries Pty Ltd.

Contact General Manager

Address PMR Quarries
C/- WA LIMESTONE
401 Spearwood Avenue
Bibra Lake WA 6065

PO Box 1404
Bibra Lake WA 6965

Phone 08 9434 7777

Existing Approvals

Mining Leases M70/1319 and M70/1320, were pegged over the top of Prospecting Licences P70/1538 and P70/1539.

The boundaries are the same.

P70/1538 and P70/1539 were used to explore for sand and limestone resources within part of the Myalup Pine Plantations.

Part of the investigations consisted of mapping and drilling the resources.

1.2 Project Objectives

WA Limestone proposes to extract sand and limestone from M70/1319 and M70/1320.

Quarries are needed because the community demands construction materials for development. The need for such materials is recognised by planning policies such as the Western Australian Planning Commission in State Planning Policy 2.4, Basic Raw Materials.

The aims of the project are to;

- Excavate sand and limestone.
- Provide reserves of strategically located sand and limestone suited to a variety of end products prior to sterilisation by local development.
- Maximise the use of sand and limestone to the south of Perth, to enable greenhouse gases, transport, and other environmental issues associated with alternative resources, to be minimised.

- Help to keep the prices of local limestone products at the lowest possible levels, by maintaining small transport distances and competition. This benefits the whole community.

- Comply with *State Planning Policies* which state that basic raw materials should be taken prior to sterilisation of the area by development.

- Work with the Forests Products Commission to ensure that the sand and limestone is taken with least disruption to the plantation timber.

- To improve the soils for plantation by lowering the land surface which in turn will provide better long term soils with higher moisture levels because of the small amounts of clay in the sands at depth and by being closer to the water table.

- Extract yellow sand that is required for fill in the Peel Harvey Catchment area. The sand is yellow with a small amount of clay. It therefore has phosphate retaining capability and is used to stabilize phosphates and prevent their escape to the Peel – Harvey Estuary.

1.3 Location and Access

The mining tenements are located at Myalup, just east of Old Coast Road, accessed from Plantation Road.

They are located in State Forest – McLarty Plantation for pines.

The resource lies on Geological Survey of Western Australia, Pinjarra 1 : 250 000 geological mapsheet; SI 50 02. The tenements are centred on Grid Location GDA 6358475 N and 381 505 E.

1.4 Resource Sought

Basic Raw Materials including limestone are of State significance.

Basic raw materials are essential for the construction and maintenance of all developments; such as roads, subdivisions, buildings, bridges, ports and rail lines.

- Almost every house on the Swan Coastal Plain is constructed using significant amounts of construction materials including sand for concrete and fill.

- Every road on the Swan Coastal Plain is constructed from limestone.

- All subdivisions use reconstituted limestone blocks to prepare the sites to AS 2870 Site Class A.

- All harbour developments use limestone or hard rock to construct the port.

For example the *Perth and Peel Development Outlook 2011/2012* has determined that the Metropolitan Area will grow by 524 400 people between 2012 and 2026.

The Chamber of Commerce and Industry estimated in 2008 that each dwelling required 155 tonnes of limestone which includes roads and 255 tonnes of sand. Dwellings in low lying ares requiring fill can require significantly more sand.

Remnant vegetation on the Spearwood Land System in the Mandurah area and other locations, that is in good condition, is considered as having conservation value thereby reducing the potential for extraction. The vegetation on site is pine plantation that can be replanted.

This has led to a situation where there are few limestone resources remaining within the southern Perth Metropolitan Area. The Hope Valley Wattleup Redevelopment Area, extending to Baldivis, is part of the last remaining high grade limestone resources left within the southern Perth metropolitan area, with little high grade limestone available from Baldivis to south of Mandurah and minimal high grade limestone available between Baldivis and south of Bunbury.

The resource is identified as a Regionally Significant Basic Raw Material (sand) by the WA Geological Survey 2012, Pinjarra Sheets 2033 and part 2133.

The limestone that is associated with the sand is not listed as a Regionally Significant Resource although it should be.

The importance of the sand is that the majority of sand and limestone south of Perth and Peel is already sterilised by development and conservation. The sand on site combined with other local resources will be required for the long term development of the Peel and southern Metropolitan Regions.

This is one of the few locations where limestone suitable for road base can be extracted without compromising conservation or land use conflicts.

The whole site is underlain by sand with some limestone of good grade. The sand has always been earmarked for extraction and has formed a key part of the resources identified by State Government Agencies of the Western Australian Planning Commission, Geological Survey of Western Australia and Department of Mines and Petroleum.

Sand and limestone occur in the Spearwood Land System. The sand has variations that enable several product types to be produced: yellow fill sand, earthy yellow sand for maximisation of phosphate retention, brickies sand and white sand.

The limestone is mainly to be used for road construction. It may also be required for agricultural lime.

On M70/1319 and M70/1320, by far the greatest volume of resource is sand. The limestone consists of lenses scattered between and within the sand.

Crushed limestone and limesand is an essential resource to the State, for correcting soil acidity caused during normal farming operations through the use of nitrogenous fertilizer and legume crops. The need for crushed limestone for use as agricultural lime is recognised by the *Department of Agriculture and Food (Bulletin 4784)*.

Acidification of soils is seen as one of the major impediments to continued viable farming in Western Australia. The *State Of the Environment Report Western Australia 2007* shows that about two thirds of the South West agricultural soils are at risk of acidification. When the acidity builds up essential nutrients become unavailable to plants and the crops reduce in vigour and eventually fail. In addition some other elements such as aluminium become soluble and lead to toxicity in stock and plants.

Lime from limesand is also used for remediation of acid sulfate conditions and a source of $CaCO_3$ for some industrial processes.

Some consideration of the basic raw materials is shown in the following documents. The Chamber of Commerce and Industry are currently updating their assessments.

See;

- Abeysinghe P B, 1998, *Limestone and Limesand Resources of Western Australia*, Geological Survey of Western Australia, Mineral Resources Bulletin 18.
- Gozzard J R, 1987, *Limesand and Limestone Resources between Lancelin and Bunbury*, Geol Surv WA, Record 1987/5
- Western Australia, Western Australian Planning Commission, *Statement of Planning Policy 2.4, Basic Raw Materials.*
- Chamber of Commerce and Industry, 1995 and 1996, *Managing the Basic Raw Materials of Perth and the Outer Metropolitan Region*, Parts 1 and 2.
- Chamber of Commerce and Industry, 2008, *Basic Raw Materials Access and Availability.*
- Fetherston J M, 2007, *Dimension Stone in Western Australia*, Volume 1, Department of Mines and Petroleum, Mineral Resources Bulletin 23.

Sand and limestone is only extracted for the community benefit, and utilised as a manufactured building product. If there was no community demand for sand and limestone as a building product it would be unlikely that this natural resource would ever be utilised for any other purpose and would have no economic significance.

1.5 Site Layout

The extraction is proposed to commence in the south, moving east and north. As there is a range of resource on site, including earthy yellow sand, white sand, brickies sand and limestone, several pits are proposed to enable a full range of products to be sourced.

As excavation proceeds the pit/s will move across the landscape, leaving a lowered landform behind that will be progressively rehabilitated and planted back to pines.

The first stage will be adjacent to Peppermint Grove Road. Any site facilities will be located near the entrance from Peppermint Grove Road, located in a secure compound.

In the initial stages the facilities will consist of transportable site office, serviced portable toilet and a transportable for storage of small items.

As the excavation progresses and expands a weighbridge and an ablution transportable linked to a septic system are likely to be required.

Any screening of sand or crushing and screening of the limestone will be conducted using mobile plant, located on the floor of the active pit. As the pit progresses the location of the mobile plant will also move to stay relatively close to the face.

Stockpiles will be located near the processing facilities and will also move as the pit progresses.

1.6 Existing Facilities

There are no facilities currently located on site.

1.7 History

WA Limestone proposes to extract sand and limestone from Mining Leases M70/1319 and M70/1320.

Mining Leases M70/1319 and M70/1320 were pegged over the top of Prospecting Licences P70/1538 and P70/1539.

The site is part of the McLarty Pine Plantation in State Forest. A limestone borrow pit is located on site to provide limestone for the plantation roads.

2.0 EXISTING ENVIRONMENT

2.1 Regional Setting

The site lies within the Peel Region, south of Mandurah and north of the Bunbury Region.

The site lies between 1.4 and 3.0 km from Lake Clifton to the west.

It is covered by pine plantation operated by the Forest Products Commission.

Agricultural land lies to the east with a strip of native vegetation of the Yalgorup National Park on the west next to the Forrest Highway.

2.2 Geology – Geomorphology

The ridges formed as aeolian dune deposits behind a shoreline during the Pleistocene. The limestone is ascribed to the Tamala Limestone.

In other localities dates of between 25 000 and 100 000 plus years have been obtained for similar limestone.

The resource is essentially a ridge of sand containing scattered limestone lenses. The sand forms thick dunes and lenses above and between the limestone. The variations occur because of the changes in the proportion of calcium carbonate and quartz sand during the formation of the original dunes.

Tamala Limestone, which outcrops along the south western coast of Western Australia, is an aeolian calcarenite (formed from wind blown calcareous sands) derived from beach sands. It consists of foraminifer, shell fragments and quartz grains, and therefore variation in the quality of the stone is normal both laterally and vertically.

The degree of lithification (hardness) changes over the resource, and determines the use to which each type of limestone can be put.

The sand is quartz sand containing small amounts of clay and iron oxide staining.

Gozzard, 1987, Limesand and Limestone resources between Lancelin and Bunbury, Western Australia, Geological Survey of Western Australia, Record 1987/5 provides good descriptions of the limestone. Deeney (undated) provides a good summary of the geology.

On the sites the land surface ranges up to just over 50 metres AHD in the north on M70/1320, dropping to 20 metres AHD along the western boundary and 10 metres AHD in the south eastern corner.

Karst

Karst is solution structures developed on a rock by the dissolution and precipitation of minerals.

This can be surface features such as rills and sharp edges, small cavities or caves.

The most common form of karst is associated with limestones.

If the karst features are significant, caves, collapse structures, structurally "weak ground" and other related features could develop.

For karst to form, the limestone must be of high grade. If a rock does not have sufficient amounts of calcium carbonate, when the calcium carbonate dissolves, the non soluble materials will fill any void and significant karst structures may not develop.

On this site there is only one small area of limestone outcrop, with the limestone being of lower grade and being restricted to lenses within the sand and not located at the water table interface.

The geology of M70/1319 and M70/1320 was assessed by Lindsay Stephens of Landform Research during the field investigations and from the results of drilling completed by WA Limestone. Lex Bastian, a widely recognised expert in local karst formations, also inspected the same limestone ridge to the north and prepared a report for that site. As the limestone on site is part of the same geological and geomorphological formation the report prepared by Lex Bastian has relevance to this site.

Grimes K G, 2006 Syngenetic karst in Australia: a review, Helictite 39 (2) 2006, summarised the types of karst and the potential for karst to develop in Tamala limestones where the karst is syngenetic karst; that is karst formed during lithification of the limestone.

If karst is present then there is a greater change of stygofauna or troglofauna being present.

Based on site examination of the geology, geomorphology and drilling, Grimes 2006, and the report by Lex Bastian, the potential for karst on site is low to non existent.

The age of this ridge of Tamala Limestone is also too young for significant karst to develop and there are not adequate sources of acidic groundwater or steep groundwater gradients that would encourage the development of karst.

The limestone is of lower grade at depth where it is restricted to lenses within the sands with only one small area of limestone outcrop where the grade could be higher.

Any void if it developed would be small to non existent and would be filled with sand filtering from the overlying beds.

2.3 Soils and Soil profiles

The deep sands are part of the Spearwood Sands which outcrop across the site.

These sands typically have a grey surface topsoil underlain by white sand grading to yellow and dark yellow earthy sand.

The proportion and thickness of the white sand varies across the site.

Limestone underlays the sand only outcropping in limited locations. On the limestone outcrops, the sands are brown grading to lighter yellow brown and reddish brown sands above the limestone.

The limestone ridges have harder, higher grade limestone near the surface, which is suitable for agricultural purposes, overlying softer limestone suitable for road making materials.

The limestone on site changes laterally and vertically through changes in the original dune morphology as does the degree of lithification (hardness). These changes determine the use to which each type of limestone can be put.

All soils are natural and contain no adverse minerals or conditions such as acidity or potential acidity that will impede surface restoration.

The proposed excavation only utiliises natural materials and will bottom on yellow earthy sand or have 4 metres of yellow earthy sand spread across limestone to provide a substrate for the replanting of pines.

Topsoil will be recovered and spread across the restored surface.

2.4 Waste Rock and Tailings

There is no waste material. All materials are natural with no adverse contained conditions or minerals.

2.5 Climate

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

Temperatures are between those of Mandurah and Bunbury, where the maximum temperatures in the summer months are 27 to 30 degrees Celsius. In winter the maxima are near 18 degrees Celsius with the minima dropping to an average of 9.0 degrees C in July.

Rainfall for the area is approximately 900 mm with more than 90% of the rain falling during the winter months April to October inclusive. Evaporation exceeds rainfall in all but the wettest winter months.

The wind direction is predominantly from the east in the morning and from the southwest in the afternoon during the summer months. During the winter months the directions are more variable and lighter but with a predominance of east - northeast in the morning and south west in the afternoon due to the presence of winter lows.

The most comparable wind data is taken from Fremantle and Bunbury. These show that the prevailing wind is from the north east and east at 9.00 am and the south west at 3.00 pm.

For the summer months, where February is a typical month, the wind directions are more variable at 9.00 am ranging from east through south east, south and south west. At 3.00 pm in February the winds are almost solely from the south west. The morning data shows that on some days the south westerly sea breeze is blowing at 9.00 am in February.

The only direction that is likely to blow to the urban area to the south is from northerly winds, which are uncommon, and north easterly winds which blow on some mornings but at 9.00 am constitute only 21% (Fremantle) of the time. At other times, such as 3.00 pm, north easterly winds are uncommon.

2.6 Hydrology

Surface Water

There is no surface drainage due to the porosity and permeability of the limestone, with precipitation draining to the water table. It has been estimated that perhaps none of the rainfall will currently reach the water table under growing pines based on research conducted by Wood 2011.

Domans Swamp lies east of M70/1319 at an elevation of 10 metres AHD. As the swamp is close to the maximum water table it is interpreted to be based with organic matter and potentially some clay that forms an area of reduced drainage in winter and a wet area.

Groundwater

The site lies 4 km m east from the saline Lake Preston, north of the Yanget Groundwater Mound. It lies 1.4 to 3.0 km from Lake Clifton.

Transmissivity is estimated by Deeney (undated) as 500 m^2/day.

From evidence of the soils, drilling, vegetation to the east and Deeney (undated) the water table lies at about 1 - 2 metres AHD on the western boundary rising to 5 – 6 metres AHD in the east near Domans Swamp. See Figure 3 in Deeney (undated). Drainage is east to west with a seasonal variation of 0.5 to 1.5 metres. Deeney (undated).

Groundwater salinity is measured by Deeney (undated) as 500 – 1000 mg/L TDS.

Limestone and sand excavation does not affect the quality of water in the shallow ground water system because the only chemicals used are normal fuels and lubricants; a fact that is recognised by the Department of Water who permit extractive industries in Priority Groundwater areas.

A Water Management Plan has been prepared which addresses the risk to groundwater. See Attached document.

2.7 Bioiversity

2.7.1 Flora

Plant Communities

A search of the vegetation on site was conducted in 2009 and again on 20 October 2013 by Lindsay Stephens of Landform Research, in order to determine whether there was any native vegetation of significance on site.

No Declared Threatened or Priority Communities or taxa were observed or recorded.

The vegetation consists of pines underlain by pasture species with many exotic taxa. Only isolated native plants of a variety of species occur under the pines. In areas that have been felled and replanted the number of native plants increases but reduces as the pines grow and mature.

The tenements are covered by pine plantation with isolated to scattered native plants.

The understory below the pines is pasture and indicates that the land was previously cleared and farmed or has been seeded with pasture species.

The density and richness of the native plants increases in the felled areas and reduces as the pines grow.

Plants identified during the site inspections are listed below. Most of these were represented by single or a couple of plants as shown in the attached photographs.

A significant number of exotic species are present and dominate the ground cover in addition to the pines.

Acacia huegelii
Acacia pulchella
Acacia rostellifera
Agonis flexuosa
Conostylis aculeata
Corymbia calophylla
Crassuls colorata
Daviesii preissii
Eucalyptus marginata
Gompholobium tomentosum
Hardenbergiana comptoniana
Hibbertia cuneiformis
Jacksonia sternbergiana
Kennedia prostrata
Kunzea glabrescens
Lepidosperma angustatum
Lyginia barbata
Nitraria billardierei
Opercularia hispidula
Patersonia occidentalis

*Anagallis arvensis var caerulea**
*Avena barbata**
*Avena fatua**
*Arctotheca calendula**
*Brassica napus**
*Bromus diandrus**
*Conyza sumatrensis**
*Cynodon dactylon**
*Euphorbia terracina**
*Gomphocarpus fruticosus**
*Hedypnois sp**
*Hypochaeris sp**
*Lagurus ovatus **
*Lupinus angustifolius**
*Lupinus cosentinii**
*Orobanche minor**
*Pelargonium capitum**
*Petrorhagia dubia**
*Phytolacca actandra**
*Solanum nigrum**
*Sonchus sp**
*Trifolium spp**
*Ursinia anthemoides**
*Vicia sativa**
*Zantedeschia aethiopica**

Conservation Status of the Flora

There is no significant vegetation conservation values with respect to communities or taxa.

Vegetation Condition

There is no significant vegetation on site. The site has been cleared and is plantation under rotation.

The vegetation condition is listed as Completely Degraded (Bush Forever 2000).

Clearing Requirements

No Clearing Permit will be required because of exemptions under *Prescribed Clearing Section 5 (14) (a)* of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*, for the plantation.

2.7.2 Fauna

A fauna study was not conducted because the resource area is cleared to pine plantation and will be returned to that landuse.

Fauna in the nearby area has been studied in the assessments for the Dawesville - Binningup region on behalf of the DPaw. Whilst that is west of the site, the fauna provides an indication of what species may be present locally.

The studies are

> *Dell and Hyder 2009, An Assessment of the Avifauna of the area between Dawesville and Binningup, Southern Swan Coastal Plain prepared for the DPaW.*
>
> *Dell and Hyder 2009, Summary of the Vertebrate Values of the area between Dawesville and Binningup, Southern Swan Coastal Plain prepared for the DPaW.*
>
> *Dell and Hyder 2009, An Assessment of the Non-Volant mammal Fauna of the area between Dawesville and Binningup, Southern Swan Coastal Plain prepared for the DpaW.*
>
> *Bat Call 2009, Echolochation Survey of Bat Activity in the Lake Clifton and Lake Preston Localities on the Swan Coastal Plain.*

The studies recorded 22 species of animals (not including bats) occurring in the Dawesville – Binningup area of which 6 species were exotic. There are many species of bird which range across the Dawesville Binningup area with 174 species listed by Dell and Hyder.

With the pine plantations it is likely that *Calyptorhynchus latirostris* and *Calyptorhynchus baudinii,* which are listed on State and EPBC conservation databases, would use the pines on site for feeding.

The flora species are not regarded as significant habitat species. They are not used for roosting or nesting.

Western Australian Museum (undated) lists *Calyptorhynchus latirostris* as visiting pine plantations, parks and gardens and Proteaceae shrubs, *especially Dryandra sessilis, Banksia menziesii, B. attenuata and B. grandis* in the area from March to September. The pines are present on site but the other species are absent apart from the occasional isolated plant.

It may be possible for possums and even the Western Ringtail Possum *Pseudocheirus occidenalis* to occur in areas such as this. They are more likely to live in the peppermint trees outside the pine plantation. These will not be impacted on.

The only other species of conservation significance (Dell and Hyder 2009) that may occur are the Quenda and Western Brush Wallaby.

The Quenda is likely to be present and is known to be thriving near human habitation which increases food and water supply. The Western Brush Wallaby may be present but is a relatively large and mobile animal that is unlikely to be affected by continued excavation.

Fauna, including *Calyptorhynchus latirostris* may be temporarily impacted as small areas of pines are cleared, excavated and replanted This is no different to normal plantation rotations that occur on site.

Other fauna are related to the preservation of habitat. Returning the excavated surface to native vegetation will assist in providing long term habitat for fauna.

Stygofauna and Troglofauna

EPA Guidance 54, concentrates on Stygofauna, which occur in caves and "are aquatic subterranean animals, found in a variety of groundwater systems". Environmental Protection Authority, 2013, *Consideration of subterranean fauna in environmental impact assessment in Western Australia* relates to the level of survey.

The likelihood of this fauna occurring on site has been assessed by Lindsay Stephens of Landform Research during the site inspection, and on the basis of the geology and geomorphology as well as the report by Lex Bastian that considers the same limestone ridge and is attached.

The limestone outcrop is minimal with most limestone occurring as lenses within the sand, based on the drilling results. The limestone is young and has low potential for karst development which are located above the water table. There are also no Tuart trees on site that might relate to root mat communities.

Therefore there is little to nil potential for stygofauna or troglofauna to be present..

Wetlands

Domans Swamp lies east of M70/1319.

Lake Clifton lies 1.4 km to the west across Forrest Highway. West of Lake Clifton is Lake Hayward and Lake Newnhan and further west from those is Lake Preston.

All the lakes are included in the Yalgorup National Park which stretches from Lake Clifton, across Lakes Hayward and Newnhan and includes Lake Preston.

The Yalgorup lake system is significant for waterbirds and is recognised under the international Ramsar Convention and have High Conservation significance. They are listed on both State and Commonwealth databases.

Lake Newnhan and Lake Hayward are hypersaline.

The lakes that characterise the area lie in the depressions between a series of coastal dunes within the Spearwood system. The lakes form three distinctive lines parallel to the coast. Lake Preston is extremely elongated and lies closest to the coast. The lakes behind the next ridge are far more broken, comprising (from north to south): Swan Pond, Duck Pond, Boundary Lake, Lake Pollard, Martins Tank Lake, Lake Yalgorup, Lake Hayward and Newnham Lake. Lake Clifton is the furthest from the coast and lies west from the resources, across Old Coast Road/Forrest Highway.

Lake Clifton is 0.75 to 3.0 km down hydraulic gradient from M70/1320 and M70/1319. Km, up groundwater gradient from the proposed excavation. The excavation area lies within the Lake Clifton catchment, *(EPA Guidance No 28, Protection of the Lake Clifton Catchment 1998).*

Rock-like structures known as thrombolites can be seen on the edge of Lake Clifton. The thrombolite-building micro-organisms of Lake Clifton appear to be associated with upwellings of fresh groundwater that are high in calcium carbonate entering from the east.

The micro-organisms living in this shallow lake environment are able to precipitate calcium carbonate from the waters as they photosynthesise, forming the mineralised structure that is the thrombolite. (Modified from DEC website).

The lakes provide important habitat for the international transequatorial waders that migrate from the northern hemisphere. These waders include the bar-tailed godwit, red-necked stint, greenshank, red knot, whimbrel and three species of sandpiper. Other waterbirds that use the lakes include the banded and black-winged stilts, red-necked avocet, hooded and red-capped plovers, Australian pelican and coot.

The quacking frog, turtle frog and slender tree frog are among the eight frog species that inhabit the Yalgorup National Park and the long-necked oblong tortoise is present in Lake Clifton.

Surveys carried out in south-western Australia between 1988 and 1992, showed that the Yalgorup lakes consistently supported the high numbers of musk ducks, Pacific black ducks, black swans and shelduck.

A Water Management Plan is attached and found that the proposed excavations and lowering of the plantations will not result in any significant changes to Lake Clifton or the other local lakes in terms of water balance nutrients or other factors.

2.8 Social Environment

2.8.1 Surrounding land use

The tenements area is accessed from Peppermint Grove Road and then to Forrest Highway.

The tenements have been utilised for pine plantation for many decades. The pines are routinely harvested and replanted. Discussions have been held between WA Limestone and Forest Product Commission who have agreed to the excavation of basic raw materials from the site with a return of the land surface to be suitable for pine plantation.

There are no nearby dwellings or sensitive premises. The closest dwelling is 500 metres west in the north adjacent to Forrest Highway and there is a second dwelling 750 metres from the western edge of the southern tenement M70/1319.

Farmland abuts the plantations/tenements in the east.

2.8.2 Aboriginal Heritage

A search of the Aboriginal Heritage Sites Register at the Department of Aboriginal Affairs (DAA) does not reveal any registered sites.

With the significant disturbance caused by clearing, pine plantation and rotation surface material will be significantly disturbed.

Searches were made for the Forrest Highway to the north and west of the tenements but no sites were recorded on the DAA database.

A search of the Department of Aboriginal Affairs database shows that there are no registered sites on or nearby M70/1319 and M70/ 1320. Two other sites are listed as "Other Heritage Places" but are not registered.

WA Limestone has a good working relationship with the local traditional land holders. Two elders worked with the drilling program and were on site during drilling. The site is heavily disturbed and the chances of finding archaeological material is low.

2.8.3 Conservation Status

Conservation

Lake Clifton lies 1.4 km to the west across Forrest Highway. West of Lake Clifton is Lake Hayward and Lake Newnhan and further west from those is Lake Preston.

Yalgorup National Park stretches from and including Lake Clifton, across Lakes Hayward and Newnhan and includes Lake Preston.

The Yalgorup lake system is significant for waterbirds and is recognised under the international Ramsar Convention.

3.0 PROJECT DESCRIPTION

3.1 Disturbance Table

Whilst a large area of ground will be disturbed over a long period of time the amount of ground opened at any one time is minimised through opening and closure within one season.

The site is cleared and planted to Pines. As that land use has been active for many years under *Prescribed Clearing Section 5 (14) (a)* of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*, a Clearing Permit is not required. The land is plantation and is maintained as that. It was lawfully cleared and maintained and planted within the last ten years

CURRENT STATUS OF M70/1319 and M70/1320

Estimated life of mine	50 plus years	
Current status (eg construction/active/decommissioning/ rehabilitating and monitoring/closed	Pine plantation with small limestone borrow pit.	
Time since project commenced (years)	Under Application	
Tenement Area	M70/1319 – 124 ha approx M70/1320 – 200 ha approx	
Total disturbance footprint to date (ha), excluding pits that do not require rehabilitation	1.5 ha of existing limestone pit	
Total approved footprint (ha)	Under application	
Area rehabilitated (ha)		
1. Preliminary earthworks reshaping and drainage design	Nil – under application	
2. Completed earthworks – growth media spread, demonstrated stability		
3. Revegetation – native vegetation established but not yet self sustaining	Nil – under application	
4. Relinquished – completion criteria met	Nil – under application	
Total area under rehabilitation (ha); sum all staged.		
% Rehabilitation of total disturbance area	NA	
Materials Balance	Total	Available
• Volume of waste rock (m^3 or tonnes)	Under application	
• Volume of topsoil		
• Volume of growth medium (if required)		
• Volume of suitable capping material (overburden)		
Current bond amount for the site	$ No bond is currently in place. (under application)	

Closure plan	
• Stage (eg Preliminary, Operational, Decommissioning)	Under application Attached to the Mining Proposal
• Date of last version	Under Application
• DMP approved date	Under Application

Tenement Conditions

Conditions have not been set for the tenements because they are under application.

Proposed Disturbance on M70/1319 – M70/1320

Excavation will be staged, commencing in the south adjacent to Peppermint Grove Road.

Several pits will be open at any one time to provide a variety of products. Each will be worked progressively and rehabilitated when ground is available.

At any one time, when operating, a maximum of 5 - 15 hectares is anticipated to be opened depending on the nature of the resource and market demands.

The life of the pit is in excess of 50 years.

This is summarised in the Activity Table below.

PROPOSED DISTURBANCE M70/1319 and M70/1320

	Current Disturbance (ha)	**Total Disturbance (ha) at end of mining**
Open pit	nil	nil
Cleared ahead of excavation	nil	nil
Access tracks	nil	nil
Rehabilitation	nil	
Total Proposed disturbance		324 ha
Total Existing disturbance		
Undisturbed land	324 ha	nil
Tenement area	324 ha	324 ha

ACTIVITY TABLE M09/151 (RESERVE 41076)

	Current Activity (ha)	Proposed Activity (ha)		
		Year 5	Year 10	Year 20
Open pit	nil	10 ha	15 ha	15 ha
Cleared ahead of excavation	nil	nil	nil	nil
Access tracks	nil	In pit and existing roads	In pit and existing roads	In pit and existing roads
Processing	In open pit	In open pit	In open pit	In open pit
Stockpiles	in open pit	In pen pit	In open pit	In open pit
Waste dumps	nil	nil	nil	nil
Rehabilitated land	nil	5 ha	20 ha	59 ha
Land to be Rehabilitated	nil	10 ha	15 ha	15 ha
Total Disturbed Ground	nil	15 ha	35 ha	74 ha
Undisturbed land	324 ha	309 ha	289 ha	250 ha
Tenement area	324 ha	324 ha	324 ha	324 ha

3.2 Mining Operations

An anticipated production of up to 100 000 tonnes per year of limestone and sand is proposed, depending on contracts won rising to 300 000 tonnes per year.

It is anticipated that a larger tonnage will be taken in some years to fill large contracts such as major developments within the Peel Region or fill in the local area. When larger contracts are being filled perhaps 500 000 tonnes of material may leave the site in a particular year.

Design of the Pit - Staging

The Staging and Timing will depend on the requirements of Forest Products Commission and their plantation rotations. The staging will minimise the disturbance to merchantable timber.

Excavation is anticipated to have covered 15 hectares in 5 years, 35 hectares in ten years and 74 hectares in 20 years. Total life of the operations are >50 years.

The excavations are designed to remove the sand and the limestone to a depth of 5 metres of the water table.

Government Policies currently provide for a separation of 2 metres outside Priority 1 Groundwater Protection Areas.

However based on the requirements of the Forest Products Commission, and initial water balance assessment of lowering the ground elevation, combined with the existing landform, an interim separation of 5 metres is proposed. This is discussed in the attached Water Management Plan.

With further discussions, assessments and consideration a modification to the Mining Proposal may be made at a later stage to reduce the separation to the water table from the 5 metres. Based on the current level of information a separation of 5 metres would appear to be a conservative separation to the water table.

Based on current contours this will result in a proposed approximate floor elevation of 6 metres AHD on the western boundary, rising to 10 metres AHD in the north and south east. Water monitoring bores will be installed to monitor groundwater, and water under the pines planted on the lowered floor, to provide continuous evaluation of the water table over the 50 plus years life of the operations.

The batter slopes would then rise gently up the existing natural land surface outside the excavation area at slopes of 1 : 6, no greater than horizontal to vertical, that will be suitable for the continued plantation activities.

Ground Preparation

1. Forest Products Commission (FPC) will select the areas of pines to be cleared and excavated, depending on their plantation management, rotations and harvest times.

2. During discussions between FPC and WA Limestone it was agreed that WA Limestone would pay compensation for any loss of product.

3. The Forest Products Commission (FPC) will fell the pines in stages to enable excavation to progress.

4. The actual staging of the operations will, to a large extent, depend on the current status of the plantation and the requirements of the Forest Products Commission.

5. The FPC will fell the pines and remove all useable timber. Normally FPC burn the trash to minimise the potential for European Wood Borer to breed.

6. At that point the cleared stage will be handed to WA Limestone for excavation and restoration of the land surface at the end of excavation.

7. WA Limestone will remove the trash by raking to windrows for additional burning or pushing to one side for later treatment. FPC will provide input at that stage to determine what is to be done with the windrows, but normal practice is to minimise breeding habitat for the European Wood Borer and the best way to do that is by burning any remaining trash.

8. Raking will be completed by a loader or bulldozer installed with a rake or by using a similar mechanism.

9. Topsoil will be pushed to one side and formed into perimeter bunds for storage, security and screening and for later use for rehabilitation. Where possible and if the perimeter bunding is already present, topsoil will be directly transferred to an area being rehabilitated.

10. A bulldozer or loader is used to remove any vegetation and topsoil cover by pushing it into windrows. This will be used on the batters to minimise soil erosion and spreading on the final land surface as part of the final rehabilitation.

Excavation

Limestone Roadbase

Limestone represents only a small portion of the proposed operations.

1. Excavation will be carried out as a sequence.

2. The excavation is similar to excavation on other local quarries.

3. Perimeter screening bunds are to be formed to elevations of approximately 3 metres to provide visual, dust and noise screening and assist security.

4. Overburden, as yellow and brown sand and low grade limestone, is removed by pushing to the perimeter of the proposed pit to form perimeter bunding to the pit.

5. This bunding will be extended along all perimeters prior to the commencement of excavation in a particular area. All stages of the pit excavation will be screened by formed bunds, which will be formed as required.

6. Where sand overlies the limestone, sand will be taken at this point to expose the limestone.

7. The void to be left at the end of limestone extraction will be gently sloping and undulating rising gently to natural land surface at the perimeter of the excavations.

8. During excavation the limestone will be deep ripped with a bulldozer pushing down a sloping face below the elevation of the perimeter bunding.

9. In the process the limestone is track rolled as the bulldozer pushes, and this crushes the limestone.

10. The rubble produced is pushed into a stockpile from which it is loaded directly into road trucks for taking offsite for use as roadbase or raw feed for crushing.

11. To produce various sized products for road bases the rubble may need to be crushed and screened. A loader will take material from the rubble stockpile created by the bulldozer and will then load it into a mobile crusher for reduction to the required size.

12. Water will be used for dust suppression, to reduce the potential for dust generation from the movement of machinery and the effect of wind.

13. Blasting is not part of the normal operations to produce road base but may be used to produce armour or core stone/rock.

14. Depending on the depth of the resource, the nature and grade of the resources and their thickness, benches may be required to differentiate product and assist safety.

15. Limestone will be excavated to a minimum of 5 metres above the water table provided the grade remains sufficiently high.

Limestone Armour Stone

1. Armour stone is the production of large boulders of several sizes for use in coastal construction. Normally only the harder recalcified surface rock is used. This is only available in the west of the excavation area.

2. Rock of suitable size for armour stone will simply be sorted and set aside during excavation. This may require blasting, or rock breaking used, to produce this material.

3. The market for armour stone is very intermittent and limited, and it is not currently proposed to produce this material. If at the end of excavation armour rock remains, it will either be removed to another location for storage or broken up and used for roadbase.

Sand Excavation

Sand is the predominant resource to be excavated.

1. Excavation will be carried out as a sequence.

2. The excavation is similar to excavation on other local quarries.

3. Perimeter screening bunds are to be formed to elevations of approximately 3 metres to provide visual, dust and noise screening and assist security.

4. Overburden, as sub-grade sand and overburden, is removed by pushing to the perimeter of the proposed pit to form perimeter bunding to the pit.

5. This bunding will be extended along all perimeters prior to the commencement of excavation in a particular area. All stages of the pit excavation will be screened by formed bunds, which will be formed as required.

6. Sand will be excavated using a loader, loading either directly to a road truck in which case there will be no need for stockpiles, or loading to a screening plant when stockpiles will be formed of the various products.

7. Water will be used for dust suppression, to reduce the potential for dust generation from the movement of machinery and the effect of wind.

8. Depending on the depth of the resource, the nature and grade of the resources and their thickness, benches may be required to differentiate product and assist safety.

9. Sand will be excavated to a minimum of 5 metres above the water table provided the grade remains sufficiently high.

3.3 Processing

Limestone

Limestone processing is a small operation as there is less limestone and it can be sandy. Therefore the amount of crushing and screening will be small.

1. A mobile crushing plant will used to prepare limestone roadbase and other products. It will normally consist of a mobile crusher together with screens, and stackers to sort the products into various sizes. The units fit together linked by conveyors. A DER Licence will be applied for with respect to any crushing or screening operations.

2. The crusher will be fed by a loader, which will collect the raw materials from the receival dumps. The loader will also load road trucks taking quarry product and recycled materials from the site.

3. The mobile plant will be located on the floor of the pit, some 10 – 20 metres below natural ground level.

4. All crushers, screens and stockpiles are to be equipped with water sprays, sprayed, enclosed or the stockpiles wetted down depending on the nature of the materials to be processed. This is the same management as for the approved extractive industry.

5. Water used in production is to be recycled if possible, although this is not normally possible because of the porous nature of the ground.

Sand

Fill sand represents the main resource. That sand will not require screening and will be loaded directly to road trucks.

Only specialty sand will require screening such as plasterers' concrete or filter sand.

It is possible that a wash plant may be installed at some point in the future, but is not proposed now and would only be used on site if there was water from a site bore available.

1. The main processing of sand will be screening of some sand to produce even grainsize for special uses such as for use in concrete.

2. Fill sand is not processed and is not included in the tonnages of the DER Licence.

3. The sand may also be washed using a mobile wash plant that removes the fine clay and iron oxide from the grains, producing a high grade silica sand.

4. The batter slopes are retained in a stable form to comply with the Mines Safety and Inspection Act 1994 with slopes battered to 1 : 6 vertical to horizontal.

3.4 Tailings Storage

There are no tailings apart from organic matter that may be encountered from washing. Any such organic or clay recovered from washed sand will be spread with the topsoil to assist with rehabilitation and improve the inherent created soil capability for plantation. See 3.2 Mining Operations above.

3.5 Support Facilities

The following equipment is anticipated to be used on site.

A fenced compound will be required for the security of associated support facilities.

Site office/lunchroom	• A portable site office/lunchroom is to be maintained on site for the management and security of small items during campaigns. • This facility will be installed at the Peppermint Grove end of the project.
Toilet system	• Initially an approved serviced portable toilet system will be used, but this will be replaced by an approved septic toilet system if a weighbridge is constructed on site. • The toilet will be integrated with any site office.
Storage sheds	• A storage container may located in the fenced compound.
Fenced compound	• A fenced security compound is to be used to secure facilities and plant.
Bulldozer	• Bulldozer equivalent to D11 is to be used on site for production of the limestone and land clearing or brought to the site as required. • Pushing, track rolling, land clearing and reinstatement and movement of limestone and for use in land restoration.
Water tanker	• A 10 000 L water truck or similar is to be used for dust suppression on the access road and working floors as required.
Excavator	• An excavator is proposed to be used from time to time to mainly move limestone, particularly armour stone.
Loader	• Loaders (Cat 980 or similar) are to be used for the movement of limestone and sand, loading road trucks and feeding crushing and screening plant. • At times there are likely to be two loaders on site.
Rock breaker	• A rock breaker is not proposed to be regularly used but may be required occasionally to break large rock.
Blasting	• Unlikely to be used but could be required for the manufacture of armour and core stone.
Weighbridge	• A weighbridge may be located on the access road from Peppermint Grove Road at some point in the future, but is not proposed at this stage.
Mobile crushing and screening and wash plants.	• Crushing and screening will represent a small part of the operations. Most material removed from site will be fill sand that does not require processing. • Mobile crushing plant (licensed by DER) will be utilised for the processing of limestone and some sand. • Mobile screening plants are to be used for the preparation of various grades of limestone, to separate sand from limestone. • Screening plant are electric and combined with a Genset generator. • A mobile wash plant may be required at some

	point in the future but is not proposed at this time. • All mobile plant will be located on the floor of the excavation and move as the excavation moves across the site.
Fuel Storage	• Vehicles will be refuelled from mobile tankers. • No fuel is proposed to be located on site at this time, although it remains a possibility at some future time for a particular campaign. • If fuel storage is maintained on site during campaigns it will be located in a dedicated secure area installed with a bunded impermeable liner. • Any storage facility will be a double skinned self contained tank compliant with the *Dangerous Goods Safety Act 2004* and relevant regulations.

All static and operational equipment will continue to operate on the quarry floor or behind bunds of overburden where possible, to provide maximum sound and visual screening where possible.

Loading and Transport

WA Limestone uses a variety of contractor vehicles to transport sand and limestone from their quarries. The most common truck configuration is semi-trailer truck transport for its blocks, with an average of 10 to 20 laden vehicle movements per day.

Bearing in mind this location, market locations and proximity to the Forrest Highway, road trains may be used if permitted by Main Roads.

3.6 Workforce

The site will be worked by 2 – 3 persons, depending market demands.

The operator has radio contact with any vehicles and can check in regularly during the working day although vehicles are mostly within view of each other.

Truck drivers regularly arrive at the site throughout the working day.

Hours of operation will be worked in campaigns from 6.00 – 6.00 pm six days per week, Monday to Saturday excluding Public Holidays.

3.7 Transportation Corridors

The access road from the site will access Peppermint Grove Road. The travel route will be to Forrest Highway.

3.8 Resource Requirements and Regional Infrastructure

Regional resource requirements are as follows;

- Water supply is not required for excavation.

- A bore will be required for dust suppression. If a Licence is not available water will be brought to the site as required.
- Potable water is to be brought to site.
- Power is not required. Any screen is self powered or connected to a genset.
- Fuel will be brought to site as required.
- WA Limestone has had no significant pollution incidents at any of its quarries.

3.9 Compliance with Legislation and Other Approvals

Conditions

As this is a new application there are no conditions attached to the applied for tenement.

Arrangements are in place with the Forest Products Commission who did not oppose the Prospecting Licences and who will be contacted as part of the application for Mining Tenements.

3.10 Buffers

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.

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*, (1997) discusses the need to consider adjoining land uses when locating buffers but does not prescribe set buffers for operations such as this. A draft updated policy (draft July 2004) reinforces these principles.

State Planning Policy No 2.5, Agricultural and Rural Land Use Planning, makes provision for the extraction of basic raw materials. SPP 2.5 in Point 9 states that "The location of rural residential and rural small holdings should avoid unacceptable impacts on, or sterilisation of natural primary resources including prospective areas for mineralisation and basic raw materials .....".

Generic buffer requirements were developed by the Victorian Government and used by the Environmental Protection Authority as the basis for a Draft guideline on recommended buffer distances. These formed the basis of *EPA Guidance Statement Number 3, Separation Distance between Industrial and Sensitive Land Uses, June 2005.*

EPA guidance "Separation Distances between Industrial and Sensitive Land Uses", June 2005 lists the generic buffers for limestone pits as 300 - 500 metres depending on the extent of processing. For quarries with crushing, milling or screening the buffer distance is listed as "case by case".

A generic buffer relates to the distance at which there are unlikely to be any problems without some further investigations and does not mean that smaller buffers are not acceptable. These buffers relate to noise and dust.

The *EPA South Australia in Guidelines for Separation Distances 2007* suggests a generic buffer of 300 metres and makes provision for lesser setbacks where the proponent is to "demonstrate why the lesser separation distance would be appropriate". The EPA South Australia also state that the guidelines are "generally more conservative than the separation distances predicted by air pollution or noise modelling". The South Australian generic buffer also provides for a mechanism whereby the distance is modified by landform, vegetation cover and prevailing winds.

The EPA Victoria recommended separation distances for industrial residual emissions 2013, are the "default minimum in the absence of detailed site specific assessment for a proposed industrial or sensitive land use". The EPA Victoria default minimum separation for a quarry of this type is 250 metres.

There are two parts to buffers. Firstly a buffer that must be in place when a quarry is proposed to be located near sensitive premises and secondly where sensitive premises are proposed to be located near existing quarries.

The other relevant aspect to buffers is the influence of the bunds and vegetation within the buffers. Information on this is contained in *Department of Natural resources Queensland 1997, Planning Guidelines Separating Agricultural and Residential Land Uses*. This document discusses the effectiveness of a 40 metres wide tree buffer. The same is outlined in the *Department of Health WA, 2012, Guidelines for Separation of Agricultural and Residential Land Uses, establishment of buffer areas.*

The excavation will be worked from the floor of the pit with the landform and pines assisting visual management.

The proposed excavation complies with all the buffer guidelines.

4.0 ENVIRONMENTAL IMPACTS AND MANAGEMENT

4.1 Land Clearing

Clearing is covered by the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004.*

The site is almost totally free from native vegetation, being productive pine plantation.

WA Limestone will work with Forest Products Commission with respect to land clearing and the rotation of the pines. FPC will allocate the areas to be excavated and their timing.

As there are isolated to scattered native plants under the pines a Clearing Permit would normally be required. However under *Prescribed Clearing Section 5 (14) (a)* of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*, a Clearing Permit is not required. The land is plantation and is maintained as that. It was lawfully cleared and maintained and plantated within the last ten years

4.2 Water

There are no watercourses, wetlands or water bodies on site.

Water for dust suppression is to be sourced from a Licensed bore to be applied for to Department of Water. If a water allocation is not available water will be brought to site as required.

WA Limestone holds a water licence at Clifton to the north for 12 500 kL and has an equivalent amount pending. That water will be used for site dust control. The Clifton allocation lies within a different groundwater subarea.

If any allocation becomes available the Department of Water will ensure that only allocations that are sustainable will be issued.

A separate Water Management Plan is attached. This addresses the issues relating to the protection of groundwater and assesses the potential risks to the high conservation values related to Lake Clifton.

As discussed in the Water Management Plan the proposed excavation has been designed to comply with the requirements of the Forest Products Commission and minimise or negate any risk to the groundwater system that feeds from a distance to Lake Clifton.

The Water Management Plan also discusses water balance with the proposed excavation.

4.3 Flora, Fauna and Ecosystem

4.3.1 Flora

The site is cleared and used for plantation.

As noted above, no Clearing Permit will be required because of exemptions under *Prescribed Clearing Section 5 (14) (a)* of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004,* for the plantation.

Even so a search of the vegetation on site was conducted in 2009 and again on 20 October 2013 in order to determine whether there was any native vegetation of significance on site.

No Declared Threatened or Priority Communities or taxa were observed or recorded.

The vegetation consists of pines underlain by pasture species with many exotic taxa. Only isolated native plants of a variety of species occur under the pines. In areas that have been felled and replanted the number of native plants increases but reduces as the pines grow and mature.

4.3.2 Fauna

Fauna in the local nearby area has been studied in the assessments for the Dawesville Binningup region on behalf of the DPaW. Whilst that is west of the site, the fauna provides an indication of what species may be present locally.

The studies are

> *Dell and Hyder 2009, An Assessment of the Avifauna of the area between Dawesville and Binningup, Southern Swan Coastal Plain prepared for the DPaW*
>
> *Dell and Hyder 2009, Summary of the Vertebrate Values of the area between Dawesville and Binningup, Southern Swan Coastal Plain prepared for the DPaW.*
>
> *Dell and Hyder 2009, An Assessment of the Non-Volant mammal Fauna of the area between Dawesville and Binningup, Southern Swan Coastal Plain prepared for the DPaW.*
>
> Bat Call 2009, Echolochation Survey of Bat Activity in the Lake Clifton and Lake Preston Localities on the Swan Coastal Plain.

The studies recorded 22 species of animals (not including bats) occurring in the Dawesville – Binningup area of which 6 species were exotic. There are many species of bird which range across the Dawesville Binningup area with 174 species listed by Dell and Hyder.

With the pine plantations it is likely that *Calyptorhynchus latirostris* and *Calyptorhynchus baudinii,* which are listed on State and EPBC conservation databases, would use the site for feeding.

The native flora species are not regarded as significant habitat or nesting species.

The pines are part of normal plantation rotation and as such the rotational harvesting of the pines, with which the excavation will fit, will not significantly change the number of pines on site, their maturity or food resources.

Therefore in situations such as this the potential impact on *Calyptorhynchus latirostris* and *Calyptorhynchus baudinii* is regarded by the FPC, through discussions, as being minimal and not significant.

As there are only isolated plants of *Agonis flexuosa* the potential for the Western Ringtail Possum *Pseudocheirus occidenalis* to occur on site and be impacted by the normal rotation of the plantation is regarded as not significant.

The only other species of conservation significance (Dell and Hyder 2009) that may occur are the Quenda and Western Brush Wallaby.

The Quenda is likely to be present and is known to be thriving near human habitation which increases food and water supply. The Western Brush Wallaby may be present but is a relatively large and mobile animal that is unlikely to be affected by continued excavation.

Fauna, including *Calyptorhynchus latirostris,* may be temporarily impacted as small areas of pines are cleared, excavated and replanted. This is no different to normal plantation rotations that occur on site.

Therefore the potential impact on fauna as a result of excavation is no different to the normal rotation of pines into which the excavation will fit.

4.3.3 Ecosystems

There are no Priority or Threatened communities listed or recorded for the site.

4.3.4 Wetlands

Domans Swamp lies east of M70/1319 at the edge of the tenements. There is no risk of impact to that swamp as discussed in the attached Water Management Plan.

Lake Clifton lies 1.4 to 3.0 km the west, across Forrest Highway. West of Lake Clifton is Lake Hayward and Lake Newman and further west f rom those is Lake Preston.

All the lakes are included in the Yalgorup National Park, which stretches from Lake Clifton, across Lakes Hayward and Newnhan and includes Lake Preston.

The Yalgorup lake system is significant for waterbirds and is recognised under the international Ramsar Convention and have High Conservation significance. They are listed on both State and Commonwealth databases.

Lake Clifton is 1.4 to 3.0 km down hydraulic gradient from M70/1320 and M70/1319 km up groundwater gradient from the proposed excavation. The excavation area lies within the Lake Clifton catchment, *(EPA Guidance No 28, Protection of the Lake Clifton Catchment 1998).*

Rock-like structures known as thrombolites can be seen on the edge of Lake Clifton. The thrombolite-building micro-organisms of Lake Clifton appear to be associated with upwellings of fresh groundwater that are high in calcium carbonate entering from the east.

The micro-organisms living in this shallow lake environment are able to precipitate calcium carbonate from the waters as they photosynthesise, forming the mineralised structure that is the thrombolite. (Modified from DEC website).

A Water Management Plan is attached. Investigations found that the proposed excavation and lowering of the plantations will not result in any significant changes to Lake Clifton or the other local lakes in terms of water balance nutrients or other factors.

4.4 Topsoil and Soil profiles

The topsoil consists of grey to grey brown sand that is up to 200 mm thick. It contains organic and other vegetation fragments.

The topsoil will be cleared prior to excavation and saved in low perimeter bunds when it cannot be directly returned to completed ground as part of the revegetation process.

In some parts there is subgrade sand as overburden. Depending on its thickness, it will be stored separately in perimeter bunds for surface restoration when thick.

From the drilling the overburden is thin and the sand below 200 – 300 mm is normally useable resource.

The Forest Products Commission have requested that a minimum of 4 metres of sand be left above limestone but this proposal limits the excavation to 5 metres above the water table.

The excavated sand will be more capable for growing pines because it has a higher clay and mineral content and better soil properties.

Wood S, 2011, Development of a system to Optimise Water Recharge and Timber Production from Pinus pinaster Aiton Plantation on the Gnangara Water Mound, Research Thesis Notre Dame University showed in research that pines grow better in yellow sands based on his data but not identified by him. This is consistent with known soil properties and the soils of the studied areas. The restoration of the soils on site as yellow sands with inherently higher capability for plant growth, moisture and nutrient retention.

The soils, sand and limestone are all natural materials with no capacity to create adverse soil conditions. There is no peat or acid conditions. The underlying limestone ensures that the groundwater remains neutral.

The clearing, retention and use of topsoil is described within 3.2 Mining Operations and the attached Mine Closure Plan.

See the attached Water Management Plan.

4.5 Domestic and Industrial Waste Products

All domestic waste will continue to be collected and any hydrocarbons in terms of oils and greases will be taken to an approved landfill.

Any hydrocarbons in terms of oils and greases will be taken to an approved landfill or disposal site.

An approved serviced portable toilet system will be used with a septic toilet system installed if a weighbridge is installed.

4.6 Waste Rock and Tailings Management

This is covered by 2.4 Waste Rock and Tailings and 3.4 Tailings Storage

There is in effect no waste rock, soils or other adverse materials. Any organic matter will be spread across the rehabilitation surface.

4.7 Hydrocarbon Management

In order to control marine pollution, any spillage or leaks of fuels from machinery involved in the process will be managed appropriately.

Hydrocarbon Management is discussed in the attached Water Management Plan. Below is a summary.

4.7.1 Fuel Storage

Fuel is not normally proposed to be stored on site, with mobile and fixed plant being refueled from a mobile tanker.

There does remain the possibility for fuel to be stored on site for a particular campaign of excavation. If retained on site fuel will be stored in a small double skinned self contained tank retained for fuelling vehicles and mobile plant.

4.7.2 Fuel Spill Management Plan

The following activities and management proposed is summarised below. More detail is provide in the attached Water Management Plan.

- Fuel will be used and stored in accordance with the DER/DOW – DMP Water Quality Protection Guidelines for Mining and Mineral Processing, *Mechanical servicing and workshop facilities* and *Above-ground fuel and chemical storage*.

- Sand and limestone are highly adsorptive. The main risk of contamination is the minor drips that occur during the removal of hoses etc. Minor spills are quickly degraded by soil microbial matter.

- Refuelling and lubricating activities is to only occur in designated areas, and equipment for the containment and clean-up of spills is to be located at the site office and on service vehicles.

- 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).

- Waste substances and chemicals will be dealt with in accordance with the Site Waste Guidelines.

- All significant adverse incidents (such as a fuel spill of >5 litres) in one dump, are recorded, investigated and remediated. A record is to be kept of incidents and the Department of Mines and Petroleum, Forest Products Commission, Shire of Waroona and Department of Water notified within 24 hours. No such incidences have been recorded on any WA Limestone operations within the past 20 years.

- Any spills will be contained by the excavation or processing area. A fluid spill emergency response kit will be retained. 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 sand and limestone soils will be scooped up and removed to an approved landfill or other approved site.

- The only other risk is from a tank rupture, but tanks are designed to manage this eventuality. Soil contaminated by large spills will be removed from the site to an approved disposal area.

- Fuel spill emergencies are included on site training and inductions.

4.7.3 Servicing and Maintenance

The following activities and management are used at all WA Limestone pits and are proposed for this site. Below is a summary with more details provided in the attached Water management Plan.

- All major servicing of vehicles is to be conducted off site at WA Limestone Bibra Lake facility.

- Only minor servicing and lubrication is conducted on site such as in the pit, using self contained mobile facilities based at WA Limestone Bibra Lake and contractor vehicles. These vehicles will remove all waste materials.

- 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.

- Servicing plant and equipment will be maintained in accordance with a maintenance schedule.

- Accidental spill containment and cleanup protocol is to be provided.

- The site is to be maintained in a tidy manner

4.8 Dangerous Goods and Hazardous Substances

Apart from fuel, none are used on site or are proposed to be used. All storage facilities for lubricants and oils comply with requirements of *AS1940* and the *Dangerous Goods Safety Act 2004 and relevant Regulations*.

4.9 Atmospheric Pollution and Noise

The only atmospheric pollution may be airborne dust and noise.

4.9.1 Dust

See the separate Dust Management Plan.

Environmental Dust

Dust has the potential to be generated during most phases of the quarrying and crushing operation, particularly during summer. In winter the frequent rains greatly reduce the potential dust emissions. The main risk is from the crushing and tipping processes and from vehicle movements.

Dust may impact on onsite workers. Dust also has the potential to be visually intrusive and travel to adjoining properties if not managed.

Dust management has been an integral part of the extraction and processing of limestone. Facilities and procedures are updated as better technology becomes available.

Dust emissions fall under the *Guidance for the Assessment of Environmental Factors, EPA, March 2000.* Assessments of the potential dust risk are normally made using the Land development sites and impacts on air quality, *Department of Environmental Protection and Conservation Guidelines, November 1996.* These are still in place but are incorporated into the *DEC 2011 Guideline for Managing the Impacts of Dust and Associated Contaminants from Land Development Sites, Contaminated Sites Remediation and other Related Activities.*

The key Environmental Objectives for the operations are;

- Manage the potential for the generation of dust.
- Monitor dust levels and take steps to reduce the potential impact of dust on occupational and environmental aspects of the operation and local area.

When classified according to DEC 2011, and the operational dust management procedures are used, the operation of the pit will have a low risk of dust crossing the boundary.

The closest dwelling is 500 metres with a second dwelling at 750 metres from the western edge of the site and separated by vegetated buffers which provide effective dust management.

A separate Dust Management Plan has been prepared and is attached. The dust assessment and operational experience on other tenements shows that dust can be effectively managed on an operation such as this.

Greenhouse Gas

The development of the Perth – Peel – Bunbury Regions have generated the need for limestone and sand products, and if these cannot be obtained from this quarry they will be obtained from another.

Over the years trucks have become more efficient with respect to greenhouse gas emissions, particularly with the use of truck and trailer and road train configurations.

WA Limestone continues to seek ways to reduce the amount of fossil fuels used, and has obtained more efficient mobile plant and equipment when this has become economically available.

The internal design of the operations attempts to minimise the haulage route to save energy use and potential impacts.

Dust Monitoring

The effectiveness of dust suppression is monitored visually, at all times during site activities. See Separate Dust Management Plan.

Most dust generated from processing and vehicle movements has a very large visible component. Lesser risks emanate from excavation and land clearing.

The trigger for dust management is the generation of visual dust. The quarry manager and leading hands are ultimately responsible for site supervision of dust.

They travel around the operations and pit frequently and are in two way radio contact with all mobile plant.

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

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

WA Limestone provides induction and protective equipment for all persons on site.

4.9.2 Noise

General Noise Regulation

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

The *Environmental Protection (Noise) Regulations 1997*, 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 Sunday 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.

Influencing factors that raise the allowable noise levels are activities such as external industrial noise, some nearby land uses and busy roads.

Under Schedule 1 of the Noise Regulations the premises on which the extraction of basic raw materials such as sand and limestone is occurring 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 the case of Mining Tenements it would apply to the whole tenement area.

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.

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.

On this site there are only two close dwellings one is 500 metres and the other 750 metres. Both are to the west. There are no other close dwellings. Forrest Highway to the west and north generates significant traffic noise.

WA Limestone will comply with the *Environmental Protection (Noise) Regulations 1997.*

There are a number of management actions that can be taken in quarries to minimise noise generation or travel. These have been used in the past and will continue to be used.

These actions are routinely used by WA Limestone where applicable and as the opportunity presents to minimise noise on the site.

In addition to using the noise management techniques listed above wherever practicable, WA Limestone has site specific management procedures that are outlined below.

Occupational Noise

Occupational noise associated with the quarrying processes falls under the Mines *Safety and Inspection Act 1994 and Regulations 1995.*

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. Regular site audits of quarry and mining operations are normally conducted by the Department of Mines and Petroleum.

As part of its commitments, WA Limestone continues to be pro-active with its worker safety awareness;

- by providing all necessary safety equipment such as ear protection,
- identifying sections of the plant where hearing protection is required, as well as,
- conducting induction and educational programs for its staff.

The operating noise levels around the site are regularly monitored by independent consultants in accordance with the *Mines Safety and Inspection Act 1994*, and the results communicated to the Department of Mines and Petroleum (DMP). All staff are provided with comprehensive ongoing training on noise protection as part of WA Limestone's commitment to occupational health and safety.

The DMP conducts inspections of all tenements and working operations.

Warning signs will be used to identify areas of potential noise.

Drilling and Blasting

No drilling and blasting is required for the excavation of sand. It is unlikely to be used for limestone extraction, but remains an option when producing armour rock.

Crushing and Screening Rock

The noise suppression measures on the crushing and screening plants are closely monitored, and appropriate signage is posted.

A DER licence under the *Environmental Protection Regulations 1987* would be required for crushing and screening plants.

Like all parts of the operations the processing has to operate under the *Environmental Protection (Noise) Regulations 1997.*

Truck Movements

Trucks will enter from the south from Peppermint Grove Road and from Forrest Highway.

Transport on Public Roads is exempt from the Noise Regulations.

OPERATIONAL PROCEDURES	COMMITMENTS ON ACTIVITIES CONDUCTED ON SITE
Comply with the *Environmental Protection (Noise) Regulations 1997.*	WA Limestone will maintain compliance with the Regulations
Comply with the provisions of the *Mines Safety and Inspection Act 1994 and Regulations 1995.*	WA Limestone is registered on the DMP SRS system and this pit will be so listed. The operations will be inspected regularly by the DMP.
Maintain adequate buffers to sensitive premises.	The closest dwelling is 500 metres to the west of M70/1319. There are no other close dwellings. Forrest Highway to the west and north generates significant traffic noise.
Locate exposed features behind natural barriers and landform.	Vegetated screening belts are already in place around the pit as the existing pines and adjoining native vegetation. Perimeter bunds will be constructed from the topsoil and overburden and will be extended as the pit progresses. Bunding will be completed prior to excavation of the nearest part of the pit.
Operate from the floor of the pit below natural ground level.	This is to be used on site and is proposed.
Construction of bunds	Bunds are to be constructed around the perimeter of the pit footprint prior to the excavation in each part of the pit. The bunds and pit faces will provide good acoustic screening.
Push overburden and interburden dumps into positions where they can form screening barriers.	Perimeter bunds will be constructed from the topsoil and overburden and will be extended as the pit progresses. Bunding will be completed prior to excavation of the nearest part of the pit.
Design site operations to maximise the separation and protection from sensitive premises.	See the discussions on Buffers above. The shape of the pit and method of operation will be designed to ensure the landform provides the best screening.
Maintain all plant in good condition with efficient mufflers and noise shielding.	WA Limestone has modern equipment that is maintained in good condition and replaced from time to time.
Maintain haul road and hardstand surfaces in good condition (free of potholes, rills and product spillages) and with suitable grades.	The access road and crossover will be maintained in good condition.

Implement a site code outlining requirements for operators and drivers.	WA Limestone maintains site induction and training for all personnel.
Shut down equipment when not in use.	This is normal policy.
Scheduling activities to minimise the likelihood of noise nuisance.	This is normal policy and will be continued.
Fit warning lights, rather than audible sirens or beepers, on mobile equipment wherever possible.	Lights or low frequency beepers are to be used rather than high pitched beepers. The design and shape of the pit maximise noise screening.
Use transport routes that minimise community disruption.	The transport route is direct to Peppermint Grove Road and then to Forrest Highway.
Avoid the use of engine braking on product delivery trucks in built up areas.	The surrounding area is gently sloping with reduced gradients. Airbrakes are unlikely to be required. Drivers are instructed not to use air brakes under normal situations when exiting along the access road.
Minimise and conduct at the least disruptive times, non day to day activities such as vegetation, topsoil or overburden stripping on exposed ridgelines.	The operational hours are the same as most operating quarries away from residential areas, 6.00 am to 6.00 pm Monday to Saturday, excluding public holidays.
Provide a complaints recording, investigation, action and reporting procedure.	A complaints recording procedure is proposed to cover all site activities.
Conduct training programs on noise minimisation practices.	WA Limestone conducts site induction and training to all personnel.
Provide all workers with efficient noise protection equipment.	All noise protection personal equipment is provided to staff.

4.10 Vegetation Impacts

4.10.1 Vegetation Hygiene Management

The site is covered by pine plantation and is almost devoid of native plants. All vegetation hygiene will be conducted in conjunction with Forest Products Commission.

However there is the potential for plant pathogens to be spread with the movement of soil and plant materials so good plant hygiene is desirable.

In the wetter parts of Western Australia, such as the south west, vegetation hygiene mainly relates to *Phytophthora cinamomi* even though there are other *Phytophthora* species and other diseases such as *Armillaria* that can cause dieback like symptoms. The same conclusions are made in the DER/DPaW Management Plans.

In most cases vegetation death is caused by a pathogen which infects the plant and causes it to lose vigour, with leaves dying, and, overtime, may kill the plant. As such the management of plant disease is essentially related to plant hygiene when coming onto a site and within a site.

The hygiene principles are proposed as part of good site management of potential plant pathogens.

The environment and site conditions on limestone and sand operations are minimal because the high alkalinity of the limestone inhibits such plant pathogens.

There are several guides to the management of plant hygiene (Dieback).

- Department of Environment and Conservation CALM *Dieback Hygiene Manual 1992* is a practical guide to Dieback management.
- Department of Environment and Conservation CALM *Best Practice Guidelines for the Management of Phytophthora cinamomi, draft 2004.*
- Dieback Working Group 2005, *Management of Phytophthora Dieback in Extractive Industries.*
- Dieback Working Group 2009, *Managing Phytophthora Dieback in Bushland.*

Plant pathogens are only likely to be an issue when equipment is brought to the site from an affected area either through vehicles or plant and soil materials.

The general principles to be used as the opportunities are presented, are listed below.

- Plant diseases are more likely to be transported under moist soil conditions.
- All vehicles and equipment to be used during excavation or land reinstatement are to be clean and free from soil or plant material prior to arriving at a site. Normally the only vehicle used is the loader that is retained on site.
- Vehicles and earth moving equipment are required to be clean prior to entering the site if they originate from another site. This is conducted offsite, independent of the tenement, by either brushing or washing. No dirty vehicle will be permitted onto the tenement.
- No soil and vegetation is to be brought to the site.
- Excavation vehicles are restricted to the excavation area apart from clearing land.
- Unwanted access to vegetated areas is discouraged through reduced tracks, signage, site marking and/or fencing, as appropriate
- A split operation is to be worked where practicable, where the road transport vehicles only access one side of the stockpile or processing area and excavation vehicles operate on the other side of the stockpiles and processing, reducing the risk of contamination from road transport.
- The site is to be secured from unwanted access with signs, fencing and other low impact measures as required.
- The Weed Management Policy will be complied with.
- Rehabilitated surfaces are free draining and do not contain wet or waterlogged conditions apart from dedicated sump and soakage areas.
- Illegally dumped rubbish is to be removed promptly.

- Roads are to be maintained as free draining and hard surfaced. All road vehicles will be confined to the dedicated roads.

4.10.2 Weed Management

Exotic and weeds species are common and widespread across the tenements.

All weed management will be conducted in conjunction with Forest Products Commission.

The understory is exotic pasture and the site appears as if it may have been cleared prior to planting pines, or pasture species deliberately added to the site at some point in the past. As the site is to continue as plantation rotation the aim is to control listed weeds and ensure that the weed loads do not impact on future plantation activities.

Some exotic species found on site are;

*Anagallis arvensis var caerulea**
*Avena barbata**
*Avena fatua**
*Arctotheca calendula**
*Brassica napus**
*Bromus diandrus**
*Conyza sumatrensis**
*Cynodon dactylon**
*Euphorbia terracina**
*Gomphocarpus fruticosus**
*Hedypnois sp**
*Hypochaeris sp**
*Lagurus ovatus **
*Lupinus angustifolius**
*Lupinus cosentinii**
*Orobanche minor**
*Pelargonium capitum**
*Petrorhagia dubia**
*Phytolacca actandra**
*Solanum nigrum**
*Sonchus sp**
*Trifolium spp**
*Ursinia anthemoides**
*Vicia sativa**
*Zantedeschia aethiopica**

Therefore weed management is to be used to minimise impact on site, remnant vegetation and on adjoining properties. Good management practices are to be used as part of the ongoing normal quarry operations.

The management of weeds therefore is to ensure that weeds are managed, that there are no Declared or Significant environmental roads, and that weed levels are not sufficient to impede future land uses such as plantation.

On a particular site there will need to be an assessment of the weed risks, weeds present and a consideration of the best treatment.

Weeds are most likely to impact on;

- Disturbed areas such as overburden dumps, topsoil stockpiles
- Edges of access roads
- Parking and amenity areas
- Locations accessible to the public on which rubbish is dumped.

The main sources of weeds are;

- Naturally occurring in soils inland. It is possible for remnant vegetation to contain a weed load that is not apparent in the natural vegetation.
- When disturbed during land clearing or road works it is not uncommon for weeds to germinate from topsoil and be carried to site on vehicles. Such weeds are not likely to gain a hold in such hostile conditions of the shell grit.

  Ongoing visual assessment needs to be made on the type of weeds and the potential impact of each species. This provides a guidance on the methods of treatment.
- Weeds from edge effects from access roads and disturbed areas that may be carried to site.
- Gradual creep of weeds along access roads.
- 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 or seed from outside the site.
- Birds and other vectors. This is more common than is often given credit for. eg *Solanum* species.

Any weed management is to utilise the most appropriate on ground measures to minimise the risk of spread of Declared and Environmental weeds.

The information provided here summarises the key points of the on ground weed management.

- The Plant Disease Management Actions are to be used to assist weed management.
- Inspections are to be conducted to monitor the presence and introduction of environmental and Declared Weeds twice per year.
- On identification of Declared and Environmental weeds, a method and timing is to be agreed on to treat the weeds. This will either be removal, burial to a minimum of 500 mm, or spray with a herbicide. There are two main type of spray, grass selective such as Fusilade or general such as Roundup.
- Large plants are to be grubbed out or spot sprayed with a herbicide.
- All vehicles and equipment used during land clearing or land reinstatement, are to be clean and free from soil or plant material when arriving at site.
- Vegetated areas ahead of excavation are quarantined to excavation vehicles until required.
- Access to vegetated areas inland off the tenement is to be discouraged through signage, marking and a lack of tracks ss required.
- Illegally dumped rubbish is the major source of weeds and will be removed promptly.
- No weed contaminated or suspect soil or plant material is to be brought onto the site.
- When clearing land or firebreaks vehicles will work in conjunction with dieback principles and push from areas of better vegetation towards areas of lower quality vegetation.
- Weed management will work best from the least affected areas to most affected.

5.0 SOCIAL IMPACTS

5.1 Heritage

The State *Aboriginal Heritage Act 1972* and *Heritage of Western Australia Act 1990* and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* have been considered within this proposal.

A search of the Department of Aboriginal Affairs database shows that there are no registered sites on or nearby M70/1319 and M70/ 1320. Two other sites are listed as "Other Heritage Places" but are not registered.

WA Limestone has a good working relationship with the local traditional land holders. Two elders worked with the drilling program and were on site during drilling. The site is heavily disturbed and the chances of finding archaeological material is low.

During the drilling operations the elders did not find any materials of significance or sites.

WA Limestone will continue to liaise with the traditional owners with respect to the potential for sites to be present and the need for any archeological or ethnographic research on site.

5.2 Land Use and Community

The McLarty State Forest is recognised as a significant plantation area for the long term production of softwoods for the State.

WA Limestone has held discussion with the Forest Products Commission with respect to the Prospecting Licences and excavation.

FPC did not oppose the Prospecting Licences

Planning

Whilst the *Mining Act 1978* prevails over the *Planning and Development Act 2005,* the extraction of basic raw materials (sand and limestone) is required for the community and development in Western Australia with particular reference to the Peel – Bunbury Regions.

The Act is required to consider Planning Policies and the Local Authority.

Therefore some consideration of the planning policies and how the proposed excavation fits with them is useful.

State Planning Policies

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 limestone, the overarching document is the;

- State Planning Policy 1.0 State Planning Framework.

Complementing this are a number of Relevant State Policies;

- State Planning Policy 2.0, Environment and Natural Resources Policy
- State Planning Policy 2.4, Basic Raw Materials
- State Planning Policy No 4.1, State Industrial Buffer Policy

- ***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:*
>
> *ii. 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.*
>
> *iii. 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 2.4, Basic Raw Materials, 2000***

This policy makes many statements on the intent and actions which local authorities should use to protect and manage basic raw materials.

Section 3.4 is very specific in explaining that basic raw materials need identification and protection because of increased urban expansion and conservation measures, (3.4.1), (3.4.2) and (3.4.4). Sections 3.4.5 and 3.4.6 recognise that environmental and amenity matters need to be considered.

There are specific provisions in Section 6.2 Local Planning Scheme Provisions, such as;

> *No support for the prohibition of extractive industries in zones that permit broad rural land uses.*
>
> *Providing an appropriate P, D or A use.*
>
> *Not precluding the extraction of basic raw materials on land which is not identified as a Priority Resource Location, Key Extraction Area* or Extraction Area (6.4.2).

The Western Australian Geological Survey has produced new mapping identifying Strategically Important Basic Raw Materials. The Geological Survey recognised the sand resources as a valuable community asset.

- ***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.

This is discussed further in Section 2.8.1 Surrounding Landuses and 3.10 Buffers of this document.

- ***State Planning Strategy, 1997***

The Western Australian Planning Commission (WAPC) released the *State Planning Strategy in 1997*. It 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 State Planning Strategy contains the following five key principles. These are:

- Environment & resources: to protect and enhance the key natural and cultural assets of the State and to deliver to all Western Australians a high quality of life which is based on sound environmentally sustainable principles.

- Community: to respond to social changes and facilitate the creation of vibrant, accessible, safe and self-reliant communities.

- Economy: to actively assist in the creation of regional wealth, support the development of new industries and encourage economic activity in accordance with sustainable development principles.

- Infrastructure: to facilitate strategic development of regional Western Australia by taking account of the special assets and accommodating the individual requirements of each region.

- Regional Development: to assist the development of regional Western Australia by taking account of the special assets and accommodating the individual requirements of each region.

Site Specific Planning Policies and Legislation

- ***Peel Region Scheme (WAPC 2002)***

The Peel Region Scheme was produced in 2002 to provide long term co-ordinated planning for the Peel Area.

The Scheme has been subject to numerous amendments with respect to land use in the more developed areas.

- ***Peel Region Scheme, Strategic Minerals and Basic Raw Materials Resource Policy (WAPC 2002).***

This Policy does not specifically list this land but does list the adjoining land to the west. Its aim is to protect the basic raw materials and make them available for their staged future use.

- ***Directions 2031 and Beyond (WAPC 2010)***

Directions 2031 and Beyond provided data on the land uses and growth of the Perth Metropolitan and Peel Areas over the 20 years to 2031.

It considered the location of urban and industrial land and their interactions. The subject land will be capable of providing employment to people living locally such as in the adjoining urban area to the south of Kerosene Lane.

- ***Coastal and Lakelands Planning Strategy (WAPC 1997).***

This policy seeks to assess and make recommendations on the competing land uses within the Peel coastal region, including such matters as visual, water, conservation, land use.

5.3 End Use

The excavation of sand and limestone is a very long term operation, with a life of over 50 years.

The site is covered by pine plantation which is currently under rotational harvest and replanting.

WA Limestone has discussed the potential for excavating the sand with the Forest Products Commission in stages that fit in with the production rotations of the pines. The FPC has accepted the extraction of sand and did not object to the Prospecting Licences that pre-dated the Mining Tenements.

The soils at the end of excavation will be reformed to soils useable for plantation and, as the soils will be cut lower in more earthy sands, the capability and productivity of the soils will be improved.

5.4 Social Environment

Indigenous Affairs

There are no known aboriginal heritage sites on the tenements on site. See 5.1 Heritage above. The chances of finding any sites is low considering the level of disturbance from pine plantations.

European Heritage

As far as is known, there are no known local areas of European heritage.

5.5 Workforce Induction and Training

WA Limestone has induction and training for all their operations with site specific inductions when personnel arrive at site. Safety will be incorporated into the existing Project Management Plans for the site.

6.0 SAFETY

6.1 Geotechnical Issues

Limestone excavation is widely conducted across the Swan Coastal Plain and issues of geotechnical management are well known. It is normally excavated by a bulldozer pushing down slope with vertical faces. The material is soft enough to readily extract and yet sufficiently strong to hold up.

WA Limestone uses the same methods on their existing operations and these are the same as those used on all local limestone pits.

Limestone is not susceptible to slumping or collapse under normal operational circumstances and can be cut to stable vertical faces as occurs on adjoining pits.

All approaches to the face are to be made perpendicular to the face and quickly run in and out. There is to be no parking at the base of the face.

Loading will be conducted in designated areas with procedures in place to ensure the safety of all personnel.

6.2 Operational Safety

The site will operate to the *Mines Safety and Inspection Act 1994 and Regulations 1995,* which are administered by the Department of Mines and Petroleum.

WA Limestone are committed to maintaining a safe working environment and have demonstrated safe operations at their other facilities.

Safety Management Plans are in place for all WA Limestone (PMR Quarries) operations, with a site specific Emergency Response Plan, to cover all operational procedures, which includes workforce induction and training to ensure that all employees involved in sand and limestone excavation are made aware of the environmental and safety implications associated with all stages of the mining activities.

Where applicable Safe Operating Procedure Sheets are prepared and made available for hazards. Workers and staff 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.

Radio contact is available for all vehicles and the site is within mobile phone range and has phone line connection.

See 1.3 Location and Access and 3.7 Transportation Corridoors for site security and Fire Management below.

A key aspect of site safety is to prevent unauthorised access, with the provision of signage.

As a Quarry the site must however operate to the *Mines Safety and Inspection Act 1984 and Regulations 1985.*

The deepest excavation will be 10 - 12 metres below natural ground level. Faces will be left in compliance with *the Mines Safety and Inspection Act 1984* at times when the site is unattended. This can include bunding, signage, stable slopes and other appropriate measures.

The site will be registered under the Department of Mines and Petroleum SRS Safety Management System for an active minesite.

6.3 Fire Management

Fire management is an integral part of plantation management. WA Limestone will work closely with the Forest Products Commission with respect to fire safety and protection of the pines.

There is less potential fire risk from quarries than other land uses because quarries clear land, and vehicles are restricted to cleared access roads, the pit floor, processing and stockpile areas.

These cleared areas form a natural firebreak. The main risk comes from an external fire in the surrounding vegetation, impacting on the quarry. As such the fire risk is no greater than a rural property.

Fire risk is normally controlled through the *Bush Fires Act 1954* and local authority bylaws.

The excavation area forms a natural firebreak; the plantation access roads will also assist. Water available on site can be used for fire fighting. A water truck is available on site in dry conditions.

Normal plantation firebreaks are maintained.

The site vehicles will be available for use in fire fighting if required. This includes the loaders or a bulldozer if on site at the time. The water truck will be available to carry water. A water canon installed on the water truck is very useful to shoot water onto a fire front from a safe distance or to wet areas ahead of a fire front.

The safety of workers is managed through a Safety Management Plan developed through the *Mines Safety and Inspection Act 1994 and Regulations 1995.*

There are a number of management actions that can be taken in quarries to minimise fire risk and these will be used wherever possible. The general management actions are summarised below together with the potential issues that relate to this site. The actions will be used where applicable and as the opportunity presents to minimise fire risk.

- Restrict vehicles to operational area, particularly on high fire risk days

- Use diesel rather than petrol powered vehicles
- Maintain perimeter fire breaks as required
- Ensure fire risk is addressed and maintained through the site Safety Management Procedures
- Provide an emergency muster area, communications and worker induction and training
- Establish on site water supplies for potential use in extinguishing fire
- Secure the site from unauthorised access
- Make available mobile plant for fire management and protection.
- Work with Forest Products Commission with respect to fire management.
- Mobile and fixed plant are equipped with shutdown emergency stop and fire extinguishers.

6.4 Site Security

The excavation area will potentially be deep.

Safety of the site is managed through a Safety Management Plan developed through the *Mines Safety and Inspection Act 1994 and Regulations 1995.*

A number of measures may be required to provide security of the pit from inadvertent access.

This could include, but not be limited to the following;

- Perimeter bunds are to be constructed around all pits.
- Trenches may be used in conjunction with the bunds to reduce incursions.
- Warning signs will be erected in compliance with the *Mines Safety and Inspection Act 1994 and Regulations 1995.*
- Fences will be used at the top of faces and on protective bunds. These will consist of stranded wire or ringlock fencing installed with warning signs to prevent off-road vehicle access.
- WA Limestone will work with Forest Products Commission to secure the access. The access road may need to be fenced for a suitable length and installed with lockable gates.
- A security compound will be used on the floor of the pit to secure plant, facilities and equipment.
- Arrangement will be made with a local landholder to leave mobile plant in a secure location at night and on weekends.

7.0 MINE CLOSURE

See the attached Mine Closure Plans for M70/1319 and M70 /1320.

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