Byford Whitby Quarry, portion of Mining Lease M70/1240 (EPBC 2021/9045) – Revegetation Management Plan

WA Limestone (ACN: 009 468 464)

Report

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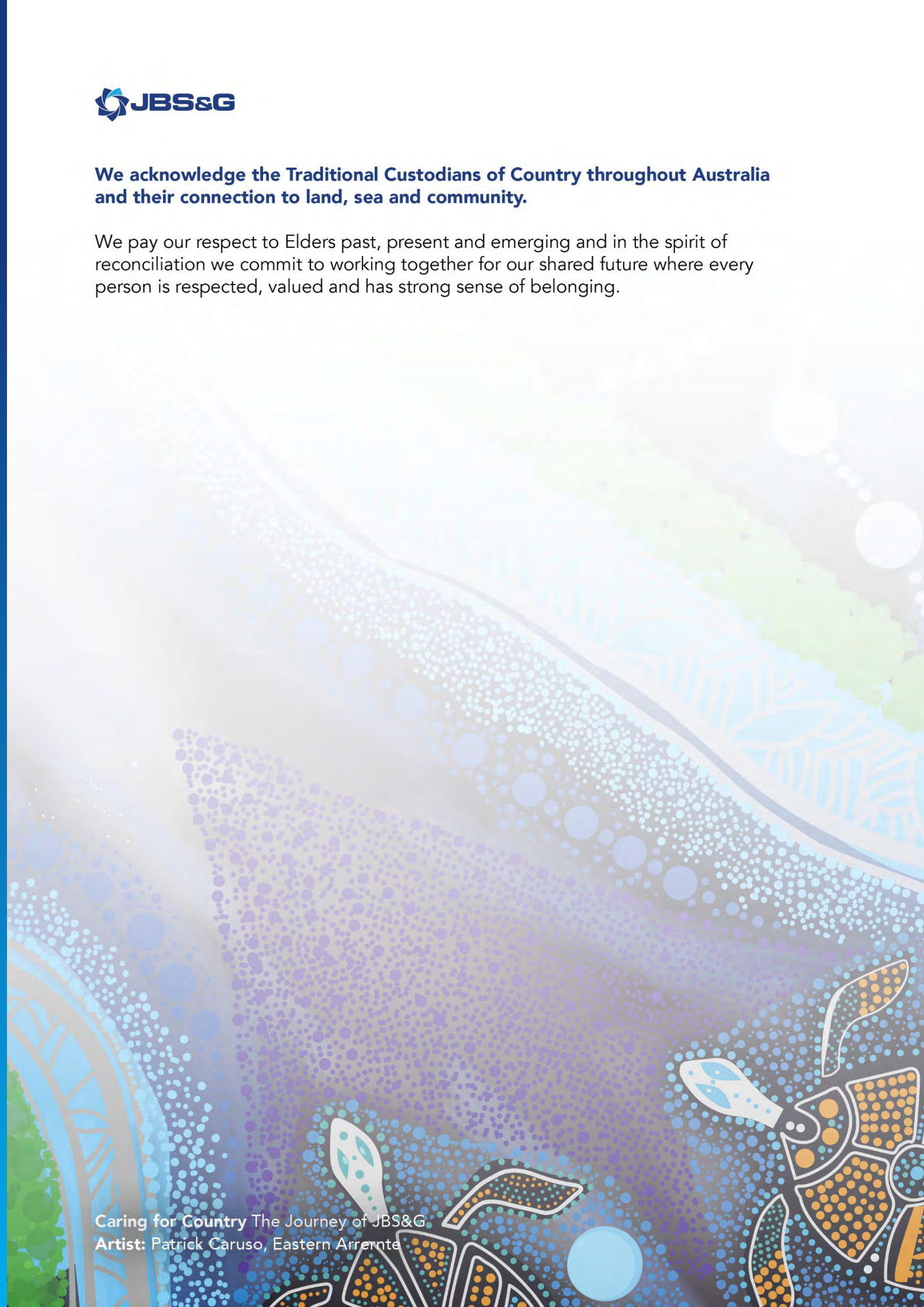
29 August 2025

We acknowledge the Traditional Custodians of Country throughout Australia and their connection to land, sea and community.

We pay our respect to Elders past, present and emerging and in the spirit of reconciliation we commit to working together for our shared future where every person is respected, valued and has strong sense of belonging.



Caring for Country The Journey of JBS&G
Artist: Patrick Caruso, Eastern Arrernte

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Declaration of Accuracy

In making this declaration, I am aware that section 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) makes it an offence in certain circumstances to knowingly provide false or misleading information or documents to specified persons who are known to be performing a duty or carrying out a function under the EPBC Act or the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth). The offence is punishable on conviction by imprisonment or a fine, or both. I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.

Signed	
Full name (please print)	ROGER STEPHENS
Organisation (please print)	WA BLUE METAL
Date	29/8/2025

Document History

Document Distribution

Rev No.	Copies	Recipient	Date
A	1: Electronic	Ransberg Pty Ltd (WA Bluemetal)	28/8/2025
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Rev No.	Author	Reviewer	Approved for Issue		
		Name	Name	Signature	Date
A1	Y. Seesaha / B. Neesham	B. Hollyock	B. Hollyock	B. Hollyock	28/8/2025

1. Introduction

1.1 Background and Project Description

Ransberg Pty Ltd (WA Bluemetal; the Proponent) is undertaking works associated with the expansion of the Byford Whitby Quarry (the Action), located within Mining Lease M70/1240 (formerly part of State Forest No. 22) in Karrakup, within the Shire of Serpentine-Jarrahdale, approximately 40 kilometres southeast of Perth, Western Australia (the Action Area; Figure 1.1). The Action involves the construction, operation, and rehabilitation of storage and laydown areas for overburden from an existing quarry, including the construction and maintenance of access tracks/roads, and the construction, maintenance, and decommissioning of associated quarry infrastructure. The works will occur within part Lot 500 on Deposited Plan 405520 and Lot 901 South Western Highway, Whitby, consistent with the referral submitted under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Up to 13.2 hectares (ha) of native vegetation is to be cleared within a 17.36 ha approved clearing permit area to facilitate the Action.

The site is situated within a landscape dominated by Jarrah-Marri Forest, with patches of Marri-Wandoo woodland, supporting habitat for several Matters of National Environmental Significance (MNES) protected under the EPBC Act, including the Forest Red-tailed Black Cockatoo, Carnaby's Black Cockatoo, Baudin's Black Cockatoo, and the Chuditch (*Dasyurus geoffroii)*.

Following referral under the EPBC Act (EPBC 2021/9045), the Action was determined to be a 'controlled action' and was approved by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) on 29 August 2024 with the controlling provision being listed threatened species and communities (sections 18 and 18A).

The approval is subject to a number of conditions to manage potential environmental impacts to the previously mentioned MNES. As part of these conditions, the Proponent is required to prepare and submit a Revegetation Management Plan (RMP) to guide and support the recovery of native vegetation and fauna habitat cleared for the Action.

1.2 Purpose and Scope of this Document

The purpose of this RMP is to satisfy Conditions 17 – 20 of the EPBC Act approval (EPBC 2021/9045; Appendix A) by outlining a framework for the rehabilitation and revegetation of areas impacted by the approved clearing activities associated with the Action Area.

Specifically, this RMP sets out:

- Revegetation objectives (aligned with Condition 19) and performance criteria;
- Target species and vegetation community composition based on pre-clearing conditions;
- Methodologies for site preparation, planting, and weed and erosion control;
- Implementation timeframes and staging;
- Monitoring, maintenance, and adaptive management actions; and
- Reporting requirements and success evaluation methods.

The scope of this RMP applies to the Overburden Area and Sheeted Laydown Area under the EPBC-approved Action that are required to be rehabilitated.

1.3 Condition of Approval

Conditions of the decision approval applicable to this RMP and corresponding in-plan section references are outline in Table 1.1 below.

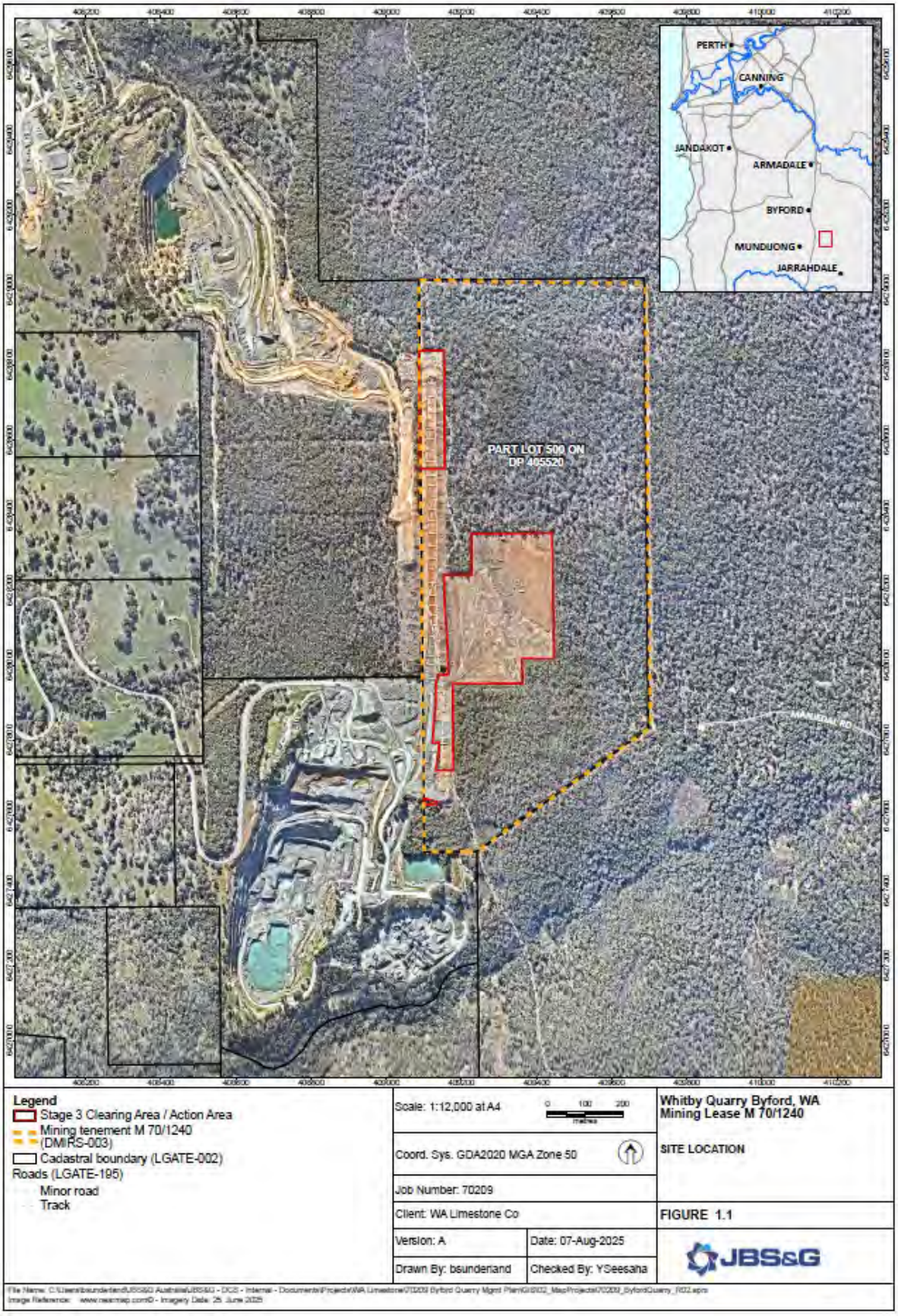
Table 1.1: Condition requirements and in-plan section references

Condition No.	Condition	Section where addressed in this plan	Demonstration of how the plan addresses condition requirements and commitments made to address condition requirements
17)	To mitigate **harm** as a result of the Action on **protected matters**, the approval holder must submit a Revegetation Management Plan to the **department** for the **Minister's** approval within 12 months following the date of this approval.	N/A	N/A
18)	The approval holder must ensure the Revegetation Management Plan is prepared to the satisfaction of the **Minister** within 24 months following the date of this approval. The approval holder must not continue **operation** unless the **Minister** has approved the Revegetation Management Plan in writing. The approval holder must implement the Revegetation Management Plan in accordance with the schedule detailed in the Revegetation Management Plan.	N/A	N/A
19)	The approval holder must include the following environmental objectives in the Revegetation Management Plan:		
	a) **Revegetating** in the **Overburden Area** to meet the completion criteria specified within the Revegetation Management Plan including:	Section 3.1	Revegetation strategy is described in this plan.
	i) restoring the dominant overstory comprised of *Eucalyptus marginata, Corymbia calophylla* and *Allocasuarina fraseriana,* and	Section 3.2; Table 3.2	The RMP describes how and where the 3 dominant overstory species will be restored on-site.
	ii) providing suitable foraging habitat for **black cockatoos** and dispersal habitat for **Chuditch**.		The RMP describes how and where black cockatoo foraging habitat and chuditch dispersal habitat will be provided.
	b) Ensuring at least 35 *Eucalyptus marginata* and/or *Corymbia calophylla* grow to an age and size likely to		The RMP describes how the 35 trees will be tracked and performance indicators to ensure the environmental objectives can be met.

	become potential roosting trees within the revegetated areas of the **Byford Whitby Quarry**, including the **Overburden area**.		
	c) Revegetating the **Sheeted Laydown Area** consistent with the approved **Mine Closure Plan**.		The Mine Closure Plan is included in Appendix D for reference.
20)	The Revegetation Management Plan must be prepared by a **suitably qualified ecologist**. All commitments, including environmental objectives, management measures, corrective measures, trigger values and performance indicators in the Revegetation Management Plan must be **SMART** and based on referenced or included evidence of effectiveness. The Revegetation Management Plan must be consistent with the **Environmental Management Plan Guidelines**, and must include:		
	a) details of the relevant **protected matters** and a reference to **EPBC Act** approval conditions to which the plan refers,	Section 1.1; Section 1.2; Section 2.2	Matters identified through PMST search and relevant conditions are clearly identified through the report.
	b) a table of commitments made in the plan to achieve the environmental objectives, and a reference to exactly where these commitments are detailed in the plan,	Section 3; Table 3.2	Objectives and how they will be met are clearly outlined in Section 3.2 with performance indicators and compliance criteria.
	c) commitments capable of ensuring that the environmental objectives are achieved,	Table 3.2; Table 6.1; Table 4.1	Conditions / commitments and how they will be met are clearly outlined in Section 3.2 with performance indicators and compliance criteria.
	d) reporting and review mechanisms to demonstrate compliance with the commitments made in the plan,	Section 7; Table 4.1; Table 6.1	Reporting and review mechanisms are provided.
	e) an assessment of risks relating to achieving the environmental objectives and risk management strategies and/or mitigation measures that will be applied to address identified risks,	Section 5; Table 5.4; Table 6.1	A risk assessment of threats to success is included in RMP.
	f) impact avoidance, mitigation and/or repair measures, and the timing of those measures,		Management and mitigation measures are also included with contingency actions if targets or completion criteria are threatened.
	g) a monitoring program, which must include:	Table 6.1	Detailed in Section 6.
	i) performance indicators,		Detailed in Section 6.

	ii) trigger values for corrective measures,		Detailed in Section 6.
	iii) the timing and frequency of monitoring, ensuring monitoring is capable of detecting trigger values and changes in the performance indicators,		Detailed in Section 6.
	iv) proposed corrective measures if trigger values are reached, and		Detailed in Section 6.
h)	links to other relevant plans or conditions of approval (including state or territory approval conditions).		Detailed in Section 6.

Figure 1.1: The Action Area



2. The Action Area

2.1 Existing Environment

2.1.1 Bioregion

The Action Area occurs within the Northern Jarrah Forest subregion of the Jarrah Forest bioregion under the Interim Biogeographic Regionalisation of Australia (IBRA) (Thackway and Cresswell 1995) and has been summarised as having Jarrah-Marri forest on lateritic gravels, replaced by *Taxandria* shrublands on eluvial and alluvial soils and Wandoo-Marri on clayey soils to the east.

2.1.2 Flora and Vegetation Assessment

Mattiske Consulting Pty Ltd was engaged to conduct flora and vegetation assessments of the WA Bluemetal Quarry near Serpentine, including the Action Area. These assessments were carried out in two separate studies, with the initial survey conducted in October 2005, followed by an updated assessment in October 2017 (Appendix B).

2.1.2.1 Vegetation

Vegetation within the Action Area is dominated by Jarrah (*Eucalyptus marginata*) Forest, interspersed with areas of Marri (*Corymbia calophylla*), She-oak (*Allocasuarina fraseriana*) woodland, Parrotbush (*Banksia sessilis*) thickets, and patches of low heath.

The vegetation falls within several mapped complexes, including Darling Scarp (42% remaining), Dwellingup 2 (79% remaining) , Murray 1 (76% remaining), and Yarragil (85% remaining) (Heddle et al, 1980; Mattiske and Havel, 1998; DBCA, 2018). All are generally well represented within the conservation estate, except the Darling Scarp complex, which is underrepresented due to its location predominantly on private land.

Vegetation Types

A total of eight site-vegetation types were identified and mapped within the Action Area, based on the classification system developed by Havel (1975a; 1975b) for the Northern Jarrah Forest. Table 2.1 provides a description of each vegetation type identified within the Action Area.

Table 2.1: Vegetation type present within the Action Area

Vegetation Type (code)	Description
CW	Woodland to Open Forest of *Eucalyptus rudis, Corymbia calophylla* over dense *Taxandria linearifolia* and *Astartea scoparia* on creeks and watercourses.
D	Open Forest of *Eucalyptus marginata* subsp. *marginata, Corymbia calophylla* over low understorey with *Baeckea camphorosmae* and *Acacia extensa* on lower slopes.
PW	Open Forest of *Allocasuarina fraseriana, Eucalyptus marginata* subsp. *marginata, Corymbia calophylla* over *Grevillea wilsonii, Adenanthos barbiger, Baeckea camphorosmae* and *Hypocalymma angustifolium* on mid and upper slopes
PT	Open Forest of *Allocasuarina fraseriana, Eucalyptus marginata* subsp. *marginata Corymbia calophylla, Banksia grandis* over *Adenanthos barbiger, Leucopogon verticillatus* and *Clematis aristata* var. *occidentalis* on mid slopes
PS	Open Forest of *Allocasuarina fraseriana*, *Eucalyptus marginata* subsp. *marginata*, *Corymbia calophylla*, *Banksia grandis* over *Adenanthos barbiger* on mid and upper slopes
S	Open Forest of *Eucalyptus marginata* subsp. *marginata, Banksia grandis, Allocasuarina fraseriana* over *Adenanthos barbiger, Leucopogon capitellatus* and *Styphelia tenuiflora* on upper slopes and ridges

SW	Open Forest of *Eucalyptus marginata* subsp. *marginata*, *Corymbia calophylla, Banksia grandis* over *Adenanthos barbiger, Hypocalymma angustifolium* and *Styphelia tenuiflora* on upper gullies and lower slopes
TS	Open Forest of *Eucalyptus marginata* subsp. *marginata, Corymbia calophylla* over *Leucopogon verticillatus* and *Clematis aristata* var. *occidentalis* on mid and upper slopes

Priority and Threatened Ecological Communities

No Priority or Threatened Ecological Communities (PECs/TECs) listed under the EPBC Act or the *Biodiversity Conservation Act 2016* were recorded within the Action Area.

Vegetation Condition

Vegetation condition across the Action Area (prior to clearing) varied from "excellent" to "completely degraded", based on the Keighery (1994) condition scale, with evidence of impacts associated with historic disturbances including from historical logging, bushfires, weed invasion, dieback, and other disturbances related to agricultural and quarry activities.

2.1.2.2 Flora

A total of 253 vascular plant taxa, including 244 native species from 154 genera and 56 families, were recorded within the Action Area. The original 2005 assessment documented 161 taxa from 105 genera and 47 families. The surveys were undertaken during peak flowering periods to maximise detection of plant diversity.

Conservation Significant Flora

Two Priority flora taxa were identified within the Action Area:

- *Millotia tenuifolia* var. *laevis* – Priority 2, recorded in both surveys; and
- *Pithocarpa corymbulosa* – Priority 3 (tentative ID), newly identified in the 2017 survey.

No Declared Rare Flora (DRF) listed under the *Biodiversity Conservation Act 2016* or Threatened flora listed under the EPBC Act were located during either survey.

Mattiske (2017; Appendix B) conducted a likelihood of occurrence assessment that suggested the potential for several threatened flora species to occur within the Action Area. However, the supporting field survey determined that the Action Area is not suitable to support these species.

Mattiske also provided further correspondence in 2021 (Appendix C) to support the DCCEEW's request for further information, indicating that all threatened flora species identified as MNES in the Protected Matters Search Tool are extremely unlikely to occur in the Action Area. The species identified occur on the Swan Coastal Plain in sandy or wetter sites. They do not occur on lateritic sandy-gravel soils of the Darling Scarp that have been confirmed to be in the Action Area.

2.1.2.3 Introduced Species

The 2005 assessment recorded 11 introduced plant species, while the 2017 survey found an increased total of 40 weed species within the Action Area. This reflects the ongoing influence of environmental disturbances, particularly along tracks, previously cleared areas, and in proximity to agricultural zones.

2.1.2.4 *Phytophthora cinnamomi* (Dieback)

While a formal dieback assessment has not been undertaken within the Action Area, multiple lines of evidence indicating the presence of the pathogen was identified during the surveys (Mattiske, 2017; Appendix B).

2.2 Environmental Values and Significance

2.2.1 EPBC Listed Threatened Fauna (MNES)

A series of targeted fauna assessments have been undertaken to characterise the ecological values of the Action Area, with an emphasis on species listed as MNES under the EPBC Act. The most recent and comprehensive of these was a targeted fauna survey conducted by Bamford Consulting Ecologists in April 2022 (Bancroft & Bamford, 2022), which provided contemporary data on species presence, habitat quality, and site utilisation. This assessment was complemented by previous investigations, including a general fauna survey by Western Wildlife (2006) and a species-specific Black Cockatoo habitat assessment by Kirkby (2017), which evaluated the availability of suitable nesting and foraging resources across the broader landscape.

In addition, expert advice provided by Mattiske (2021; Appendix C) on threatened flora has informed the interpretation of habitat condition and structure as it relates to fauna values. Collectively, these datasets provided a robust foundation for evaluating the presence, distribution, and ecological significance of threatened fauna within the Action Area, and for assessing the potential impacts associated with the Action on relevant MNES species and highlight the need for appropriate revegetation management measures.

2.2.1.1 Black Cockatoos

Prior to the commencement of the Action, targeted fauna surveys and habitat assessments confirmed the presence of suitable habitat within the Action Area for all three EPBC Act-listed Black Cockatoo species, that is, Carnaby's Black-Cockatoo (*Zanda latirostris*), Forest Red-tailed Black-Cockatoo (*Calyptorhynchus banksii naso*), and Baudin's Black-Cockatoo (*Zanda baudinii*). Field surveys identified key habitat features including Marri (*Corymbia calophylla*) and Jarrah (*Eucalyptus marginata*) trees, which provide important foraging resources and potential nesting hollows. Forest Red-tailed Black-Cockatoos were directly recorded within the site, indicating active use of the area. Based on observations and habitat characteristics, it was determined that the Forest Red-tailed Black-Cockatoo was likely to be a breeding resident in low numbers, while Carnaby's and Baudin's Black Cockatoos may utilise the area as seasonal migrants, potentially for breeding (Carnaby's) or non-breeding (Baudin's) purposes (Bancroft & Bamford, 2022).

Prior to any clearing or disturbance associated with the Action, the Action Area contained intact habitat that contributed to the broader ecological function of the surrounding landscape. Although the Action Area itself is relatively small, its connectivity to adjacent remnant vegetation likely enhanced its value for these species. The presence of foraging resources, potential roosting and nesting sites, and confirmed use by at least one species of Black Cockatoo demonstrated that the Action Area supported environmental values relevant to the conservation and recovery of these threatened species at a local scale.

2.2.1.2 Chuditch (*Dasyurus geoffroii*)

Surveys conducted prior to the commencement of the Action confirmed the presence of the Chuditch, a species listed as Vulnerable under the EPBC Act, within the Action Area (Bancroft & Bamford, 2022). This species occupies a wide range of habitats, including Marri-Jarrah Forest and eucalypt woodlands, and requires structurally complex habitat for denning and foraging. The Action Area, assessed prior to clearing, supported suitable habitat features such as dense understorey vegetation, coarse woody debris, and potential den sites, indicative of habitat capable of supporting at least transient or dispersing individuals.

Although the 13.2 ha Action Area represents only a small fraction of the typical home range of an individual Chuditch, it is likely to form part of a larger habitat network supporting the species at the landscape scale. The confirmed presence of the species prior to site disturbance underscores the local conservation significance of the area.

2.3 Potential Environmental Constraints and Risks/Threatening Processes to MNES

2.3.1 Unauthorised Access

Unauthorised public access can result in erosion and soil compaction, vandalism and damage to native vegetation as a result of illegal clearing/disturbance, waste discharge and/or soil contamination.

In addition to unauthorised clearing of habitat, it is noted in the recovery plans for Black Cockatoos (DPaW, 2013; DEC, 2008) and the Chuditch (DEC, 2012) that other major threats to the species include deliberate and accidental mortality from actions such as poisoning, trapping, illegal shooting, and vehicle strike. Though these activities occur to a lesser extent than historically reported due to increased public education, unauthorised public access is expected to worsen if appropriate fencing is not installed and the site is not maintained for the purposes of conservation.

2.3.2 Weeds and Pathogens

The spread and introduction of weeds and pathogens, such as Phytophthora dieback, are recognised as key drivers of habitat decline for MNES, including Black Cockatoos and the Chuditch (DEC 2008; DEC 2012; DPaW 2013). Both weed species and evidence of dieback have been recorded within the Action Area. Without the implementation of active management measures such as regular monitoring, targeted weed and dieback control, and appropriate site protection (e.g., fencing), there is a heightened risk of further infestation. This risk is exacerbated by potential site disturbance from livestock, vehicles, and foot traffic, all of which can degrade vegetation condition and reduce habitat quality, particularly for foraging and breeding resources critical to Black Cockatoos (DPaW, 2013).

2.3.3 Pests

Pest animals, such as foxes, feral cats, and introduced herbivores, pose significant risks to vegetation and MNES species. Herbivores can reduce revegetation success through browsing, while predators threaten native fauna through direct predation. The Chuditch is particularly vulnerable, being ground-bounded, and feral cats have been documented preying on Black Cockatoos at nesting hollows (DPAW 2013; DEC 2008; DEC, 2012). Without active control, pests can degrade habitat quality and hinder conservation outcomes.

2.3.4 Bushfire

Altered fire regimes are noted as a factor that may impact MNES habitat and individuals, such as the Chuditch (DEC, 2012) and Black Cockatoos (DPAW, 2013; DEC, 2008). In Jarrah forests, Chuditch abundance has been related to fire intensity and history. Abundance was higher in areas where fire intensity had been low or in areas not burnt for a considerable number of years. Similarly, fires are considered destructive to Black Cockatoo habitat due to the potential loss of significant foraging habitat and loss or damage to potential breeding habitat should trees containing nest hollows be lost to fire or the nest chambers be damaged by fire (DPAW 2013; DEC 2008).

2.3.5 Waste

Unregulated waste disposal near remnant vegetation or fauna habitat can introduce weeds, dieback pathogens, and soil contaminants, degrading vegetation and habitat quality. Organic waste also attracts pest species, increasing risks to native fauna through predation and competition. Effective waste management is essential to protect rehabilitated areas and MNES habitat.

2.3.6 Climate Change

Climate change is one of the primary global threats to biodiversity and ecosystem function (Brook et al.2008) and the south-west of Western Australia has been assessed as being particularly vulnerable to the effects of climate change (Pouliquen-Young and Newman 2000; Howden et al. 2003). Predictions of climate change in the south-west of Western Australia are that there will be an increased frequency of extreme weather events.

Such extreme weather event is likely to have a significant effect on the extent and survival, or capacity for regeneration of the vegetation providing habitat for Black Cockatoos and the Chuditch (DPaW 2013; DEC 2008; DEC, 2012).

3. Revegetation Strategy

3.1 Objectives and Scope

To mitigate impacts resulting from the Action on protected matters under the EPBC Act, this RMP outlines targeted measures to achieve long-term conservation outcomes for native vegetation within designated revegetation areas, that is, the Overburden and Sheeted Laydown Areas, as shown in Figure 3.1.

In accordance with the approval decision notice for EPBC 2021/9045, this RMP incorporates the following key environmental objectives:

1. Revegetating in the Overburden Area to meet the completion criteria specified within the Revegetation Management Plan including:
    a. restoring the dominant overstory comprised of *Eucalyptus marginata, Corymbia calophylla* and *Allocasuarina fraseriana,*
    b. providing suitable foraging habitat for black cockatoos and dispersal habitat for Chuditch,
2. Ensuring at least 35 *Eucalyptus marginata* and/or *Corymbia calophylla* grow to an age and size likely to become potential roosting trees within the revegetated areas of the Byford Whitby Quarry, including the Overburden area, and
3. Revegetating the Sheeted Laydown Area consistent with the approved Mine Closure Plan (WA Bluemetal, 2016; Appendix D).

It should be noted that while Objective 3 specifically addresses revegetation in the context of the Mine Closure Plan, this RMP, including its associated management actions, performance indicators, and contingency measures, has been developed to ensure alignment with the commitments and strategies outlined in the Mine Closure Plan.

Figure 3.1: Revegetation Areas

3.2 Objectives, Performance Indicators and Completion Criteria

Performance indicators have been developed in accordance with the rehabilitation objectives to guide revegetation activities. Completion criteria have been developed to provide measurable criteria to be met before revegetation activities can be considered completed.

Given that final closure of the operation and consequently the Overburden and Sheeted Laydown Areas, is not expected to occur for at least 100 years, the Mine Closure Plan outlines provisional completion criteria that establish the broader long-term vision for revegetation outcomes. This RMP complements that approach by defining interim performance objectives, indicators, and targets, which are expected to be refined and adapted over the remaining life of the quarry as further data becomes available, and site conditions evolve.

Table 3.1 outlines the objectives, indicators, and targets for revegetation as defined in the Mine Closure Plan. In alignment with these, Table 3.2 provides a summary of the objectives, performance indicators, and completion criteria established to meet the requirements under EPBC for this RMP. These have been designed to complement and work in conjunction with the Mine Closure Plan throughout the life of the quarry.

Table 3.1: Objectives, indicators and targets as set out in the Mine Closure Plan (WA Bluemetal, 2016)

Closure Objective	Indicative Completion Criteria	Completion Criteria	Measurement Tools
Disturbed areas to be rehabilitated to a condition compatible with the postmining land use and adjoining State Forest.	• Revegetation composition is representative of the target ecosystem in species diversity and structure.	• Reaching agreed rehabilitation targets.	• Quantitative vegetation monitoring using recognised standard techniques. • Audit of records for sources of plant materials used in rehabilitation.

Table 3.2: RMP objective, performance indicators and targets

Objective No.	Objective	Performance indicators	Completion criteria/Targets
1.	Revegetating in the Overburden Area to: a) Restore the dominant overstorey comprised of *Eucalyptus marginata, Corymbia calophylla*, and *Allocasuarina fraseriana*	• Vegetation monitoring indicates a positive trend toward achieving the target of ≥60% of total overstorey species comprising the three target species. • Target species present in ≥80% of monitoring plots. • ≥70% survival rate after two summer periods.	• Dominant species make up ≥60% of overstorey native vegetation composition. • Presence of natural recruitment of at least one target species within 5 years (post planting).
	b) Provide suitable foraging habitat for black cockatoos and dispersal habitat for Chuditch	• ≥25% of planted species are known food sources for black cockatoos. • Mid- and upper-canopy cover increasing in monitoring plots.	• Revegetation includes species known as primary foraging habitat for black cockatoos. • Ground cover and structure support Chuditch habitat needs (logs, leaf litter,

		• Signs of black cockatoo or Chuditch use (e.g., camera traps, scats, foraging evidence).	understorey). • Black cockatoo foraging activity and/or Chuditch presence recorded within 10 years.
2.	Ensuring at least 35 *Eucalyptus marginata* and/or *Corymbia calophylla* grow to an age and size likely to become potential roosting trees within the revegetated areas of the Byford Whitby Quarry, including the Overburden area	• Minimum of 35 *E. marginata* and/or *C. calophylla* established and tagged and GPS-located for monitoring. • Tagged trees monitored annually for growth (height and DBH). • Health and survival of trees recorded. • Tree spacing and density sufficient to allow long-term development. • Progressive monitoring to ensure trees are protected from fire, grazing, and competition. • Trees remain alive and healthy for the life of the approval.	• 35 *E. marginata* and/or *C. calophylla* trees established and protected. • Trees reaching size thresholds consistent with black cockatoo roost potential.
3.	Revegetating the Sheeted Laydown Area consistent with the approved Mine Closure Plan	• Vegetation monitoring shows species composition and structure representative of the target native ecosystem (as described in Table 2.1). • No evidence of significant weed invasion or pathogen introduction.	• Condition of revegetation area is compatible with the post-mining land use and adjoining State Forest. • Revegetation shows ≥70% similarity in native species richness and structure compared to reference sites (adjacent State Forest or analogue site). • Native vegetation cover ≥60% within 10 years of revegetation. • Structural vegetation layers (overstorey, midstorey, understorey) present and progressing. • Weed cover <5%; no new weed species introduced. • No spread of Dieback confirmed via regular monitoring of susceptible species.

3.3 Methodology

Revegetation within both the Overburden Area and the Sheeted Laydown Area will be undertaken from a baseline of complete vegetation loss, as both areas have been entirely cleared of native vegetation. As such, the revegetation process will involve establishing native plant communities from the ground up, beginning with landform reconstruction and progressing through site preparation, soil assessment and conditioning (if required), and staged vegetation establishment. Rehabilitation will follow each campaign of overburden placement, with revegetation occurring at the earliest practicable opportunity to stabilise the surface and reduce the risk of wind erosion. This approach is essential to reconstruct a functioning and self-sustaining vegetation community that meets the specified environmental objectives and supports the recovery of ecological values over the long term.

The strategy for revegetation will consist of the following works:

- Engagement of revegetation contractor or suitably qualified Officer;
- Site Preparation and erosion control;
- Weed control, if and where required;
- Planting and seed spread;
- Pest control;
- Hygiene management;
- Access control; and
- Fertiliser and irrigation management.

3.3.1 Engagement of Revegetation Contractor or Suitably Qualified Officer

A suitably qualified expert will be engaged to undertake revegetation activities. Upon commencement, a site visit will be undertaken and refinements to RMP, in particular the revegetation methodology, will be made if required in consultation with the DCCEEW.

3.3.2 Site Preparation and Erosion Control

Site preparation will include a combination of techniques, aiming to reduce the presence of weed material, if present, at the site and alleviating any areas of compaction prior to revegetation activities commencing.

Where appropriate, scalping may be undertaken in areas devoid of native vegetation and are likely to have a significant weed load in the topsoil. Scalping involves complete removal of the surface soil to a depth of approximately 5-10 cm. Material removed from revegetation areas should be taken off site and disposed of or buried on site to a depth where weed seeds are unlikely to germinate.

Furthermore, ripping will be undertaken in areas deemed necessary to maximise water infiltration, promote soil aeration and alleviate compaction. Ripping involves fracturing the ground to a depth of approximately 0.5 cm to ensure plant roots can develop and creates microhabitats for seedling establishment. It is anticipated that ripping is undertaken over late summer or early autumn (March – April) which will aid new plant growth in spring following planting.

Erosion control structures are proposed to assist in stabilisation and prevent erosion during plant establishment. Depending on the steepness of any given slope, these may include:

- coir netting; and
- jute matting.

Each of the above options are biodegradable and will naturally break down over time and will be employed on an as required basis.

3.3.2.1 Landform Reconstruction

As per the Mine Closure Plan (Appendix D), following each campaign of overburden placement, rehabilitation activities will commence at the earliest practicable opportunity to stabilise the surface and reduce the risk of wind erosion. Rehabilitation will include planting of native vegetation and application of seed mixes, tailored to the characteristics of the newly formed landform. Overburden placement will occur in discrete stages during the summer months, when the high clay content material is most workable.

Due to the altered landform characteristics such as increased slope angles, clay-rich overburden substrates, and variable moisture and shading conditions, rehabilitation techniques will differ from those typically used in shallow quarry rehabilitation. Standard methods, such as direct topsoil spreading from laterite gravel and duricrust areas, are unlikely to be effective, as many species within that topsoil are not suited to the sloping, clay-based conditions. Furthermore, species derived from direct-spread topsoil may not contribute sufficient geotechnical stability.

Given that native vegetation reference communities in the area often comprise slower-growing groundcover shrubs that provide limited erosion control, rehabilitation strategies must instead reflect the unique conditions created by landform raising. These include steeper slopes, higher clay content, and microclimatic variations such as increased shading or seasonal dryness. To address these challenges, a suite of local provenance species has been selected for their structural and ecological suitability. These include *Eucalyptus patens, E. laeliae, and E. megacarpa* (adapted to valley-side environments); *E. wandoo* (tolerant of dry clay-based slopes); *Viminaria juncea* (for shaded soils) and species such as *Calothamnus* spp., *Kunzea recurva*, and *Melaleuca* spp., which possess fibrous root systems effective in maintaining slope stability and preventing soil loss (refer to Table 3.4 for full species list).

3.3.3 Weed and Pathogen Control

A baseline weed survey will be conducted within the revegetation area to identify weed species present, establish baseline weed densities and determine the level of weed management required.

Weed control will commence in winter, prior to revegetation activities commencing. This will be in the form of a broad scale weed spray over vegetation areas (where required) to reduce initial weed loads prior to planting. Weed control will occur up to four times in 12 months[1], depending on weeds present and severity of infestation (most likely timing: late autumn, midwinter, mid-spring, early summer).

Weed control post planting will be focused on the immediate areas surrounding planted seedlings (e.g., 1 m radius around planted seedlings). This approach will increase the survival of planted seedlings while maintaining the current and future vegetation type of the rehabilitation areas (native trees over grass).

Pending monitoring results, isolated weed control will be undertaken twice a year at the revegetation areas in winter and spring.

Table 3.3: Summary of weed control methods

Weed control method		Indicative weed type
Chemical Control	Initial broad scale spray herbicide application	For blanket control of most weed species including grass weeds prior to revegetation germination/ seed planting.
	Spot spray herbicide application	For targeted control of most weed species including grass weeds after revegetation germination/ seedling planting.
	Stem injection, cut and paint	To control large woody weeds

[1] Or as advised by the revegetation contractor based on their site assessment prior to the commencement of revegetation activities.

Manual control	Hand weeding	Weeds encountered within and immediately adjacent to tree guards will be removed by hand to ensure no off-target damage with chemical control.

Appropriate management measures will also be implemented prior to, during, and after revegetation works to minimise potential spread of weed and dieback infestations to vegetation within the revegetation areas.

3.3.4 Planting

A program of direct seeding and infill planting will be undertaken, as per the Mine Closure Plan (2016; Appendix D). Seeds and seedling planting, in the form of tubestock (propagated by and purchased from a NIASA accredited nursey), will be undertaken in the designated revegetation areas. Seedling planting will be undertaken in early winter, if possible, to benefit from winter rainfall.

3.3.4.1 Plant/Vegetation Establishment

The revegetated overburden bunds will be designed to achieve the following outcomes, with minimum planting densities aligned with the requirements outlined in the Mine Closure Plan (WA Bluemetal, 2016; Appendix D), unless otherwise specified by the engaged revegetation contractor or suitably qualified Officer:

- Incorporation of suitable soils and slopes to promote long-term stability and minimise erosion.
- Establishment of a self-sustaining cover comprising local native trees, shrubs, and groundcover species.
- Planting of at least one deep-rooted tree or shrub per 3 m² to support slope stabilisation and ecological function.
- A minimum planting density of 1,200 tree stems per hectare.
- Achievement of a target species richness of at least 10 native species per 100 m².
- Maintenance of weed cover at levels that do not pose a threat to the establishment and persistence of native vegetation.

In addition to the above, the following general planting density guidelines may also be applied, subject to site-specific conditions and final recommendations from the revegetation contractor or suitably qualified Officer:

- 4 to 6 plants per square metre of rushes, sedges, and grasses;
- 1.5 to 2 plants per square metre of shrubs/herbs; and
- 0.1 to 0.2 plants per square metre of trees.

These density figures provide additional flexibility in tailoring revegetation efforts to the ecological characteristics and rehabilitation goals of each bund location as it is important to recognise that revegetation needs to be tailored to the specific conditions of each revegetation area.

Following a comprehensive baseline survey of the revegetation areas by the revegetation contractor or suitably qualified Officer, a more accurate understanding of the current conditions will be obtained, allowing for a more informed approach to the level of planting intensity required to ensure a high success rate. This will take into account factors such as vegetation type, soil condition, and other relevant variables, along with the anticipated seedling survival rate.

Notwithstanding, the initial planting density will also be adjusted to account for the anticipated level of seedling mortality, ensuring a higher density to support successful establishment. The plan will be revised to reflect these changes and provide a more accurate approach to the revegetation process.

Seedlings used for planting should be suitably mature, between 6 to 12 months to enable optimal establishment and growth. Tubestock should also not be root bound and planting should be undertaken as follows:

- optimal location of each species at the site should be chosen at the time of planting to ensure appropriate condition for each species (e.g. topography, shade/sun, soil moisture etc);
- seedling should be planted so that the stem is vertical and the base of the plant is slightly below the original soil surface;
- soil surrounding the seedling root ball should be pressed in firmly to avoid air pockets; and
- a minimum of three stakes and a protective guard manufactured for such purpose should be placed around the seedling to protect the vegetation from grazing and wind damage.

It is anticipated that no post-planting watering will be needed as winter rain will provide adequate water to support the tubestock following planting. The timing of planting will ensure that rainfall will provide the planted seedlings with access to sufficient water during their establishment phase. Tube stock will be watered before transport to the site if considered necessary, to reduce the risk of mortality during and after planting.

Irrigation is not proposed within the designated revegetation area. If during monitoring plant stress is observed, contingency for a wetting agent or additional watering options will be investigated (e.g., use of a water irrigation truck for spot watering).

3.3.4.2 Species List

Revegetation will be undertaken using native species of local provenance. The key species deemed suitable for revegetation, based on the vegetation types present within the designated revegetation area, have been derived from the Mine Closure Plan and are presented in Table 3.4. The species list comprises fast-growing, drought-tolerant species indigenous to the local area to support early establishment and ecological resilience. Once a revegetation contractor or suitably qualified Officer is engaged, this list will be further refined to reflect the specific vegetation types within individual revegetation zones (i.e., Overburden Area and Sheeted Laydown Area) and the availability of appropriate tubestock.

Notwithstanding, the final revegetation list will prioritise species endemic to the locality and consider their ecological suitability relative to the condition of revegetation areas. An updated species list will be provided to the DCCEEW following the completion of baseline surveys, and this RMP will be revised accordingly.

Table 3.4: Revegetation species list for clay bunds for seed mix and tube planting (as per Mine Closure Plan)

Local Species List	Tube Stock	Moist Areas
Acacia celastrifolia		
Acacia extensa		
Acacia latericola		
Acacia microbotrya		
Acacia pulchella		
Acacia saligna	T	W
Acacia urophylla		
Agonis linearifolia	T	W
Allocasuarina fraseriana		

Allocasuarina huegeliana		
Allocasuarina humilis		
Banksia grandis		
Calistemon phoeniceus	T	W
Calothamnus quadrifidus	T	W
Calothamnus rupestris	T	W
Dryandra sessilis		
Eucalyptus accedens	T	W
Eucalyptus calophylla	T	W
Eucalyptus laeliae	T	W
Eucalyptus megacarpa	T	W
Eucalytus marginata	T	W
Eucalyptus patens	T	W
Eucalyptus rudis	T	W
Eucalyptus wandoo	T	W
Hardenbergia comptoniana		
Kennedia coccinea		
Kennedia prostrata		
Kunzea recurve		
Leptospermum erubescens		
Melaleuca preissiana	T	W
Melaleuca rhaphiophylla	T	W
Melaleuca scabra		
Paraserianthes lophantha		
Viminea juncea		

3.3.5 Pest control

Feral fauna, predominantly rabbits, have the potential to affect retained vegetation and revegetation efforts. Corflute tree guards will be installed around planted seedlings with at least one stake which will provide protection from herbivory. If impacts from animal activities (i.e., evidence of grazing) are recorded during monitoring, contingency measures as described in Table 6.1 will be implemented.

Tree guards are proposed to be removed once monitoring indicates that plants have outgrown them or as otherwise directed by the revegetation contractor or suitably qualified Officer.

3.3.6 Hygiene management

To reduce the risk of introducing Dieback or other pathogens and spread of weeds, the following will be undertaken:

- All machinery, vehicles, equipment and footwear used during revegetation activities will be clean upon entry and exit to and from the revegetation areas; and
- Seed sources to be used in tubestock will be propagated by a NIASA (Nursery Industry Accreditation Scheme of Australia) accredited nursery.

3.3.7 Access control

Signage and fencing will be installed on the boundary of the designated revegetation area to limit accessibility. Signage will detail the restoration efforts occurring on site and note the accessibility limitations to the revegetation areas, whilst fencing will provide physical access restrictions.

4. Management Actions

Specific management actions to be implemented within the revegetation area have been provided below in Table 4.1.

Table 4.1: Management action for revegetation areas

Reference	Management Action	Timing	Responsibility
RMP 1	Engage revegetation contractor or suitably qualified Officer with demonstrated experience in native ecosystem restoration and species relevant to Black Cockatoo and Chuditch habitat.	Prior to revegetation activities taking place.	Proponent
RMP 2	Develop species list and planting strategy targeting ≥60% overstorey composition of *Eucalyptus marginata, Corymbia calophylla*, and *Allocasuarina fraseriana*. Include ≥25% Black Cockatoo foraging species.	Prior to planting	Proponent/ Revegetation contractor or suitably qualified Officer
RMP 3	Prepare planting areas in the Overburden and Sheeted Laydown areas through soil ripping, erosion control and pathogen hygiene measures.	Prior to planting	Revegetation contractor or suitably qualified Officer
RMP 4	Undertake planting of selected species in accordance with RMP species density and composition targets. Include understorey components to support Chuditch dispersal habitat.	Late Autumn/early Winter	Revegetation contractor or suitably qualified Officer
RMP 5	Tag, GPS-locate, and record a minimum of 35 *Eucalyptus marginata* and/or *Corymbia calophylla* seedlings for long-term monitoring as potential roost trees.	During planting	Revegetation contractor or suitably qualified Officer
RMP 6	Install guards around seedlings to prevent grazing and promote seedling establishment.	Immediately following planting	Revegetation contractor or suitably qualified Officer
RMP 7	Undertake weed control in accordance with site weed management plan to maintain <5% weed cover and prevent new weed incursions.	Quarterly for first 3 years, then biannually (unless otherwise required based on monitoring results)	Proponent/ Revegetation contractor or suitably qualified Officer/ Weed control contractor
RMP 8	Implement supplementary planting where survival is <70% or target species composition is not met.	As required, based on monitoring results	Revegetation contractor or suitably qualified Officer
RMP 9	Conduct annual vegetation monitoring in revegetation areas, assessing: • species composition; • survival rates; • canopy development; and • natural recruitment.	Annually	Proponent/ Environmental consultant/ Revegetation contractor or suitably qualified Officer
RMP 10	Monitor tagged trees annually for height, DBH, and health to assess potential for future roost suitability.	Annually	Proponent/ Environmental consultant/ Revegetation contractor or suitably qualified Officer
RMP 11	Install firebreaks and access controls to protect long-term development of tagged potential roost trees.	Prior to second summer	Proponent/ Revegetation contractor or suitably qualified Officer
RMP 12	Conduct camera trapping and/or field surveys for signs of black cockatoo foraging and Chuditch presence (e.g., scats, scratchings).	After 10 years, annually for 10 years or until presence confirmed	Fauna ecologist
RMP 13	Ensure that all equipment, vehicles, and planting materials used in revegetation activities are free of dieback and weed seed.	Prior to and during all revegetation activities	All site personnel/ Revegetation contractor or suitably qualified Officer

RMP 14	Assess the Sheeted Laydown Area annually against reference site benchmarks (vegetation structure, species richness, cover).	Annually until completion criteria is met	Proponent/ Environmental consultant/ Revegetation contractor or suitably qualified Officer

5. Risk Assessment

A qualitative risk assessment was conducted in accordance with the DCCEEW Environmental Management Plan Guidelines to assess the risks to the revegetation site and the success of the RMP and detailed in Table 5.4. Results of the risk assessment have been used to develop management measures that form part of this RMP.

Each environmental risk identified has been provided a likelihood and consequence rating using the criteria in Table 5.1 and Table 5.2. These ratings are then combined using Table 5.3 to generate a risk rating of low, medium, high or severe.

Table 5.1: Likelihood

Qualitative Measures for likelihood (How likely is it that this event/issue a fter control strategies have been put in place)	
Highly likely	Is expected to occur in most circumstances.
Likely	Will probably occur during the life of the project.
Possible	Might occur during the life of the project.
Unlikely	Could occur but considered unlikely or doubtful.
Rare	May occur in exceptional circumstances.

Table 5.2: Consequence

Qualitative Measures for consequence (what will be the consequence/result if this issue does occur rating)	
Minor	Minor incident of environmental damage that can be reversed.
Moderate	Isolated but substantial instances of environmental damage that could be reversed with intensive efforts.
High	Substantial instances of environmental damage that could be reversed with intensive efforts.
Major	Major loss of environmental amenity and real danger of continuing.
Critical	Severe widespread loss of environmental amenity and irrecoverable environmental damage.

Table 5.3: Risk Rating

	Consequence				
	Minor	Moderate	High	Major	Critical
Highly likely	Medium	High	High	Severe	Severe
Likely	Low	Medium	High	High	Severe
Possible	Low	Medium	Medium	High	Severe
Unlikely	Low	Low	Medium	High	High
Rare	Low	Low	Low	Medium	High

Table 5.4: Environmental Risk Assessment of Threats to Success of RMP

Threats	Potential Impacts	Inherent Risk Rating			Mitigation measures	Residual Risk Rating		
		Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
Threats to the success of the RMP								
Unauthorised access	Unauthorised access may result in damage to native habitat, endangerment to MNES and soil compaction which can lead to habitat degradation through the inability for native vegetation to grow or regenerate.	Possible	Moderate	**Medium**	Management measures include: • Installation and maintenance (monitoring)/ repair of fencing on site; and • Ongoing monitoring of fencing and access track integrity. Targets and completion criteria have been established against each management action listed above and a monitoring plan developed (see Section 6) to monitor each action performance. Contingency actions have been incorporated into the RMP if monitoring indicates targets and completion criteria are not being met. Please see Section 6; Table 6.1 for more detail.	Unlikely	Moderate	**Low**
Weeds and pathogens	The introduction/ spread of weed species and pathogens may lead to reduced flora species and system diversity, resulting in a decline in MNES habitat quality.	Likely	Moderate	**Medium**	Management measures include: • Implementation of weed and dieback management, as required; • Ongoing monitoring; and • Installation/ repair of site fencing. Targets and completion criteria have been established against each management action listed above and a	Unlikely	Moderate	**Low**

					monitoring plan developed (see Section 6) to monitor each action performance. Contingency actions have been incorporated into the RMP if monitoring indicates targets and completion criteria are not being met. Please see Section 6; Table 6.1 for more detail.			
Pest	Lack of maintained fencing surrounding the revegetation and overall site may result in habitat loss and degradation due to presence and persistence of pests. Pests can impact revegetation progress by damaging or destroying young plants, reducing survival rates, and hindering establishment through browsing, root disturbance, or competition for resources.	Likely	Moderate	**Medium**	Management measures include: • Installation and maintenance (monitoring)/ repair of fencing on site; • Pest control, as required; and • Ongoing monitoring of pest occurrence within revegetation areas, fencing and access track integrity. Targets and completion criteria have been established against each management action listed above and a monitoring plan developed (see Section 6) to monitor each action performance. Contingency actions have been incorporated into the RMP if monitoring indicates targets and completion criteria are not being met. Please see Section 6; Table 6.1 for more detail.	Unlikely	Moderate	**Low**
Bushfire	Too frequent fire may prevent plants from recovering post-fire and lead to localised species extinctions or a contraction of a vegetation community	Possible	Moderate	**Medium**	Management measures include: • Bushfire management in accordance with Shire of Serpentine-Jarrahdale annual firebreak notice.	Possible	Moderate	**Medium**

	which provides suitable habitat for MNES.				Targets and completion criteria have been established against each management action listed above and a monitoring plan developed (see Section 6) to monitor each action performance. Contingency actions have been incorporated into the RMP if monitoring indicates targets and completion criteria are not being met. Please see Section 6; Table 6.1 for more detail.			
Waste	Unregulated disposal and storage of waste in proximity to native vegetation may increase contamination of soils, introduce presence of pests and predation species (i.e., foxes and cats) and physical endanger native fauna.	Unlikely	Moderate	**Low**	Management measures include: • Removal of any rubbish that has been dumped or drifted into the Action Area. Targets and completion criteria have been established against each management action listed above and a monitoring plan developed (see Section 6) to monitor each action performance. Contingency actions have been incorporated into the RMP if monitoring indicates targets and completion criteria are not being met. Please see Section 6; Table 6.1 for more detail.	Unlikely	Moderate	**Low**
Climate change	Climate change has the potential to impact the extent and survival, or capacity for regeneration of the vegetation providing habitat for Black Cockatoos and Chuditch through the following:	Likely	High	**High**	Management measures include: • Protection of suitable Black Cockatoo and the Chuditch habitat within their distribution range to ensure the ongoing protection and management of the site.	Possible	High	**Medium**

	• Increased bushfire risk; • Increased rainfall events leading to erosion and subsequent degradation of habitat quality; and • Reduction in habitat extent within MNES distribution range.			Targets and completion criteria have been established against each management action listed above and a monitoring plan developed (see Section 6) to monitor each action performance. Contingency actions have been incorporated into the RMP if monitoring indicates targets and completion criteria are not being met. Please see Section 6; Table 6.1 for more detail.	

6. Monitoring and Contingency Actions

The purpose of monitoring actions is to determine whether the environmental objectives for this RMP are being achieved, and whether the management actions require revision or review. Table 6.1 provides a high-level overview of the proposed monitoring program, which will be implemented for a minimum maintenance period, determined by the revegetation contractor or suitably qualified Officer based on their pre-revegetation assessment, and will continue until completion criteria are achieved or as otherwise agreed with the DCCEEW.

If monitoring results indicate that the management actions outlined for the designated revegetation areas (Table 4.1) are not effective or that the completion criteria (Table 3.2) are not being met, contingency actions, as described in Table 6.1, will be triggered. Any implementation of contingency actions will be documented in the annual monitoring report to ensure transparency and adaptive management throughout the rehabilitation process.

Table 6.1: Monitoring and contingency actions for revegetation areas

Reference	Parameter	Purpose / Performance	Frequency	Monitoring Type	Corrective Actions	Responsibility	Reporting
RMP 1	Contractor engagement	To ensure a qualified contractor is engaged for species relevant to Black Cockatoo and Chuditch habitat.	Once, prior to revegetation	Document verification	• Replace contractor if qualifications/experience are insufficient.	Proponent	N/A
RMP 2	Species list and planting strategy	To confirm planting design meets ≥60% target species and ≥25% Black Cockatoo food species.	Once, prior to planting	Review of planting plan	• Revise species mix and planting densities to meet targets before planting.	Proponent/ Revegetation contractor or suitably qualified Officer	Included in revegetation plan submission
RMP 3 & RMP 13	Site preparation & hygiene	To ensure soil is properly prepared and free from pathogens and weed seed.	Opportunistically during works	Visual inspection / hygiene register review	• Re-treat site if compaction, erosion, or contamination observed. • Reinforce hygiene protocol.	Revegetation contractor or suitably qualified Officer/ Site personnel	Annual reporting
RMP 4	Revegetation planting success	To assess planting success and survival against performance targets.	Annually until completion criteria is met	Quadrat floristics / survival counts	• Infill planting where survival <70%. • Replace species if not establishing. • Improve soil or shade if needed.	Revegetation contractor or suitably qualified Officer	Annual reporting
RMP 5 & RMP 10	Roost tree tracking	To ensure minimum of 35 trees are tagged and monitored for roosting potential.	Annually	Tree growth measurement (DBH/height) and GPS records	• Replace dead tagged trees. • Supplement planting. • Apply protection (e.g., fencing, thinning).	Revegetation contractor or suitably qualified Officer	Annual reporting
RMP 6 & RMP 7	Grazing control	To detect and manage grazing impacts on seedlings.	Annually and opportunistically	Visual inspection of damage and guard effectiveness	• Reinforce guards. • Implement targeted pest control. • Monitor grazing pressure.	Revegetation contractor or suitably qualified Officer	Annual reporting
RMP 7	Weed management	To maintain <5% weed cover and detect new species or infestations.	Quarterly (3 yrs), then biannually, until completion criteria is met	Quadrat-based weed surveys	• Revise weed control program. • Treat WoNS and Declared Pests. • Reinforce hygiene procedures.	Revegetation contractor or suitably qualified Officer/ Weed contractor	Annual weed monitoring report/ Annual reporting
RMP 8	Supplementary planting needs	To determine if supplementary planting is needed to meet targets.	After each annual monitoring event	Survival rate assessment	• Implement targeted infill planting. • Consider alternate local provenance species. • Address causes of low survival.	Revegetation contractor or suitably qualified Officer	Annual reporting
RMP 9 & RMP 14	Vegetation condition and recruitment	To monitor native species richness, cover, recruitment, and structural development.	Annually until completion criteria is met	Floristics (quadrats), photo points, reference site comparison	• Infill planting for missing strata. • Address nutrient/moisture stress. • Remove persistent weeds.	Proponent/ Revegetation contractor or suitably qualified Officer	Annual reporting with reference comparison
RMP 11	Fire and access control	To protect revegetation and roost trees from fire and unauthorised access.	Opportunistically and prior to summer	Site inspection of firebreaks and fencing	• Repair damaged fencing. • Reinforce firebreaks. • Install signs/barriers if needed.	Proponent / Revegetation contractor or suitably qualified Officer	Annual reporting or incident-based updates
RMP 12	Fauna use monitoring	To detect signs of Black Cockatoo foraging and Chuditch activity.	After 10 years, annually for 10 years or until presence confirmed	Camera traps, scat surveys, foraging evidence	• Adjust species mix for food availability. • Enhance structure (e.g. logs, shrub cover). • Target habitat gaps in future planting.	Proponent/ Fauna ecologist	Fauna monitoring report/ Annual reporting
RMP 13	Hygiene effectiveness	To prevent dieback and weed seed spread via personnel or machinery.	Opportunistically	Hygiene register and visual inspection	• Clean contaminated vehicles/equipment. • Restrict access to infected areas. • Engage Dieback specialist, if required.	All site personnel / Proponent/ Revegetation contractor or suitably qualified Officer	Annual reporting
RMP 14	Sheeted Laydown Area benchmark alignment	To assess similarity with reference sites (structure, richness, cover).	Annually until completion criteria is met	Comparative floristic assessment	• Infill planting if targets unmet. • Additional weed or pest control. • Adjust planting strategy in following season.	Environmental consultant	Annual progress report comparing to reference site
RMP 15	Emergency procedures	In accordance with relevant Local, State and Federal requirements (fire, flooding, wall collapse, evacuation).	Ongoing	Visual and forecasting.	• Response training	Proponent	As required.

7. RMP Implementation and Reporting

7.1 Annual Compliance Reporting

The Proponent will provide to the DCCEEW an Annual Compliance Report (ACR) annually, in accordance with the requirements outlined in the conditions of the EPBC approval. The ACR will provide details on the progress made towards achieving performance and completion criteria and will provide all monitoring reports.

The ACR will include the following information (if applicable):

- Audit season (summer/winter etc);
- Audit year;
- Weed control report;
- Photos of weed prevention and site preparation/stabilisation of soils;
- Evidence of weed control events (photos and receipts/invoices);
- Dates of weed control events;
- Weed species observed during weed control events;
- Evidence of vehicle inspections (inspection records);
- Photos of public access prevention;
- Results of weed surveys including:
    - Weed species composition and abundance;
    - Percentage cover;
    - A list of any Weeds of National Significance and Declared Weeds observed to identify significant weeds for removal (if applicable);
- Results of revegetation monitoring including:
    - Quadrat number;
    - Planting List/ Representation in quadrats from original species list;
    - Original number of stems planted;
    - Native stems dead/alive;
    - Natural recruitment;
    - Density (plants m/2);
    - Percentage survival / mortality of planted seedlings within revegetation area;
    - Any evidence of water stress / potential factors contributing to mortality;
    - Weed abundance and diversity (% cover per quadrat);
    - Native abundance and diversity (% cover per quadrat);
    - Total average native abundance and diversity (all quadrats);
    - Total average weed abundance and diversity (all quadrats);
- Opportunistic observations

- Pest presence/herbivory; and
- Details of control actions and/ or contingency actions undertaken.

7.2 Roles and Responsibilities for Implementation

The Proponent holds overall responsibility for implementing the RMP. Any training that may be necessary for implementation of the RMP will be provided as required.

7.3 Adaptive Management and Review

Review of the learnings from the implementation of management actions will be utilised for the development of adaptive management practices to meet environmental objectives (as detailed in Table 5.1) more effectively.

This OMP will be reviewed and/ or updated by the Proponent at the following intervals to ensure objectives are achieved:

- Upon grant or modification of relevant approvals;
- Following completion of the revegetation contractor or suitably qualified Officer's assessment of the revegetation areas, and prior to the commencement of revegetation activities;
- Following the development of control programs and, if required, the establishment of updated targets based on the revegetation contractor or suitably qualified Officer's assessment of the revegetation areas, prior to commencing revegetation activities;
- Once implementation cost estimates for the RMP are obtained;
- At a specified post-planting interval, determined by the revegetation contractor or suitably qualified Officer, to assess progress and ensure that objectives and targets remain on track;
- When monitoring identifies a potential new or heightened threatening process;
- When monitoring results indicate that existing management measures are inadequate or fail to demonstrate progress toward targets set;
- Based on findings or actions identified through monitoring, audits or incident reports;
- Annually, following each monitoring event, until completion criteria are met; and
- As directed by Chief Executive Officer and DCCEEW.

8. Limitations

Scope of services

This report ("the report") has been prepared by JBS&G in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and JBS&G. In some circumstances, a range of factors such as time, budget, access and/or site disturbance constraints may have limited the scope of services. This report is strictly limited to the matters stated in it and is not to be read as extending, by implication, to any other matter in connection with the matters addressed in it.

Reliance on data

In preparing the report JBS&G has relied upon data and other information provided by the Client and other individuals and organisations, most of which are referred to in the report ("the data"). Except as otherwise expressly stated in the report, JBS&G has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report ("conclusions") are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. JBS&G has also not attempted to determine whether any material matter has been omitted from the data. JBS&G will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to JBS&G. The making of any assumption does not imply that JBS&G has made any enquiry to verify the correctness of that assumption.

The report is based on conditions encountered and information received at the time of preparation of this report or the time that site investigations were carried out. JBS&G disclaims responsibility for any changes that may have occurred after this time. This report and any legal issues arising from it are governed by and construed in accordance with the law of Western Australia as at the date of this report.

Environmental conclusions

Within the limitations imposed by the scope of services, the preparation of this report has been undertaken and performed in a professional manner, in accordance with generally accepted environmental consulting practices. No other warranty, whether express or implied, is made.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

JBS&G accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced without prior approval by the client, or amended in any way without prior approval by JBS&G, and should not be relied upon by other parties, who should make their own enquiries.

9. References

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Appendix A EPBC 2021/9045 Decision Notice

Australian Government
Department of Climate Change, Energy, the Environment and Water

Notification of approval decision

Byford Whitby Quarry, portion of Mining Lease M701240 (EPBC 2021/9045)

This decision is made under section 130(1) and 133(1) of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Note that section 134(1A) of the EPBC Act also applies to this approval. That provision provides, in general terms, that if the approval holder authorises another person to undertake any part of the Action, the approval holder must take all reasonable steps to ensure that the other person is informed of any conditions attached to this approval, and that the other person complies with any such conditions.

Approved Action

person to whom the approval is granted (approval holder)	Ransberg Pty Ltd ACN: 009 468 464
Action	To construct, operate and rehabilitate storage and laydown areas for the overburden from an existing quarry, including construction and maintenance of access tracks/roads and the construction, maintenance and decommission of associated quarry infrastructure at Mining Lease 70/1240, Byford Whitby Quarry, part Lot 500 on Deposited Plan 405520, Lot 901 South West Hwy, Whitby, 40 km southeast of Perth (see EPBC Act referral 2021/9045).

Approval decision

decision	My decision on whether or not to approve the taking of the Action for the purposes of the controlling provision for the Action is as follows.	
	Controlling Provision	**Decision**
	Listed threatened species and communities (section 18 and section 18A)	Approved
period for which the approval has effect	This approval has effect until 29 August 2124.	
conditions of approval	The approval is subject to conditions under the EPBC Act as set out in Annexure A.	

Person authorised to make decision

name and position	Kylie Calhoun Branch Head Environment Assessments West
signature	
date of decision	29 August 2024

Annexure A

Note: Words and terms appearing in **bold** (excluding headings) have the meaning assigned to them at **Part C – Definitions**.

Part A – Avoidance, mitigation, and compensation conditions

CLEARING LIMITS

1) The approval holder must not:
   a) **clear** outside the **Action area**.
   b) **construct** outside the **Action area**.
2) The approval holder must not **clear** outside of **daylight hours**.
3) The approval holder must not **clear** any **black cockatoo known nesting trees**.
4) The approval holder must not **clear** more than:
   a) 13.2 hectares (ha) of **black cockatoo habitat**
   b) 102 individual **black cockatoo potential nesting trees**
   c) 31 individual **black cockatoo suitable nesting trees**
   d) 13.2 ha of **chuditch habitat**.

PRE-CLEARANCE SURVEYS

5) To avoid **harm** on **protected matters** as a result of the Action, the approval holder must ensure a **suitably qualified ecologist** conducts a pre-clearance survey in any area to be **cleared** less than five days prior to **clearing** that area, to identify **recent activity** of any **nesting black cockatoos** and **chuditch**.
6) If there is **recent activity** of any **black cockatoos** nesting or **chuditch** nesting within the **Action area** then the Approval holder must stop the Action, keep evidence of the occurrence, and

include it in the next **compliance report**, and wait until after the **black cockatoos** or **chuditch** have moved of their own accord before commencing the **clearing**.

INJURY AVOIDANCE AND VETERINARY CARE

7) The approval holder must immediately arrange for veterinary care or assistance from an experienced **wildlife expert** if any **black cockatoo** or **chuditch** individual is found injured within or adjacent to the **Action area** during the Action.

VEHICLE & LIGHT POLLUTION MANAGEMENT

8) To avoid and mitigate the risk of **black cockatoo** or **chuditch** injury or death from **vehicle strike**, the approval holder must ensure that no vehicle travels within the **Action area** at a speed exceeding 40 km/h except in an emergency where human life is threatened.

9) The approval holder must report any **vehicle strike** within the **Action area** to the **department** in the next **compliance report**.

10) The approval holder must not **transport overburden** into the **Action area** outside of **daylight hours**.

11) The approval holder must not install **artificial light outdoors** within the **Action area**.

ACTION MANAGEMENT PLANS

Nest Hollow Management Plan

12) To avoid and mitigate **harm** as a result of the Action on **protected matters**, the approval holder must submit a Nest Hollow Management Plan to the **department** for the **Minister's** approval within 12 months following the date of this approval. The approval holder must commence implementation of the Nest Hollow Management Plan approved by the **Minister** in writing from the date the Nest Hollow Management Plan is approved by the **Minister** and continue to implement it until the expiry date of this approval.

13) The approval holder must ensure the Nest Hollow Management Plan is prepared to the satisfaction of the **Minister** within 24 months following the date of this approval. The approval holder must not continue **operation** unless the **Minister** has approved the Nest Hollow Management Plan in writing.

14) By implementing the Nest Hollow Management Plan, the approval holder must achieve the following environmental outcomes:

    a) Ensure a total of at least 35 **nest hollows**, additional to those retained, are available to **FRTBC** at the **Mining Lease Site** or nearby within 12 months from when the Nest Hollow Management Plan is approved by the **Minister** and maintained until the expiry date of this approval. At any point in time after the additional 35 (or greater) **nest hollows** are established, the 35 additional **nest hollows** can comprise any combination of artificial **nest hollows** and the improvement of additional natural **nest hollows** to create additional **black cockatoo suitable nesting trees**.

b) Establish and maintain all retained and additional **nest hollows** within an area up to 1 kilometre from the **Mining Lease Site** but outside of the **action area,** in accordance with best known science to maximise the use of the **nest hollows** for **FRTBC nesting**.

15) The Nest Hollow Management Plan must be prepared by a **suitably qualified expert**. All commitments including environmental outcomes, management measures, corrective measures, trigger values and performance indicators in the Nest Hollow Management Plan must be **SMART** and based on referenced or included evidence of effectiveness. The Nest Hollow Management Plan must be consistent with the **Environmental Management Plan Guidelines**, and must include:

a) details of the relevant **protected matters** and a reference to **EPBC Act** approval conditions to which the plan refers,

b) a table of commitments made in the plan to achieve the environmental outcomes, and a reference to exactly where these commitments are detailed in the plan,

c) commitments capable of ensuring that the environmental outcomes are achieved,

d) the goals for the **artificial nest hollows** or improvement of **natural nest hollows**, including expected use by **FRTBC** for **nesting**,

e) the locations for installation of **artificial nest hollows** and the locations of **natural nest hollows** for improvement to create additional **black cockatoo suitable nesting trees**,

f) specifications of the design, particular to **FRTBC**, of the **artificial nest hollows**.

g) specification of the timing and the methods to be used to install the **artificial nest hollows** and improve **natural nest hollows**,

h) specifications of the timing and the methods to be used to maintain the **artificial nest hollows** and improved **natural nest hollows**,

i) reporting and review mechanisms to demonstrate compliance with the commitments made in the plan,

j) an assessment of the risks related to achieving the environmental outcomes and risk management strategies and/or mitigation measures that will be applied to address identified risks,

k) impact avoidance, mitigation and/or repair measures and the timing of those measures,

l) a reporting program to submit to the **DBCA** and **department**, within 20 **business days** of establishing any **nest hollow**:

i) **shapefiles** showing the location of all **nest hollows** established in accordance with the plan, and

ii) details of all **nest hollows** established in accordance with the plan, and

iii) a monitoring program, which must include:

1. performance indicators,

2. trigger values for corrective measures,

3. the timing and frequency of monitoring, ensuring monitoring is capable of detecting trigger values and changes in the performance indicators,

4. proposed corrective measures if trigger values are reached,
5. a process to evaluate the evidence that effectively determines progress towards, attainment and maintenance of ecological benefits for the **protected matters**,
6. commitments to submit monitoring results on the use, attempted use or absence of use of all **nest hollows** managed in accordance with the plan to the **DBCA**.

16) The approval holder must consult with **DBCA** on the appropriateness of the Nest Hollow Management Plan prior to submitting the Nest Hollow Management Plan to the **department** for the **Minister's** approval. The approval holder must include, and show how it addresses, any feedback from **DBCA** in the Nest Hollow Management Plan submitted to the **department** for the **Minister's** approval.

Revegetation Management Plan

17) To mitigate **harm** as a result of the Action on **protected matters**, the approval holder must submit a Revegetation Management Plan to the **department** for the **Minister's** approval within 12 months following the date of this approval.

18) The approval holder must ensure the Revegetation Management Plan is prepared to the satisfaction of the **Minister** within 24 months following the date of this approval. The approval holder must not continue **operation** unless the **Minister** has approved the Revegetation Management Plan in writing. The approval holder must implement the Revegetation Management Plan in accordance with the schedule detailed in the Revegetation Management Plan.

19) The approval holder must include the following environmental objectives in the Revegetation Management Plan:

a) **Revegetating** in the **Overburden Area** to meet the completion criteria specified within the Revegetation Management Plan including:

i) restoring the dominant overstory comprised of *Eucalyptus marginata*, *Corymbia calophylla* and *Allocasuarina fraseriana*

ii) providing suitable foraging habitat for **black cockatoos** and dispersal habitat for **Chuditch**.

b) Ensuring at least 35 *Eucalyptus marginata* and/or *Corymbia calophylla* grow to an age and size likely to become potential roosting trees within the revegetated areas of the **Byford Whitby Quarry**, including the **Overburden area**.

c) Revegetating the **Sheeted Laydown Area** consistent with the approved **Mine Closure Plan**.

20) The Revegetation Management Plan must be prepared by a **suitably qualified ecologist**. All commitments, including environmental objectives, management measures, corrective measures, trigger values and performance indicators in the Revegetation Management Plan must be **SMART** and based on referenced or included evidence of effectiveness. The Revegetation Management Plan must be consistent with the **Environmental Management Plan Guidelines**, and must include:

a) details of the relevant **protected matters** and a reference to **EPBC Act** approval conditions to which the plan refers,

b) a table of commitments made in the plan to achieve the environmental objectives, and a reference to exactly where these commitments are detailed in the plan,

c) commitments capable of ensuring that the environmental objectives are achieved,

d) reporting and review mechanisms to demonstrate compliance with the commitments made in the plan,

e) an assessment of risks relating to achieving the environmental objectives and risk management strategies and/or mitigation measures that will be applied to address identified risks,

f) impact avoidance, mitigation and/or repair measures, and the timing of those measures,

g) a monitoring program, which must include:

   i) performance indicators,

   ii) trigger values for corrective measures,

   iii) the timing and frequency of monitoring, ensuring monitoring is capable of detecting trigger values and changes in the performance indicators,

   iv) proposed corrective measures if trigger values are reached, and

h) links to other relevant plans or conditions of approval (including state or territory approval conditions).

DIEBACK MANAGEMENT AT THE ACTION AREA

21) To avoid and mitigate **harm** to **black cockatoos** and **chuditch** at the **Action area**, the approval holder must implement the following **dieback** control measures where the **laydown area** is not **sheeted**:

   a) Prior to **commencement of the Action**, establish at least one **clean on entry point** and:

      i) Install prominent, legible signage in positions that enable drivers of **vehicles** associated with the Action to readily locate the **clean on entry point** at which **hygiene inspections** are required,

      ii) Maintain the **clean on entry point** in working order.

   b) From the **commencement of the Action** ensure that:

      i) Hygiene inspections will be undertaken for all **carriers** prior to entry and exit of the Action area for the purpose of clearing of native vegetation to ensure they are clear of soil, mud and vegetation material and **carriers** only exit the **Action area** through the **clean on entry point** and are **clean on entry**,

      ii) if a **carrier** entering or exiting the **action area** does not meet the **hygiene standard**, ensure the **carrier** proceeds directly to the **hygiene station** and meets the **hygiene standard** prior to entry or exiting the **Action area**,

      iii) Records of hygiene inspections will be maintained within a **hygiene register**,

      iv) where **dieback** affected soil, mulch, fill, or other material is removed from the **Action area**, ensure it is transferred to areas of **comparable soil disease status**.

v) waste from the **hygiene station** is treated and managed to prevent release to the environment, including the Byford Whitby Mine, of dieback or contaminants.

vi) **clean on entry** of all **carriers** is only undertaken by persons who have completed **dieback risk and management site inductions**.

OFFSETS

OFFSET SITE SECUREMENT

22) To compensate for the residual significant impacts of the Action on **black cockatoos** and **chuditch**, the approval holder must commence formal procedures to purchase the **offset site** within 30 days following the date of this approval decision.

23) The approval holder must **control** the **offset sites** within 12 months of the date of this approval decision. The approval holder must not continue **operation** unless the approval holder has **control** of the **offset sites**.

24) Within 5 **business days** of the **offset site** being under **control** of the approval holder, the approval holder must notify and provide evidence to the **department** in writing.

25) The approval holder must legally **secure** the **offset site** within 48 months of the date of approval of this decision. The approval holder must stop undertaking the Action if the **offset site** is not legally **secured** within 48 months of the date of approval of this decision.

26) Within 5 **business days** of the **offset site** being **secured**, the approval holder must notify in writing and provide evidence to the **department**. In this notification, the approval holder must demonstrate that the land title for the **offset site** contains provisions to protect the sites against future development and infrastructure incompatible with conservation.

27) The approval holder must ensure that the **offset site** remains **secured** at least until the expiry date of this approval.

IMPLEMENTATION OF OFFSET MANAGEMENT PLAN

28) To compensate for the residual significant impacts of the Action on **black cockatoos** and **chuditch**, the approval holder must commence implementation of the **Offset Management Plan** from the date the **offset site** is **controlled** and continue to implement the **Offset Management Plan** at least until the expiry date of this approval.

29) To compensate for residual significant impacts of the Action on **chuditch**, the approval holder must ensure that, within 20 years of the **commencement of the Action**, **chuditch** are present within the **offset site**.

30) The approval holder must have a **suitably qualified ecologist** survey the **offset site** for the presence of **chuditch** at least once every five years from the date the **offset site** is **controlled**.

DIEBACK OFFSET MANAGEMENT PLAN

31) To compensate for the residual significant impacts of the Action on **black cockatoos** and **chuditch**, the approval holder must implement the **Dieback Offset Management Plan** at the **offset site** from when the approval holder first **contro**ls the **offset site** and continue to implement the **Dieback Offset Management Plan** at least until the expiry date of this approval.

ACHIEVEMENT OF OFFSET OUTCOMES

32) The approval holder must achieve the offset outcomes at the **offset site** by the time specified for each outcome in the **Offset Management Plan** and the **Dieback Offset Management Plan**. Once achieved, the approval holder must maintain or exceed the **offset outcomes** at least until the expiry of this approval.

33) The approval holder must, within 40 **business days** after 20 years from when the **control** of the **offset site** is achieved:

a) have the **offset site** assessed by a **suitably qualified ecologist** to determine if the offset outcomes have been achieved,

b) submit to the **department** a report prepared by the **suitably qualified ecologist** detailing the presence of **black cockatoos** and **chuditch** and **habitat quality** of their habitat within the offset site in the month prior to 20 years from when the **control of the offset site** is achieved, and

c) notify the **department** in writing of any **offset outcome** that has not been achieved at the **offset site** and the likely reasons that this/these **offset outcomes** have not been met.

Part B – Administrative conditions

REVISION OF ACTION MANAGEMENT PLANS

34) The approval holder may, at any time, apply to the **Minister** for a variation to a **plan** by submitting an application in accordance with the requirements of section 143A of the **EPBC Act**. If the **Minister** approves a revised action management plan (RAMP) then, from the date specified, the approval holder must implement the RAMP in place of any previous version of the **plan**.

35) The approval holder may choose to revise a **plan** required by conditions 12 or 17, or as subsequently revised in accordance with these conditions, without submitting it for approval under section 143A of the **EPBC Act**, if the taking of the Action in accordance with the RAMP would not be likely to have a **new or increased impact**.

36) If the approval holder makes the choice under condition 35 to revise an action management plan without submitting it for approval, the approval holder must:

a) Notify the **department** electronically that the approved action management plan has been revised and provide the **department** with:

i) An electronic copy of the RAMP.

ii) An electronic copy of the RAMP marked up with track changes to show the differences between the approved action management plan and the RAMP.

iii) An explanation of the differences between the approved action management plan and the RAMP.

iv) The reasons the approval holder considers that taking the Action in accordance with the RAMP would not be likely to have a **new or increased impact**.

v) Written notice of the date on which the approval holder will implement the RAMP (RAMP implementation date), being at least 20 **business days** after the date of providing notice of the revision of the action management plan, or a date agreed to in writing with the **department**.

b) Subject to condition 38, implement the RAMP from the RAMP implementation date.

37) The approval holder may revoke its choice to implement a RAMP under condition 35 at any time by giving written notice to the **department**. If the approval holder revokes the choice under condition 35, the approval holder must implement the action management plan in force immediately prior to the revision undertaken under condition 35.

38) If the **Minister** notifies the approval holder that the **Minister** is satisfied that the taking of the Action in accordance with the RAMP would be likely to have a **new or increased impact**, then:

    a) Condition 35 does not apply, or ceases to apply, in relation to the RAMP.

    b) The approval holder must implement the action management plan specified by the **Minister** in the notice.

39) At the time of giving the notice under condition 38, the **Minister** may also notify that for a specified period of time, condition 35 does not apply for one or more specified action management plans.

Note: Conditions 34-39 are not intended to limit the operation of section 143A of the **EPBC Act** which allows the approval holder to submit a revised action management plan, at any time, to the **Minister** for approval.

SUBMISSION AND PUBLICATION OF PLANS

40) Wherever these conditions require the approval holder to submit any **plan** to the **department**, all such **plans** must be submitted to the **department** electronically.

41) Unless otherwise agreed to in writing by the **Minister**, the approval holder must publish each **plan** on the **website** within 15 **business days** of the date:

    a) of this approval, if the version of the **plan** to be implemented is specified in these conditions,

    b) the **plan** is approved by the **Minister** in writing, if the **plan** requires the approval of the **Minister**, or

    c) the **plan** is submitted to the **department** in accordance with a requirement of these conditions, if the **plan** does not require the approval of the **Minister**.

42) The approval holder must keep all **plans** published on the **website**, in a format that is easily accessible and downloadable, from the first date which that **plan** must be published and until the expiry date of this approval. This requirement applies to all current and superseded versions of **plans**.

43) The approval holder is required to exclude or redact **sensitive ecological data** from any version of a **plan** before that **plan** is published on the **website** or otherwise provided to a member of the public. If **sensitive ecological data** is excluded or redacted from a **plan**, the approval holder must notify the **department** in writing what exclusions and redactions have been made in the version published on the **website**.

COMMENCEMENT OF THE ACTION

44) The approval holder must notify the **department** electronically of the date of **commencement of the Action**, within 5 **business days** following **commencement of the Action**.

45) The approval holder must not **commence the Action** later than 5 years after the date of this approval decision.

46) The approval holder must notify the **department** electronically of the date of commencement of **operation**, within 5 **business days** following commencement of **operation**.

COMPLIANCE RECORDS

47) The approval holder must maintain accurate and complete **compliance records** and document the procedure for recording and storing **compliance records**.

48) If the **department** makes a request in writing, the approval holder must provide electronic copies of **compliance records** to the **department** within the timeframe specified in the request.

Note: Compliance records may be subject to audit by the **department**, or by an **independent auditor** in accordance with section 458 of the **EPBC Act**, and/or be used to verify compliance with the conditions. Summaries of the results of an audit may be published on the **department's** website or through the general media.

49) The approval holder must ensure that any **monitoring data** (including **sensitive ecological data**), surveys, maps, and other spatial and metadata required under the conditions of this approval are prepared in accordance with the *Guidelines for biological survey and mapped data*, Commonwealth of Australia 2018, or as otherwise specified by the **Minister** in writing.

50) The approval holder must ensure that any **monitoring data** (including **sensitive ecological data**), surveys, maps, and other spatial and metadata required under the conditions of this approval are prepared in accordance with the *Guide to providing maps and boundary data for EPBC Act projects*, Commonwealth of Australia 2021, or as otherwise specified by the **Minister** in writing.

51) The approval holder must submit all **monitoring data** (including **sensitive ecological data**), surveys, maps, other spatial and metadata and all species occurrence record data (sightings and evidence of presence) electronically to the **department** within 20 **business days** of each anniversary of the date of this approval decision except where otherwise specified in a **plan**.

ANNUAL COMPLIANCE REPORTING

52) The approval holder must prepare a **compliance report** for each **Annual Compliance Report period** (**ACR period**).

53) The approval holder must ensure each **compliance report** includes:

    a) accurate and complete details of compliance and any non-compliance with:

        i) each condition attached to this approval decision, and

        ii) all commitments made in each **plan**,

    b) a schedule of all **plans** in effect in relation to these conditions during the **ACR period**,

    c) accurate and complete details of how each **plan** was implemented during the **ACR period**, and

    d) if any **incident** occurred, accurate and complete details of each **incident**.

54) The approval holder must ensure each **compliance report** is completed to the satisfaction of the **Minister** and is consistent with the *Annual Compliance Report Guidelines*, Commonwealth of Australia 2023.

55) The approval holder must, within 20 **business days** following the end each **ACR period**, in a format that is easily accessible and downloadable, publish on the **website**:

a) each **compliance report**, and

b) a **shapefile** showing all **clearing** of **protected matters**, and their habitat, undertaken within the **ACR period**.

56) The approval holder must:

a) Exclude or redact **sensitive ecological data** from each **compliance report** and **shapefile** published on the **website** or otherwise provided to a member of the public.

b) If **sensitive ecological data** is excluded or redacted from a version of a **compliance report** published or otherwise provided to a member of the public, submit the full **compliance report** to the **department** within 5 **business days** of its publication on the **website** and notify the **department** in writing what exclusions and redactions have been made in the version published on the **website** or otherwise provided to a member of the public.

c) If **sensitive ecological data** is excluded or redacted from a version of a **shapefile** published or otherwise provided to a member of the public, submit the full **shapefile** to the **department** within 5 **business days** of its publication on the **website** and notify the **department** in writing what exclusions and redactions have been made in the version published on the **website** or otherwise provided to a member of the public.

57) The approval holder must notify the **department** electronically, within 5 **business days** of each date of publication that the **compliance report** has been published on the **website**. In this notification, the approval holder must provide the **department** with the web address for where the **compliance report** and related **shapefile** are published on the **website**.

58) The approval holder must keep each **compliance report** and related **shapefile** published on the **website** from the first date which that **compliance report** must be published and until the expiry date of this approval.

Note: Compliance reports may be published on the **department's** website.

REPORTING NON-COMPLIANCE

59) The approval holder must notify the **department** electronically, within 2 **business days** of becoming aware of any **event**. The approval holder must specify in each notification:

a) any condition or commitment made in a **plan** which has been or may have been not complied with,

b) a short description of the **event**, and

c) the location (if applicable, including co-ordinates), date and time of the **event**.

60) The approval holder must provide to the **department** in writing, within 12 **business days** of becoming aware of an **event**, the details of that **event**. The approval holder must specify:

a) all corrective measures and investigations which the approval holder has already taken in respect of the **event**,

b) the potential impacts of the **event**,

c) the method and timing of any corrective measures that the approval holder proposes to undertake to address the **event**, and

d) any variation of these conditions or revision of a plan that will be required to prevent recurrence of the **event** and/or to address its consequences.

INDEPENDENT AUDIT

61) The approval holder must ensure that an **independent audit** of compliance with the conditions is conducted for every **audit period**.

62) The approval holder must submit details of the proposed **independent auditor** and their qualifications to the **department** within 10 **business days** following the end of each **audit period**.

63) The approval holder must ensure the scope of each **independent audit** is sufficient to determine the compliance status for each condition of approval, and each commitment made in each **plan**.

64) The approval holder must ensure the criteria for each **independent audit** and the undertaking of each **independent audit** are consistent with the *Environment Protection and Biodiversity Conservation Act 1999 Independent Audit and Audit Report Guidelines*, Commonwealth of Australia 2019.

65) The approval holder must submit an **audit report** to the **department** for written agreement from the **department** within 3 months following the end of each **audit period**, or as otherwise directed by the **Minister** in writing.

66) The approval holder must ensure each **audit report** is completed to the satisfaction of the **Minister** and is consistent with the *Environment Protection and Biodiversity Conservation Act 1999 Independent Audit and Audit Report Guidelines*, Commonwealth of Australia 2019.

67) The approval holder must publish each **audit report** on the **website**, in a format that is easily accessible and downloadable, within 10 **business days** of the date of the **department** agrees to the **audit report** in writing.

68) The approval holder must notify the **department** within 5 **business days** of the date the **audit report** is published on the **website**. In this notification, the approval holder must provide the **department** with the web address for where the **audit report** is published on the **website**.

69) The approval holder must keep each **audit report** published on the **website** from the first date which that **audit report** must be published and until the expiry date of this approval.

COMPLETION OF THE ACTION

70) Within 20 **business days** after the **completion of the Action**, and, in any event, at least 20 **business days** before this approval expires, the approval holder must notify the **department** electronically of the date of **completion of the Action** and provide **completion data**. The approval holder must submit any spatial data that comprises **completion data** as a **shapefile**.

71) The approval holder must notify the **department** electronically 60 **business days** prior to the expiry date of this approval, that the approval is due to expire.

Note: Section 145C of the **EPBC Act** entitles the approval holder to request an extension to the period of effect of this approval.

Part C – Definitions

Words and terms appearing in **bold** (excluding headings) have the meaning assigned to them in the list below:

Action area means the location of the Action, represented in Attachment A by the zone enclosed by the solid red line designated 'Stage 3 clearing area/Action area.

Annual Compliance Report period or **ACR period** means each subsequent 12-month period following the date of this approval decision until the expiry date of this approval, unless otherwise specified in writing by the **Minister**.

Artificial light means light derived from a source other than direct sunlight.

Artificial nest hollow means a deliberately positioned artificial or repurposed natural structure suitable for **nesting** by **Black Cockatoos** constructed in accordance with the Nesting Hollows Management Plan approved by the **Minister** in writing.

Audit period means each subsequent three-year period following the **commencement of the Action** until the expiry date of this approval unless otherwise specified in writing by the **Minister**.

Audit report means a written report of an **independent audit**.

Baudin's Black Cockatoo or **BBC** means the **EPBC Act** listed threatened species Baudin's Black Cockatoo (*Zanda baudinii* listed as *Calyptorhynchus baudinii*).

Black cockatoo means any of the three **EPBC Act** listed threatened species of black cockatoo endemic to Western Australia, comprising the **CBC**, **BBC** and **FRTBC**.

Black cockatoo habitat means habitat suitable for use and/or used by **black cockatoos** for foraging, breeding or roosting. Within the **Action area**, the location of **Black cockatoo habitat** identified at the time of this approval is represented in Attachment A1 by the areas shaded in green.

Black cockatoo known nesting tree means standing tree (whether live or dead) which contains a tree hollow where black cockatoo breeding has been recorded or which demonstrates evidence of breeding (i.e. showing evidence of use through scratches, chew marks or feathers).

Black cockatoo potential nesting tree means any alive native eucalypt that has a diameter at breast height of greater than 500 mm. Within the **Action area**, the location of **Black cockatoo potential nesting trees** identified at the time of this approval are represented in Attachment A2 by the circle markers shaded:

- green and labelled 'Jarrah',
- pink and labelled 'Marri', and
- orange and labelled 'Sheoak'.

Black cockatoo suitable nesting tree means any standing tree (whether alive or dead) which contain a tree hollow that appears to be deep enough and with an opening large enough (> 100 mm wide at some point) to be used by **black cockatoos**, as determined by a **suitably qualified ecologist**, but where there is no evidence of use by **Black Cockatoos**. Within the **Action area**, the locations of **Black cockatoo suitable nesting trees** are represented in Attachment A2 by the point locations shaded in green and represented by a triangle.

Business day means a day that is not a Saturday, a Sunday, or a public holiday in Western Australia.

Byford Whitby Mine means the location of the Action and the existing mining operation, represented in Attachment B by the area enclosed by the solid blue-green line designated 'Existing cleared area of the mining operation' and the area enclosed by the solid red line designated 'stage 3 clearing area/Action area'.

Carriers means anything that may move soil, including machines, **vehicles**, footwear and equipment.

Carnaby's Black Cockatoo or **CBC** means the **EPBC Act** listed threatened species Carnaby's Black Cockatoo (*Zanda latirostris* listed as *Calyptorhynchus latirostris*).

Chuditch means the **EBPC Act** listed threatened species **Chuditch** (*Dasyurus geoffroii*).

Chuditch Habitat means habitat suitable for **Chuditch** to breed, forage or use for dispersal or cover including but not limited to mallee shrublands, woodland and jarrah forests. Within the **Action area**, the location of **Chuditch Habitat** identified at the time of this approval is represented in Attachment A3 by the areas shaded in green.

Clean on entry means that the **carrier** meets the **hygiene standard**.

Clean on entry point means an ingress/egress point to the **Action area** designed for **carriers** to be inspected to determine if they meet the **hygiene standard** prior to entry to/exiting from the **Action area** and enabling their diversion for **cleaning** at a **hygiene station** if they do not meet the **hygiene standard**.

Clear, **cleared** or **clearing** means the cutting down, felling, thinning, logging, removing, killing, destroying, poisoning, ringbarking, uprooting, or burning of vegetation. **Clear** does not include **land management**.

Commence the Action or **commences the Action** means the first instance of any on-site **clearing**, **construction** or other physical activity associated with the Action, but does not include minor physical disturbance necessary to:

- Undertake pre-clearance surveys or monitoring programs.
- Install signage and/or temporary fencing to prevent unapproved use of the **Action area**, so long as the signage and/or temporary fencing is located where it does not **harm** any **protected matter**.

- Protect environmental and property assets from fire, weeds, and feral animals, including use of existing surface access tracks.
- Install temporary site facilities for persons undertaking pre-commencement activities so long as these facilities are located where they do not **harm** any **protected matter**.

Commencement of the Action means the date on which the approval holder **commences the Action**.

Comparable soil disease status means the **disease occurrence category** is the same at two sites.

Completion data means an environmental report and spatial data clearly detailing how the conditions of this approval have been met.

Completion of the Action means the date on which all activities associated with the approved Action have permanently ceased and/or been completed.

Compliance records means all documentation or other material in whatever form required to demonstrate compliance with these conditions of approval (including compliance with commitments made in **plans**) in the approval holder's possession, or that are within the approval holder's power to obtain lawfully.

Compliance report means a written report of compliance with, and fulfilment of, these conditions (including compliance with commitments made in **plans**).

Construct or **Construction** means:

- the erection of a building or structure that is, or is to be, fixed to the ground and wholly or partially fabricated on-site,
- the alteration, maintenance, repair or demolition of any building or structure,
- any work which involves breaking of the ground (including pile driving) or bulk earthworks,
- the laying of pipes and other prefabricated materials in the ground, and
- any associated excavation work.

Construction does not include the installation of temporary fences or signage.

Control or **controlled** means to prevent, by way of ownership or binding contract with the landowner, any use of, or activity on the **offset site** that negates or is counter to the conservation purposes of the **offset site** and objectives of the **Offset Management Plan**.

Daylight hours means any time after sunrise and before sunset on the same day, where sunrise and sunset are deemed to occur at the times specified for that day for Whitby, Western Australia in the Geoscience Australia Geodetic Calculator.

DBCA means the Western Australian government agency responsible for administering the *Biodiversity Conservation Act* 2016 (WA).

Department means the Australian Government agency responsible for administering the **EPBC Act**.

Dieback means the destructive plant disease caused by the pathogen *Phytophthora cinnamomi* and other *Phytophthora* species.

Dieback Offset Management Plan means the *JBS&G Dieback Management Plan - Bannister Offset Site WA Limestone Report*, 22 March 2024, or a subsequent version approved by the **Minister** in writing.

Note: At the time of this approval, the **Dieback Offset Management Plan** can be found at Appendix C of the **Offset Management Plan**.

Dieback Risk and Management Site inductions means inductions that provide the skills and knowledge in Phytophthora Dieback Hygiene needed to avoid the risk of spreading **dieback.**

Disease occurrence category means the categories that the **Registered Phytophthora Dieback Interpreter** determines, based on the results of the **dieback** assessment and sampling.

Environmental Management Plan Guidelines means the *Environmental Management Plan Guidelines*, Commonwealth of Australia 2024.

EPBC Act means the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

Event means any:

- **incident**,
- potential non-compliance with these conditions, including the administrative requirements,
- actual non-compliance with these conditions, including the administrative requirements,
- potential non-compliance with one or more commitment made in a **plan**, and/or
- actual non-compliance with one or more commitment made in a **plan**.

Forest Red-tail Black Cockatoo or **FRTBC** means the **EPBC Act** listed threatened species Forest Red-tail Black Cockatoo (*Calyptorhynchus banksii naso*).

Habitat quality means a measure of the overall viability of a site and its capacity to support **protected matters**, with respect to site condition, site context and species stocking rate and/or composition.

Harm means to cause any measurable direct or indirect disturbance or deleterious change as a result of any activity associated with the Action.

Hygiene inspection means inspections of carriers for presence of soil, mud and vegetation material.

Hygiene register means a document that records all hygiene inspections.

Hygiene standard means completely free of soil, mud, and vegetation material.

Hygiene station means a designated station on a hard, well drained surface, where soil, mud and vegetation material is removed. If water is used, ensure that it does not drain into bushland.

Incident means any event which has the potential to, or does, **harm** any **protected matter**.

Independent audit means an audit, conducted by an **independent auditor**, of compliance with and fulfilment of these conditions and the commitments made in **plans**, objectively evaluated against the audit criteria developed by the **independent auditor**, in accordance with the *Environment Protection and Biodiversity Conservation Act 1999 Independent Audit and Audit Report Guidelines*, Commonwealth of Australia 2019.

Independent auditor means a person, or firm, who:

- does not have any individual, financial*, employment* or family affiliation or any conflicting interests with the Action, the approval holder or the approval holder's staff, representatives, or associated persons,
- has demonstrated experience in undertaking government-regulated environmental compliance audits, and
- holds relevant professional qualifications and accreditations.

*Other than for the purpose of undertaking the role for which an independent person, or firm, is required.

Land management means:

- prescribed burns for bushfire management.
- weed management (see the *Australian Weeds Strategy 2017-2027*, Commonwealth of Australia 2017 for further guidance).
- Feral animal control and reduction.
- the modification of trees for the installation of **artificial nest hollows** or improvement of **natural nest hollows** in accordance with the approved Nest Hollow Management Plan.

Laydown area means the location of the areas represented in Attachment B by the 2 green hatched polygons identified as "sheeted laydown areas".

Mine Closure Plan means a decommissioning management plan as prepared and approved and current in accordance with the WA Mining Act 1978.

Mining Lease Site means the Mining Lease M70/1240, Lot 901 South West Hwy, Whitby represented in Attachment A by:

- the area enclosed by the broken purple line designated 'Mining tenements - (DMIRS – 003).
- including the area enclosed by the solid red line designated 'stage 3 clearing area/Action area'.

Minister means the Australian Government Minister administering the **EPBC Act**, including any delegate thereof.

Monitoring data means the data required to be recorded under the conditions of this approval.

Natural nest hollow means natural structures suitable, or potentially suitable, for **black cockatoos nesting**.

Nest hollow means a structure suitable, or potentially suitable, for **black cockatoos nesting**.

Nesting means building, occupying or building and occupying a **nest**.

New or increased impact means any direct or indirect increase in the impacts of an Action, an increase to the likelihood of an impact occurring, a reduction to the monitoring or mitigation measures for a **protected matter**, and/or a change to the nature or management of an environmental offset as outlined in the *Guidance on 'new or increased impact' relating to changes to approved management plans under EPBC Act environmental approvals*, Commonwealth of Australia 2017.

Offset Management Plan means the document titled *Ransberg Pty Ltd-Byford Whitby Quarry Offset Site Management Plan* (Document Number=62543, Rev 4, 9 April 2024, JBS&G), or the latest subsequent version approved by the **Minister** in writing.

Note: On the date of this approval decision the **Offset Management Plan** can be accessed via the following web address: walimestone.com/wp-content/uploads/2024/04/Appendix-N-Bannister-Offset-Management-Plan-Rev-4.pdf.

Offset outcomes means Table 4.1 Management Actions in the **Offset Management Plan**, included at Attachment D.

Offset site means the area represented in Attachment C by the zone outlined in yellow designated 'offset site 119 ha', which is located within the western portion of Lot P011005 6, 8772 Albany Highway, Bannister within the Shire of Boddington.

Operation means the use of any storage or laydown area constructed as part of this Action and includes, but is not limited to, **transporting overburden** and **clearing**.

Outdoors means outside of a building or shelter.

Overburden area means the area used for storage of material removed to allow access to the Byford Whitby Quarry material.

Plan means any action management plan or strategy that the approval holder is required by these conditions to implement.

Protected matter means a matter protected under a controlling provision in Part 3 of the **EPBC Act** for which this approval has effect.

Recent Activity means any activity associated with **nesting** of the **protected matter** within the most recent breeding season for that **protected matter**.

Registered Phytophthora Dieback Interpreter means a person specially trained to detect, diagnose and map the presence of *Phytophthora*, particularly *P. cinnamomi*, according to the processes, procedures and standards accepted by **DBCA**.

Revegetate or **revegetation** means the process of rebuilding the soil of disturbed land and re-establishing viable vegetation of appropriate species until it thrives without requiring further support such as watering and weed and herbivore control.

Secure, secured or **securement** means to implement long-term legally binding protection for conservation management. Demonstration that the offset site is legally secure would include evidence that the land title contains provisions to protect the sites against future development and infrastructure.

Sensitive ecological data means data as defined in the *Sensitive Ecological Data – Access and Management Policy v1.0*, Commonwealth of Australia 2016.

Shapefile means location and attribute information about the Action provided in an Esri shapefile format containing:

- '.shp', '.shx', '.dbf' files,
- a '.prj' file which specifies the projection or geographic coordinate system used, and
- an '.xml' metadata file that describes the shapefile for discovery and identification purposes.

Sheeted/sheeting means the laying down of a suitable material that covers or binds the surface soil to provide a trafficable surface.

SMART means specific, measurable, achievable, relevant and time bound.

Suitably qualified ecologist means a person(s) who have relevant professional qualifications and at least 3 years of work experience designing and implementing surveys for either **black cockatoos** or **Chuditch** and can give an authoritative assessment and advice on the presence of **black cockatoo known nesting tree** or **Chuditch nesting** using relevant protocols, standards, methods and/or literature. The **suitably qualified ecologist** must be qualified for the species (respectively) they are providing advice on, and the approval holder may consult with different **suitably qualified ecologists** for the individual **protected matters**.

Suitably qualified expert means a person who has relevant professional qualifications and:

- at least 3 years of work experience writing and implementing management plans for providing and maintaining **artificial nest hollows** or modified **natural nest hollows** for **black cockatoos**,
- has implemented and reported on management plans for providing and maintaining **artificial nest hollows** or modified **natural nest hollows** for **black cockatoos**, and
- can give authoritative assessment and advice on management to providing and maintaining **artificial nest hollows** or modified **natural nest hollows** for **black cockatoos** using the relevant protocols, standards, methods and/or literature.

Transport overburden means the movement of overburden by **vehicles**.

Vehicle means a machine used for transporting people or goods.

Vehicle strike means any event in which a **vehicle** and a **protected matter** collide.

Website means a set of related web pages located under a single domain name attributed to the approval holder and available to the public.

Wildlife expert means a person, such as a veterinarian, who practices in, and holds current qualifications for, caring for injured wildlife, and has access to adequate equipment to provide appropriate care.

Attachments

Attachment A – Action area

Attachment A1 – Black cockatoo habitat within Action area

Attachment A2 – Black cockatoo potential and suitable nesting trees within Action area

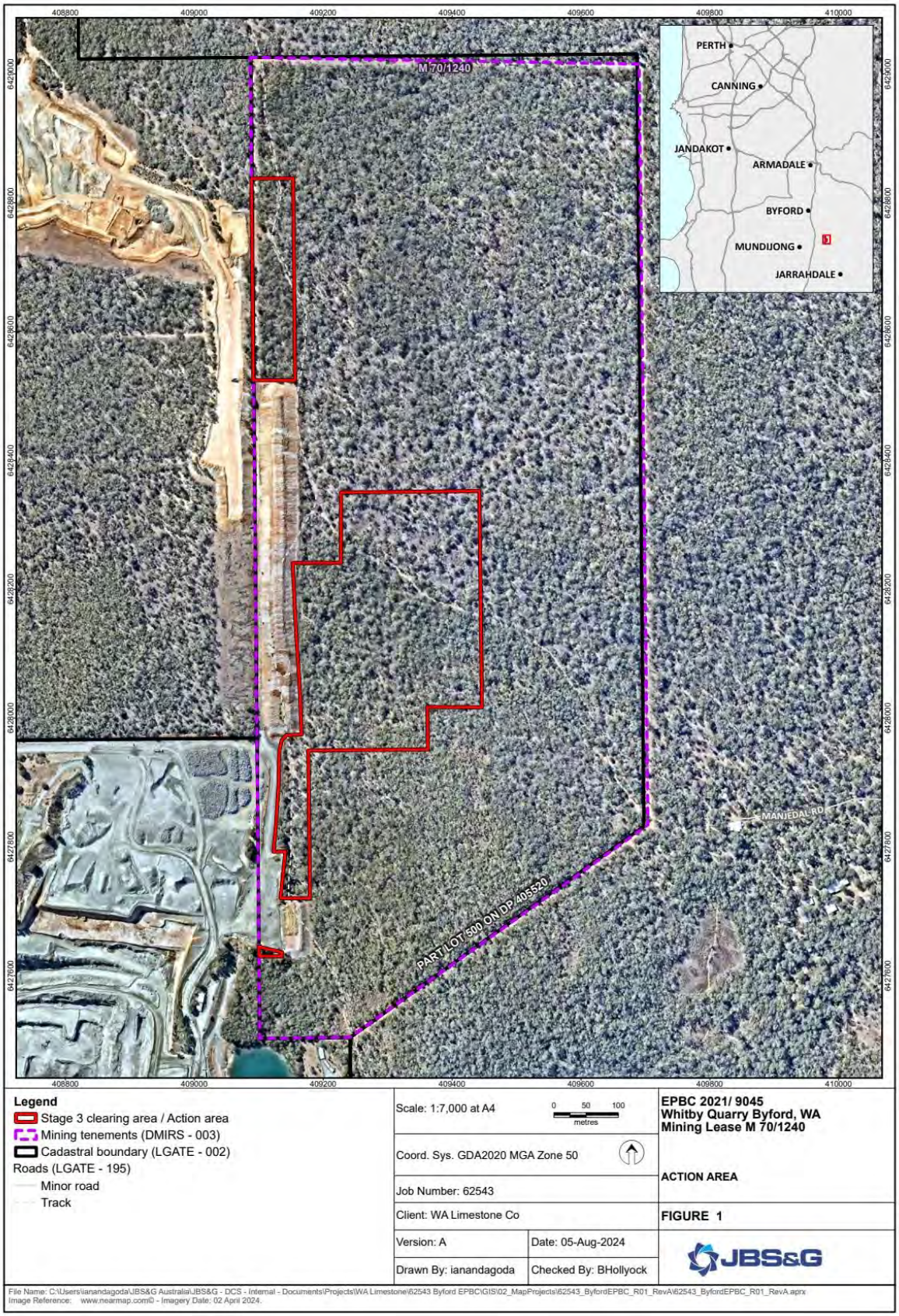
Attachment A3 – Chuditch habitat within Action area

Attachment B – Byford Whitby Mine and lay down and overburden Areas

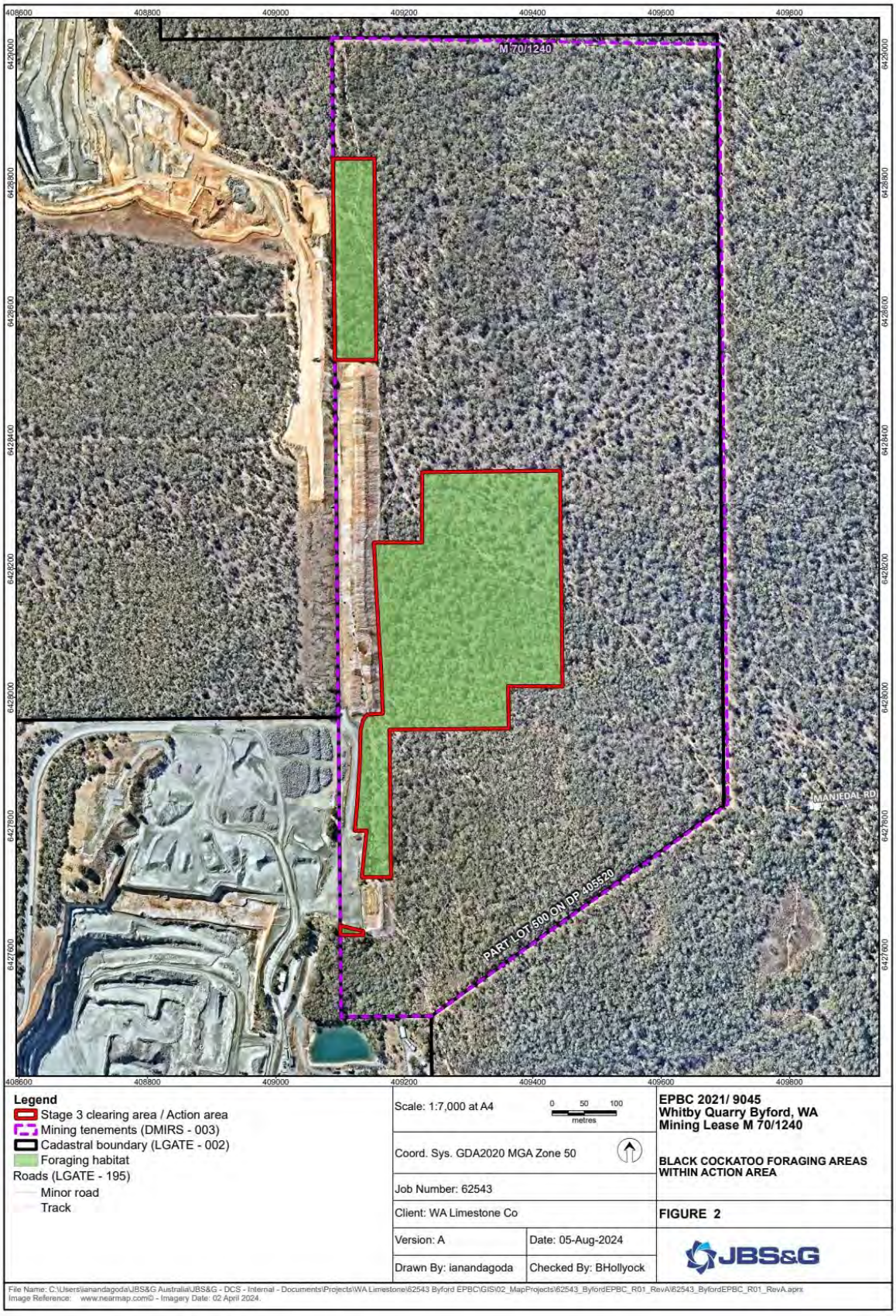
Attachment C – Offset site

Attachment D – Offset Outcomes

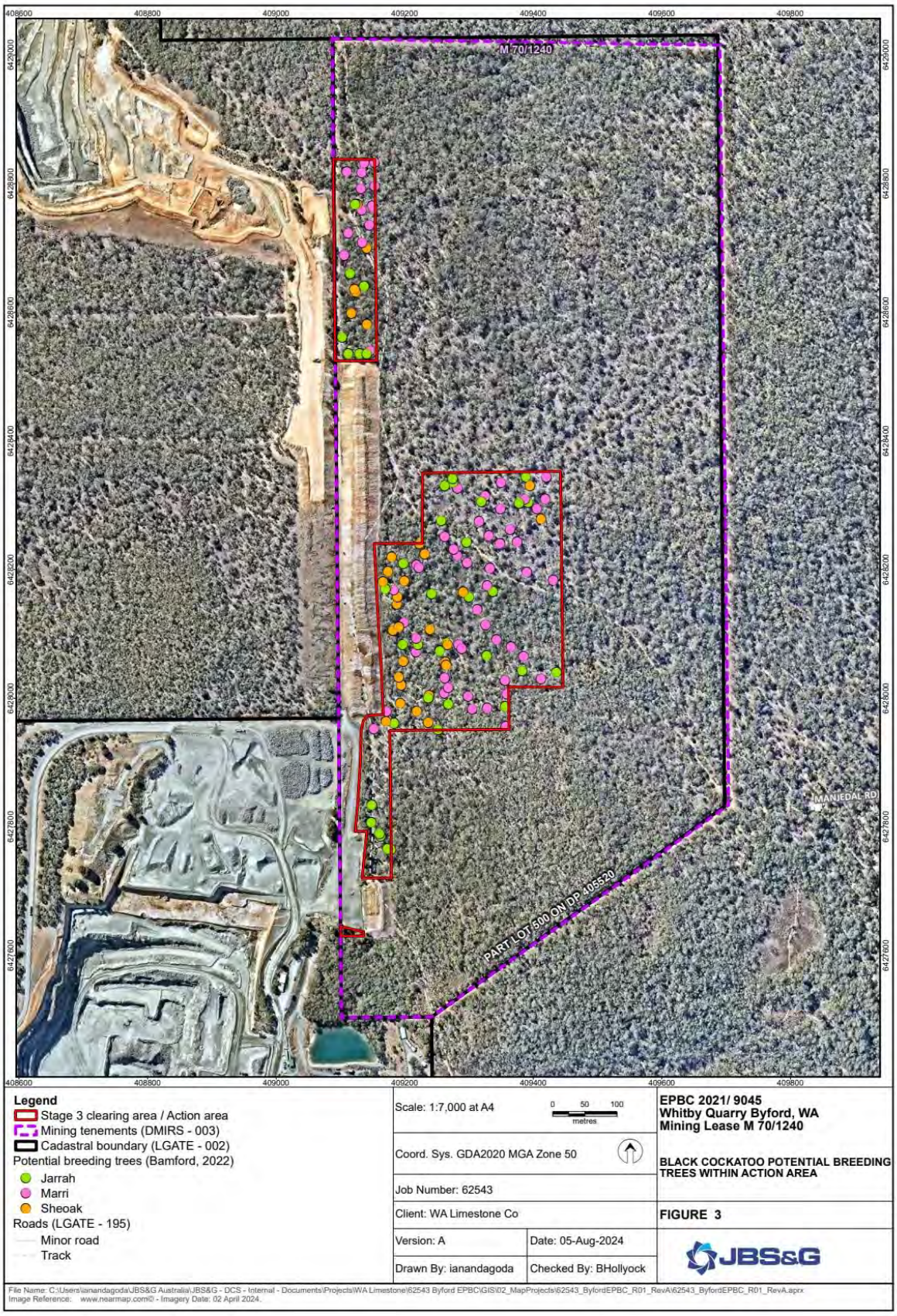
Attachment A: Action Area

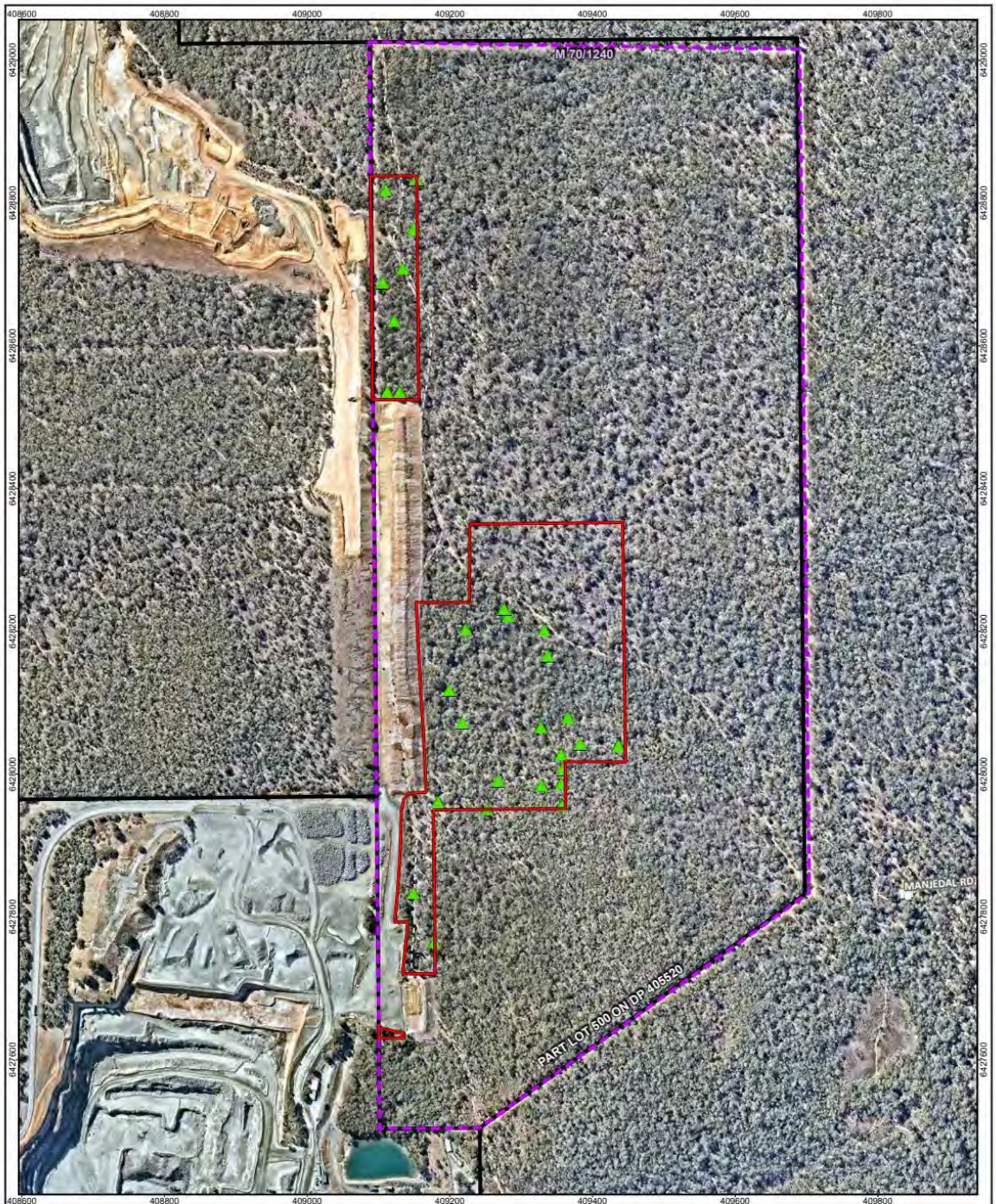


Attachment A1: Black cockatoo habitat within Action area



Attachment A2: Black cockatoo suitable and potential nesting trees within the Action area





Legend

- Stage 3 clearing area / Action area
- Mining tenements (DMIRS - 003)
- Cadastral boundary (LGATE - 002)
- Suitable breeding trees

Roads (LGATE - 195)

- Minor road
- Track

Scale: 1:7,000 at A4	0 50 100 metres
Coord. Sys. GDA2020 MGA Zone 50	
Job Number: 62543	
Client: WA Limestone Co	
Version: A	Date: 05-Aug-2024
Drawn By: ianandagoda	Checked By: BHollyock

EPBC 2021/ 9045
Whitby Quarry Byford, WA
Mining Lease M 70/1240

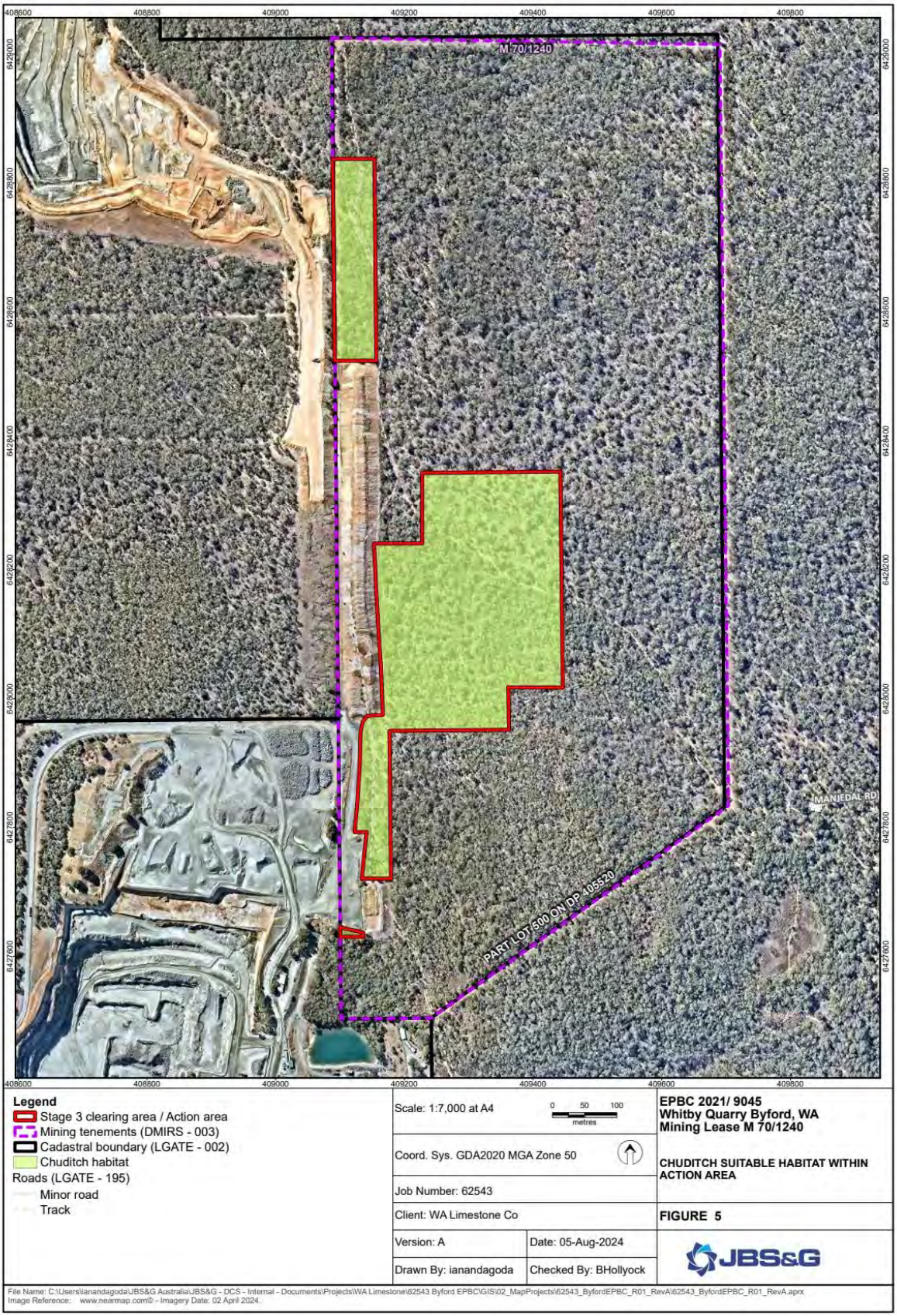
BLACK COCKATOO SUITABLE BREEDING TREES WITHIN ACTION AREA

FIGURE 4

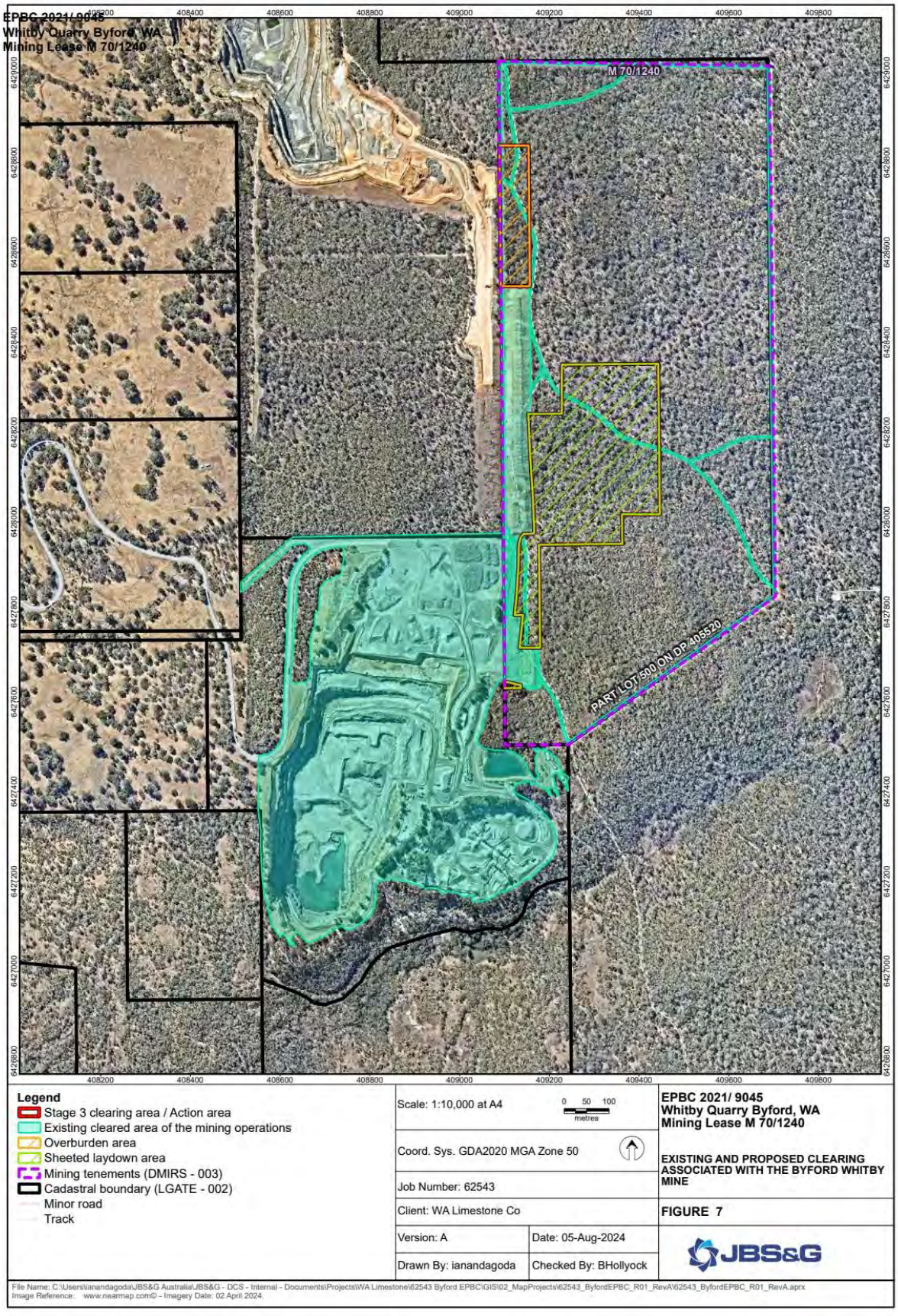
JBS&G

File Name: C:\Users\ianandagoda\JBS&G Australia\JBS&G - DCS - Internal - Documents\Projects\WA Limestone\62543 Byford EPBC\GIS\02_MapProjects\62543_ByfordEPBC_R01_RevA\62543_ByfordEPBC_R01_RevA.aprx
Image Reference: www.nearmap.com© - Imagery Date: 02 April 2024.

Attachment A3: Chuditch habitat within Action area



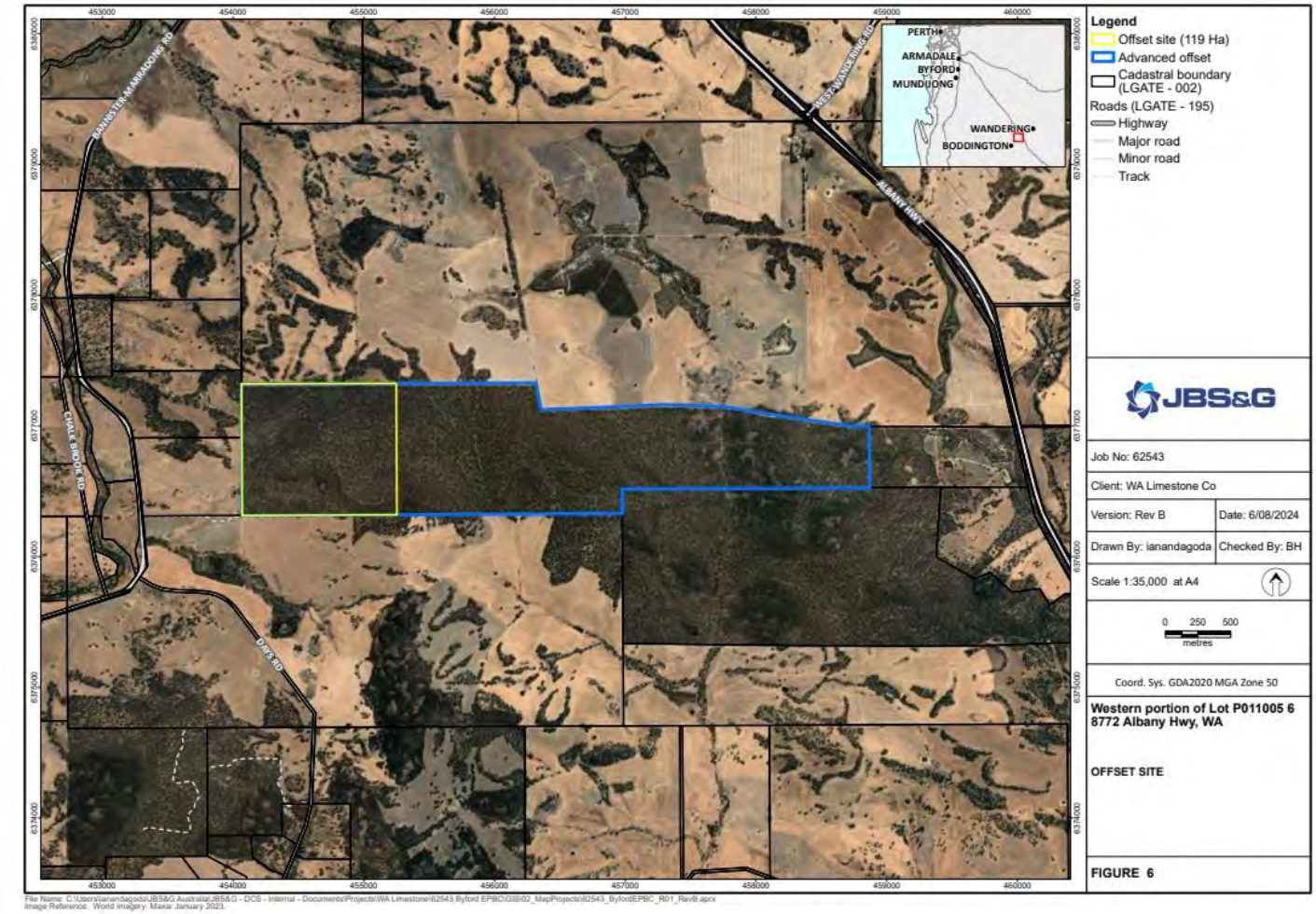
Attachment B: Byford Whitby Mine and Action Area



Australian Government

Department of Climate Change, Energy, the Environment and Water

Attachment C: Offset Site



Attachment D: Offset Outcomes

Management Objectives	Key threat addressed, as per recovery plans (DEC 2008, 2012; DPoW 2013)	Management and Mitigation Measures	Trigger for Further Action	Monitoring in Place	Corrective Actions
Protect existing habitat from future developments	Chuditch: • Land clearing and habitat alteration Carnaby's cockatoo: • Loss of breeding habitat • Loss of non-breeding foraging and night roosting habitat Baudins and FRTBC: • Habitat loss	• Purchase and conserve in perpetuity as a conservation reserve.	• If Conservation Reservation has not been achieved within 2 years.	• Notification of completion of land purchase and transfer to DBCA to be sent to DCCEEW within 4 weeks of finalisation.	• If Conservation Reservation has failed then a Conservation Covenant under the *Biodiversity Conservation Act 2016* will be placed over the site.
Reverse habitat alteration and decline caused by livestock grazing	Chuditch: • habitat alteration caused by (rabbit and) livestock grazing Carnaby's: • habitat degradation caused by factors including grazing	• Ensure effective fencing to exclude livestock are in place within 8 weeks of land transfer.	• Livestock in Conservation Reserve or observable breech of fence.	• No livestock on site, and fences erect and well-maintained with monthly inspection.	• If fencing is not in place or has been compromised, then it will be immediately re-instated and stock removed.
Implement fire management to improve habitat values, especially the availability of suitable Chuditch den logs and den sites, and habitat, feeding and roosting trees for Black Cockatoos	Changed fire regimes, including hot summer bushfires. • For Chuditch, fire may have the same medium-term impact as clearing due to its destructive nature. Broad scale, high intensity fires destroy den logs, protective cover and remove prey biomass (particularly large invertebrates) and homogenise large areas of habitat. • For Black Cockatoos, hot bushfires can destroy trees that contain nest hollows or that may develop hollows in the future, and can also destroy roosting trees. Fire may also affect the availability of foraging habitat.	• Maintenance of fire breaks and tracks within the Bannister Offset Site, with yearly inspections; • Locked gate and limited site access; • Fuel reduction burns every 8-10 years. • Fire management will be integrated with management of the surrounding Youraling State Forest and Conservation Park.	• If fire fuel loads reach a level unacceptable to DBCA fire control officers it will be prioritised for reduction.	• Annual inspections of fuel loads and firebreaks with addressing any maintenance if needed. • Visual inspection to ensure no unauthorised access	• Prescribed burns are planned according to the DBCA Prescribed Fire Plan, occur at least every 10 years, and are integrated with surrounding DBCA estates. • Compliance with DBCA Fire Management strategy (https://www.dbca.wa.gov.au/parks-and-wildlife-service/fire).
Minimise the risk of introduction or spread of dieback	Dieback caused by *Phytophthora cinnamomi* Carnaby's cockatoo: • *Phytophthora* dieback contributes to the degradation and loss of habitat Baudin's and FRTBC: • *Phytophthora* dieback threatens the ecosystems that provide feeding and breeding habitat for both cockatoos.	• Yearly inspections • Strategic road upgrades and maintenance to reduce the risk of introduction and spread of Dieback from access tracks; • Locked gate and limited site access; • Inspect all machinery, light and heavy vehicles prior to entry to the Conservation area. Any equipment with soil, weeds or seeds attached are	• Inspections identified potential dieback outbreak. • Quarantine protocols not adhered to.	• Inspections identify no *Phytophthora* dieback infestations. • Compliance with DBCA Dieback Management Manual (DBCA 2017). • Annual Inspections from Ransberg to verify compliance with hygiene management plan; • 5 yearly dieback survey confirm no introduction or spread of Dieback.	• If dieback has been confirmed on-site then the area is to be demarked and segregated with no access other than essential maintenance. • Dieback Management Plan to be reviewed and updated. • Restrict access by quarantine breechers. • Notify DCCEEW.

Management Objectives	Key threat addressed, as per recovery plans (DEC 2008, 2012; DPaW 2013)	Management and Mitigation Measures	Trigger for Further Action	Monitoring in Place	Corrective Actions
		to be denied entry to site until cleaned. • Further dieback surveys to be completed every 5 years to inform BOMP reviews. • Dieback management will be integrated with management within the adjoining Youraling State Forest and Conservation Park.			
Prevent any increases in weed cover to protect habitat values	Carnaby's cockatoo: • Weed invasions contribute to the degradation and loss of habitat Baudin's and FRTBC: • Weed invasions threaten the ecosystems that provide feeding and breeding habitat for both of these Cockatoos.	• Locked gate and limited site access; • Undertake weed control if monitoring shows new or increased weed occurrence. Introduced flora control will be via herbicide (chemical spray); being the most cost-effective approach for weed control. Specific weed control methodology will be developed in consultation with DBCA and will be dependent upon the species identified and observed extent, in accordance with DBCA advice and requirements.	• Introduction of new invasive species. • Weed load (cover) increase by 20% above photo monitoring baseline.	• Photo monitoring at defined areas around site. • Implementing five-year monitoring program for weed survey.	• If weed load or number of invasive species increases introduce a more targeted chemical control program.
Protect Chuditch from predation by, and competition from, introduced cats and foxes by reducing cat and fox abundance	Foxes may have a direct effect on Chuditch populations in the form of predation of young animals, or indirect effect, by competing with Chuditch for food resources. Feral cats are also believed to compete with Chuditch for food, and probably predate young Chuditch.	• Use fire to regenerate Gastrolobium thickets to provide protection for a range of vulnerable fauna including Chuditch species from fox and cat predation. • Feral fox and cat control (i.e. baiting, trapping) ensuring that detrimental impacts on Chuditch are avoided. •	• If reduction in feral fox and cat numbers is not identified after 3 years then review techniques being used.	• Annual photo monitoring of Chuditch, foxes and cats.	• Extend geographical extent of feral management program.
Maintaining artificial hollows to ensure their effectiveness to ensure the artificial hollows continue to provide opportunities to be used by Black Cockatoos.	• Invasion by bees • Being used by non-targeted species	• Installation of 35 artificial nesting hollows adjacent to the impact area, to offset the 31 trees that have been flagged by Bancroft and Bamford (2022a) as containing suitable hollows within the Proposed Action Area in accordance with the offset calculator. Specific location of the artificial hollows will be guided by recognised expert. • Protecting habitat by fencing and/or rabbit control to encourage regeneration of native vegetation;	• If no artificial nesting hollows are occupied within 3 years then location to be reviewed with recognised expert and relocated if recommended. Artificial hollows are maintained to appropriate standard for 20 years. • Artificial hollows remain pest free for 20 years.	• Annual monitoring of artificial nesting hollows.	• Any damaged or infested artificial nesting boxes to be repaired or replaced.

Management Objectives	Key threat addressed, as per recovery plans (DEC 2008, 2012; DPaW 2013)	Management and Mitigation Measures	Trigger for Further Action	Monitoring in Place	Corrective Actions
		• Controlling competitive species such as galahs, corellas and feral bees that may occupy hollows; • Repairing old and damaged natural nesting hollows; • Creating linkages of vegetation between nesting and feeding areas			

Appendix B Assessment of Flora, Vegetation and Fauna Values on the WA Bluemetal Quarry Survey Area at Serpentine (Mattiske, 2017)

ASSESSMENT OF FLORA, VEGETATION AND FAUNA VALUES

ON THE WA BLUEMETAL QUARRY SURVEY AREA

AT SERPENTINE

Prepared for:

WA Bluemetal Quarry

Prepared by:

Mattiske Consulting Pty Ltd

October 2017

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TABLES

FIGURES

APPENDICES

1. SUMMARY

Mattiske Consulting Pty Ltd were commissioned to update the earlier studies on the WA Bluemetal Quarry near Serpentine. The initial work was undertaken in 2005 and this data was reviewed for any changes in current status of flora species and vegetation communities. In addition, a desktop assessment of potential flora, vegetation and fauna values was undertaken as part of this review in October 2017.

The leases involved include Lots 246 and 344 and M 70/1240 near Serpentine, Figure 1. The botanical values on the WA Bluemetal Quarry survey area were assessed systematically by Mattiske Consulting Pty Ltd during a prime flowering period in October 2005. Three experienced botanists from Mattiske Consulting Pty Ltd were involved in the field studies. Therefore the survey effort was undertaken at an appropriate time to maximise the return for effort. The recent studies have assessed other potential flora and vegetation community values that may have changed in this period.

The searches of the State and Federal databases highlighted a range of potential flora and fauna species that may occur in the area and several threatened ecological communities that may occur in the area. As some of these occur on the Swan Coastal Plain some of the potential values are not relevant for the survey area. The area under consideration occurs on the Darling Range and Darling Scarp (not the Swan Coastal Plain).

Wetlands of National Environmental Significance

- Peel Yalgorup System – unlikely to be impacted by any developments as 30-40m km downstream from Darling Scarp and survey area.

Potential Threatened Ecological Communities

- Three potential threatened ecological communities at the Federal level are all located on the Swan Coastal Plain and as such do not occur within the survey area.

Potential Threatened Fauna Species

- Seven threatened avifauna species were highlighted in the search of the Federal database. Of these the four threatened Black Cockatoos (Forest Red-tailed Black-Cockatoo (*Calyptorhynchus banksia naso*), Baudin's Cockatoo (*Calyptorhynchus baudinii*), Carnaby's CocKatoo (*Calyptorhynchus latriostris*) and the White-tailed Black Cockatoo (*Calyptorhynchus* sp.) are most likely to occur in the survey area.
- Three threatened mammals were highlighted in the search of the Federal database. Of these the Chuditch (*Dasyurus geoffroii*) is the most likely to occur in the survey area.
- One Freshwater Mussel was highlighted in the State database as potentially occurring in survey the area.

Potential Threatened and Priority Flora

- A total of 12 potential threatened and priority flora species twelve are listed at the State level and of these 3 species (*Lasiopetalum pterocarpum* (T), *Thelymitra stellata* (T) and *Pithocarpa corymbulosa* (P3) may occur at the site due to site preferences.
- A total of 11 potential threatened flora species are listed at the Federal level and of these 2 species (*Lasiopetalum pterocarpum* (E), *Thelymitra stellata* (E) may occur at the site due to site preferences.

Potential Migratory Species

- Of the potential migratory species the majority occur near wetlands and marine areas and therefore are not likely to occur in the survey area. Of the highlighted species the most likely is the Grey Wagtail (*Motacilla cinerea*).

Recorded Values - Flora

A total of 253 vascular plant taxa, including 244 species, from 154 plant genera and 56 families were recorded within three locations. Two of these locations are within the WA Bluemetal Quarry lease and the third is privately owned. No Declared Rare Flora species gazetted under the Wildlife Conservation Act (1950-1980) were located on the survey areas. No endangered or vulnerable species, pursuant to s179 of the Environmental Protection and Biodiversity Conservation Act (1999) were located during the survey. Two Priority taxa, as defined by the Department of Conservation and Land Management (2005a), were identified in the survey. These were *Millotia tenuifolia* var. *laevis* and *Pithocarpa* ?*corymbulosa*. Forty introduced species were identified during the survey, reflecting the proximity of agriculture, tracks and other environmental disturbance to the area.

Recorded Values - Vegetation

The four vegetation complexes that occur in the WA Blue Metal survey area included Darling Scarp (DS), Dwellingup 2 (D2), Murray 1 (My1) and Yarragil (Yg1) as defined by Heddle et al. (1980) and Mattiske and Havel (1998). The majority of the vegetation complexes are well represented (23.0%, 7.9%, 36.0% and 29.9% respectively) within the formal and informal reserve systems (Conservation Commission 2003). The exception to the latter is the Darling Scarp (7.9%), as it is largely in private landholdings. Any land swap that might include less disturbed sections of the Darling Scarp complex (with its associated vegetation on the shallow and granitic soils) would benefit the conservation of this complex in the regional context.

A total of ten site-vegetation types were defined and mapped for the WA Bluemetal Quarry survey area. In addition, the disturbed and pasture areas were defined and mapped. These units were based on the site-vegetation types as developed by Havel for the northern Jarrah forest (Havel 1975a and 1975b). All of the site-vegetation types are well represented in the conservation estate.

None of these site-vegetation types are listed as threatened ecological communities listed by the Department of Biodiversity Conservation and Attractions (2017c). None of these site-vegetation types are listed as threatened under the Environmental Protection and Biodiversity Conservation Act (1999).

The flora and vegetation values on the respective areas varies substantially largely in response to the differences between the underlying geology, landform and soils of the Darling Scarp (largely shallow granitic soils) and the Dwellingup (largely lateritic caprock and lateritic gravels) mapping units. There is a similar number of flora taxon on both M70/1240 and Loc 344, as both support a range of site conditions. The values of the native flora and vegetation on Loc 246 have been modified significantly by grazing activities. The condition of the vegetation on the survey area varied from "excellent" to "completely degraded", based on the scale as developed by Keighery (1994). A few local areas have been impacted by previous snigging tracks, dieback, clearing for agricultural activities and quarry activities.

WA Limestone

SERPENTINE VEGETATION

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CAD Ref: g1270_f01.dgn	Date: Oct 2005	Rev: **A** **A1**

2. INTRODUCTION

2.1 Background

Mattiske Consulting Pty Ltd was commissioned by WA Bluemetal Quarry to conduct a survey of flora and vegetation on Lots 246 and 344 and M 70/1240 near Serpentine (Figure 1) in 2005.

The WA Bluemetal Quarry survey area is situated in the Shire of Serpentine-Jarrahdale. The survey area consists of three locations, two of which are covered by the WA Bluemetal Quarry lease and the third privately owned. The two locations which are covered by the lease are known as M70/1240 (the most northern and eastern parcel of the three, towards the top of the Darling Scarp) and Location 344 (on a lower section of the Darling Scarp). The third (privately owned) area is Location 246, and is the most western and southern of the three parcels.

The botanical values on the WA Bluemetal Quarry survey area were assessed systematically by Mattiske Consulting Pty Ltd, during a prime flowering period in October 2005. Three experienced botanists from Mattiske Consulting Pty Ltd were involved in the field studies and the assessment would meet the detailed assessment level as delineated by EPA (2016a and 2016b).

The recent studies were associated with updated the potential values on the flora, vegetation and fauna as a result of the recent changes in listings of threatened species and communities at the State and Federal levels. This report provides an updated summary of the potential and recorded values.

2.2 Climate

Serpentine-Jarrahdale shire is approximately 40km south east of Perth in the southwest of Western Australia. The southwest has a warm dry Mediterranean climate with a defined seasonal pattern of cool, wet winters and hot, dry summers. Climate statistics from the Bureau of Meteorology weather stations situated at Karnet (on the Darling Scarp) is given below. Generally, winter rain occurs during June, July and August in Karnet. For Karnet, the mean annual rainfall is 925mm and the highest total monthly rainfall was in June at 520.4mm. Mean daily minimum and maximum temperatures in winter range from 6.3 to 16.4 for Karnet, and in summer from 13.5 ºC to 30.7 ºC for Karnet. Although these minima and maxima may seem to indicate a mild climate, temperature extremes lie well outside these ranges (Bureau of Meteorology 2017).

Table 1: Climate data for Karnet (Latitude 32.4400 S, Longitude 116.0744 E, elevation 286 m, for 1907 to 2017 (Rainfall) and 1965 to 2017 (Temperature); Bureau of Meteorology 2017)

Climate data	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Mean daily max temperature (Cº)	30.7	30.5	27.8	23.3	19.2	16.4	15.4	15.9	17.6	20.8	24.5	28.2	22.6
Mean daily min temperature (Cº)	15.4	15.8	14.2	11.8	9.0	7.3	6.3	6.3	7.2	9.0	11.4	13.5	10.6
Mean rainfall (mm)	9.7	12.9	17.3	48.2	127.8	185.5	180.7	140.1	89.9	56.2	24.5	13.8	925
Highest monthly rainfall (mm)	60.6	190.2	97.8	165.1	271.8	520.4	467.4	352.0	221.8	131.7	81.3	72.2	1389.0
Lowest monthly rainfall (mm)	0.0	0.0	0.0	0.0	3.8	21.8	0.0	25.8	1.6	0.0	0.0	0.0	500.4

2.3 Vegetation

The WA Bluemetal Quarry survey area lies within the Darling Botanical District of the South-western Botanical Province as recognized by Diels (1906) and later developed by Gardner (1942) and Beard (1979, 1980).

More recently, the vegetation of Western Australia has been assigned to bioregions under the Interim Biogeographical Regionalisation for Australia (IBRA) (Thackway and Cresswell 1995 and Environment Australia 2000, 2005). These subdivisions largely relied on the earlier physiographic work of Beard (1981). The WA Bluemetal Quarry survey area is within the Jarrah Forest bioregion, and has been summarised as having Jarrah-Marri forest on lateritic gravels, replaced by *Taxandria* shrublands on eluvial and alluvial soils and Wandoo-Marri on clayey soils to the east (Western Australian Herbarium 2005a).

Jarrah Forest is dominated by Jarrah *Eucalyptus marginata* subsp. *marginata*, with an understorey of small trees such as Sheoak *Allocasuarina fraseriana*, Bull Banksia *Banksia grandis* and Snottygobbles *Persoonia longifolia* and *Persoonia elliptica*. The groundcover is composed of woody shrubs such as Free Flowering Lasiopetalum (*Lasiopetalum floribundum)*, *Trymalium ledifolium* and Honey Bush (*Hakea lissocarpha)*, with Balga (*Xanthorrhoea preissii)*, Kingia (*Kingia australis)* and cycad (*Macrozamia riedlei)* (Beard 1990, Dell et al 1989).

Previous workers have stressed the significance of the climate, landforms and soils in determining the distribution of plant communities in this area (Diels 1906; Williams 1932, 1942; Speck 1952, 1958; Lange 1960; Churchill 1961, 1968; Smith 1974; Seddon 1972; Havel 1968, 1975a, 1975b; Heddle *et al*. 1980a; Beard 1981, Mattiske and Havel 1998).

In vegetation mapping it is necessary to define and map the plant communities into groups with common characteristics in structure and floristics. This grouping and classification has been achieved by:

- Havel on the Swan Coastal Plain (1968) and in the Northern Jarrah Forest (1975a, 1975b),
- Beard (1979) in the Pinjarra area (1:250,000),
- Heddle *et al*. (1980a) in the System 6 area; Perth, Pinjarra and Collie areas (1:250,000), and
- Mattiske and Havel (1998) in the vegetation mapping for the Regional Forest Agreement.

The classification system of Heddle *et al*. (1980a), which utilized the concept of vegetation complexes, emphasized the relationships between the underlying landforms, soils and the plant communities. This latter system incorporated linkages with the previous work by Havel (1975a and b). The following vegetation complexes occur within and near the survey area:

Darling Scarp

Mosaic of Open Forest of *Eucalyptus marginata* subsp. *marginata – Corymbia calophylla,* with some admixtures with *Eucalyptus laeliae* in the north (subhumid zone) and *Corymbia haematoxylon* in the south (humid zone) on deeper soils adjacent to outcrops, woodland of *Eucalyptus wandoo* (subhumid and semiarid zones), low woodland of *Allocasuarina huegeliana* on shallow soils over granite outcrops, closed heath of Myrtaceae – Proteaceae species and lithic complex on or near granite outcrops in all climate zones.

Dwellingup 2

Open Forest of *Eucalyptus marginata* subsp. *marginata - Corymbia calophylla on* lateritic uplands in subhumid and semiarid zones. Dominant vegetation-site types S, P; less consistently O, T and R.

Murray 1

Vegetation ranges from Open Forest of *Eucalyptus marginata* subsp. *marginata - Corymbia calophylla - Eucalyptus patens* on valley slopes to woodland of *Eucalyptus rudis – Melaleuca*

rhaphiophylla on the valley floors in humid and subhumid zones. Dominant vegetation types C, Q, U, T; less consistently D, O, R, W.

Yarragil 1

Open Forest of *Eucalyptus marginata* subsp. *marginata* - *Corymbia calophylla* on slopes with mixtures of *Eucalyptus patens* and *Eucalyptus megacarpa* on the valley floors in humid and subhumid zones Dominant vegetation types C, D, W; less consistently Q, T, U.

The site-vegetation types defined by Havel (1975a, 1975b) for the Northern Jarrah Forest covered the variation of plant communities on this section of the Darling Range. Although the plant communities in this area form a continuum, it is possible to classify the site-vegetation types by incorporating site descriptions (e.g. soils, topography, slope, aspect, soil moisture regimes), floristic information and structural information.

In the last twenty years, subsequent studies by Mattiske and Havel in the Northern Jarrah Forest have recognised a series of new vegetation types not covered previously by Havel (1975a, 1975b). These include variations on the previously defined site vegetation types (e.g. ST, SW) as well as site-vegetation types which were not covered by Havel (e.g. X, refer E.M. Mattiske and Associates 1988, 1992, 1993a).

3. METHODS

3.1 Fieldwork

An initial search for the Declared Rare and Priority flora species known to occur in the region was made using the Department of the Environment and Heritage (2005a and 2005b) and the Department of Conservation and Land Management databases (Western Australian Herbarium 2005a and 2005b) and then updated by reviewing databases in August 2017 managed by the Department of the Environment and Energy (2017a, 2017b) and the Department of Biodiversity, Conservation and Attractions (2017a, 2017b and 2017c).

Photographs, location data and descriptions of these species were taken into the field in 2005 to assist in identifying rare plants and habitats where rare plants may be found.

The flora of the WA Bluemetal Quarry survey area was described and collected systematically at each survey site in three specific areas, from a grid overlaid on topographic maps with sites at 150m intervals, by three experienced botanists from Mattiske Consulting Pty Ltd in October 2005. Selective opportunistic collecting was further undertaken at additional sites in plant communities of like structure and floristic composition. Details on topography, percentage litter cover, soil ratio, percentage of bare ground, outcropping rocks and their type, pebble type and size, and time since fire, were recorded at each site. The average height and percent foliage cover of all species, alive and dead, was recorded at each site. Digital photographs were taken of some species such as orchids, instead of collecting, to minimise the impact on potentially rare or endangered species.

All plant specimens collected during the field surveys were pressed, dried and fumigated in accordance with the requirements of the Western Australian Herbarium. The plant species were identified and then compared with pressed specimens housed at the Western Australian Herbarium. Where appropriate, plant taxonomists with specialist skills were consulted. Nomenclature of the species recorded follows the Western Australian Herbarium standards (2017d). Several species have changed names since the 2005 studies as a result of changes to taxonomic nomenclature, e.g. *Dryandra* species have been changed to *Banksia* species and *Austrodanthonia* species to *Rytidosperma* species.

3.2 Local and Regional Significance

The Environmental Protection Authority (2004) in Guidance Statements 51 and 56 stated that species, subspecies, varieties, hybrids and ecotypes may be significant for a variety of reasons, including:

- a keystone role in a particular habitat for threatened species, or supporting large populations representing a significant proportion of the local regional population of a species;
- relic status;
- anomalous features that indicate a potential new discovery;
- being representative of the range of a species (particularly, at the extremes of range, recently discovered range extensions, or isolated outliers of the main range);
- the presence of restricted subspecies, varieties, or naturally occurring hybrids;
- local endemism/a restricted distribution;
- being poorly reserved.

Plant communities or vegetation may be significant for a range of reasons, other than a statutory listing as a Threatened Ecological Community or because the extent is below a threshold level. The Environmental Protection Authority (2004) in Guidance Statement 51 stated that significant vegetation may include communities that have:

- scarcity;
- unusual species;
- novel combinations of species;
- a role as a refuge;
- a role as a key habitat for threatened species or large populations representing a significant proportion of the local to regional total population of a species;
- being representative of the range of a unit (particularly, a good local and/or regional example of a unit in "prime" habitat, at the extremes of range, recently discovered range extensions, or isolated outliers of the main range);
- a restricted distribution.

The application of the degree of significance may apply at a range of scales.

3.3 Threatened and Priority Flora and Fauna

Species of flora and fauna are given threatened or priority conservation status when populations are restricted geographically or threatened by local processes. The Department of Biodiversity, Conservation and Attractions and the Department of the Environment and Energy recognise these threats of extinction and consequently applies regulations towards population and species protection, see Appendix A.

3.4 Threatened and Priority Ecological Communities

Ecological Communities are given threatened or priority conservation status when communities are restricted geographically or threatened by local processes. The Department of Biodiversity, Conservation and Attractions and the Department of the Environment and Energy recognise these threats of extinction and consequently applies regulations towards protection, see Appendix A.

3.5 Condition Rating

The condition of each plant community was rated according to the scale as developed by Keighery (1994) and as used for assessing Bush Forever sites (Government of Western Australia 2000). The scale is summarised in Table 2.

Table 2: Condition rating scale from Bush Forever (Government of Western Australia 2000), based on Keighery 1994

Rating	Description	Explanation
1	Pristine	Pristine or nearly so, no obvious signs of disturbance.
2	Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
3	Very Good	Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation structure covers repeated fire, aggressive weeds, dieback, logging, grazing.
4	Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure covers frequent fires, aggressive weeds at high density, partial clearing, dieback and grazing.
5	Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. Disturbance to vegetation structure includes frequent fires, presence of very aggressive weeds, partial clearing, dieback and grazing.
6	Completely degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas often described as "parkland cleared" with the flora comprising weed or crop species with isolated native trees or shrubs.

4. OBJECTIVES

In 2005, WA Bluemetal Quarry commissioned Mattiske Consulting Pty Ltd to undertake a flora and vegetation-mapping program of the WA Bluemetal Quarry survey area at Serpentine.

The specific objectives of this study were to:

- Define vegetation communities to enable mapping of the vegetation on the WA Bluemetal Quarry survey area,
- Assess the condition of all vegetation within the survey area,
- Produce maps of vegetation communities and vegetation condition within the survey area,
- Assess the conservation status of all vegetation communities and plant taxa, and
- Prepare a report summarising the findings.

In 2017, WA Bluemetal Quarry commissioned Mattiske Consulting Pty Ltd to review the values in relation to current listings.

5. RESULTS

5.1 Desktop Assessment

The searches of the State and Federal databases highlighted a range of potential flora and fauna species that may occur in the area and several threatened ecological communities that may occur in the area. As some of these occur on the Swan Coastal Plain some of the potential values are not relevant for the survey area. The area under consideration occurs on the Darling Range and Darling Scarp (not the Swan Coastal Plain).

The review ore State and Federal databases highlighted the following key biological values that have the potential to occur on the Serpentine survey area, see Appendices B and C.

Wetlands of National Environmental Significance

- Peel Yalgorup System – unlikely to be impacted by any developments as 30-40m km downstream from Darling Scarp and survey area.

Potential Threatened Ecological Communities

- Three potential threatened ecological communities at the Federal level are all located on the Swan Coastal Plain and as such do not occur within the survey area.

Potential Threatened Fauna Species

- Seven threatened avifauna species were highlighted in the search of the Federal and State databases. Of these the four threatened Black Cockatoos (Forest Red-tailed Black-Cockatoo (*Calyptorhynchus banksia naso*), Baudin's Cockatoo (*Calyptorhynchus baudinii*), Carnaby's CocKatoo (*Calyptorhynchus latriostris*) and the White-tailed Black Cockatoo (*Calyptorhynchus* sp.) are most likely to occur in the survey area.
- Three threatened mammals were highlighted in the search of the Federal and State databases. Of these the Chuditch (Dasyurus geoffroii) is the most likely to occur in the survey area.
- One Freshwater Mussel was highlighted in the State database as potentially occurring in survey the area.

Potential Threatened and Priority Flora

- A total of 12 potential threatened and priority flora species twelve are listed at the State level and of these 3 species (*Lasiopetalum pterocarpum* (T), *Thelymitra stellata* (T) and *Pithocarpa corymbulosa* (P3) may occur at the site due to site preferences.
- A total of 11 potential threatened flora species are listed at the Federal level and of these 2 species (*Lasiopetalum pterocarpum* (E), *Thelymitra stellata* (E) may occur at the site due to site preferences.

Potential Migratory Species

- Of the potential migratory species the majority occur near wetalnds and marine areas and therefore are not likely to occur in the survey area. Of the highlighted species the most likely is the Grey Wagtail (*Motacilla cinerea*).

5.2 Field Studies - Flora

A total of 253 vascular plant taxa from 154 plant genera and 56 families were recorded on the WA Bluemetal Quarry survey area in Location 246, Location 344 and M70/1240 (Mattiske Consulting Pty Ltd 2005).

No Declared Rare Flora species gazetted under the Wildlife Conservation Act (1950-1980) were located on the WA Bluemetal Quarry survey area. No endangered or vulnerable species, pursuant to s179 of the Environmental Protection and Biodiversity Conservation Act (1999) were located during the survey. However, two Priority taxa, as defined by the Department of Conservation and Land Management in 2005 were identified in the survey. These were *Millotia tenuifolia* var. *laevis* and *Pithocarpa*

?*corymbulosa* (Table 3). Neither of these species is restricted to the survey area; however both are relatively geographically restricted and are only known from 11 and 22 records respectively on the basis of State Herbarium records (Department of Biodiversity, Conservation and Attractions (2017b). The latter lack of collections also reflects the lack of survey effort in the wider region.

Table 3: Locations of Priority Flora species found during the WA Bluemetal Quarry survey

Species	GPS Location (GDA - Zone 50J)		Location
	Easting (mE)	Northing (mN)	
Pithocarpa ?corymbulosa P2	408980	6426520	Loc 344
Millotia tenuifolia var. *laevis* P2	409686	6428901	M70/1240
Millotia tenuifolia var. *laevis* P2	409700	6428764	M70/1240
Millotia tenuifolia var. *laevis* P2	409691	6428675	M70/1240
Millotia tenuifolia var. *laevis* P2	409168	6428464	M70/1240
Millotia tenuifolia var. *laevis* P2	409144	6427991	M70/1240
Millotia tenuifolia var. *laevis* P2	409280	6428120	M70/1240
Millotia tenuifolia var. *laevis* P2	409280	6428840	M70/1240

In M70/1240, 161 taxa from 47 Families, 105 genera and 159 species were collected. One Priority Two species was collected in this area; namely *Millotia tenuifolia* var. *laevis*. Eleven species of introduced plant (i.e. weeds) were found in M70/1240. This area was generally Jarrah *Eucalyptus marginata* subsp. *marginata* or Jarrah/Marri *Eucalyptus marginata* subsp. *marginata / Corymbia calophylla* forest with subdominant trees *Allocasuarina fraseriana*, *Banksia grandis* and occasionally *Persoonia longifolia* and *Nuytsia floribunda* on lateritic soils. Dominant understorey plants included the grasstrees *Xanthorrhoea preissii* and *Xanthorrhoea gracilis*, shrubs *Dryandra sessilis*, *Trymalium ledifolium* and *Hypocalymma angustifolium*. Other understorey plants included species from the genera *Drosera*, *Stylidium*, *Hibbertia* and *Conostylis*. Evidence of disturbance included old logging tracks, sawn logs and weeds. There were signs of dieback and storm damage in some places, particularly in the many "black gravel" areas. The pocket to the far south-east of M70/1240 (south-west of the creek) was generally in a better condition with healthier vegetation (less disturbance) than much of the remainder of the survey area.

In Location 344, 170 taxa were collected from 46 families, 113 genera and 166 species. One Priority Two species was found in the area, namely *Pithocarpa ?corymbulosa*. Twenty-nine introduced plant species were found. Location 344 was predominantly Marri (*Corymbia calophylla* forest with a disturbed understorey on loamy soils, and some large granite outcrops. Around the granite outcrops, there were *Acacia pulchella*, *Banksia sphaerocarpa*, *Melaleuca parviceps*, *Pimelea imbricata* var. *piligera*, *Stylidium dichotomum*, *Darwinia citriodora* and *Verticordia huegelii* var. *huegelii* but also weeds such as **Briza maxima* and **Trifolium campestre.* The forest nearest the creek (northern end of Location 344, at the bottom of the Darling Scarp) had a "parkland" appearance, with a severely degraded understorey consisting of *Xanthorrhoea preissii*, *Phyllanthus calycinus* and *Macrozamia riedlei* and weeds such as **Brachypodium distachyon* and **Briza maxima*. This is probably the result of historic grazing by cattle and may be being perpetuated due to the high density of Western Grey Kangaroos *Macropus fuliginosus* now inhabiting the area.

Location 246 was a highly degraded environment consisting of a few native trees (e.g. *Eucalyptus rudis*, *Corymbia calophylla*) over introduced grasses such as **Avena barbata*, **Briza maxima* and **Lolium rigidum*. There were 15 taxa (and 15 species) identified, from 7 families and 13 genera. No Priority species were found in Location 246. Thirteen weeds were identified in Location 246.

Thirty-nine introduced species were identified during the survey. This number largely reflects the proximity of agriculture and other disturbances on the area.

5.3 Field Studies - Vegetation

A total of ten site-vegetation types were defined and mapped for the WA Bluemetal Quarry survey area. In addition, the disturbed and pasture areas were defined and mapped. The native vegetation areas were based on the site-vegetation types that were defined by Havel (1975a and 1975b). These site-vegetation types are described in the following text and presented on the enclosed vegetation map (Figure 3).

CW - Woodland to Open Forest of *Eucalyptus rudis – Corymbia calophylla* with dense *Taxandria linearifolia* and *Astartea scoparia* in understorey on creek-lines and water-courses (this type is a variant of site-vegetation types C and W as defined by Havel (1975a) and in part reflects the narrow linear nature of the C type and the need to combine this type with the type W for mapping purposes (CW). This type occurs within the Murray and Yarragil complexes as defined by Heddle *et al.* (1980a) and Mattiske and Havel (1998).

This site-vegetation type occurs in the gullies and creek-beds of the western valley floors, which are dominated by loamy soils in the Darling Ranges. This site-vegetation type occurs in other conservation areas (Heddle *et al.* 1980b; Department of Conservation and Environment 1980; Department of Conservation and Land Management 1987) and tends to be dominated by sedges and specific shrub species which dominate the wetter lower slopes and creek-beds (e.g. *Astartea scoparia* and *Taxandria linearifolia*), as well as species which reflect the moister and fertile slopes of the valley systems (e.g. *Hypocalymma angustifolium, Eucalyptus patens* and *Acacia extensa* of site-vegetation type W).

D - Open Forest of *Eucalyptus marginata* subsp. *marginata – Corymbia calophylla* on lower slopes with mixed low understorey species, including *Baeckea camphorosmae* and *Acacia extensa* (site-vegetation type D as defined by Havel (1975a)). This type occurs mainly within the Yarragil and Swamp complexes as defined by Heddle *et al.* (1980a) and Mattiske and Havel (1998).
This site-vegetation type occur on the lower, less fertile slopes with sandy-clays to clay loams on the western valley systems in the Darling Ranges and also occur in other conservation areas (Heddle *et al.* 1980b; Department of Conservation and Environment 1980; Department of Conservation and Land Management 1987). This site-vegetation type tends to be dominated by specific shrub species, which dominate the moister and less fertile lower slopes of the valley systems (e.g. *Hypocalymma angustifolium* and *Baeckea camphorosmae* of site-vegetation type D).

PW - Open Forest of *Allocasuarina fraseriana - Eucalyptus marginata* subsp. *marginata - Corymbia calophylla* with scattered understorey, including *Grevillea wilsonii, Adenanthos barbiger, Baeckea camphorosmae* and *Hypocalymma angustifolium* (this type is a variant of site-vegetation type P as defined by Havel (1975a) due to the presence of moisture indicators such as *Hypocalymma angustifolium* and *Baeckea camphorosmae*). This type occurs within the Dwellingup, Dwellingup-Hester and Yarragil complexes as defined by Heddle *et al.* (1980a) and Mattiske and Havel (1998).

This site-vegetation type occurs on the lower slopes and less commonly the mid slopes of the undulating hills on the Darling Ranges. The type is not well represented in the conservation estate as it appears to be a local variant of the P site-vegetation type (Heddle *et al.* 1980b; Department of Conservation and Environment 1980; Department of Conservation and Land Management 1987). This site-vegetation type tends to be dominated by specific shrub species which dominate the sandy-gravelly slopes and moist soil conditions of the Darling Ranges (e.g. *Lechenaultia biloba, Allocasuarina fraseriana* (formerly *Casuarina fraseriana), Adenanthos barbiger* and *Banksia grandis* of site-vegetation type P and *Hypocalymma angustifolium* and *Baeckea camphorosmae* of the site-vegetation type W which dominates moister soils in the nearby forest areas).

407000mE
408000mE
409000mE
6429000mN
6428000mN
6427000mN
6426000mN
VCL
2778
11
4223
45
4590
4592
100
4589
4591
4594
246
526
126
9
0
67
410
68
0
PS
D
SW
PW
PT
S
M70/1240
D
PS
PW
PS
SW
TS
S
CW
D
PS
PW
S
DISTURBED
TS
CW
D
G
D
R
D
344
G
G
R
G
R
D
G
G
PASTURE
CW
G
G
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R
G
G
S
R
TS
PASTURE
S.F. No. 22

LEGEND

CW Woodland to Open Forest of *Eucalyptus rudis Corymbia calophylla* over dense *Taxandria linearifolia* and *Astartea scoparia* on creekand water

D Open Forest of *Eucalyptus marginata* subsp. *marginata Corymbia calophylla* over low understorey with *Baeckea camphorosmae* and *Acacia extensa* on lower slopes.

PW Open Forest of *Allocasuarina fraseriana Eucalyptus marginata* subsp. *marginata Corymbia calophylla* over *Grevillea wilsonii, Adenanthos barbiger, Baeckea camphorosmae* and *Hypocalymma angustifolium* on mid and upper slopes.

PT Open Forest of *Allocasuarina fraseriana Eucalyptus marginata* subsp. *marginata Corymbia calophylla Banksia grandis* over *Adenanthos barbiger, Leucopogon verticillatus* and *Clematis aristata* var. *occidentalis* on mid slopes.

PS Open Forest of *Allocasuarina fraseriana Eucalyptus marginata* subsp. *marginata Corymbia calophylla Banksia grandis* over *Adenanthos barbiger* on mid and upper slopes.

S Open Forest *of Eucalyptus marginata* subsp. *marginata Banksia grandis Allocasuarina fraseriana* over *Adenanthos barbiger, Leucopogon capitellatus* and *Styphelia tenuiflora* on upper slopes and ridges.

SW Open Forest of *Eucalyptus marginata* subsp. *marginata Corymbia calophylla Banksia grandis* over *Adenanthos barbiger, Hypocalymma angustifolium* and *Styphelia tenuiflora* on upper gullies and lower slopes.

TS Open Forest of *Eucalyptus marginata* subsp. *marginata Corymbia calophylla* over *Leucopogon verticillatus* and *Clematis aristata* var. *occidentalis* on mid and upper slopes.

R Open Woodland of *Eucalyptus marginata* subsp. *marginata Corymbia calophylla* on fringes of granite outcrops or shallow soils.

G - Closed Heath *Darwinia citriodora*, *Trymalium ledifolium, Phyllanthus calycinus, Acacia pulchella*, *Banksia sphaerocarpa*, *Melaleuca parviceps* and *Verticordia huegelii* var. *huegelii* and *Hypocalymma angustifolium* on granite outcrops or shallow soils.

Pasture - Cleared parkland with remnant trees over pastures.

Disturbed Previously cleared areas.

N

0 100m

Scale
MGA94 Zone 50

WA BLUEMETAL QUARRY

SERPENTINE PROJECT

VEGETATION

DECEMBER 2005

MATTISKE CONSULTING PTY LTD
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Drawn: CAD Resources ~ www.cadresources.com.au Tel: (08) 9246 3242 ~ Fax: (08) 9246 3202		Figure: 1
CAD Ref: g1270_f01.dgn	Date: Dec 2005	Rev: B A1

Photograph 1: Open Forest of *Allocasuarina fraseriana - Eucalyptus marginata* subsp. *marginata - Corymbia calophylla - Banksia grandis* over *Dryandra sessilis* (PW site-vegetation type).

PT - Open Forest of *Allocasuarina fraseriana - Eucalyptus marginata* subsp. *marginata - Corymbia calophylla - Banksia grandis* with scattered understorey, including *Adenanthos barbiger, Leucopogon verticillatus* and *Clematis aristata* var. *occidentalis* (this site type is a variant of the site-vegetation types P and T as defined by Havel (1975a)). This type occurs within the Dwellingup-Hester complex as defined by Heddle *et al.* (1980a) and Mattiske and Havel (1998).

This site-vegetation type occurs on the mid to upper slopes of the undulating hills on the Darling Ranges. This combined type of types P and T is relatively restricted in distribution within the Northern Jarrah Forest and is poorly represented in the conservation estate (Heddle *et al.* 1980b; Department of Conservation and Environment 1980; Department of Conservation and Land Management 1987).

This site-vegetation type tends to be dominated by specific shrub species which dominate the sandy-gravelly slopes of the Darling Ranges (e.g. *Allocasuarina fraseriana, Adenanthos barbiger, Clematis aristata* var. *occidentalis, Leucopogon verticillatus* and *Banksia grandis* of site-vegetation types P and T) but which lack some of the key indicators of the P type (e.g. *Grevillea wilsonii*) and includes species which occur on the gravelly soils (*Hovea chorizemifolia* and *Leucopogon verticillatus*).

Photograph 2: Open Forest of *Allocasuarina fraseriana - Eucalyptus marginata* subsp. *marginata - Corymbia calophylla - Banksia grandis* over *Dryandra sessilis* (PS site-vegetation type).

PS - Open Forest of *Allocasuarina fraseriana - Eucalyptus marginata* subsp. *marginata - Corymbia calophylla - Banksia grandis* with scattered understorey, including *Adenanthos barbiger* (this site type is a variant of the site-vegetation types P and S as defined by Havel (1975a)). This type occurs within the Dwellingup and Dwellingup-Hester complexes as defined by Heddle *et al.* (1980a) and Mattiske and Havel (1998).

This site-vegetation type occurs on the mid to upper slopes of the undulating hills on the Darling Ranges. This combined type of types P and S is relatively widespread in distribution within the Northern Jarrah Forest and is well represented in the conservation estate (Heddle *et al.* 1980b; Department of Conservation and Environment 1980; Department of Conservation and Land Management 1987). This site-vegetation type tends to be dominated by specific shrub species which dominate the sandy-gravelly slopes of the Darling Ranges (e.g. *Allocasuarina fraseriana, Adenanthos barbiger, Leucopogon propinquus* and *Banksia grandis* of site-vegetation types P and S) but which lack some of the key indicators of the P type (e.g. *Grevillea wilsonii*) and includes species which occur on the gravelly soils (*Hovea chorizemifolia* and *Leucopogon capitellatus*).

S - Open Forest *of Eucalyptus marginata* subsp. *marginata - Banksia grandis - Allocasuarina fraseriana* with scattered understorey, *including Adenanthos barbiger, Leucopogon capitellatus* and *Styphelia tenuiflora* (site-vegetation type S as defined by Havel (1975a)). This type occurs within the Dwellingup and Dwellingup-Hester complexes as defined by Heddle *et al.* (1980a) and Mattiske and Havel (1998).

This site-vegetation type occurs on the upper slopes, and to a lesser degree mid slopes, of the undulating hills on the Darling Ranges. The type is widespread in distribution within the Northern Jarrah Forest and is well represented in the conservation estate (Heddle *et al.* 1980b; Department of Conservation and Environment 1980; Department of Conservation and Land Management 1987). This site-vegetation type tends to be dominated by specific shrub species, which dominate the gravelly slopes of the Darling Ranges (e.g. *Adenanthos barbiger, Leucopogon propinquus*, *Styphelia tenuiflora, Leucopogon capitellatus, Banksia grandis* and *Hovea chorizemifolia*).

SW - Open Forest of *Eucalyptus marginata* subsp. *marginata - Corymbia calophylla – Banksia grandis* with scattered understorey, including *Adenanthos barbiger, Hypocalymma angustifolium* and *Styphelia tenuiflora* (this type is a variant of site-vegetation type S as defined by Havel (1975a) due to the presence of moisture indicators such as *Hypocalymma angustifolium* and *Baeckea camphorosmae*). This type occurs within the Dwellingup, Dwellingup-Hester and Yarragil complexes as defined by Heddle *et al.* (1980a) and Mattiske and Havel (1998).

This type is not well represented in the conservation estate as it appears to be a local variant of the S site-vegetation type (Heddle *et al.* 1980b; Department of Conservation and Environment 1980; Department of Conservation and Land Management 1987). This site-vegetation type tends to be dominated by specific shrub species which dominate the gravelly slopes and moist soil conditions of the Darling Ranges (e.g. *Leucopogon capitellatus, Leucopogon propinquus, Hovea chorizemifolia, Adenanthos barbiger* and *Banksia grandis* of site-vegetation type S and *Hypocalymma angustifolium* and *Baeckea camphorosmae* of the site-vegetation type W which dominates moister soils in the nearby forest areas).

TS - Open Forest of *Eucalyptus marginata* subsp. *marginata - Corymbia calophylla* with scattered understorey, including *Leucopogon verticillatus* and *Clematis aristata* var. *occidentalis* (site-vegetation type T as defined by Havel (1975a)). This type occurs within the Helena, Murray, Dwellingup and Dwellingup-Hester complexes as defined by Heddle *et al.* (1980a) and Mattiske and Havel (1998).

This site-vegetation type occurs on the upper slopes, and to a lesser degree mid slopes, of the undulating hills on the Darling Ranges. This type is widespread in distribution within the Northern Jarrah Forest and is well represented in the conservation estate (Heddle *et al.* 1980b; Department of Conservation and Environment 1980; Department of Conservation and Land Management 1987). This site-vegetation type tends to be dominated by specific shrub species, which dominate the more fertile loams of the Darling Ranges (e.g. *Leucopogon verticillatus, Clematis aristata* var. *occidentalis* and *Hovea chorizemifolia*).

R - Open Woodland of *Eucalyptus marginata* subsp. *marginata - Corymbia calophylla* on fringes of granite outcrops or shallow soils (site-vegetation type R as defined by Havel 1975a) within the Cooke, Helena, Dwellingup and Dwellingup-Hester complexes as defined by Heddle *et al.* (1980a) and Mattiske and Havel (1998).

This site-vegetation type occurs on the shallow soils surrounding outcrops on the upland and valley systems on the Darling Ranges. This type is restricted in distribution within the Northern Jarrah Forest, but is well represented in the conservation estate, e.g. the Monadnocks near Mt Cooke and Mt Windsor (Heddle *et al.* 1980b; Department of Conservation and Environment 1980; Department of Conservation and Land Management 1987). This site-vegetation type tends to be dominated by specific shrub species, which reflect the soils and moisture associated with outcrops on the Darling Ranges (e.g. *Trymalium ledifolium, Phyllanthus calycinus* and *Hypocalymma angustifolium*).

G - Closed Heath of Myrtaceae – Proteaceae species on shallow soils of granite outcrops (site-vegetation type G as defined by Havel 1975b) within the Cooke, Helena and Darling Scarp vegetation complexes as defined by Heddle *et al.* (1980a) and Mattiske and Havel (1998).

This site-vegetation type occurs on the shallow soils associated with outcrops on the upland and valley systems on the Darling Ranges. This type is restricted in distribution within the Northern Jarrah Forest, but is well represented in the conservation estate, e.g. the Monadnocks near Mt Cooke and Mt Windsor (Heddle *et al.* 1980b; Department of Conservation and Environment 1980; Department of Conservation and Land Management 1987).

Photograph 3: Mosaic of Closed Heath of Myrtaceae – Proteaceae species (G site-vegetation type) and Open Forest of *Eucalyptus marginata* subsp*. marginata - Corymbia calophylla* on shallow soils (R site-vegetation type).

This site-vegetation type tends to be dominated by specific shrub species, which reflect the soils and moisture associated with outcrops on the Darling Ranges (e.g. *Darwinia citriodora*, *Trymalium ledifolium, Phyllanthus calycinus, Acacia pulchella*, *Banksia sphaerocarpa*, *Melaleuca parviceps*, *Pimelea imbricata* var. *piligera*, *Stylidium dichotomum* and *Verticordia huegelii* var. *huegelii* and *Hypocalymma angustifolium*).

Photograph 4: Disturbed, grazed and partly modified Open Forest of *Eucalyptus marginata* subsp. *marginata - Corymbia calophylla*.

5.4 Review of the Conservation Status of the Site-vegetation Types

A number of site-vegetation types were found to be locally and regionally significant. These site-vegetation types are:

- The site-vegetation types G and R are locally significant as they are associated with localised outcropping. Both site-vegetation types are well represented in the conservation estate (Heddle *et al.* 1980a).

- The valley types (CW) are also significant in providing habitat diversity for fauna species.

- The combinations PW and SW site-vegetation types have significant implications for the management of the *Phytophthora cinnamomi* infections in the area. It should be recognized that dieback infections are present on the upper slopes of Location M70/1240 and therefore there is still a need to introduce hygiene measures.

5.5 Review of Physiological Stress in the Survey Area

The condition of the vegetation on the survey area varied from "excellent" to "completely degraded", based on the scale as developed by Keighery (1994). A few local areas have been impacted by previous snigging tracks, dieback (mainly on M70/1240), clearing for agricultural activities (mainly Loc 246) and quarry activities (Loc 344).

6. DISCUSSION

Mattiske Consulting Pty Ltd was commissioned by WA Bluemetal Quarry to conduct an assessment of the flora and vegetation values on three locations near Serpentine. Mattiske Consulting Pty Ltd undertook the field studies during a prime flowering period in October 2005. Three experienced botanists from Mattiske Consulting Pty Ltd were involved in the field studies. Therefore the survey effort was undertaken at an appropriate time to maximise the return for effort.

Flora

- A total of 12 potential threatened and priority flora species twelve are listed at the State level and of these 3 species (*Lasiopetalum pterocarpum* (T), *Thelymitra stellata* (T) and *Pithocarpa corymbulosa* (P3) may occur at the site due to site preferences.
- A total of 11 potential threatened flora species are listed at the Federal level and of these 2 species (*Lasiopetalum pterocarpum* (E), *Thelymitra stellata* (E) may occur at the site due to site preferences.
- No Threatened Flora species gazetted under the Wildlife Conservation Act (1950-1980) were located on the WA Bluemetal Quarry survey area.
- No endangered or vulnerable species, pursuant to s179 of the Environmental Protection and Biodiversity Conservation Act (1999) were located during the survey.
- Two Priority taxa, as defined by the Department of Biodiversity, Conservation and Attractions (2017b), were identified in the survey. These were *Millotia tenuifolia* var. *laevis* and *Pithocarpa* ?*corymbulosa.* Neither of these species are restricted to the survey area; however both are relatively geographically restricted and were only known from 4 and 20 records respectively on the basis of State Herbarium records in 2005 (Department of Biodiversity, Conservation and Attractions 2017b). The latter lack of collections also reflects the lack of survey effort in the wider region.

Fauna

Seven threatened avifauna species were highlighted in the search of the Federal database. Of these the three threatened Black Cockatoos (Forest Red-tailed Black-Cockatoo (*Calyptorhynchus banksia naso*), Baudin's Cockatoo (*Calyptorhynchus baudinii*) and Carnaby's CocKatoo (*Calyptorhynchus latriostris*) are most likely to occur in the survey area.

Three threatened mammals were highlighted in the search of the Federal database. Of these the Chuditch (*Dasyurus geoffroii*) is the most likely to occur in the survey area.

Of the potential migratory species the majority occur near wetlands and marine areas and therefore are not likely to occur in the survey area. Of the highlighted species the most likely is the Grey Wagtail (*Motacilla cinerea*).

Vegetation Complexes

The four vegetation complexes that occur in the WA Blue Metal survey area included Dwellingup 2 (D2) Darling Scarp (DS), Murray 1 (My1) and Yarragil (Yg1). The majority of the vegetation complexes are well represented (23.0%, 7.9%, 36.0% and 29.9% respectively) within the formal and informal reserve systems (Conservation Commission 2003). The exception to the latter is the Darling Scarp (7.9%), as it is largely in private landholdings. Any land swap that might include less disturbed sections of the Darling Scarp complex (with its associated vegetation on the shallow and granitic soils) would benefit the conservation of this complex in the regional context.

Site-Vegetation Types

A total of ten site-vegetation types were defined and mapped for the WA Bluemetal Quarry survey area. In addition, the disturbed and pasture areas were defined and mapped. These units were a combination of Havel's (1975a and 1975b) site-vegetation types, and all of the site-vegetation types are well represented in the conservation estate. A total of ten site-vegetation types and two disturbed types (pasture and disturbed) were defined within the three survey areas, namely:

Table 4: Summary of Site - Vegetation Types recorded on the Survey Areas

Site-Vegetation Types	Location 246	Location 344	M70/1240
CW	X	X	X
D		X	X
G		X	
R		X	
S		X	X
SW			X
PW			X
PS			X
PT			X
TS		X	X
Pasture	X		
Disturbed		X	

The site-vegetation types varied between the respective areas and this in part reflects the differences between the underlying landforms and soils associated with the Darling Scarp and the Dwellingup mapping units (Table 4). Although there was some overlap between the site-vegetation types, the types differed in either key overstorey species or indicator species. All of the site-vegetation types occur in similar environments in adjacent areas of State Forest and National Parks.

Threatened Ecological Communities (State and Federal Listings)

None of these site-vegetation types are listed as threatened ecological communities listed by the Department of Biodiversity, Conservation and Attractions (2017c). None of these site-vegetation types are listed as threatened under the Environmental Protection and Biodiversity Conservation Act (1999). The potential threatened ecological communities occur on the nearby Swan Coastal Plain and as the survey area occurs in the Darling Ranges and on the Darling Scarp the potential Threatened Ecological Communities are not present in the survey area.

Vegetation Condition

The condition of the vegetation on the survey area varied from "excellent" to "completely degraded", based on the scale as developed by Keighery (1994). A few local areas have been impacted by previous snigging tracks, dieback, clearing for agricultural activities and quarry activities.

6.1 Review of Clearing Principles

The following is a review of the relevant clearing principles as it relates to native vegetation.

Principle (a): Native vegetation should not be cleared if it comprises a high level of biodiversity.

The property has sections that have been influenced by previous grazing and agricultural activities see Section 5.5. Although a range of species were recorded, the key values appear to occur on the less disturbed areas which have not been as intensively impacted by previous clearing activities associated with agriculture.

Consequently, clearing of native vegetation may be at variance with this Principle.

Principle (b): Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a significant habitat for fauna indigenous to Western Australia.

In view of the potential of the area to be utilized by a range of threatened fauna species (including the listed Black Cockatoos and the Chuditch) the proposed activities may be at variance with this Principle.

Principle (c): Native Vegetation should not be cleared if it includes, or is necessary, for the continued existence of rare flora.

Despite searching, no Threatened flora species gazetted under the *Wildlife Conservation Act* (1950-1980) were located on the Serpentine survey area. Two Priority flora species were located on the Serpentine survey area.

Despite searching, no Threatened flora species, pursuant to s179 of the *Environment Protection and Biodiversity Conservation Act* (1999) were located during the survey.

Consequently, clearing of native vegetation is unlikely to be at variance with this Principle.

Principle (d): Native vegetation should not be cleared if it compromises the whole or part of, or is necessary for the maintenance of a threatened ecological community.

The site-vegetation types were based on the Havel's site-vegetation types for the Northern Jarrah Forest Region (Havel 1975a, 1975b). None of these communities are listed at threatened ecological communities or priority ecological communities (Department of Biodiversity, Conservation and Attractions 2017c; Department of the Environment and Energy 2017b).

Therefore the proposed clearing is unlikely to be at variance with this Principle.

Principle (e): Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

As the Serpentine survey area abuts the State Forest and lands managed for water catchment and conservation the majority of the vegetation complexes on the survey area are well represented in the local and regional context. The Darling Scarp vegetation complex which is represented by 7.9% in informal and formal reserves occurs largely on private properties and therefore, clearing of native vegetation the Serpentine survey area is map be at variance with this Principle.

Principle (f): Native vegetation should not be cleared if it is growing in, or in association with, and environment associated with a watercourse or wetland.

A small section of the native vegetation on the Serpentine survey area occurs near a watercourse, although the area has been subjected to indirect impacts of agricultural activities. Although the survey

area occurs within the Peel Harvey catchment the proposed activities are some distance from the lower reaches of the water courses to the west. Therefore the proposed clearing is unlikely to be at variance with this Principle.

Principle (g): Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

Although the Serpentine survey area abuts State Forest and forested areas any clearing of native vegetation on the Serpentine survey area is unlikely to be at variance with this Principle.

Principle (h): Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.
As previous agricultural activities have been undertaken on sections of the Serpentine survey area and provided appropriate management strategies have been put in place, the proposed clearing is unlikely to be at variance with this Principle.

Principle (i): Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water

Clearing of native vegetation on the Serpentine survey area is not envisaged to cause deterioration in the quality of surface or underground water and is therefore not at variance with this Principle.

Principle (j): Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.

Clearing of native vegetation on the Serpentine survey area is not envisaged to cause or exacerbate the incidence of flooding and is therefore not at variance with this Principle.

7. ACKNOWLEDGMENTS

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8. LIST OF PARTICIPANTS

The following personnel of Mattiske Consulting Pty Ltd were involved with this project:

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THREATENED AND PRIORITY DEFINITIONS

Under section 179 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), threatened flora and fauna are categorised as extinct, extinct in the wild, critically endangered, endangered, vulnerable and conservation dependent (Table A1.1).

Table A1.1 Federal definition of threatened species

Note: Adapted from section 179 of the EPBC Act.

CODE	CATEGORY	DEFINITION
Ex	Extinct	Species which at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
ExW	Extinct in the Wild	Species which is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
CE	Critically Endangered	Species which at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
E	Endangered	Species which is not critically endangered and it is facing a very high risk of extinction in the wild in the immediate or near future, as determined in accordance with the prescribed criteria.
V	Vulnerable	Species which is not critically endangered or endangered and is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
CD	Conservation Dependent	Species which at a particular time if, at that time, the species is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.

The *Wildlife Conservation Act 1950* (WC Act) provides for (amongst other things) the protection of flora and fauna likely to become extinct or rare or otherwise in need of special protection in Western Australia under section 23F. Threatened (or rare) flora and fauna are listed in the *Wildlife Conservation Notices* (under section 23F(2) of the WC Act; Department of Biodiversity, Conservation and Attractions 2017) and are categorised under Schedules 1-4 as critically endangered, endangered, vulnerable or extinct, respectively. Threatened flora and fauna are defined as "likely to become extinct or is rare, or otherwise in need of special protection", pursuant to section 23F(2) of the WC Act. Threatened species are categorised as critically endangered, endangered, vulnerable and presumed extinct (Table A1.2).

Table A1.2 State definition of threatened species

Note: Adapted from Department of Biodiversity, Conservation and Attractions (2017).

CODE	CATEGORY	DEFINITION
CR	Critically endangered	Species considered to be facing an extremely high risk of becoming extinct in the wild (listed under Schedule 1 of the *Wildlife Conservation (Rare Flora) Notice 2016*).
EN	Endangered	Species considered to be facing a very high risk of becoming extinct in the wild (listed under Schedule 2 of the *Wildlife Conservation (Rare Flora) Notice 2016*).
VU	Vulnerable	Species considered to be facing a high risk of becoming extinct in the wild (listed under Schedule 3 of the *Wildlife Conservation (Rare Flora) Notice 2016*).
EX	Presumed extinct species	Species that have been adequately searched for and there is no reasonable doubt that the last individual has died (listed under Schedule 4 of the *Wildlife Conservation (Rare Flora) Notice 2016*).

Priority species are defined as "possibly threatened species that do not meet the survey criteria, or are otherwise data deficient; or are adequately known, are rare but not threatened, meet criteria for near threatened or have recently been removed from the threatened species list for other than taxonomic reasons" (Department of Biodiversity, Conservation and Attractions 2017). Priority species are not afforded any protection under state or federal legislation, however are considered significant under the Environmental Protection Authority's *Environmental Factor Guideline: Flora and Vegetation*. The Department of Biodiversity, Conservation and Attractions categorises priority species into categories: Priority 1; Priority 2, Priority 3 and Priority 4 (Table A1.3).

Table A1.3: State definition of priority species

Note: Adapted from Department of Biodiversity, Conservation and Attractions (2017).

CODE	CATEGORY	DEFINITION
P1	Priority 1: Poorly-known species	Known from one or a few locations (< 5) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation; or are otherwise under threat of habitat destruction or degradation. In urgent need of further survey.
P2	Priority 2: Poorly-known species	Known from one or a few locations (< 5). Some occurrences are on lands managed primarily for nature conservation. In urgent need of further survey.
P3	Priority 3: Poorly-known species	Known from several locations and the species does not appear to be under imminent threat; or from few but widespread locations with either a large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. In need of further survey.
P4	Priority 4: Rare, Near Threatened, and other species in need of monitoring	a) Rare - Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands. b) Near Threatened - Species that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. c) Other - Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

THREATENED AND PRIORITY ECOLOGICAL COMMUNITY DEFINITIONS

Under section 181 of the EPBC Act, threatened ecological communities are categorised as critically endangered, endangered and vulnerable (Table A2.1).

Table A2.1 Federal definition of threatened ecological communities

Note: Adapted from section 181 and section 182 of the EPBC Act.

CATEGORY	DEFINITION
Critically Endangered	If, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future.
Endangered	If, at that time, it is not critically endangered and is facing a very high risk of extinction in the wild in the near future.
Vulnerable	If, at that time, it is not critically endangered or endangered, and is facing a high risk of extinction in the wild in the medium-term future.

Currently there is no Western Australian legislation covering the conservation of state listed threatened ecological communities (TECs), however, a non-statutory process is in place, whereby the from Department of Biodiversity, Conservation and Attractions have been identifying and informally listing TECs since 1994. Some of these TECs are endorsed by the Federal Minister as threatened, and some of these are also listed under the EPBC Act and therefore afforded legislative protection at the Commonwealth level.

Table A2.2 State definition of threatened ecological communities

Note: Adapted from Department of Biodiversity, Conservation and Attractions (2017c)

CODE	CATEGORY	DEFINITION
PD	Presumed Totally Destroyed	An ecological community will be listed as PD if there are no recent records of the community being extant and either of the following applies: 1. Records within the last 50 years have not been confirmed despite thorough searches or known likely habitats; or 2. All occurrences recorded within the last 50 years have since been destroyed.
CR	Critically Endangered	An ecological community will be listed as CR when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future, meeting any one or more of the following criteria: 1. The estimated geographic range and distribution has been reduced by at least 90% and is either continuing to decline with total destruction imminent, or is unlikely to be substantially rehabilitated in the immediate future due to modification; 2. The current distribution is limited i.e. highly restricted, having very few small or isolated occurrences, or covering a small area; or 3. The ecological community is highly modified with potential of being rehabilitated in the immediate future.
EN	Endangered	An ecological community will be listed as EN when it has been adequately surveyed and is not CR, but is facing a very high risk of total destruction in the near future. The ecological community must meet any one or more of the following criteria: 1. The estimated geographic range and distribution has been reduced by at least 70% and is either continuing to decline with total destruction imminent in the short term future, or is unlikely to be substantially rehabilitated in the short term future due to modification; 2. The current distribution is limited i.e. highly restricted, having very few small or isolated occurrences, or covering a small area; or 3. The ecological community is highly modified with potential of being rehabilitated in the short term future.
VU	Vulnerable	An ecological community will be listed as VU when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing high risk of total destruction in the medium to long term future. The ecological community must meet any one or more of the following criteria: 1. The ecological community exists largely as modified occurrences that are likely to be able to be substantially restored or rehabilitated; 2. The ecological community may already be modified and would be vulnerable to threatening process, and restricted in range or distribution; or 3. The ecological community may be widespread but has potential to move to a higher threat category due to existing or impending threatening processes.

Priority ecological communities (PECs) are defined as possible threatened ecological communities that do not meet the stringent survey criteria for the assessment of threatened ecological communities, and are listed by the Environmental Protection Authority (2016a) *Environmental Factor Guideline: Flora and Vegetation*. The Department of Biodiversity, Conservation and Attractions categorises priority ecological communities into five categories: Priority 1; Priority 2, Priority 3, Priority 4 and Priority 5 (Table A2.3).

Table A2.3 State definition of priority ecological communities

Note: Adapted from Department of Biodiversity, Conservation and Attractions (2017c)

CODE	CATEGORY	DEFINITION
P1	Priority 1 (Poorly known ecological communities)	Ecological communities that are known from very few, restricted occurrences (generally ≤ 5 occurrences or a total area of ≤ 100 ha). Most of these occurrences are not actively managed for conservation (e.g. located within agricultural or pastoral lands, urban areas, or active mineral leases) and for which immediate threats exist.
P2	Priority 2 (Poorly known ecological communities)	Communities that are known from few small occurrences (generally ≤ 10 occurrences or a total area of ≤ 200 ha). At least some occurrences are not believed to be under immediate threat of destruction or degradation.
P3	Priority 3 (Poorly known ecological communities)	1. Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation; 2. Communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat; or 3. Communities made up of large, and/or widespread occurrences, that may or not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing and inappropriate fire regimes.
P4	Priority 4 (Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring)	1. Rare – Communities known from few occurrences that are considered to have been adequately surveyed, sufficient knowledge is available, and are considered not to be currently threatened. 2. Near Threatened – Communities considered to have been adequately surveyed and do not qualify for Conservation Dependent, but are close to qualifying for Vulnerable. 3. Communities that have been removed from the list of threatened communities during the past five years.
P5	Priority 5 (Conservation Dependent ecological communities)	Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

CATEGORIES AND CONTROL MEASURES OF DECLARED PEST (PLANT) ORGANISMS IN WESTERN AUSTRALIA

Section 22 of Western Australia's *Biosecurity and Agriculture Management Act 2007* (BAM Act) makes provision for a plant taxon to be listed as a declared pest organism in respect to parts of, or the entire State. According to the BAM Act, a declared pest is defined as a prohibited organism (section 12), or an organism for which a declaration under section 22 (2) of the Act is in force.

Under the *Biosecurity and Agriculture Management Regulations 2013* (WA), declared pest plants are placed in one of three control categories, C1 (exclusion), C2 (eradication) or C3 (management), which determines the measures of control which apply to the declared pest (Table A4.1). The current listing of declared pest organisms and their control category is through the Western Australian Organism List (Department of Agriculture and Food Western Australia 2017).

Table A3.1 Categories and control measures of declared pest (plant) organisms

Note: Adapted from *Biosecurity and Agriculture Management Regulations 2013*.

CONTROL CATEGORY	CONTROL MEASURES
C1 (Exclusion) '(a) Category 1 (C1) — Exclusion: if in the opinion of the Minister introduction of the declared pest into an area or part of an area for which it is declared should be prevented.' Pests will be assigned to this category if they are not established in Western Australia and control measures are to be taken, including border checks, in order to prevent them entering and establishing in the State.	In relation to a category 1 declared pest, the owner or occupier of land in an area for which an organism is a declared pest or a person who is conducting an activity on the land must take such of the control measures specified in subregulation (1) as are reasonable and necessary to destroy, prevent or eradicate the declared pest.
C2 (Eradication) '(b) Category 2 (C2) — Eradication: if in the opinion of the Minister eradication of the declared pest from an area or part of an area for which it is declared is feasible.' Pests will be assigned to this category if they are present in Western Australia in low enough numbers or in sufficiently limited areas that their eradication is still a possibility.	In relation to a category 2 declared pest, the owner or occupier of land in an area for which an organism is a declared pest or a person who is conducting an activity on the land must take such of the control measures specified in subregulation (1) as are reasonable and necessary to destroy, prevent or eradicate the declared pest.
C3 (Management) '(c) Category 3 (C3) — Management: if in the opinion of the Minister eradication of the declared pest from an area or part of an area for which it is declared is not feasible but that it is necessary to: (i) alleviate the harmful impact of the declared pest in the area; or (ii) reduce the number or distribution of the declared pest in the area; or (iii) prevent or contain the spread of the declared pest in the area.' Pests will be assigned to this category if they are established in Western Australia but it is feasible, or desirable, to manage them in order to limit their damage. Control measures can prevent a C3 pest from increasing in population size or density or moving from an area in which it is established into an area which currently is free of that pest.	In relation to a category 3 declared pest, the owner or occupier of land in an area for which an organism is a declared pest or a person who is conducting an activity on the land must take such of the control measures specified in subregulation (1) as are reasonable and necessary to: (a) alleviate the harmful impact of the declared pest in the area for which it is declared; or (b) reduce the number or distribution of the declared pest in the area for which it is declared; or (c) prevent or contain the spread of the declared pest in the area for which it is declared.

OTHER DEFINITIONS

Environmentally sensitive areas

Environmentally sensitive areas are declared by the State Minister under section 51B of the *Environmental Protection Act 1986* (EP Act) and are listed in the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005*, gazetted 8 April 2005. Specific environmentally sensitive areas relevant to this report include: a defined wetland and the area within 50 metres of the wetland; the area covered by vegetation within 50 metres of rare flora; the area covered by a threatened ecological community; a Bush Forever site – further areas and information are described in the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005*.

Conservation significant flora

Under the *Environmental Factor Guideline: Flora and Vegetation* (Environmental Protection Authority 2016a), flora may be considered significant for a range of reasons, including, but not limited to the following:

- being identified as threatened or priority species;
- locally endemic or associated with a restricted habitat type (e.g. surface water or groundwater dependent ecosystems);
- new species or anomalous features that indicate a potential new species;
- representative of the range of a species (particularly, at the extremes of range, recently discovered range extensions, or isolated outliers of the main range);
- unusual species, including restricted subspecies, varieties or naturally occurring hybrids; or
- relictual status, being representative of taxonomic groups that no longer occur widely in the broader landscape.

Conservation significant vegetation

Under the *Environmental Factor Guideline: Flora and Vegetation* (Environmental Protection Authority 2016a), vegetation may be considered significant for a range of reasons, including, but not limited to the following:

- being identified as threatened or priority ecological communities;
- restricted distribution;
- degree of historical impact from threatening processes;
- a role as a refuge; or
- providing an important function required to maintain ecological integrity of a significant ecosystem.

Australian Government
Department of the Environment and Energy

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

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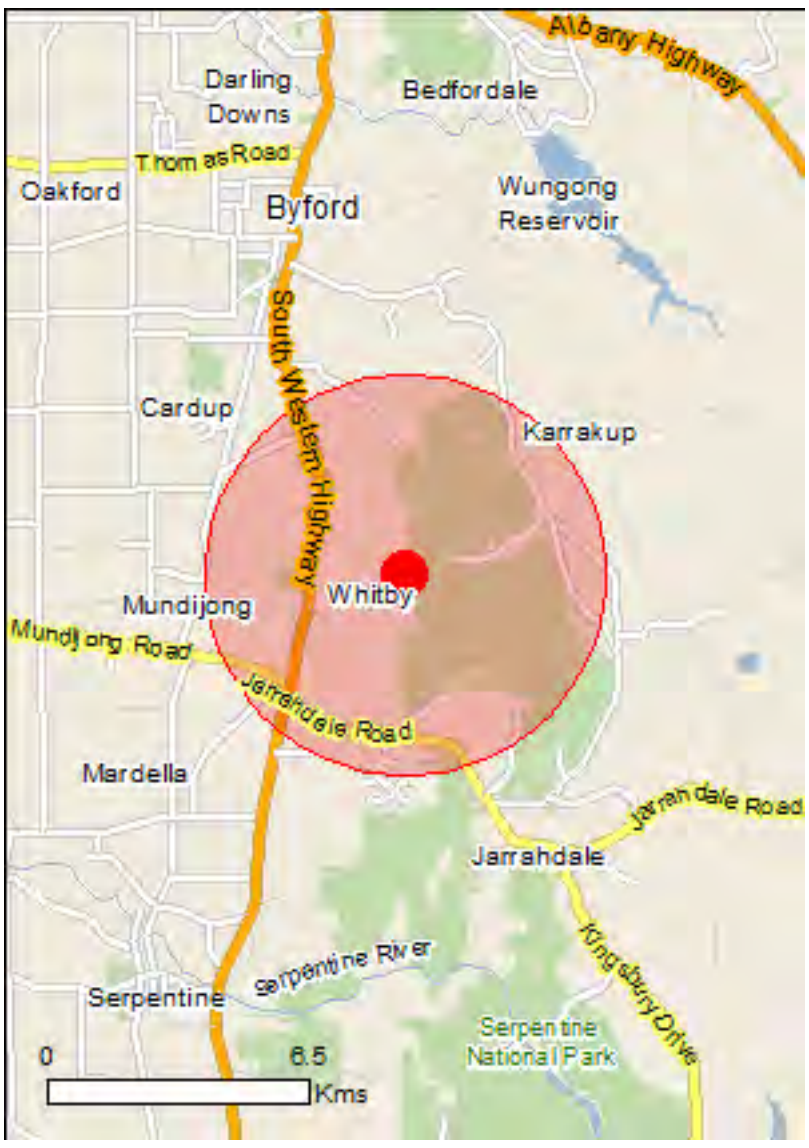
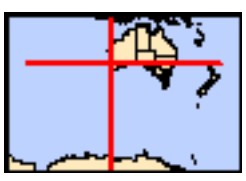


This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates

Buffer: 5.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	21
Listed Migratory Species:	8

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	13
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	4
Regional Forest Agreements:	1
Invasive Species:	38
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Peel-yalgorup system	30 - 40km upstream

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community likely to occur within area
Corymbia calophylla - Kingia australis woodlands on heavy soils of the Swan Coastal Plain	Endangered	Community known to occur within area
Corymbia calophylla - Xanthorrhoea preissii woodlands and shrublands of the Swan Coastal Plain	Endangered	Community known to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calyptorhynchus banksii naso		
Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat likely to occur within area
Calyptorhynchus baudinii		
Baudin's Cockatoo, Long-billed Black-Cockatoo [769]	Vulnerable	Roosting known to occur within area
Calyptorhynchus latirostris		
Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Species or species habitat known to occur within area
Leipoa ocellata		
Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rostratula australis		
Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Mammals		
Dasyurus geoffroii		
Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area
Pseudocheirus occidentalis		
Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Vulnerable	Species or species habitat may occur within

Name	Status	Type of Presence
		area
Setonix brachyurus Quokka [229]	Vulnerable	Species or species habitat known to occur within area
Plants		
Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat likely to occur within area
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat likely to occur within area
Diuris purdiei Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat likely to occur within area
Drakaea elastica Glossy-leafed Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat known to occur within area
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat may occur within area
Eleocharis keigheryi Keighery's Eleocharis [64893]	Vulnerable	Species or species habitat may occur within area
Eucalyptus x balanites Cadda Road Mallee, Cadda Mallee [87816]	Endangered	Species or species habitat likely to occur within area
Lasiopetalum pterocarpum Wing-fruited Lasiopetalum [64922]	Endangered	Species or species habitat likely to occur within area
Synaphea sp. Fairbridge Farm (D. Papenfus 696) Selena's Synaphea [82881]	Critically Endangered	Species or species habitat likely to occur within area
Tetraria australiensis Southern Tetraria [10137]	Vulnerable	Species or species habitat likely to occur within area
Thelymitra stellata Star Sun-orchid [7060]	Endangered	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus		
Osprey [952]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato)		
Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Gooralong	WA
Serpentine	WA
Unnamed WA46818	WA
Watkins Road	WA

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
South West WA RFA	Western Australia

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis		
Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos		
Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis		
European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia		
Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus		
House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus		
Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Streptopelia chinensis		
Spotted Turtle-Dove [780]		Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Funambulus pennantii Northern Palm Squirrel, Five-striped Palm Squirrel [129]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Brachiaria mutica Para Grass [5879]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species

Name	Status	Type of Presence
		habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Olea europaea Olive, Common Olive [9160]		Species or species habitat may occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Solanum elaeagnifolium Silver Nightshade, Silver-leaved Nightshade, White Horse Nettle, Silver-leaf Nightshade, Tomato Weed, White Nightshade, Bull-nettle, Prairie-berry, Satansbos, Silver-leaf Bitter-apple, Silverleaf-nettle, Trompillo [12323]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-32.28509 116.0337

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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NatureMap
Mapping Western Australia's biodiversity

NatureMap Species Report

Created By Guest user on 02/11/2017

Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 116° 02' 01" E,32° 17' 08" S
Buffer 5km

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
1.	15429	*Acacia alata var. alata*			
2.	15466	*Acacia applanata*			
3.	3233	*Acacia barbinervis*			
4.	15469	*Acacia barbinervis subsp. barbinervis*			
5.	11926	*Acacia drewiana subsp. drewiana*			
6.	3409	*Acacia lasiocarpa (Panjang)*			
7.	3410	*Acacia lateriticola*			
8.	3454	*Acacia nervosa (Rib Wattle)*			
9.	17860	*Acacia podalyriifolia*	Y		
10.	3502	*Acacia pulchella (Prickly Moses)*			
11.	15481	*Acacia pulchella var. glaberrima*			
12.	15483	*Acacia pulchella var. pulchella*			
13.	3541	*Acacia sessilis*			
14.	3557	*Acacia stenoptera (Narrow Winged Wattle)*			
15.	3591	*Acacia urophylla*			
16.	24260	*Acanthiza apicalis (Broad-tailed Thornbill, Inland Thornbill)*			
17.	24261	*Acanthiza chrysorrhoa (Yellow-rumped Thornbill)*			
18.	24262	*Acanthiza inornata (Western Thornbill)*			
19.	24265	*Acanthiza uropygialis (Chestnut-rumped Thornbill)*			
20.	24560	*Acanthorhynchus superciliosus (Western Spinebill)*			
21.	25535	*Accipiter cirrocephalus (Collared Sparrowhawk)*			
22.	24281	*Accipiter cirrocephalus subsp. cirrocephalus (Collared Sparrowhawk)*			
23.	25536	*Accipiter fasciatus (Brown Goshawk)*			
24.	6205	*Actinotus leucocephalus (Flannel Flower)*			
25.	23474	*Agrostocrinum hirsutum*			
26.	1261	*Agrostocrinum scabrum (Blue Grass Lily)*			
27.	184	*Aira caryophyllea (Silvery Hairgrass)*	Y		
28.	185	*Aira cupaniana (Silvery Hairgrass)*	Y		
29.	1728	*Allocasuarina fraseriana (Sheoak, Kondil)*			
30.	1732	*Allocasuarina humilis (Dwarf Sheoak)*			
31.	18195	*Amanita carneiphylla*		P3	
32.	43543	*Amanita fibrillopes*		P3	
33.	38755	*Amanita ochroterrea*			
34.	43542	*Amanita wadjukiorum*		P3	
35.	200	*Amphipogon turbinatus*			
36.		*Aname tepperi*			
37.	24312	*Anas gracilis (Grey Teal)*			
38.	24316	*Anas superciliosa (Pacific Black Duck)*			
39.	1411	*Anigozanthos manglesii (Mangles Kangaroo Paw, Kurulbrang)*			
40.	11261	*Anigozanthos manglesii subsp. manglesii*			
41.	25449	*Antechinus flavipes (Yellow-footed Antechinus)*			
42.	24088	*Antechinus flavipes subsp. leucogaster (Yellow-footed Antechinus, Mardo)*			
43.	24561	*Anthochaera carunculata (Red Wattlebird)*			
44.	24562	*Anthochaera lunulata (Western Little Wattlebird)*			
45.	24599	*Anthus australis subsp. australis (Australian Pipit)*			
46.	1117	*Aphelia cyperoides*			
47.	24990	*Aprasia pulchella (Granite Worm-lizard)*			
48.	24991	*Aprasia repens (Sand-plain Worm-lizard)*			
49.	24285	*Aquila audax (Wedge-tailed Eagle)*			
50.		*Araneus senicaudatus*			
51.	33903	*Arbanitis inornatus (trapdoor spider (Darling Scarp))*		P1	
52.	7838	*Arctotheca calendula (Cape Weed, African Marigold)*	Y		
53.	24341	*Ardea pacifica (White-necked Heron)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
54.	25566	*Artamus cinereus (Black-faced Woodswallow)*			
55.	24353	*Artamus cyanopterus (Dusky Woodswallow)*			
56.		*Asadipus kunderang*			
57.	6334	*Astroloma pallidum (Kick Bush)*			
58.	17233	*Austrostipa campylachne*			
59.	17257	*Austrostipa variabilis*			
60.	231	*Avellinia michelii*	Y		
61.	36441	*Babingtonia camphorosmae (Camphor Myrtle)*			
62.		*Backobourkia heroine*			
63.		*Ballarra longipalpus*			
64.	32580	*Banksia dallanneyi var. dallanneyi*			
65.	32214	*Banksia kippistiana*			
66.	32202	*Banksia nivea (Honeypot Dryandra, Pudjarn)*			
67.	32053	*Banksia undata (Urchin Dryandra)*			
68.		*Barnardius zonarius*			
69.	739	*Baumea acuta (Pale Twig-rush)*			
70.	24162	*Bettongia penicillata subsp. ogilbyi (Woylie, Brush-tailed Bettong)*		T	
71.	25788	*Billardiera fraseri (Elegant Pronaya)*			
72.	3165	*Billardiera variifolia*			
73.	1273	*Borya sphaerocephala (Pincushions)*			
74.	3710	*Bossiaea eriocarpa (Common Brown Pea)*			
75.	3714	*Bossiaea ornata (Broad Leaved Brown Pea)*			
76.	18497	*Bossiaea sp. Waroona (B.J. Keighery & N. Gibson 229)*			
77.	10915	*Brachychiton populneus (Kurrajong)*	Y		
78.	244	*Briza maxima (Blowfly Grass)*	Y		
79.	245	*Briza minor (Shivery Grass)*	Y		
80.	12770	*Burchardia congesta*			
81.	1385	*Burchardia multiflora (Dwarf Burchardia)*			
82.	25715	*Cacatua roseicapilla (Galah)*			
83.	25716	*Cacatua sanguinea (Little Corella)*			
84.	25598	*Cacomantis flabelliformis (Fan-tailed Cuckoo)*			
85.	42307	*Cacomantis pallidus (Pallid Cuckoo)*			
86.	1276	*Caesia micrantha (Pale Grass Lily)*			
87.	1586	*Caladenia discoidea (Dancing Orchid)*			
88.	15348	*Caladenia flava subsp. flava*			
89.	19309	*Calectasia narragara*			
90.	4717	*Callitriche stagnalis (Common Starwort)*	Y		
91.	25717	*Calyptorhynchus banksii (Red-tailed Black-Cockatoo)*			
92.	24731	*Calyptorhynchus banksii subsp. naso (Forest Red-tailed Black-Cockatoo)*		T	
93.	24733	*Calyptorhynchus baudinii (Baudin's Cockatoo (long-billed black-cockatoo), Baudin's Cockatoo)*		T	
94.	24734	*Calyptorhynchus latirostris (Carnaby's Cockatoo (short-billed black-cockatoo), Carnaby's Cockatoo)*		T	
95.	48400	*Calyptorhynchus sp. (white-tailed black cockatoo)*		T	
96.	5458	*Calytrix flavescens (Summer Starflower)*			
97.	2952	*Cassytha glabella (Tangled Dodder Laurel)*			
98.	6539	*Centaurium erythraea (Common Centaury)*	Y		
99.	1121	*Centrolepis aristata (Pointed Centrolepis)*			
100.	1125	*Centrolepis drummondiana*			
101.	1280	*Chamaescilla corymbosa (Blue Squill)*			
102.	5498	*Chamelaucium uncinatum (Geraldton Wax)*			
103.	31	*Cheilanthes austrotenuifolia*			
104.	12818	*Cheilanthes sieberi subsp. sieberi*			
105.	24321	*Chenonetta jubata (Australian Wood Duck, Wood Duck)*			
106.	24431	*Chrysococcyx basalis (Horsfield's Bronze Cuckoo)*			
107.	6543	*Cicendia filiformis (Slender Cicendia)*	Y		
108.	7935	*Cichorium intybus (Chicory)*	Y		
109.	48177	*Cladia muelleri*			
110.	25675	*Colluricincla harmonica (Grey Shrike-thrush)*			
111.	24613	*Colluricincla harmonica subsp. rufiventris (Grey Shrike-thrush)*			
112.	24399	*Columba livia (Domestic Pigeon)*	Y		
113.	1882	*Conospermum stoechadis (Common Smokebush)*			
114.	15611	*Conospermum stoechadis subsp. stoechadis (Common Smokebush)*			
115.	6348	*Conostephium pendulum (Pearl Flower)*			
116.	6349	*Conostephium preissii*			
117.	1418	*Conostylis aculeata (Prickly Conostylis)*			
118.	11826	*Conostylis aculeata subsp. aculeata*			
119.	12109	*Conostylis aculeata subsp. preissii*			
120.	1436	*Conostylis juncea*			
121.	1455	*Conostylis setosa (White Cottonhead)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
122.	25568	*Coracina novaehollandiae (Black-faced Cuckoo-shrike)*			
123.	24363	*Coracina novaehollandiae subsp. subpallida (Black-faced Cuckoo-shrike)*			
124.	25592	*Corvus coronoides (Australian Raven)*			
125.	24417	*Corvus coronoides subsp. perplexus (Australian Raven)*			
126.	17104	*Corymbia calophylla (Marri)*			
127.	24671	*Coturnix pectoralis (Stubble Quail)*			
128.	24420	*Cracticus nigrogularis (Pied Butcherbird)*			
129.	25595	*Cracticus tibicen (Australian Magpie)*			
130.	24422	*Cracticus tibicen subsp. dorsalis (White-backed Magpie)*			
131.	25596	*Cracticus torquatus (Grey Butcherbird)*			
132.	13354	*Craspedia variabilis*			
133.	20271	*Crassula extrorsa*			
134.	15706	*Crassula natans var. minus*	Y		
135.	25398	*Crinia georgiana (Quacking Frog)*			
136.	25399	*Crinia glauerti (Clicking Frog)*			
137.	25400	*Crinia insignifera (Squelching Froglet)*			
138.	35838	*Cristonia biloba subsp. biloba*			
139.		*Crustulina bicruciata*			
140.	30893	*Cryptoblepharus buchananii*			
141.	25039	*Ctenotus fallens*			
142.	25047	*Ctenotus impar*			
143.	25049	*Ctenotus labillardieri*			
144.		*Cyclosa trilobata*			
145.	815	*Cyperus tenellus (Tiny Flatsedge)*	Y		
146.	30901	*Dacelo novaeguineae (Laughing Kookaburra)*	Y		
147.	7454	*Dampiera linearis (Common Dampiera)*			
148.	25673	*Daphoenositta chrysoptera (Varied Sittella)*			
149.	1218	*Dasypogon bromeliifolius (Pineapple Bush)*			
150.	24092	*Dasyurus geoffroii (Chuditch, Western Quoll)*		T	
151.	6218	*Daucus glochidiatus (Australian Carrot)*			
152.	19747	*Daviesia decurrens subsp. decurrens*			
153.	3815	*Daviesia horrida (Prickly Bitter-pea)*			
154.	16585	*Daviesia nudiflora subsp. nudiflora*			
155.	3832	*Daviesia physodes*			
156.	17691	*Desmocladus fasciculatus*			
157.	46362	*Desmocladus lateriflorus*			
158.	11636	*Dianella revoluta var. divaricata*			
159.	25607	*Dicaeum hirundinaceum (Mistletoebird)*			
160.	306	*Dichelachne crinita (Longhair Plumegrass)*			
161.	1287	*Dichopogon capillipes*			
162.	12943	*Diuris brumalis*			
163.	11049	*Diuris corymbosa*			
164.	1637	*Diuris purdiei (Purdie's Donkey Orchid)*		T	
165.	1639	*Drakaea elastica (Glossy-leaved Hammer Orchid)*		T	
166.	24470	*Dromaius novaehollandiae (Emu)*			
167.	13217	*Drosera erythrorhiza subsp. erythrorhiza*			
168.	3097	*Drosera gigantea (Giant Sundew)*			
169.	15453	*Drosera gigantea subsp. gigantea*			
170.	14298	*Drosera macrantha subsp. macrantha*			
171.	3118	*Drosera pallida (Pale Rainbow)*			
172.	29178	*Drosera porrecta*			
173.	3131	*Drosera stolonifera (Leafy Sundew)*			
174.	25096	*Egernia kingii (King's Skink)*			
175.		*Egretta novaehollandiae*			
176.	347	*Ehrharta calycina (Perennial Veldt Grass)*	Y		
177.		*Elanus axillaris*			
178.		*Eolophus roseicapillus*			
179.	24651	*Eopsaltria australis subsp. griseogularis (Western Yellow Robin)*			
180.	24652	*Eopsaltria georgiana (White-breasted Robin)*			
181.	24567	*Epthianura albifrons (White-fronted Chat)*			
182.	14104	*Eremaea pauciflora var. pauciflora*			
183.	15446	*Eryngium pinnatifidum subsp. pinnatifidum*			
184.	5690	*Eucalyptus lane-poolei (Salmon White Gum)*			
185.	5708	*Eucalyptus marginata (Jarrah, Djara)*			
186.	13547	*Eucalyptus marginata subsp. marginata (Jarrah)*			
187.	13548	*Eucalyptus marginata subsp. thalassica (Blue-leaved Jarrah)*			
188.	13511	*Eucalyptus rudis subsp. rudis*			
189.	5797	*Eucalyptus wandoo (Wandoo, Wondu)*			
190.	12906	*Eucalyptus wandoo subsp. wandoo*			
191.		*Eucyrtops latior*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
192.	25622	*Falco cenchroides (Australian Kestrel, Nankeen Kestrel)*			
193.	25624	*Falco peregrinus (Peregrine Falcon)*		S	
194.	24041	*Felis catus (Cat)*	Y		
195.	18392	*Freesia alba x leichtlinii*	Y		
196.	25727	*Fulica atra (Eurasian Coot)*			
197.	24765	*Gallirallus philippensis subsp. mellori (Buff-banded Rail)*			
198.	25530	*Gerygone fusca (Western Gerygone)*			
199.	24271	*Gerygone fusca subsp. fusca (Western Gerygone)*			
200.	6587	*Gomphocarpus fruticosus (Narrowleaf Cottonbush)*	Y		
201.	3950	*Gompholobium knightianum*			
202.	3951	*Gompholobium marginatum*			
203.	3954	*Gompholobium polymorphum*			
204.	3955	*Gompholobium preissii*			
205.	3957	*Gompholobium tomentosum (Hairy Yellow Pea)*			
206.	12551	*Goodenia micrantha*			
207.	24443	*Grallina cyanoleuca (Magpie-lark)*			
208.	1964	*Grevillea bipinnatifida (Fuchsia Grevillea)*			
209.	19628	*Grevillea bipinnatifida subsp. bipinnatifida*			
210.	2066	*Grevillea pilulifera (Woolly-flowered Grevillea)*			
211.	2080	*Grevillea quercifolia (Oak-leaf Grevillea)*			
212.	2122	*Grevillea wilsonii (Native Fuchsia)*			
213.	1465	*Haemodorum discolor*			
214.	1468	*Haemodorum laxum*			
215.	1472	*Haemodorum simplex*			
216.	2128	*Hakea amplexicaulis (Prickly Hakea)*			
217.	2175	*Hakea lissocarpha (Honey Bush)*			
218.	2179	*Hakea marginata*			
219.	2197	*Hakea prostrata (Harsh Hakea)*			
220.	2203	*Hakea ruscifolia (Candle Hakea)*			
221.	2206	*Hakea stenocarpa (Narrow-fruited Hakea)*			
222.	2216	*Hakea varia (Variable-leaved Hakea)*			
223.	25410	*Heleioporus eyrei (Moaning Frog)*			
224.	6839	*Hemiandra pungens (Snakebush)*			
225.	6856	*Hemigenia incana (Silky Hemigenia)*			
226.	5109	*Hibbertia amplexicaulis*			
227.	5114	*Hibbertia commutata*			
228.	19778	*Hibbertia glomerata subsp. darlingensis*			
229.	5134	*Hibbertia huegelii*			
230.	5135	*Hibbertia hypericoides (Yellow Buttercups)*			
231.	45534	*Hibbertia hypericoides subsp. hypericoides*			
232.	48381	*Hibbertia striata*			
233.	5176	*Hibbertia vaginata*			
234.	47965	*Hieraaetus morphnoides (Little Eagle)*			
235.	24491	*Hirundo neoxena (Welcome Swallow)*			
236.	6222	*Homalosciadium homalocarpum*			
237.	3964	*Hovea chorizemifolia (Holly-leaved Hovea)*			
238.	3968	*Hovea trisperma (Common Hovea)*			
239.	12741	*Hyalosperma cotula*			
240.	5216	*Hybanthus calycinus (Wild Violet)*			
241.	5221	*Hybanthus floribundus*			
242.	6223	*Hydrocotyle alata*			
243.	6226	*Hydrocotyle callicarpa (Small Pennywort)*			
244.	5817	*Hypocalymma angustifolium (White Myrtle, Kudjid)*			
245.	5825	*Hypocalymma robustum (Swan River Myrtle)*			
246.	8086	*Hypochaeris glabra (Smooth Catsear)*	Y		
247.	1070	*Hypolaena exsulca*			
248.	44926	*Ileodictyon gracile*			
249.	20200	*Isolepis cernua var. setiformis*			
250.	912	*Isolepis cyperoides*			
251.	917	*Isolepis marginata (Coarse Club-rush)*			
252.	919	*Isolepis oldfieldiana*			
253.	25478	*Isoodon obesulus (Southern Brown Bandicoot)*		P4	
254.	24153	*Isoodon obesulus subsp. fusciventer (Quenda, Southern Brown Bandicoot)*		P4	
255.	2221	*Isopogon asper*			
256.	7396	*Isotoma hypocrateriformis (Woodbridge Poison)*			
257.	4018	*Jacksonia lehmannii*			
258.	19632	*Johnsonia pubescens subsp. pubescens*			
259.	1178	*Juncus bufonius (Toad Rush)*	Y		
260.	1180	*Juncus capitatus (Capitate Rush)*	Y		
261.	4037	*Kennedia coccinea (Coral Vine)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
262.	4041	*Kennedia microphylla*			
263.	4044	*Kennedia prostrata (Scarlet Runner)*			
264.	5835	*Kunzea micrantha*			
265.	17461	*Kunzea micrantha subsp. micrantha*			
266.	3669	*Labichea punctata (Lance-leaved Cassia)*			
267.	13562	*Lachenalia aloides*	Y		
268.	18585	*Lagenophora huegelii*			
269.	14083	*Lambertia multiflora var. darlingensis*			
270.		*Lamponusa gleneagle*			
271.	1309	*Laxmannia squarrosa*			
272.	7568	*Lechenaultia biloba (Blue Leschenaultia)*			
273.	18074	*Lepidobolus preissianus subsp. preissianus*			
274.	41620	*Lepidosperma asperatum*			
275.	929	*Lepidosperma carphoides (Black Rapier Sedge)*			
276.	936	*Lepidosperma leptostachyum*			
277.	940	*Lepidosperma pubisquameum*			
278.	944	*Lepidosperma scabrum*			
279.		*Lepidosperma sp.*			
280.	5850	*Leptospermum laevigatum (Coast Teatree)*	Y		
281.	1088	*Lepyrodia macra (Large Scale Rush)*			
282.	25131	*Lerista distinguenda*			
283.	25133	*Lerista elegans*			
284.	6367	*Leucopogon capitellatus*			
285.	6400	*Leucopogon gracillimus*			
286.	6436	*Leucopogon propinquus*			
287.	6439	*Leucopogon pulchellus (Beard-heath)*			
288.	28302	*Leucopogon sp. Parkerville (A. Meebold 11654)*			
289.	25661	*Lichmera indistincta (Brown Honeyeater)*			
290.	24582	*Lichmera indistincta subsp. indistincta (Brown Honeyeater)*			
291.	4363	*Linum trigynum (French Flax)*	Y		
292.	7407	*Lobelia rhytidosperma (Wrinkled-seeded Lobelia)*			
293.	9356	*Logfia gallica*			
294.	1222	*Lomandra brittanii*			
295.	1223	*Lomandra caespitosa (Tufted Mat Rush)*			
296.	1228	*Lomandra hermaphrodita*			
297.	1234	*Lomandra nigricans*			
298.	1239	*Lomandra preissii*			
299.		*Lomandra sp.*			
300.	1245	*Lomandra spartea*			
301.	1246	*Lomandra suaveolens*			
302.		*Lophoictinia isura*			
303.	4059	*Lotus angustissimus (Narrowleaf Trefoil)*	Y		
304.	36375	*Lysimachia arvensis (Pimpernel)*	Y		
305.	24132	*Macropus fuliginosus (Western Grey Kangaroo)*			
306.	85	*Macrozamia riedlei (Zamia, Djiridji)*			
307.	25650	*Malurus elegans (Red-winged Fairy-wren)*			
308.	24551	*Malurus pulcherrimus (Blue-breasted Fairy-wren)*			
309.	25654	*Malurus splendens (Splendid Fairy-wren)*			
310.	24583	*Manorina flavigula (Yellow-throated Miner)*			
311.	17630	*Marianthus tenuis*			
312.	14985	*Melinis repens*	Y		
313.	25184	*Menetia greyii*			
314.	24598	*Merops ornatus (Rainbow Bee-eater)*		IA	
315.	955	*Mesomelaena pseudostygia*			
316.	957	*Mesomelaena tetragona (Semaphore Sedge)*			
317.	25693	*Microeca fascinans (Jacky Winter)*			
318.	485	*Microlaena stipoides (Weeping Grass)*			
319.	14337	*Millotia tenuifolia var. laevis*		P2	
320.	14344	*Millotia tenuifolia var. tenuifolia (Soft Millotia)*			
321.	7085	*Misopates orontium (Lesser Snapdragon)*	Y		
322.	37440	*Monopsis debilis var. depressa*	Y		
323.	19585	*Monotaxis grandiflora var. grandiflora*			
324.	25192	*Morethia obscura*			
325.	24223	*Mus musculus (House Mouse)*	Y		
326.	24738	*Neophema elegans (Elegant Parrot)*			
327.	492	*Neurachne alopecuroidea (Foxtail Mulga Grass)*			
328.	24407	*Ocyphaps lophotes (Crested Pigeon)*			
329.	8143	*Olearia paucidentata (Autumn Scrub Daisy)*			
330.	4114	*Ornithopus pinnatus (Slender Serradella)*	Y		
331.	4355	*Oxalis perennans*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
332.		*Ozarchaea westraliensis*			
333.	25680	*Pachycephala rufiventris (Rufous Whistler)*			
334.	24624	*Pachycephala rufiventris subsp. rufiventris (Rufous Whistler)*			
335.	25253	*Parasuta gouldii*			
336.	25255	*Parasuta nigriceps*			
337.	25681	*Pardalotus punctatus (Spotted Pardalote)*			
338.	25682	*Pardalotus striatus (Striated Pardalote)*			
339.	24628	*Pardalotus striatus subsp. murchisoni (Striated Pardalote)*			
340.	7089	*Parentucellia latifolia (Common Bartsia)*	Y		
341.	7090	*Parentucellia viscosa (Sticky Bartsia)*	Y		
342.	1542	*Patersonia babianoides*			
343.	1546	*Patersonia juncea (Rush Leaved Patersonia)*			
344.	1551	*Patersonia pygmaea (Pygmy Patersonia)*			
345.	40424	*Pentameris airoides subsp. airoides*	Y		
346.	6245	*Pentapeltis peltigera*			
347.	24155	*Perameles eremiana (Desert Bandicoot, walilya)*		X	
348.	16477	*Pericalymma ellipticum var. ellipticum*			
349.	2273	*Persoonia saccata (Snottygobble)*			
350.	48061	*Petrochelidon nigricans (Tree Martin)*			
351.	48066	*Petroica boodang (Scarlet Robin)*			
352.	24659	*Petroica goodenovii (Red-capped Robin)*			
353.	2299	*Petrophile linearis (Pixie Mops)*			
354.	2301	*Petrophile macrostachya*			
355.	24165	*Petropseudes dahli (Rock Ringtail Possum, Wogoit)*		P3	
356.	25698	*Phalacrocorax melanoleucos (Little Pied Cormorant)*			
357.	24409	*Phaps chalcoptera (Common Bronzewing)*			
358.	18529	*Philotheca spicata (Pepper and Salt)*			
359.	48071	*Phylidonyris niger (White-cheeked Honeyeater)*			
360.	24596	*Phylidonyris novaehollandiae (New Holland Honeyeater)*			
361.	16825	*Phyllangium divergens*			
362.	4675	*Phyllanthus calycinus (False Boronia)*			
363.		*Phytophthora cinnamomi*			
364.	5232	*Pimelea argentea (Silvery Leaved Pimelea)*			
365.	12041	*Pimelea suaveolens subsp. suaveolens*			
366.	8163	*Pithocarpa corymbulosa (Corymbose Pithocarpa)*		P3	
367.	25720	*Platycercus icterotis (Western Rosella)*			
368.	24747	*Platycercus spurius (Red-capped Parrot)*			
369.	25721	*Platycercus zonarius (Australian Ringneck, Ring-necked Parrot)*			
370.	571	*Poa annua (Winter Grass)*	Y		
371.	573	*Poa drummondiana (Knotted Poa)*			
372.	25703	*Podargus strigoides (Tawny Frogmouth)*			
373.	24907	*Pogona minor subsp. minor (Dwarf Bearded Dragon)*			
374.	25722	*Polytelis anthopeplus (Regent Parrot)*			
375.	24771	*Porzana tabuensis (Spotless Crake)*			
376.	24164	*Potorous platyops (Broad-faced Potoroo)*		X	
377.	24166	*Pseudocheirus occidentalis (Western Ringtail Possum, ngwayir)*		T	
378.	25259	*Pseudonaja affinis subsp. affinis (Dugite)*			
379.	25433	*Pseudophryne guentheri (Crawling Toadlet)*			
380.	12217	*Pterostylis sanguinea*			
381.	1698	*Pterostylis vittata (Banded Greenhood)*			
382.	2742	*Ptilotus manglesii (Pom Poms, Mulamula)*			
383.		*Purpureicephalus spurius*			
384.	8195	*Quinetia urvillei*			
385.	24245	*Rattus rattus (Black Rat)*	Y		
386.		*Raveniella cirrata*			
387.	48096	*Rhipidura albiscapa (Grey Fantail)*			
388.	25614	*Rhipidura leucophrys (Willie Wagtail)*			
389.	13234	*Rhodanthe manglesii*			
390.	1556	*Romulea rosea (Guildford Grass)*	Y		
391.	3191	*Rubus ulmifolius (Blackberry)*	Y		
392.	7602	*Scaevola calliptera*			
393.	7613	*Scaevola glandulifera (Viscid Hand-flower)*			
394.	982	*Schoenus clandestinus*			
395.	991	*Schoenus grammatophyllus*			
396.	1006	*Schoenus odontocarpus*			
397.	1011	*Schoenus rigens*			
398.	1013	*Schoenus sculptus (Gimlet Bog-rush)*			
399.	1026	*Schoenus unispiculatus*			
400.	25534	*Sericornis frontalis (White-browed Scrubwren)*			
401.	24145	*Setonix brachyurus (Quokka)*		T	

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
402.	8224	*Siloxerus filifolius*			
403.	14583	*Siloxerus multiflorus*			
404.	30948	*Smicrornis brevirostris (Weebill)*			
405.	8230	*Sonchus asper (Rough Sowthistle)*	Y		
406.	1312	*Sowerbaea laxiflora (Purple Tassels)*			
407.	4207	*Sphaerolobium medium*			
408.	4716	*Stachystemon vermicularis*			
409.	4733	*Stackhousia monogyna*			
410.	9070	*Stackhousia pubescens (Downy Stackhousia)*			
411.	24426	*Strepera versicolor subsp. plumbea (Grey Currawong)*			
412.	25590	*Streptopelia senegalensis (Laughing Turtle-Dove)*	Y		
413.	30278	*Stylidium androsaceum*			
414.	7693	*Stylidium brunonianum (Pink Fountain Triggerplant)*			
415.	7694	*Stylidium bulbiferum (Circus Triggerplant)*			
416.	7696	*Stylidium calcaratum (Book Triggerplant)*			
417.	7699	*Stylidium carnosum (Fleshy-leaved Triggerplant)*			
418.	7702	*Stylidium ciliatum (Golden Triggerplant)*			
419.	7712	*Stylidium despectum (Dwarf Triggerplant)*			
420.	7713	*Stylidium dichotomum (Pins-and-needles)*			
421.	7718	*Stylidium diversifolium (Touch-me-not)*			
422.	7736	*Stylidium hispidum (White Butterfly Triggerplant)*			
423.	33106	*Stylidium recurvum*			
424.		*Stylidium sp.*			
425.	45594	*Stylidium tenue subsp. majusculum (Showy Fountain Triggerplant)*			
426.	1260	*Stypandra glauca (Blind Grass)*			
427.		*Supunna funerea*			
428.	24259	*Sus scrofa (Pig)*	Y		
429.	25902	*Symphyotrichum squamatum (Bushy Starwort)*	Y		
430.	2321	*Synaphea acutiloba (Granite Synaphea)*			
431.	2323	*Synaphea gracillima*			
432.	16864	*Synaphea petiolaris subsp. petiolaris*			
433.	2325	*Synaphea pinnata (Helena Synaphea)*			
434.	30751	*Synaphea sp. Pinjarra Plain (A.S. George 17182)*		T	
435.	28354	*Synaphea sp. Serpentine (G.R. Brand 103)*		T	
436.		*Synothele durokoppin*			
437.		*Synothele michaelseni*			
438.	25705	*Tachybaptus novaehollandiae (Australasian Grebe, Black-throated Grebe)*			
439.	24331	*Tadorna tadornoides (Australian Shelduck, Mountain Duck)*			
440.	24167	*Tarsipes rostratus (Honey Possum, Noolbenger)*			
441.	1033	*Tetraria australiensis*		T	
442.	1034	*Tetraria capillaris (Hair Sedge)*			
443.	1036	*Tetraria octandra*			
444.	1705	*Thelymitra crinita (Blue Lady Orchid)*			
445.	5080	*Thomasia foliosa*			
446.	24845	*Threskiornis spinicollis (Straw-necked Ibis)*			
447.	1338	*Thysanotus manglesianus (Fringed Lily)*			
448.	1343	*Thysanotus patersonii*			
449.	1357	*Thysanotus thyrsoideus*			
450.	25203	*Tiliqua occipitalis (Western Bluetongue)*			
451.	25519	*Tiliqua rugosa*			
452.	25549	*Todiramphus sanctus (Sacred Kingfisher)*			
453.	6280	*Trachymene pilosa (Native Parsnip)*			
454.	1481	*Tribonanthes australis*			
455.	8251	*Trichocline spathulata (Native Gerbera)*			
456.	25521	*Trichosurus vulpecula (Common Brushtail Possum)*			
457.	24157	*Trichosurus vulpecula subsp. arnhemensis (northern brushtail possum (Kimberley))*		T	
458.	24158	*Trichosurus vulpecula subsp. vulpecula (Common Brushtail Possum)*			
459.	1361	*Tricoryne elatior (Yellow Autumn Lily)*			
460.	1038	*Tricostularia neesii*			
461.	4293	*Trifolium cernuum (Drooping Flower Clover)*	Y		
462.	4295	*Trifolium dubium (Suckling Clover)*	Y		
463.	18587	*Triglochin nana*			
464.	1561	*Tritonia crocata*	Y		
465.	48147	*Turnix varius (Painted Button-quail)*			
466.	24852	*Tyto alba subsp. delicatula (Barn Owl)*			
467.		*Urodacus novaehollandiae*			
468.		*Urodacus woodwardii*			
469.	38388	*Ursinia anthemoides subsp. anthemoides*	Y		
470.	7157	*Utricularia violacea (Violet Bladderwort)*			
471.	24386	*Vanellus tricolor (Banded Lapwing)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
472.	7665	*Velleia trinervis*			
473.		*Venator immansueta*			
474.	15618	*Verticordia plumosa var. plumosa*			
475.	24040	*Vulpes vulpes (Red Fox)*	Y		
476.	724	*Vulpia myuros (Rat's Tail Fescue)*	Y		
477.	17910	*Washingtonia filifera*	Y		
478.	13103	*Watsonia borbonica*	Y		
479.	34113	*Westralunio carteri (Carter's Freshwater Mussel)*		T	
480.	1253	*Xanthorrhoea gracilis (Graceful Grass Tree, Mimidi)*			
481.	1256	*Xanthorrhoea preissii (Grass tree, Palga)*			
482.	6284	*Xanthosia candida*			
483.	6289	*Xanthosia huegelii*			
484.	2331	*Xylomelum occidentale (Woody Pear, Djandin)*			
485.	25765	*Zosterops lateralis (Grey-breasted White-eye, Silvereye)*			

Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

APPENDIX D: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT WITHIN THE WA LIMESTONE SURVEY AREA, SERPENTINE

Refer to Appendix A for State (SCC) and Federal (FCC; EPBC Act) conservation code definitions. IBRA Distribution: AVW – Avon Wheatbelt; JAF –Jarrah Forest; GES – Geraldton Sandplains; MAL – Mallee; SWA – Swan Coastal Plain; WAR - Warren

Taxon / Common Name	Family	SCC	FCC	Description and Habitat	Potential to Occur in Survey Area
Caladenia huegelii	ORCHIDACEAE	T	E	Habit: Tuberous, perennial, herb, 0.25 to 0.6 metres high Flowers: green, cream & red Flowering period: September to October Soils: Grey or brown sand, clay loam IBRA Distribution: JAF, SWA Florabase records: 41	Unlikely Preferred soils unlikely to be present in survey area.
Diuris micrantha	ORCHIDACEAE	T	V	Habit: Tuberous, perennial, herb, 0.25 to 0.6 metres high Flowers: yellow & brown Flowering period: September to October Soils: Brown loamy clay Winter-wet swamps, in shallow water. IBRA Distribution: JAF, SWA Florabase records: 6	Unlikely Preferred soils unlikely to be present in survey area.
Diuris purdiei	ORCHIDACEAE	T	E	Habit: Tuberous, perennial, herb, 0.15-0.35 metres high Flowers: yellow Flowering period: September to October Soils: Grey-black sand, moist. Located in winter-wet swamps. IBRA Distribution: JAF, SWA Florabase records: 11	Unlikely Preferred soils unlikely to be present in survey area.
Drakaea elastica	ORCHIDACEAE	T	E	Habit: Tuberous, perennial, herb, 0.12-0.3 metres high Flowers: red & green & yellow Flowering period: September to October Soils: Grey-black sand, moist. Located in winter-wet swamps. IBRA Distribution: SWA Florabase records: 18	Unlikely Preferred soils unlikely to be present in survey area.

APPENDIX D: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT WITHIN THE WA LIMESONE SURVEY AREA, SERPENTINE

Refer to Appendix A for State (SCC) and Federal (FCC; EPBC Act) conservation code definitions. IBRA Distribution: AVW – Avon Wheatbelt; JAF –Jarrah Forest; GES – Geraldton Sandplains; MAL – Mallee; SWA – Swan Coastal Plain; WAR - Warren

Taxon / Common Name	Family	SCC	FCC	Description and Habitat	Potential to Occur in Survey Area
Drakaea micrantha	ORCHIDACEAE	T	V	Habit: Tuberous, perennial, herb, 0.15 to 0.3 metres high Flowers: red & yellow Flowering period: September to October Soils: White-grey sand IBRA Distribution: JAF, SWA, WAR Florabase records: 45	Unlikely Preferred soils unlikely to be present in survey area.
Eleocharis keigheryi	CYPERACEAE	T	V	Habit: Rhizomatous, clumped perennial, grass-like or herb (sedge), to 0.4 metres high Flowers: green Flowering period: August to November Soils: Clay, sandy loam. Emergent in freshwater: creeks, claypans IBRA Distribution: GES, SWA Florabase records: 54	Unlikely Preferred soils unlikely to be present in survey area.
Eucalyptus x *balanites*	MYRTACEAE	T	E	Habit: Mallee to 5 metres high, with rough and flaky bark. Flowers: White Flowering period: October to December or January to February Soils: Sandy soils with lateritic gravel IBRA Distribution: GES, SWA Florabase records: 11	Unlikely Preferred soils unlikely to be present in survey area.
Lasiopetalum pterocarpum	MALVACEAE	T	E	Habit: Open, multi-stemmed shrub, to 1.2 metres high Flowers: pink Flowering period: August to December Soils: Dark red-brown loam or clayey sand over granite. Found on sloping banks near creeklines IBRA Distribution: JAF Florabase records: 11	Medium Preferred soils and associated vegetation potentially present in the survey area. Previously recorded in close proximity at Serpentine National Park.

APPENDIX D: ASSESSMENT OF THREATENED AND PRIORITY FLORA POTENTIALLY PRESENT WITHIN THE WA LIMESONE SURVEY AREA, SERPENTINE

Refer to Appendix A for State (SCC) and Federal (FCC; EPBC Act) conservation code definitions. IBRA Distribution: AVW – Avon Wheatbelt; JAF –Jarrah Forest; GES – Geraldton Sandplains; MAL – Mallee; SWA – Swan Coastal Plain; WAR - Warren

Taxon / Common Name	Family	SCC	FCC	Description and Habitat	Potential to Occur in Survey Area
Pithocarpa corymbulosa	ASTERACEAE	P3	-	Habit: Erect to scrambling perennial, herb, 0.5-1 metres high Flowers: white Flowering period: January to April Soils: Gravelly or sandy loam and located amongst granite outcrops. IBRA Distribution: GES, JAF, SWA Florabase records: 22	Medium Preferred soils and associated vegetation potentially present in the survey area. Previously recorded at Lot 334 at the survey area in 2005.
Synaphea sp. Fairbridge Farm (D. Papenfus 696)	PROTEACEAE	T	CE	Habit: Dense, clumped shrub, to 0.3 metres high and up to 0.4 metres wide Flowers: yellow Flowering period: October Soils: Sandy with lateritic pebbles. Located near winter-wet flats, in low woodland with weedy grasses. IBRA Distribution: JAF, SWA Florabase records: 30	Medium Preferred soils and landforms potentially present in survey area. Recorded in the local Government area previously.
Tetraria australiensis	CYPERACEAE	T	V	Habit: Rhizomatous, tufted perennial, grass-like or herb (sedge), to 1 metre high Flowers: Brown Flowering period: Nov to Dec. Soils: Sandy, grey/brown IBRA Distribution: JAF, SWA Florabase records: 34	Medium Preferred soils and landforms potentially present in survey area. Recorded in the local Government area previously.
Thelymitra stellata	ORCHIDACEAE	T	E	Habit: Tuberous, perennial, herb, 0.15-0.25 metres high Flowers: yellow & brown Flowering period: October to November Soils: Sand, gravel and lateritic loam. IBRA Distribution: AVW, GES, JAF, MAL, SWA Florabase records: 23	Medium Preferred soils potentially present in survey area.

APPENDIX E: SUMMARY OF VASCULAR PLANT SPECIES RECORDED WITHIN THE WA LIMESTONE SURVEY AREA , SERPENTINE, 2005

Note: * denotes introduced species; T denotes threatened flora and P1-P4 denote priority flora species (DBCA 2017a).

FAMILY	SPECIES	M 70/1240	Loc 344	Loc 246
PTERIDACEAE	*Adiantum aethiopicum*		x	
	Cheilanthes austrotenuifolia		x	
	Cheilanthes sieberi subsp. *sieberi*		x	
ZAMIACEAE	*Macrozamia riedlei*	x	x	
POACEAE	* *Aira caryophyllea*		x	
	* *Aira cupaniana*	x	x	
	* *Avena barbata*		x	x
	* *Brachypodium distachyon*		x	
	* *Briza maxima*	x	x	x
	* *Briza minor*	x	x	x
	* *Bromus diandrus*		x	x
	* *Bromus ?hordeaceus*			x
	* *Ehrharta longiflora*		x	
	* *Hordeum leporinum*			x
	* *Lolium rigidum*			x
	Microlaena stipoides	x		
	Neurachne alopecuroidea	x	x	
	Rytidosperma caespitosum	x	x	
	Rytidosperma pilosum		x	
	Tetrarrhena laevis	x	x	
	* *Vulpia myuros*	x		
CYPERACEAE	*Cyathochaeta avenacea*	x	x	
	Gahnia aristata		x	
	Gahnia decomposita	x		
	* *Isolepis prolifera*			x
	Lepidosperma drummondii		x	
	Lepidosperma effusum		x	
	Lepidosperma leptostachyum	x	x	
	Lepidosperma pubisquameum	x	x	
	Lepidosperma squamatum	x		
	Lepidosperma tetraquetrum	x	x	
	Mesomelaena tetragona	x		
	Tetraria capillaris	x	x	
	Tetraria octandra	x	x	
RESTIONACEAE	*Desmocladus asper*		x	
	Desmocladus fasciculatus	x	x	
	Hypolaena exsulca	x		
	Loxocarya cinerea		x	
CENTROLEPIDACEAE	*Centrolepis aristata*	x		
PHILYDRACEAE	*Philydrella pygmaea* subsp. *pygmaea*	x		
JUNCACEAE	* *Juncus articulatus*			x
	Luzula meridionalis		x	
ASPARAGACEAE	*Chamaescilla corymbosa*	x	x	
	Dichopogon capillipes	x	x	
	Laxmannia squarrosa	x		
	Lomandra caespitosa	x	x	
	Lomandra hermaphrodita	x		
	Lomandra micrantha subsp. *micrantha*	x	x	
	Lomandra sonderi	x	x	
	Sowerbaea laxiflora		x	
	Thysanotus dichotomus	x	x	
	Thysanotus fastigiatus	x		
	Thysanotus manglesianus	x	x	
	Thysanotus multiflorus	x	x	
	Thysanotus thyrsoideus	x	x	

APPENDIX E: SUMMARY OF VASCULAR PLANT SPECIES RECORDED WITHIN THE WA LIMESTONE SURVEY AREA , SERPENTINE, 2005

Note: * denotes introduced species; T denotes threatened flora and P1-P4 denote priority flora species (DBCA 2017a).

FAMILY	SPECIES	M 70/1240	Loc 344	Loc 246
XANTHORRHOEACEAE	*Xanthorrhoea gracilis*	x	x	
	Xanthorrhoea preissii	x	x	
HEMEROCALLIDACEAE	*Agrostocrinum scabrum*		x	
	Caesia micrantha	x	x	
	Caesia micrantha/occidentalis		x	
	Dianella revoluta	x		
	Stypandra glauca		x	
COLCHICACEAE	*Burchardia congesta*	x	x	
	Burchardia multiflora	x		
HAEMODORACEAE	*Conostylis aculeata*	x	x	
	Conostylis aculeata subsp. *preissii*	x	x	
	Conostylis setigera	x		
	Conostylis setosa	x	x	
	Conostylis sp.	x		
	Haemodorum laxum	x	x	
	Haemodorum sp.		x	
DIOSCOREACEAE	*Dioscorea hastifolia*		x	
IRIDACEAE	* *Moraea flaccida*		x	
	Orthrosanthus laxus var. *laxus*		x	
	Patersonia occidentalis		x	
	Patersonia rudis	x		
	* *Romulea rosea*		x	
ORCHIDACEAE	*Caladenia ?magniclavata*	x		
	Caladenia flava	x	x	
	* *Disa bracteata*		x	
	Elythranthera brunonis	x		
	Eriochilus sp.	x		
	Pterostylis sp.	x		
	Pyrorchis nigricans		x	
	Thelymitra crinita	x	x	
CASUARINACEAE	*Allocasuarina fraseriana*	x		
	Allocasuarina humilis		x	
PROTEACEAE	*Adenanthos barbiger*	x	x	
	Banksia armata var. *armata*		x	
	Banksia dallanneyi	x	x	
	Banksia grandis	x	x	
	Banksia sessilis	x	x	
	Banksia sphaerocarpa		x	
	Grevillea bipinnatifida		x	
	Grevillea wilsonii	x		
	Hakea amplexicaulis	x		
	Hakea lissocarpha	x	x	
	Hakea stenocarpa	x	x	
	Hakea trifurcata		x	
	Hakea undulata		x	
	Persoonia elliptica		x	
	Persoonia longifolia	x		
	Petrophile biloba		x	
	Stirlingia latifolia	x		
LORANTHACEAE	*Nuytsia floribunda*	x		
AMARANTHACEAE	*Ptilotus manglesii*	x	x	
RANUNCULACEAE	*Clematis pubescens*	x	x	

APPENDIX E: SUMMARY OF VASCULAR PLANT SPECIES RECORDED WITHIN THE WA LIMESTONE SURVEY AREA , SERPENTINE, 2005

Note: * denotes introduced species; T denotes threatened flora and P1-P4 denote priority flora species (DBCA 2017a).

FAMILY	SPECIES	M 70/1240	Loc 344	Loc 246
RANUNCULACEAE (Continued)	*Ranunculus colonorum*		x	
LAURACEAE	*Cassytha ?glabella*		x	
DROSERACEAE	*Drosera bulbosa*	x		
	Drosera erythrorhiza	x	x	
	Drosera erythrorhiza subsp. *collina*	x		
	Drosera gigantea	x		
	Drosera glanduligera	x		
	Drosera hyperostigma	x		
	Drosera menziesii		x	
	Drosera menziesii subsp. *menziesii*		x	
	Drosera ?neesii		x	
	Drosera pallida		x	
	Drosera platystigma	x		
	Drosera rosulata	x		
	Drosera sp. (climbing)		x	
CRASSULACEAE	*Crassula colorata* var. *colorata*	x		
FABACEAE	*Acacia alata* var. *alata*	x	x	
	Acacia extensa	x		
	Acacia pulchella	x	x	
	Acacia urophylla		x	
	Bossiaea ornata		x	
	Chorizema dicksonii		x	
	Daviesia horrida		x	
	Gompholobium knightianum	x		
	Gompholobium marginatum	x	x	
	Hovea chorizemifolia		x	
	Kennedia coccinea	x		
	Kennedia prostrata		x	
	Labichea punctata	x		
	* *Lotus subbiflorus*		x	x
	Mirbelia dilatata		x	
	* *Trifolium campestre*		x	
	* *Trifolium campestre* var. *campestre*		x	
	* *Trifolium subterraneum*		x	
OXALIDACEAE	* *Oxalis corniculata*	x	x	
	* *Oxalis pes-caprae*		x	
LINACEAE	* *Linum trigynum*		x	
RUTACEAE	*Boronia fastigiata*	x		
	Philotheca spicata	x		
EUPHORBIACEAE	* *Euphorbia peplus*		x	
	Monotaxis grandiflora var. *grandiflora*	x	x	
PHYLLANTHACEAE	*Poranthera microphylla*	x		
	Phyllanthus calycinus	x	x	
STACKHOUSIACEAE	*Stackhousia monogyna*		x	
	Tripterococcus brunonis	x		
SAPINDACEAE	*Dodonaea ceratocarpa*		x	
RHAMNACEAE	*Trymalium ledifolium*	x		
	Trymalium odoratissimum Lindl. subsp. *odoratissimum*	x	x	
ELAEOCARPACEAE	*Tetratheca nuda*		x	
STERCULIACEAE	*Lasiopetalum floribundum*	x		

APPENDIX E: SUMMARY OF VASCULAR PLANT SPECIES RECORDED WITHIN THE WA LIMESTONE SURVEY AREA , SERPENTINE, 2005

Note: * denotes introduced species; T denotes threatened flora and P1-P4 denote priority flora species (DBCA 2017a).

FAMILY	SPECIES	M 70/1240	Loc 344	Loc 246
STERCULIACEAE (Continued)	*Lasiopetalum glabratum*	x		
DILLENIACEAE	*Hibbertia acerosa*	x		
	Hibbertia amplexicaulis	x	x	
	Hibbertia commutata	x		
	Hibbertia glomerata	x		
	Hibbertia glomerata subsp. *darlingensis*	x	x	
	Hibbertia huegelii		x	
	Hibbertia hypericoides		x	
	Hibbertia ?pachyrrhiza	x	x	
	Hibbertia rupicola	x		
THYMELAEACEAE	*Pimelea ciliata*		x	
	Pimelea imbricata var. *piligera*		x	
	Pimelea spectabilis		x	
	Pimelea suaveolens	x		
MYRTACEAE	*Astartea scoparia*	x	x	
	Babingtonia camphorosmae	x	x	
	Corymbia calophylla	x	x	x
	Darwinia citriodora		x	
	Eucalyptus marginata subsp. *marginata*	x	x	
	Eucalyptus patens	x		
	Eucalyptus rudis	x		x
	Eucalyptus wandoo	x		
	Hypocalymma angustifolium	x	x	
	Kunzea micrantha subsp. *micrantha*	x	x	
	Melaleuca parviceps		x	
	Melaleuca radula		x	
	Pericalymma ellipticum	x		
	Taxandria linearifolia	x	x	x
	Verticordia densiflora var. *?densiflora*	x		
	Verticordia huegelii var. *huegelii*	x	x	
	Verticordia pennigera		x	
APIACEAE	*Daucus glochidiatus*	x	x	
	Eryngium pinnatifidum		x	
	Hydrocotyle callicarpa	x	x	
	Pentapeltis peltigera	x	x	
	Platysace compressa	x		
	Trachymene pilosa	x	x	
	Xanthosia candida	x		
	Xanthosia huegelii	x		
EPACRIDACEAE	*Leucopogon capitellatus*	x	x	
	Leucopogon ?gracillimus		x	
	Leucopogon nutans	x	x	
	Leucopogon propinquus	x		
	Leucopogon verticillatus	x		
	Styphelia tenuiflora	x		
PRIMULACEAE	* *Anagallis arvensis*	x	x	
LOGANIACEAE	*Phyllangium paradoxum*	x		
ASCLEPIADACEAE	* *Gomphocarpus fruticosus*		x	x
BORAGINACEAE	* *Echium plantagineum*		x	
LAMIACEAE	*Hemigenia incana*		x	
	Hemigenia rigida (P1)	x		
	* *Mentha* sp.		x	
SOLANACEAE	* *Solanum nigrum*	x		

APPENDIX E: SUMMARY OF VASCULAR PLANT SPECIES RECORDED WITHIN THE WA LIMESTONE SURVEY AREA , SERPENTINE, 2005

Note: * denotes introduced species; T denotes threatened flora and P1-P4 denote priority flora species (DBCA 2017a).

FAMILY	SPECIES	M 70/1240	Loc 344	Loc 246
OROBANCHACEAE	* *Bartsia trixago*		x	
	* *Orobanche minor*		x	
	* *Parentucellia* sp.	x		
RUBIACEAE	* *Galium murale*		x	
	Opercularia echinocephala	x	x	
	Opercularia hispidula		x	
CAMPANULACEAE	*Isotoma hypocrateriformis*	x		
	Wahlenbergia gracilenta	x		
GOODENIACEAE	*Dampiera linearis*	x	x	
	Goodenia micrantha		x	
	Lechenaultia biloba	x	x	
	Scaevola calliptera	x	x	
	Scaevola glandulifera		x	
STYLIDIACEAE	*Levenhookia pusilla*	x	x	
	Stylidium brunonianum	x	x	
	Stylidium calcaratum	x	x	
	Stylidium dichotomum	x	x	
	Stylidium hispidum	x	x	
	Stylidium junceum	x		
	Stylidium piliferum	x		
	Stylidium repens	x		
	Stylidium schoenoides	x		
ASTERACEAE	* *Arctotheca calendula*	x	x	x
	Craspedia variabilis	x	x	
	Hyalosperma cotula	x	x	
	* *Hypochaeris glabra*	x	x	
	Lagenophora huegelii	x	x	
	Millotia tenuifolia	x		
	Millotia tenuifolia var. *laevis* (P2)	x		
	Pithocarpa ?corymbulosa (P3)		x	
	Podolepis lessonii		x	
	Podotheca angustifolia	x		
	Pterochaeta paniculata	x		
	Rhodanthe citrina	x		
	Senecio hispidulus		x	
	Senecio hispidulus	x		
	Senecio pinnatifolius var. *pinnatifolius*	x		
	Siloxerus multiflorus		x	
	* *Sonchus oleraceus*		x	
	* *Tolpis barbata*		x	
	Trichocline spathulata	x		
	* *Ursinia anthemoides*	x	x	

Appendix C Mattiske Expert Advice (Mattiske, 2021)

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(ACN 063 507 175, ABN 39 063 507 175)

19th November 2021

WA Bluemetal

Head Office

401 Spearwood Ave

Bibra Lake, WA 6965

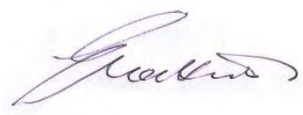
Response to Flora Issues raised in correspondence from the Department of Agriculture, Water and the Environment

The following summaries on specific flora species raised in the letter from the Department of Agriculture, Water and the Environment.

The flora species as designated in his correspondence are extremely unlikely to occur in the WA Bluemetal quarry area near Byford as all these species occur on the Swan Coastal Plain in sandy or wetter sites which do not occur on the lateritic sandy-gravel soils on the Darling Scarp in the proposed expansion areas of the WA Bluemetal quarry area. The summary below is based on data from the Western Australian FloraBase records (WAH 1998-) and also on the basis of over 40 years of botanical and ecological knowledge of Dr Mattiske.

Therefore, the suggestion that these 6 flora species have the potential to occur in the Byford quarry areas on upland sandy-gravel soils of the steep Darling Scarp on the eastern fringes of the Swan Coastal Plain and on the western fringes of the elevated Darling Range reflects the errors that arise when agencies rely on database searches and not detailed survey results or knowledge of specific species or local ecological knowledge of ecosystems and associated flora species.

Yours sincerely.



Dr E.M. (Libby) Mattiske (Adj. Prof. Murdoch University)

B.Sc. Hons, Ph.D.

Diuris micrantha (Dwarf Bee-orchid)-Vulnerable (photographs from FloraBase, WAH 1998-)

Diuris micrantha, Family Orchidaceae, is a tuberous perennial herb (Western Australian Herbarium, 1998–), that has a basal tuft of narrow, linear leaves and a loose, slender inflorescence up to 60 cm high (Department of Agriculture, Water and the Environment, 2021a) . This species flowers during August to early October (Brown *et al.,* 1998). The flowers are yellow, and can number up to seven, with reddish-brown markings (Department of Agriculture, Water and the Environment, 2021a).

Diuris micrantha is known from seven populations, from east of Kwinana and south towards the Frankland area, Western Australia (Department of Agriculture, Water and the Environment, 2021a). It is found in small populations, on dark, grey to blackish, sandy clay-loam substrates in swamps or winter wet depressions (Western Australian Herbarium, 1998-). The bases of the flowering plants are often covered with shallow water (Brown *et al*. 1998).

There are 8 records of this species on FloraBase. It has not been previously recorded in the area and as the Byford quarry site occurs on lateritic sandy gravels on upland areas of the Darling Scarp it is extremely unlikely that this species would occur in the WA Bluemetal Quarry area.

Diuris purdiei (Donkey-orchid)- Endangered (photographs from FloraBase, WAH 1998-)

Diuris purdiei, Family Orchidaceae, is a tuberous, perennial, slender, terrestrial orchid growing up to 45 cm tall (Department of Agriculture, Water and the Environment, 2021b). The flowers are flattened, which are prominently marked with brown blotches on their lower surface. Flowering occurs from late September to mid-October (Western Australian Herbarium, 1998–).

This species grows on moist grey-black sand, in areas subject to inundation, and amongst native sedges and dense heath with scattered emergent overstorey species (Brown *et al*., 1998). *Diuris purdiei* is unlikely to occur in the project area, as it occurs on flats and wet or damp sandy soils (Western Australian Herbarium, 1998–). There are 26 records of on FloraBase. It has not been previously recorded in the area and as the Byford quarry site occurs on lateritic sandy gravels on upland areas of the Darling Scarp it is extremely unlikely that this species would occur in the WA Bluemetal Quarry area.

Drakaea elastica (Glossy-leaved Hammer Orchid)- Endangered (photographs from FloraBase, WAH 1998-)

Drakaea elastica is a tuberous, perennial herb. This species has a slender flower stem up to 30 cm high and a single distinctively glossy, bright-green, prostrate, heart-shaped leaf 1 cm to 2 cm in diameter. The flowers, which are red/ green and yellow in colour, appears in September to November (Western Australian Herbarium (1998–). The plant dies back to a dormant underground tuber over summer (Department of Agriculture, Water and the Environment, 2021c).

Drakaea elastica is known only from the Swan Coastal Plain over a range of approximately 350 km between Cataby in the north and Busselton in the south West of Western Australia (Department of Agriculture, Water and the Environment, 2021c). The species grows on bare patches of white or grey sand near adjoining low-lying winter-wet swamps (Western Australian Herbarium, 1998–). There are 19 records on FloraBase known to be found previously in Busselton, Capel, Dandaragan, Harvey, Kwinana, Murray and Rockingham. It has not been previously recorded in the area and as the Byford quarry site occurs on lateritic sandy gravels on upland areas of the Darling Scarp it is extremely unlikely that this species would occur in the WA Bluemetal Quarry area.

Synaphea sp. Fairbridge Farm (D. Papenfus 696)- Critically Endangered (photographs from FloraBase, WAH 1998-)

Synaphea sp. Fairbridge Farm (D. Papenfus 696), Family Proteaceae, is a dense, clumped shrub 25–65 cm tall by 20–80 cm wide. The flowers open narrowly, are yellow, hairy, openly spaced and are angled upwards in the spike (Western Australian Herbarium (1998–). Flowering occurs in October.

This species is endemic to the Pinjarra Plain of Western Australia (Department of Agriculture, Water and the Environment, 2021c). It has been known to occur in Canning, Dardanup, Murray and the Serpentine-Jarrahdale area. It is found on grey, clayey sand with lateritic pebbles in low woodland areas near winter flats. It is often associated with weedy grasses (Department of Agriculture, Water and the Environment, 2021c).

There are 31 records known on FloraBase, these records are mainly occurring on flat black or grey sandy loam or sand in seasonally wet areas. It has not been previously recorded in the area and as the Byford quarry site occurs on lateritic sandy gravels on upland areas of the Darling Scarp it is extremely unlikely that this species would occur in the WA Bluemetal Quarry area.

Synaphea sp. Pinjarra Plain (A.S. George 17182) (photographs from FloraBase, WAH 1998-)

Synaphea sp. Pinjarra Plain (A.S. George 17182) is an erect, clumped shrub that grows to 80 cm high. It flowers in the months of September to November, and the flowers are yellow in colour.

This species is known to occur on grey sandy loam or clay, grey-brown clayey sand, brown clayey loam, and laterite. It occurs on flats, seasonally wet areas, railroad reserves, and often on wet depressions or drains (Western Australian Herbarium (1998–).

Synaphea sp. Pinjarra Plain (A.S. George 17182) has been previously recorded on the Swan Coastal Plain in the Capel, Murray and Serpentine-Jarrahdale areas. There are 63 known records on FloraBase. It has not been previously recorded in the area and as the Byford quarry site occurs on lateritic sandy gravels on upland areas of the Darling Scarp it is extremely unlikely that this species would occur in the WA Bluemetal Quarry area.

Morelotia australiensis (Formerly *Tetraria australiensis*) – Vulnerable

(photographs from FloraBase, WAH 1998-)

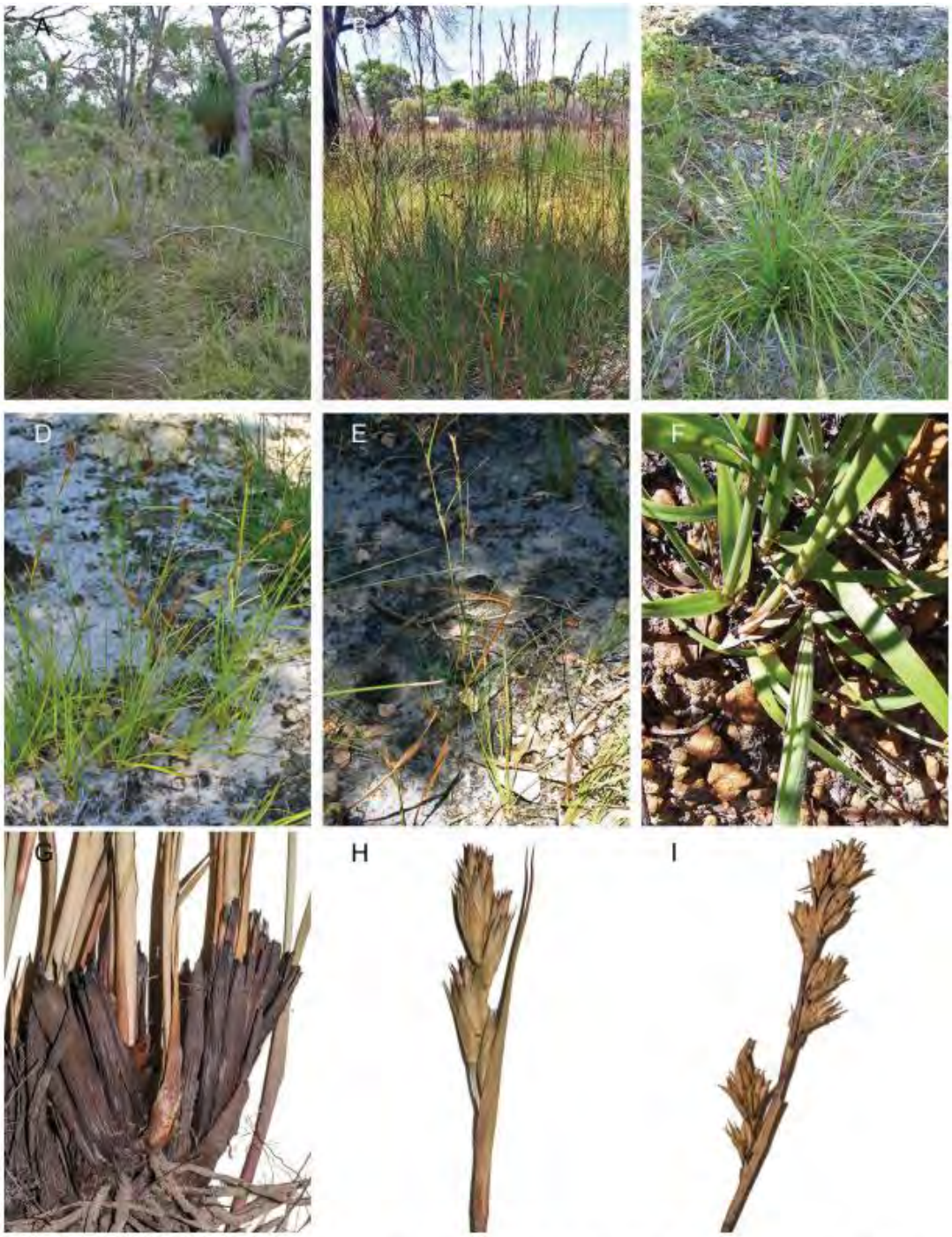


Fig. 7. *Morelotia australiensis*. A. Habitat. B. Plants in habitat. C. Plant with old inflorescences. D, E. Flowering plants. F. Leaf and culm bases. G. Plant base with new growth after fire. H, I. Inflorescence. A–E, G–I from Watkins Reserve. F from North Dandalup. G–I from *K.L. Wilson 9310* (NSW). Photos A, B, D–F by M. Okely; C. by V. English; G–I by R.L. Barrett.

Morelotia australiensis, Family Cyperaceae, is a perennial, tufted herb, with stems up to 1 metre high (Department of Agriculture, Water and the Environment, 2021d).

The distribution of *Morelotia australiensis* is severely fragmented, with the known populations occurring in isolated remnant patches of vegetation (Department of Agriculture, Water and the Environment, 2021d). It is found on grey sand over clay, and yellow sandy or clayey lateritic soils (Brown *et al*. 1998). *Morelotia australiensis* favours winter-wet swampy depressions, drainage lines or rises surrounding swamps (Brown *et al.* 1998). It is found in Marri *Corymbia calophylla* woodlands over low shrubs, herbs and sedges (Brown *et al*. 1998).

There are 36 records of *Morelotia australiensis* known to occur on FloraBase. These have been known to occur on flats and gentle slopes. This species is endemic to the greater Perth region, and is known to occur on the eastern side of the Swan Coastal Plain, from Busselton, Mundijong and Waroona, north to Serpentine. The historical populations near the Perth suburbs of Armadale and Canning are thought to be extinct (Barrett *et al*, 2021)

Two records of *Morelotia australiensis* has been previously found on the South west Highway in Whitby, which is close to the project area on the Pinjarra Plain below the Darling Scarp.

1 metre high (Department of Agriculture, Water and the Environment, 2021d). The distribution of *Morelotia australiensis* is severely fragmented, with the known populations occurring in isolated remnant patches of vegetation (Department of Agriculture, Water and the Environment, 2021d). It is found on grey sand over clay, and yellow sandy or clayey lateritic soils (Brown *et al*. 1998). *Morelotia australiensis* favours winter-wet swampy depressions, drainage lines or rises surrounding swamps (Brown *et al.* 1998). It is found in Marri *Corymbia calophylla* woodlands over low shrubs, herbs and sedges (Brown *et al*. 1998).

There are 36 records of *Morelotia australiensis* known to occur on FloraBase. These have been known to occur on flats and gentle slopes. This species is endemic to the greater Perth region, and is known to occur on the eastern side of the Swan Coastal Plain, from Busselton, Mundijong and Waroona, north to Serpentine. The historical populations near the Perth suburbs of Armadale and Canning are thought to be extinct (Barrett *et al.* 2021)

Two records of *Morelotia australiensis* have been previously found on the South west Highway in Whitby, which is close to the project area; however as this species occurs mainly on winter-wet swampy depressions, drainage lines or rises surrounding swamps (Brown *et al.* 1998) supporting woodlands of Marri *Corymbia calophylla* woodlands over low shrubs, herbs and sedges it is unlikely to extend onto the drier upper slopes on sandy gravels on the upper slopes of the Darling Scarp supporting Jarrah-Marri-Sheoak (*Eucalyptus marginata-Corymbia calophylla-Allocasuarina fraseriana*) in the WA Bluemetal quarry area.

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Appendix D Mine Closure Plan (WA Bluemetal, 2016)

DMP MINE CLOSURE PLAN CHECKLIST

Q No	Mine Closure Plan (MCP) checklist	Y/N NA	Page No.	Comments
1	Has the Checklist been endorsed by a senior representative within the tenement holder/operating company? (See bottom of checklist)	Y		
2	How many copies were submitted to DMP?	Hard Copies = 1 Electronic = 1		
	Cover Page, Table of Contents			
3	Does the cover page include: • Project Title; • Company Name; • Contact Details (including telephone numbers and email addresses); • Document ID and version number; • Date of submission (needs to match the date of this checklist).	Y		
4	Has a Table of Contents been provided?	Y		
	Scope and Project Summary			
5	State why the MCP is submitted (as part of a Mining Proposal of a reviewed MCP or to fulfil other legal requirements)	Y		Part of Mining Proposal
6	Does the project summary include: • Land ownership details; • Location of the project; • Comprehensive site plan(s); • Background information on the history and status of the project.	Y	1	Section 2.0
	Legal Obligations and Commitments			
7	Has a consolidated summary or register of closure obligations and commitments been included?	Y	4	Section 3.0
	Data Collection and Analysis			
8	Has information relevant to mine closure been collected for each domain or feature (including pre-mining baseline studies, environmental and other data)?	Y	6	Section 4.0
9	Has a gap analysis been conducted to determine if further information is required in relation to closure of each domain or feature?	Y	11	Section 4.9
	Stakeholder Consultation			
10	Have all stakeholders involved in closure been identified?	Y	11	Section 5.0
11	Has a summary or register of stakeholder consultation been provided, with details as to who has been consulted and the outcomes?	Y	12	Section 5.2
	Final land use(s) and Closure Objectives			
12	Does the MCP include agreed post-mining land use(s), closure objectives and conceptual landform design diagram?	Y	14	Section 6.2
13	Does the MCP identify all potential (or pre-existing) environmental legacies, which may restrict the post mining land use (including contaminated sites)?	Y	15	Section 6.3
	Identification and Management of Closure Issues			
14	Does the MCP identify all key issues impacting mine closure objectives and outcomes?	Y	15	Section 7.0
15	Does the MCP include proposed management or mitigation options to deal with these issues?	Y	15	Section 7.0
16	Have the process, methodology, and rationale been provided to justify identification and management of the issues?	Y	15	Section 7.0

	Closure Criteria			
17	Does the MCP include an appropriate set of specific closure criteria and closure performance indicators?	Y	23	Section 9.0
	Closure Financial Provisioning			
18	Does the MCP include costing methodology, assumptions and financial provision to resource closure implementation and monitoring?	Y	24	Section 10.2
19	Does the MCP include a process for regular review of the financial provision?	Y	24	Section 10.3
	Closure Implementation			
20	Does the reviewed MCP include a summary of closure implementation strategies and activities for the proposed operations or for the whole site?	Y	25	Section 11.0
21	Does the MCP include a closure work program for each domain or feature?	Y	25	Section 11.0
22	Have site layout plans been provided to clearly show each type of disturbance?	Y	34	Figure 4
23	Does the MCP contain a schedule of research and trial activities?	Y	27	Section 11.3
24	Does the MCP contain a schedule of progressive rehabilitation activities?	Y	27	Section 11.4
25	Does the MCP include details of how unexpected closure and care and maintenance will be handled?	Y	28	Section 11.4. 11.6
26	Does the MCP contain a schedule of decommissioning activities?	Y	29	Section 11.7
27	Does the MCP contain a schedule of closure performance monitoring and maintenance activities?	Y	29	Section 12.0
	Closure Monitoring and Maintenance			
28	Does the MCP contain a framework, including methodology, quality control and remedial strategy for closure performance monitoring including post-closure monitoring and maintenance?	Y	29	Section 12.0
	Closure Information and Data Management	Y	30	Section 13.0
29	Does the mine closure plan contain a description of management strategies including systems, and processes for the retention of mine records?	Y	30	Section 13.0
30	Confidentiality	N/A		

Corporate Endorsement:

"I hereby certify that to the best of my knowledge, the information within this Mine Closure Plan and checklist is true and correct and addresses all the requirements of the Guidelines for the Preparation of a Mine Closure Plan approved by the Director General of Mines.

Name: David Della Bona **Signed:**

Position: Managing Director **Date:** 15/11/2016

(NB): The corporate endorsement must be given by tenement holder(s) or a senior representative authorised by the tenement holder(s), such as a Registered Manager or Company Director.

W.A. BLUEMETAL

REVISED MINE CLOSURE PLAN

WA Bluemetal Whitby Quarry

M70/1240

South Western Highway, Whitby

Holder: Ransberg Pty Ltd T/A WA Bluemetal

401 Spearwood Ave, Bibra Lake WA 6163
PO Box 1404 Bibra Lake WA 6965

Operator: Ransberg Pty Ltd T/A WA Bluemetal

401 Spearwood Ave, Bibra Lake WA 6163
PO Box 1404 Bibra Lake WA 6965

Reg ID:_____

Report: 026.R008.Rev2 6th October 2016

MINE CLOSURE PLAN

WA Bluemetal Whitby Quarry

M70/1240
South Western Highway, Whitby

Prepared By:

PMR Quarries Pty Ltd T/A WA Limestone
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Document Control

Reference	Status	Date	Prepared	Checked	Authorised
026.R008	Rev 0	10 July 2013	Roger Stephens	David Della Bona	David Della Bona
026.R008	Rev 1	20 May 2016	Caroline Scally	Roger Stephens	David Della Bona
026.R008	Rev 2	6 October 2016	Caroline Scally	Roger Stephens	David Della Bona

DMP MINE CLOSURE PLAN CHECKLIST

Q No	Mine Closure Plan (MCP) checklist	Y/N NA	Page No.	Comments
1	Has the Checklist been endorsed by a senior representative within the tenement holder/operating company? (See bottom of checklist)	Y		
2	How many copies were submitted to DMP?	Hard Copies = 1 Electronic = 1		
	Cover Page, Table of Contents			
3	Does the cover page include: • Project Title; • Company Name; • Contact Details (including telephone numbers and email addresses); • Document ID and version number; • Date of submission (needs to match the date of this checklist).	Y		
4	Has a Table of Contents been provided?	Y		
	Scope and Project Summary			
5	State why the MCP is submitted (as part of a Mining Proposal of a reviewed MCP or to fulfil other legal requirements)	Y		Part of Mining Proposal
6	Does the project summary include: • Land ownership details; • Location of the project; • Comprehensive site plan(s); • Background information on the history and status of the project.	Y		Section 2.0
	Legal Obligations and Commitments			
7	Has a consolidated summary or register of closure obligations and commitments been included?	Y		Section 3.0
	Data Collection and Analysis			
8	Has information relevant to mine closure been collected for each domain or feature (including pre-mining baseline studies, environmental and other data)?	Y		Section 4.0
9	Has a gap analysis been conducted to determine if further information is required in relation to closure of each domain or feature?	Y		Section 4.9
	Stakeholder Consultation			
10	Have all stakeholders involved in closure been identified?	Y		Section 5.0
11	Has a summary or register of stakeholder consultation been provided, with details as to who has been consulted and the outcomes?	Y		Section 5.0
	Final land use(s) and Closure Objectives			
12	Does the MCP include agreed post-mining land use(s), closure objectives and conceptual landform design diagram?	Y		Section 6.2
13	Does the MCP identify all potential (or pre-existing) environmental legacies, which may restrict the post mining land use (including contaminated sites)?	Y		Section 6.3
	Identification and Management of Closure Issues			
14	Does the MCP identify all key issues impacting mine closure objectives and outcomes?	Y		Section 7.0
15	Does the MCP include proposed management or mitigation options to deal with these issues?	Y		Section 7.0
16	Have the process, methodology, and rationale been provided to	Y		Section 7.0

	justify identification and management of the issues?			
	Closure Criteria			
17	Does the MCP include an appropriate set of specific closure criteria and closure performance indicators?	Y		Section 9.0
	Closure Financial Provisioning			
18	Does the MCP include costing methodology, assumptions and financial provision to resource closure implementation and monitoring?	Y		Section 10.2
19	Does the MCP include a process for regular review of the financial provision?	Y		Section 10.3
	Closure Implementation			
20	Does the reviewed MCP include a summary of closure implementation strategies and activities for the proposed operations or for the whole site?	Y		Section 11.0
21	Does the MCP include a closure work program for each domain or feature?	Y		Section 11.0
22	Have site layout plans been provided to clearly show each type of disturbance?	Y		Figure 4
23	Does the MCP contain a schedule of research and trial activities?	Y		Section 11.3
24	Does the MCP contain a schedule of progressive rehabilitation activities?	Y		Section 11.4
25	Does the MCP include details of how unexpected closure and care and maintenance will be handled?	Y		Sections 11.4 & 11.6
26	Does the MCP contain a schedule of decommissioning activities?	Y		Section 11.7
27	Does the MCP contain a schedule of closure performance monitoring and maintenance activities?	Y		Section 12.0
	Closure Monitoring and Maintenance			
28	Does the MCP contain a framework, including methodology, quality control and remedial strategy for closure performance monitoring including post-closure monitoring and maintenance?	Y		Section 12.0
	Closure Information and Data Management	Y		Section 13.0
29	Does the mine closure plan contain a description of management strategies including systems, and processes for the retention of mine records?	Y		Section 13.0
30	Confidentiality	N/A		

Corporate Endorsement:

"I hereby certify that to the best of my knowledge, the information within this Mine Closure Plan and checklist is true and correct and addresses all the requirements of the Guidelines for the Preparation of a Mine Closure Plan approved by the Director General of Mines.

Name: _____ **Signed:** _____

Position: _____ **Date:** _____

(NB): The corporate endorsement must be given by tenement holder(s) or a senior representative authorised by the tenement holder(s), such as a Registered Manager or Company Director.

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FIGURES

TABLES

APPENDICES

1.0 SCOPE AND PURPOSE

This Mine Closure Plan is submitted in support of a Mining Proposal for M70/1240 dated October 2016. This closure plan defines the approach to be used for the eventual closure of mining activities of WA Bluemetal's (WAB) hardstand area to store stockpiled aggregate products from the adjacent quarry, overburden bund and settling basins for water management of the site.

Although final closure will not occur for many years, rehabilitation of completed areas of mining will occur progressively, limiting the disturbed area at any point in time. This plan defines the environmental impacts of the project and provides a summary of the proposed closure works to be implemented.

2.0 PROJECT SUMMARY

2.1 Ownership

Once M70/1240 is granted the tenement will provide additional land for mining activities and extend the operating life of the existing quarry in Lot 901. Under the agreement, in return WAB has provided land with high conservation value as environmental offsets.

Tenement	Area (ha)	Date Pegged	Status	Holder(s)
M70/1240	84.0000	15/06/2005	Pending	Ransberg Pty. Ltd.

Table 1: Mining Tenements

The environmental management of this project involves the provision of offsets to the State Government.

Land Description	Area (ha)	Address
Lot 902 on Plan 61651	48.6647	Lot 902 South Western Highway, Whitby WA
Lot 502 on Deposited Plan 59680	362.175	Lot 502 Whitfield Springs Road, Beermullah WA

Table 2: Environmental Offsets

The tenement holder of M70/1240 is Ransberg Pty. Ltd. trading as WA Bluemetal. Correspondence should be addressed to Head Office.

WA Bluemetal – Head Office
401 Spearwood Avenue Bibra Lake Western Australia
PO Box 1404 Bibra Lake WA 6965
Ph 08 9434 2299
Fax 08 9434 1513

WA Bluemetal – Whitby Quarry
Lot 901 South Western Highway Western Australia
PO Box 1404 Bibra Lake WA 6965
Ph. 08 9525 5200 (Weighbridge)

Registered Quarry Manager:
David Della Bona/ Director
WA Limestone
PO Box 1404 Bibra Lake WA 6965
Ph. 08 9434 2299

2.2 Project Description

The mining activities proposed for this Mining Closure Plan M70/1240 are defined as a hardstand area to store stockpiled aggregate products from the adjacent quarry, overburden perimeter bund and settling basins for water management of the site.

The proposed activities on M70/1240 will allow the existing Whitby quarry in Lot 901 to continue operating which is close to reaching its maximum area. The quarry pit (Lot 901) is progressing at a fast rate towards the existing stockpile area, resulting in limited space to continue operations. Furthermore, the overburden from the Lot 901 quarry must be removed before excavation of the hard rock materials lying below can continue. The provision of adequate storage space for the overburden on M70/1240 is required.

WAB land holdings originally straddled Manjedal Brook, with Ministerial approval to quarry on the southern side of the brook. For a number of economic and environmental reasons, the creation of a second quarry pit on the southern side of Manjedal Brook was considered undesirable. Through consultation with key stakeholders including the Department of Environment and Conservation, Department of Mines and Petroleum, Western Australian Planning Commission and the Shire of Serpentine Jarrahdale it was mutually agreed that it would be preferable for the existing quarry operations to extend to the northeast into the State Forest instead of south across Manjedal Brook.

The result of the consultation process was an in-principle agreement by the stakeholders to exchange WAB land south of Manjedal Brook for a portion of State Forest to the east of the quarry. It was further agreed that this process would involve the pegging of a Mining Lease (M70/1240) over the State Forest No.22 exchanged for Lot 902 & 502. This area of land in the State Forest No.22 was excised from State Forest January 2016.

As an interim measure until freehold conversion takes place, the Department of Lands (DoL) will be issuing WAB a Section 91 Land Administration Act 1997 Licence for the purpose of “Access” for a term of five years. The DMP have provided approval and the DPaW have provided information to support the submission to the Minister for Lands.

In the future WAB objective is to convert M70/1240 to freehold tenure and ownership transferred to WAB.

2.3 Mining Operations

Mining activities for this proposal consist of a hardstand area to store stockpiled aggregate products from the adjacent quarry, overburden perimeter bund and settling basins for water management of the site.

Plant consists of CAT 980 and 988 wheel loaders, 50 tonne dump trucks and various service, fuel, water trucks and light vehicles.

The initial mining operations into M70/1240 will see an area of approximately 9ha cleared, topsoil stripped and laterite gravel excavated for sale as roadbase. This will then provide a new area for hardstand and overburden placement.

It is anticipated once the mining proposal is approved the overburden from the excavation in Lot 901 will be placed around the perimeter of M70/1240 in a form of a bund, refer to the Proposed Site

Plan (Figure 5) for details. Excavation and stockpiling of the overburden material is to occur during summer months when the overburden is in a workable state, in a staged campaign over several years.

2.4 Location and Site Plan

WAB Whitby Quarry is located approximately 35km southeast of Perth and 4km northeast of Mundijong at approximately 408700E, 6427300N (GDA 94 MGA Zone 50), with access from South Western Highway. Refer to Figure 3 for the Location Plan.

M70/1240 lies back from the brow of the Darling Scarp, north-east of the current quarry operations (Lot 901). The site is located on the western edge of land formerly known as State Forest No.22, which has recently been excised from State Forest. The tenement is within the State Agreement Area ML 1SA, held by Alcoa of Australia.

The layout of the site consists of an existing weighbridge at the base of the scarp with a sealed access road up the scarp to the quarry operations. Adjoining M70/1240 is a single pit being operated by WAB over the crest of the scarp with the processing area to the east of the pit. A plan of the current site layout is provided at Figure 4.

2.5 Environmental Management System

WAB is committed to environmentally responsible mining in Byford. This commitment is recognised, communicated and achieved through the implementation of WAB Environmental Management System (EMS). The site is ISO: 14001 certified and guided by WAB Environmental Policy which governs all of its operations such that they:

- Protect and enhance the natural environment.
- Perform all operations and workplace activities to minimise impact to the environment.
- Continual improvement in environmental performance.

WAB is committed to undertaking all phases of its business activities in an environmentally responsible manner and, through effective management practices, aims to minimise environmental impacts at every stage of work.

Our commitment to the following guiding principles is fundamental in carrying out the company's environmental policy:

To comply with environmental, safety and health laws and regulations, and to consider environmental aspects as an essential element when evaluating new projects, products, and operations.

- To establish objectives and targets aimed at the prevention of pollution by reducing the generation of waste, recycling waste that is generated, and properly disposing of waste that cannot be recycled.
- To encourage the conservation of energy, water, and natural resources through increased efficiency and continual improvement in environmental performance.
- Where applicable rehabilitate sites or disturbed areas by company activities to comply with the Environmental Management Plans.

- To provide employees with a better understanding of environmental issues and the company's commitment, policies, and programs to preserve and improve the environment.
- Compliance with all relevant Acts, Regulations, and industry standards.

Through this EMS, rehabilitation and closure aspects across all of its operations are addressed by:

- Environmental risks are identified, analysed and evaluated, and controls established.
- Responsibility for meeting environmental objectives, targets and obligations, and the implementation of controls are clearly communicated.
- Regular checks are undertaken to determine whether environmental objectives, targets, obligations and controls are being met.
- Environmental performance is monitored and reviewed to ensure continuous improvement.

3.0 IDENTIFICATION OF CLOSURE OBLIGATIONS AND COMMITMENTS

This closure plan is for M70/1240, the closure obligations and commitments will need to be adjusted when conditions are placed on the tenement. These commitments will be updated as required.

Conditions are likely to be applied by the following authorities outlined in Table 3.

Department	Nature of Conditions	Comment
Department of Mines and Petroleum	General Conditions relating to Closure	Will be attached during the approval process for M70/1240.
Department of Mines and Petroleum	Commitments made in the Mine Closure Plan such as meeting completion criteria.	These cannot be made until DMP have approved the Mine Closure Plan.
Department of Mines and Petroleum	Conditions of Clearing Permit	Will be attached during the approval process for any clearing on M70/1240. Application cannot be made until granting of the tenement.
Commonwealth EPBC Act 1999	If the project is assessed as a Controlled action under the EPBC Act then conditions may be applied relating to closure and/or offsets.	Application cannot be made until granting of the tenement.

Table 3: Legal Obligations Register

3.1 Environmental Protection Act 1986

Rehabilitation and mine closure is regulated by the EPA under Part IV of the EP Act. The EPA applies the following objective to the assessment of mine closure and rehabilitation:

To ensure that premises can be closed, decommissioned and rehabilitated in an ecologically sustainable manner, consistent with agreed outcomes and land uses, and without unacceptable liability to the State.

The EPA has developed policies to assist with achieving its objective. These include policies and guidance notes on the use of the precautionary principle, the conservation of biological diversity and ecological integrity, and waste minimisation. The following regulatory position and guidance statements set the framework for the management of rehabilitation and mine closure:

- DMP and EPA ((2011);(2014)) Guidelines for Preparing Mine Closure Plans.
- EPA (2006) Guidance Statement No 6: Rehabilitation of Terrestrial Ecosystems.

The following position and guidance statements are relevant to the management of rehabilitation and mine closure:

- EPA Guidance Statement Number 33: Environmental Guidance for Planning and Development (2008).

3.2 The Commonwealth Environment Protection and Biodiversity Conservation Act 1999

Under this Act (EPBC Act), a proponent whose actions have a potential significant impact on a matter of National Environmental Significance must be referred to the Commonwealth Minister for the Environment for a decision as to whether assessment is required under the provisions of that Act. A bilateral agreement has been reached between Western Australia and the Commonwealth about approval under the EPBC Act.

3.3 Mining Act 1978

Operations are located within tenements dedicated to the *Mining Act 1978.* However this will have limited application in terms of rehabilitation and mine closure once the land is converted to freehold tenure.

Mining activities for Basic Raw Materials on freehold land cannot be approved under the Mining Act. Where Basic Raw Materials occur on freehold land they are not defined as a mineral for the purposes of the Mining Act 1978. However, extraction does require approval under the Planning and Development Act 2005 and is administered by Local government through the grant of an Extractive Industry Licence and Planning Approval.

Therefore when the freehold conversion occurs, all approvals issued under the Mining Act (including this Closure Plan) will cease to have effect.

3.3 Aboriginal Heritage Act 1972

The *Aboriginal Heritage Act 1972* provides for the recognition, protection and preservation of Aboriginal sites in Western Australia. WAB consults regularly with the Traditional Owners on all aspects relating to the identification, protection and management of their cultural heritage. A Heritage survey was completed for the entire tenement with no aboriginal sites found.

3.3 Closure Standards and Guidelines

WAB has applied the following closure standards and guidelines to ensure environmentally sound development of the Whitby operations:

- Environmental Guidelines for the Management of Quarries, Department of Mines Western Australia 1991.

4.0 COLLECTION AND ANALYSIS OF CLOSURE DATA

4.1 Flora

A flora assessment of M70/1240 was commissioned by WAB and undertaken by Mattiske Consulting in October 2005. The vegetation within M70/1240 principally consists of Jarrah (*Eucalyptus marginata*) forest with areas of large Marri (*Corymbia calophylla*), She-oak (*Allocasuarina fraseriana*) woodland, Parrotbush (*Dryandra sessilis*) thickets, and areas of low heath.

A total of 161 flora taxa from 47 Families, 105 genera and 159 species were recorded. One Priority 2 species was collected in this area; namely *Millotia tenuifolia* var. *laevis*. Eleven species of introduced plant (i.e. weeds) were found in M70/1240. No rare flora or Threatened Ecological Communities were recorded.

M70/1240 is within State Forest No.22, which has recently been excised from State Forest. The site has been degraded by extensive historical logging. The area has also been subject to past fires with subsequent weed invasion and there is evidence of dieback.

4.2 Fauna

A Level 1 fauna assessment was commissioned by WAB and undertaken by Western Wildlife in January 2006 (Appendix 3). The survey assessed both M70/1240 and the area now covered by Lot 902. The assessment identified through a desktop investigation of fauna databases, 12 Amphibian, 44 Reptile, 92 Bird and 26 Mammal species as potentially occurring within M70/1240, including a number of threatened species of national conservation significance.

The list of threatened species was recently reviewed by Western Wildlife (Appendix 8). The major changes included the deletion of the previously listed Conservation significance (1) Carpet Python *Morelia spilota imbricate (now listed as a Priority 4 only).* Species that are placed in priority 4 are adequately known, are rare but not threatened or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons. The Carpet Python was not recorded during the fauna study in 2006.

The review also noted the inclusion of the Southwestern Brush-tailed Phascogale *Phascogale tapoatafa.* The Southwestern Brush-tailed Phascogale is not listed under the EPBC Act, but is now ranked under the *Wildlife Conservation Act 1950* as a Schedule 3 (*Vulnerable)*. During the 2006 fauna study there were no records of this species.

The assessment found that the vegetation is likely to support a range of species. However degradation of the site by logging, fire and weeds has impacted upon the quality of the habitat and the number of species able to be supported.

WAB commissioned Wetland Research & Management to undertake a targeted Western Petaltail Dragonfly (Petalura hesperia) assessment of Manjedal Brook in 2007. The species is listed as 'Near Threatened' by the IUCN Conservation Status listing. The assessment found no evidence of the dragon fly occurring within the vegetation. Lot 901 and M70/1240 are considered not suitable for P. hesperia breeding habitat and as such the mining activities is unlikely to impact the species.

4.3 Geology

M70/1240 is underlain by felsic to intermediate gneisses and diorite/dolerite dykes. The hard rock varies from very-fractured, and in localised places sheared rock, through to areas where there are less joints and the rock is more massive. The resource continues to depth and is only limited by the design of the quarry and the width that can be achieved within the constraints of the land holding.

4.4 Soil and Soil Profiles

The soils of the resource area have a laterite profile with gravel overlaying a layer of duricrust approximately one metre thick, over variable depth of subsoils of between 1 to over 20 metres (average 13 metres) of gibbsite material grading into light to white coloured kaolin clay and then saprolite (weathered rock) close to the granite basement.

4.5 Hydrology

4.5.1 Surface Hydrology

The site is free-draining but is centred on the northern slopes of Manjedal Brook. The Manjedal Brook does not intersect the mining lease and is within State Forest. There are no significant surface drainage lines or creeks within the proposed project area. The seepages are only active during winter months and will be captured by the settlement basins to prevent discharge into Manjedal Brook. See Surface Water Management Figure 6 for details.

The Munjedal Brook has been tested and the following baseline results are show in Table 4.

Date	Parameters	Results
15/09/2016	pH	7.4
15/09/2016	EC	420
15/09/2016	TSS	<5

Table 4: Manjedal Brook Baseline Water Quality Data

All surface water from the proposal area will be fed to a series of three settlement basins located in the south east corner of the site. A discharge point from the final settlement basin releases the treated clean stormwater to Manjedal Brook. This is unlikely to overflow due to the capacity of the three basins proposed. The proposed overflow basins have a similar function and connection to the Manjedal Brook as the dams in Lot 901. This water management technique has been used in the existing quarry operations (Lot 901) for over 20 years and proven to be effective.

The primary focus of quarry water management is to prevent sedimentation impacts on the Manjedal Brook. This will largely be achieved by capturing of water away from Manjedal Brook. These sediment dams will not only act as a capture point for subsequent water use on site, but also as sedimentation basins, ensuring any overflow is free from suspended particles. The key indicator for water monitoring will therefore be total suspended solids (“TSS”). Other water quality parameters to be monitored and proposed trigger levels and mitigation measures are included in Table 5.

Surface water runoff will be managed to ensure that the quality of water in the Manjedal Brook is not impacted by the proposal. This will be verified by water quality monitoring, which will include monitoring the overflow point from the settling basins before being discharged into the Manjedal Brook.

The overflow will be periodically monitored from the overflow discharge point, if the water is found to be discharging into the Manjedal Brook samples will be taken from the overflow point. Monitoring and manual sampling will be undertaken by WAB personnel on a monthly basis, commencing from first flow in the Manjedal Brook until flow ceases (approximately June through to October) each year.

This method of monitoring and sampling is a condition under the DER Licence for the neighbouring WAB Whitby quarry (Lot 901). The monitoring has proven to be effective, including all emission points to surface water have been within the DER emission limits, this demonstrates the water management technique proposed will be effective.

Any surface water discharging will be sampled and analysed at the overflow discharge point shown in the Surface Water Management Plan Figure 6. The following parameters shown in Table 5 will be tested.

Site	Frequency	Parameters
Settlement basin overflow discharge point	Commencing from first flow, on a monthly basis monitoring and manual sampling until flow ceases (approximately June through to October) each year	pH, EC, and TSS

Table 5: Surface Water Monitoring

The sediment collecting basins will be completed prior to construction works of overburden and hardstand.

All overburden areas will be rehabilitated within 12 months of placement of the final landform surface to reduce potential erosion.

Based on the proposed low impact operations to occur on the mining lease area and the control measures planned to manage the surface water, no significant impact should occur on the environmental quality of receiving waters.

4.5.2 Groundwater Hydrology

There will be no intersection of the groundwater from this proposal, the Mining Proposal is for shallow excavation only to extract laterite and construct a hardstand.

The quality of the regional groundwater will not be affected by the closure of the mining activity area. A deep watertable is contained within the granitic basement mostly located within fractures in the rock. The water table is at depth, near or below the elevation of the local creeks with some perched and isolated water occurring fractures within the granite at a higher elevation. Minor seepages are encountered in the existing pit, however these are just perched water filled fractures and do not represent the water table. The granite is tight and forms an aquiclude or aquitard.

Basement granite such as this does not normally produce sufficient groundwater for exploitation. If any larger water source is present it will be in large fractures which do not occur on the resource area. The resource area was selected on the basis of minimising then number of fractures present, so water encountered during excavation is anticipated to be minimal to nil.

4.6 Local Climatic Conditions

The climate of the area is warm Mediterranean with cool wet winters and hot dry summers. The summer months are controlled by the low pressure heat troughs which develop southwards between the highs.

Rain falls mainly in winter with 80% falling between May to September inclusive. Evaporation exceeds rainfall in all but the four wettest months May to September.

In summer the prevailing winds are easterly in the morning and south-westerly in the afternoon. In winter the dominant wind direction is less distinct. Of particular significance are the strong katabatic easterly air flows occurring on summer mornings which can contribute to dust management issues.

Temperature inversions can occur on still winter mornings which may influence the distance noise is transmitted. Data from Perth Airport shows that 90% of inversions are broken up by solar heating alone by 12:30pm, and 100% by 2:00pm.

Statistic	**Karnet** BOM Site ID: 009111 (17km south)
Mean annual max. temp. (°C)	22.5
Highest max. temp. recorded (°C)	44.5 (23 Feb 1991)
Mean annual min. temp. (°C)	10.5
Lowest min. temp. (°C)	-2.0 (1 August 1994)
Mean annual rainfall (mm)	1156.9

Table 6: Climate Statistics

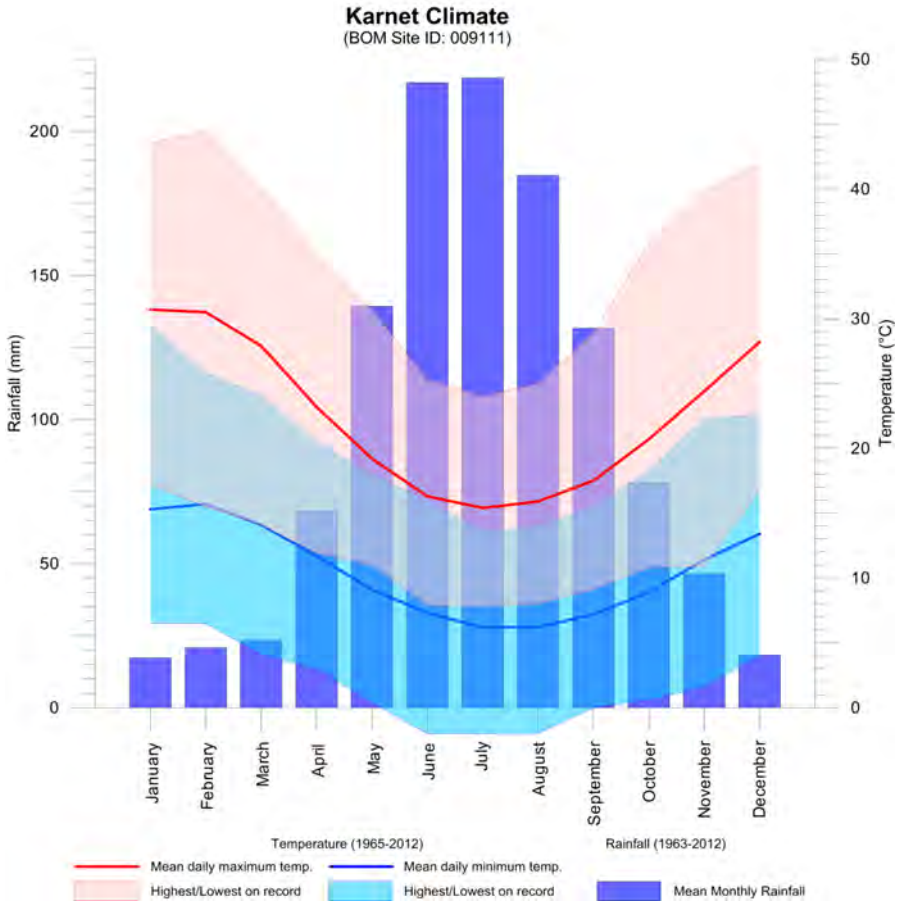

Figure 1: Climate Statistics

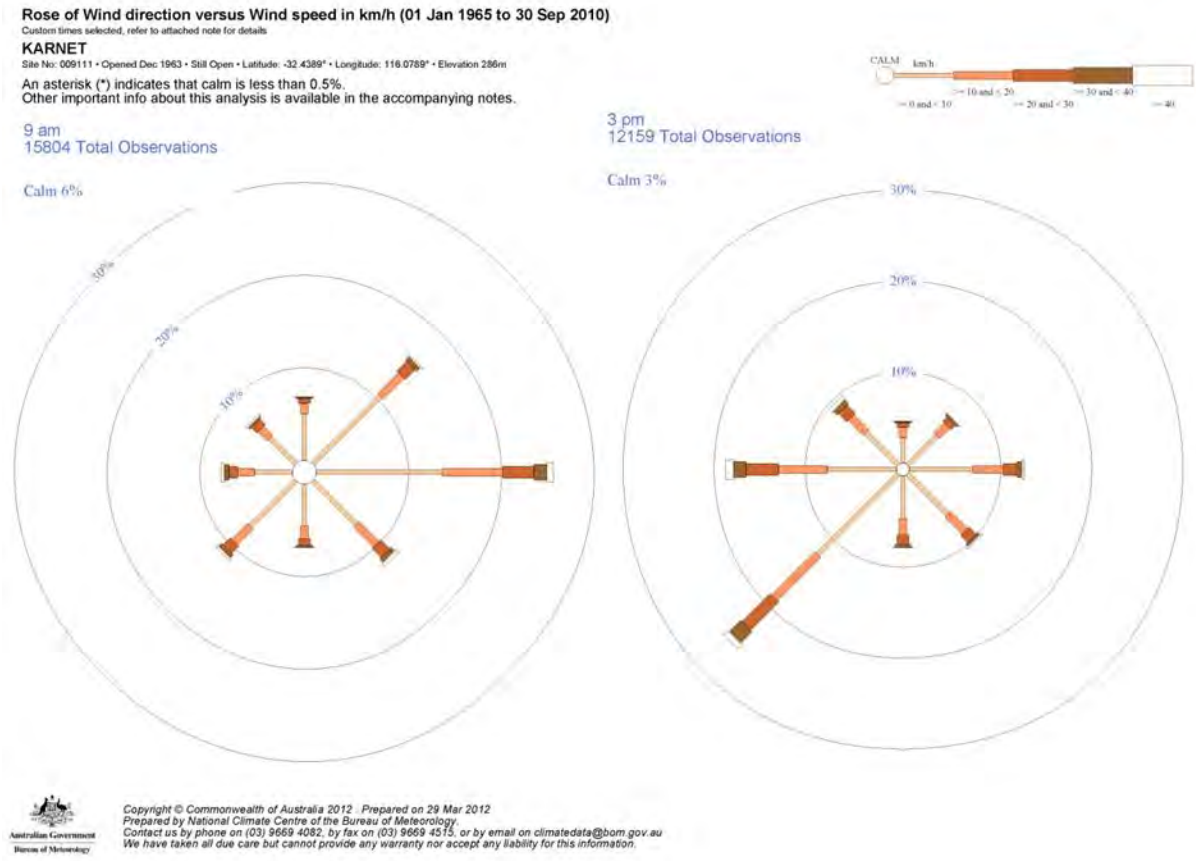

Figure 2 Wind Roses

4.7 Heritage

4.7.1 Indigenous Heritage

There are no registered sites recorded in the Department of Indigenous Affairs – Aboriginal Heritage Inquiry System within M70/1240 or the existing quarry. The nearest recorded site (No: 4623) is more than 2,000 metres from M70/1240 at the base of the scarp.

WAB commissioned R & E O'Connor Pty Ltd to carry out an Aboriginal Heritage Survey of M70/1240 in consultation with six members of the Gnaala Karla Booja native title group on 15th August 2015. The report was prepared by anthropologist R.O'Connor- Aboriginal Heritage Survey of M70/1240 (Appendix 5). The field inspection found no Aboriginal sites within the tenement. Therefore Aboriginal heritage considerations should not be deemed an impediment to the proposed development of a quarry and associate activities within M70/1240.

WA Limestone recognises that it has obligations under Section 15 of the *Aboriginal Heritage Act 1972* to inform the DIA should any archaeological material be encountered during ground disturbance.

4.7.2 European Heritage

There are no registered sites of European heritage within the project area. Whitby Falls Hostel, listed by the Heritage Council of Western Australia (Place Number: 8064), is 2,270 metres from M70/1240 at the closest point. Whitby Falls is currently leased to Murdoch University, who WAB have consulted with and currently have involvement in cooperative research projects.

Given the separation distance between the mining activities and the hostel it is considered highly unlikely that any impact will occur by this Mining Proposal. Murdoch University have been consulted with and have no objection to this proposal.

4.8 Social Environment

The mining activities on M70/1240 are proposed to commence in an area of native vegetation to the north east, into land recently excised from State Forest No.22.

To the east of the site is State Forest, which also contains the Manjedal Scout Camp. The camp is currently 280 metres from the proposed activities. Representatives of the Scout Camp have previously expressed their desire to move the camp further to the south east. Negotiations have commenced and will continue with respect to assistance with moving the permanent facilities further to the south east when the quarry eventually moves north east, in order to maintain a similar or greater buffer.

To the north west of M70/1240 is the Hanson Byford quarry. This quarry is proposed to eventually extend south to the northern boundary of WAB and between M70/1240 and the scarp.

To the west is the Quarry Farm Function Centre (formerly Tumbulgum Farm). This property was acquired by WAB in 2012 after being largely disused in recent years. The centre is currently being used as a function centre managed by WA Limestone.

The new Whitby urban development site is in early stages of construction, currently 2,070m away, on the western side of the South Western Highway. According to the *Shire of Serpentine-Jarrahdale Whitby Local Structure Plan July 2012*, larger residential lots will be located around the eastern edges of the structure plan, which will provide a design response to noise.

South of the quarry and M70/1240 is State Forest. Lot 902, directly south of the current quarry was formerly owned by WAB and was originally to be the area of future expansion for the quarry. As part of this current land swap process involving M70/1240, this land was subdivided and donated to the State Government and community for inclusion into the State Forest.

4.9 Information Gap Analysis

A review of the closure information and potential closure issues has revealed no knowledge gaps. The proposed closure is a continuation of current and proven rehabilitation techniques. Therefore WAB believes there are no significant information gap exists pertaining to mine closure for this project.

5.0 STAKEHOLDER ENGAGMENT STRATEGY

WAB conducted regular community consultation meetings and maintains a community feedback and complaints management system.

Regular inspections of the project by the DMP, DER and Shire of Serpentine Jarrahdale (typically annually) and regular statutory reporting provide comprehensive awareness and feedback on the operations and environmental management of the project.

All key stakeholders have previously been consulted in relation to M70/1240 and have provided letters of support for the proposal. See Appendix 1.

As the operations are proposed to continue for in excess of 100 years, ongoing stakeholder consultation is proposed.

The consultation will continue, and copies of the Mine Closure Plan will be forwarded to the relevant departments as listed in Table 8. The table will be updated as required as additional consultation is needed prior to and during operations.

5.2 Stakeholder Identification

The identification of stakeholders relevant to rehabilitation and closure is to identify parties with an interest in the ongoing environmental management of the operation for the remaining life of mine and post-closure. The following have been identified as key stakeholders for the closure process:

- Department of Mines and Petroleum
- Department of Parks and Wildlife
- Department of Environment Regulation
- Shire of Serpentine Jarrahdale (Local government authority)
- Traditional land owners
- Local Community

5.2 Stakeholder Engagement Register

Consultation	Stakeholder	Comment
The Mining Proposal will be sent to DPaW for comment.	Department of Parks and Wildlife	Past consultations through previous versions of the DPaW. DPaW approved Mining activities on the tenement.
The Mining Proposal will be sent to DoW for comment.	Department of Water	No comments are available.
A Clearing Permit Application.	DMP	No comments. The application has not been lodged.
Notification of traditional owners	Traditional land holders	Agreement has been reached with the registered claimants
Progressing the land exchange	Department of Lands	DoL advised the DMP provided a section 91(5) approval – DPaW provided support of the submission to the Minister of Lands. DoL are required to complete the freehold transfer of land to WAB. The s91 licence is only a temporary protection on the land until this occurs. WAB is waiting for native title to be extinguished so the land can be converted to freehold and transferred to WAB.
Referral of Mining Proposal to EPA	EPA	Determined that a formal assessment was not required and that the proposal could be assessed under the provisions

Consultation	Stakeholder	Comment
		of the Environmental Protection (Clearing of Native Vegetation) Regulations 2004.
On-going consultation	DMP	No conditions currently in place.
Discussions with Alcoa	Alcoa	Alcoa support the granting of M70/1240 Letter attached as Appendix1.
Discussions with the Shire of Serpentine	Local Government Agency	The Shire of Serpentine Jarrahdale has provided in-principle support for the granting of M70/1240.

Table 7: Stakeholder Consultation

5.3 Stakeholder Engagement Process

Stakeholder	Description of Consultation	Consultation Frequency
Department of Mines and Petroleum	• Mines Safety • Environmental Approvals & Reporting	• Site Inspections • Reporting on as-required basis
Department of Mines and Petroleum	• Clearing of Native Vegetation	• Annual Reporting • Site Inspections
Department of Lands	• Progression of land swap	• As required
Local Community	• Community Meetings • Complaints Management System	• As required
Traditional Landowners	• Native Title • Heritage	• As required

Table 8: Consultation Schedule

6.0 POST-MINING LAND USE(S) AND CLOSURE OBJECTIVES

It should be noted that the land within M70/1240 is to be converted to freehold tenure and ownership transferred to WAB. Once this occurs, all closure obligations and liabilities will be regulated under the Local Government Act through Planning Approval and Extractive Industry conditions.

All closure objectives and proposed post-mining land use(s) are to be considered as “Provisional” and subject to further refinement and amendment over the remaining life of the operation.

6.1 Mine Closure Objectives

The objectives of the mine closure plan are:

Compliance

- The disturbed areas within the tenement shall be made safe and the closure requirements of all relevant regulatory authorities are to be met. No unsafe areas will remain after closure whereby members of the general public and animals could be harmed.

- All legally binding conditions and commitments relevant to mine closure will be met.

Landform

- The completed landform will be stable and compatible with the post-mining landuse and local topography.

- Rehabilitated and closed operational areas will be aesthetically consistent with the surrounding landform and meet agreed stakeholder expectations.

Revegetation

- Disturbed areas to be rehabilitated with vegetation of density and diversity compatible with the local natural ecosystem.
- Establish rehabilitation objectives and completion criteria, based on the findings of previous monitoring and research, which are appropriate to the agreed post-mine land use.
- Where practicable, progressively rehabilitate and revegetate disturbed areas in accordance with regulatory criteria.
- Construct safe, stable, non-polluting landforms that are geomorphologically and functionally compatible with the surrounding landscape and capable of sustaining agreed post-operational land use, and do not impact on surrounding environmental values or uses.
- Revegetate disturbed areas to meet agreed post-operational land use objectives and completion criteria.

Water Management

- Surface and groundwater hydrological patterns/flows not adversely affected.
- There shall be no long term reduction in the availability of water to meet local environmental values.
- No significant long-term physical off-site impacts will occur as a result of operations.
- No significant long-term impact on baseline surface or groundwater flow patterns and quality will occur as a result of operations.

Infrastructure and Waste

- No infrastructure left on site unless agreed to by regulators and required for the post-mining landuse.

Stakeholders

- Ensure the interests of all relevant stakeholders are considered during all stages of closure planning.

6.2 Post-Mining Land Use

This Mine Closure Plan has been developed for M70/1240 with the intention the land will eventually be converted to freehold land, and regulated by the Shire of Serpentine under an Extractive Industry Licence and Planning Approval.

WAB expects the Post-Mining Land uses will be split into the following categories:

- Overburden will be progressively rehabilitated as soon as practicable after it is placed. The rehabilitation of the overburden bund is to be in accordance with the relevant sections of the Rehabilitation Plan (2005) see Appendix 6. These rehabilitation techniques are compatible with the Environmental Guidelines for the Management of Quarries, Department of Mines Western Australia 1991. The Minister for the Environment approved the project and therefore approved the Rehabilitation Plan; this was also accepted by the EPA and the Shire of Serpentine.

- Following cessation of the hardstand area, the land use of the area will be converted to pastoral (low intensity livestock grazing). This will also include access tracks and internal roads.

- All sediment dams will remain in use as farm dams or water points for fire control after mine closure.

6.3 Legacy Environmental Issues

Mining lease M70/1240 is within mining tenement ML 1SA, held by Alcoa of Australia. WAB is not aware of any previous exploration or mining activity within M70/1240 and no ground disturbance from mining has been identified. Alcoa support the granting of M70/1240 and the transfer of the land to freehold tenure.

The tenement area was previously part of State Forest No.22 where extensive logging occurred in the past. This disturbance has been largely rehabilitated by natural regrowth albeit to a poorer condition than undisturbed vegetation of the region. The area has additionally been subject to past fires with subsequent weed invasion and there is evidence of dieback.

The presence of exotic weeds and dieback within the tenement are considered to be legacy environmental issues and will be addressed by the appropriate procedures. No other previous environmental contamination or legacy issues have been identified within M70/1240.

7.0 IDENTIFICATION AND MANAGEMENT OF CLOSURE ISSUES

There are no significant closure issues that require management. No major infrastructure or buildings such as works shop, fuel storage areas or magazine compounds are proposed for the site. No tailings, ponds, adverse soil or other materials or features are located on site.

7.1 Hazardous Materials

No hydrocarbons proposed to be stored within M70/1240.No hazardous materials are utilised by the mining operation. Hydrocarbons for the mining activities are stored in the neighbouring quarry (lot 901) and managed in accordance with the *Dangerous Goods Safety Act 2004* and associated regulations, and the DMP Code of Practice for the Storage and Handling of Dangerous Goods (2nd edition).

All waste hydrocarbons are collected by licensed contractor and disposed of at approved licensed facilities.

7.2 Surface and Groundwater Quality

No significant closure issues have been identified in relation to surface or groundwater quality that requires management.

7.2.1 Surface Water

The site is free-draining but is centred on the northern slopes of Manjedal Brook. There are no significant surface drainage lines or creeks within the proposed project area. The seepages are only active during winter months and will be captured by the settlement basins to prevent discharge into Manjedal Brook. See Surface Water Management Figure 6 for details.

Surface water runoff will be managed to ensure that the quality of water in the Manjedal Brook is not impacted by the proposal. This is discussed in more detail in Section 5.2.1.

Baseline water quality data for the Manjedal Brook is provided in Table 4. Based on the proposed low impact operations to occur on the mining lease area and the control measures planned to manage the surface water, no significant impact should occur on the environmental quality of receiving waters.

The drainage system and surface water management requirements will be regularly reviewed and adjusted as the mining operation progresses.

All sediment dams will remain in use as farm dams or water points for fire control after mine closure.

7.2.2 Groundwater

There will be no intersection of the groundwater from this proposal, the Mining Proposal is for shallow excavation only to extract laterite and construct a hardstand.

The floor of the existing quarry pit (Lot 901) is above the water table and there is no evidence from drilling that the base of the pit will go below the water table.

The granite basement is tight and of very low permeability, which ensures that the risk from pollution is very low. In addition the groundwater contained within the granite is not in the aquifers that are locally used. The aquifers used locally are alluvial sediments in valleys that are perched on top of the granite basement.

Quarrying is a clean industry, well known for minimal risk to aquifers. No closure issues have been identified in relation to groundwater quality.

7.3 Dust Emissions

Whilst the quarry is operating, dust suppression measures such as water carts will be able to effectively manage any dust emissions.

During the final mine closure and any temporary closures, little or no activity is anticipated on the site. Mining activities that have the potential to produce dust will not be occurring therefore the risk of dust emissions will be greatly reduced. Areas of exposed topsoil and overburden will be stabilised and/or rehabilitated at the earliest opportunity to minimise the potential for dust emissions and erosion.

Regular site inspections during temporary closures and ongoing monitoring post-closure will be undertaken. Should dust be identified as an issue, appropriate measures will be implemented to mitigate the issue.

7.4 Flora and Fauna

7.4.1 Flora

The mining operation involves the progressive clearing of the vegetation within M70/1240, which will cause some impact on local flora. In recognition of this potential impact, in consultation with the DMP, DPaW, Shire of Serpentine Jarrahdale, and WAPC a mitigation package involving substantial offsets was developed.

Mattiske Consulting found the vegetation complexes within M70/1240 to be 'well represented' within the formal and informal reserve systems. The assessment found the vegetation within Lot 902, adjacent to the quarry and part of the offsets provided by WAB to contain significant vegetation and its inclusion in the conservation estate would provide benefit to the region.

A principal consideration for this proposal is the preservation and protection of the land south of Manjedal Brook (Lot 902) and was therefore swapped for land of lower conservation value on M70/1240. WAB is surrendering land larger in size, with higher conservation value and existing ministerial approval to mine.

7.4.2 Fauna

Western Wildlife identified a number of threatened species that have the potential to occur within M70/1240 and the offset land. The assessment found the degradation of the vegetation within M70/1240 by extensive logging and weed invasion to have had a detrimental effect on the habitat values of the area.

The assessment found Lot 902 to be more significant in terms of fauna habitat and conservation value as in general the vegetation is of better condition and it provides vegetated stream and granite heath systems, which do not occur within M70/1240. The land swap will preserve the higher conservation value land on Lot 902, by transferring ownership to the State Government in return for access to M70/1240.

7.4.3 Biodiversity

M70/1240 has been assessed by Mattiske Consulting and Western Wildlife as being of lower habitat quality, sensitivity or representation, to the 48.6 hectares of habitat on Lot 902 that is to form part of the biodiversity offset. Lot 902 also contains part of Manjedal Brook which will now be permanently protected. Ownership of Lot 902 has been transferred to the State of Western Australia for inclusion into State Forest No.22.

In addition WAB purchased Lot 500 Brand Highway, Beermullah which is adjacent to the Moore River National Park. This site was identified as containing significant high value native vegetation and fauna habitat. The native vegetation within Lot 500 (363 hectares) was subdivided into Lot 502 and ownership transferred to the State of Western Australia, for inclusion into the Moore River National Park.

7.5 Visual Amenity

The Mining Lease is not visible from any public vantage point or at any location on the Swan Coastal Plain. No visual impact will occur. The operations are well set back from South Western Highway and are not visible from the Swan Coastal Plain or South Western Highway.

The hardstand area and overburden is located behind screening vegetation and will be progressively rehabilitated as they are completed, when possible.

Light overspill is highly unlikely as night operations are not proposed. The only lighting that may be required at night could be security lighting or for maintenance.

There have not been any complaints or issues identified in regard to visual impact or light overspill from the existing quarry (Lot 901) and no significant changes to site facilities are proposed by this mining proposal.

7.6 Heritage Issues

7.6.1 Indigenous Heritage

There are no registered sites recorded in the Department of Indigenous Affairs – Aboriginal Heritage Inquiry System within M70/1240 or the existing quarry. The nearest recorded site (No: 4623) is more than 2,000 metres from M70/1240 at the base of the scarp.

WAB commissioned R & E O'Connor Pty Ltd to carry out an Aboriginal Heritage Survey of M70/1240 in consultation with six members of the Gnaala Karla Booja native title group on 15th August 2015. The report was prepared by anthropologist R.O'Connor- Aboriginal Heritage Survey of M70/1240 (Appendix 5). The field inspection revealed that there are no Aboriginal sites within that tenement. Therefor it was recommended that Aboriginal heritage considerations should not be deemed an impediment to the proposed development of a quarry and associate activities within M70/1240.

WA Limestone acknowledges that it has obligations under the *Aboriginal Heritage Act 1972* to inform the DIA should any archaeological material be encountered during ground disturbance.

In recognition of the potential for unidentified sites to be present within M70/1240, WAB will engage a heritage survey in consultation with the traditional land owners to assess the area for sites of archaeological and ethnographic significance prior to any ground disturbance occurring.

7.6.2 European Heritage

There are no registered sites of European heritage within the project area. Whitby Falls Hostel is listed by the Heritage Council of Western Australia (Place Number: 8064), located 1,300 metres south west of the existing quarry and 2,070 metres from M70/1240 at the closest point.

Whitby Falls is currently leased to Murdoch University, who WAB have consulted with and are currently working on a collaborative research project together in completing a Marri Planting Research project on WAB land.

The quarry is progressing away from the Darling Scarp and sensitive receptors on the Swan Coastal Plain, including the Hostel. It is considered highly improbably that any impact will occur by the activities proposed in this Mining Proposal.

7.7 Public Access

To ensure the closed areas do not pose a risk to public health and safety, unauthorised access to the mine site will have measures in place to mitigate potential public access and hazards.

Structures will be erected to prevent inadvertent public access to areas, including bund construction. The site will continue to be fenced with locked gates installed for times when the site is unmanned. Warning signs maintained according to the Mines Safety and Inspection Act 1994, the Shire of Serpentine Jarrahdale and DMP.

Measures to mitigate public health and safety hazards will comply with relevant Acts and Regulations by undertaking activities such as:

- Provide perimeter fences, and warning signs.
- Provide regular inspections of fences and repair as necessary.
- Maintain locked gates when the site is unmanned.
- Provide out of hours supervision.

- Setback operations from perimeter fences.
- Provide a register of persons entering the site.
- Develop practices to ensure uncontrolled access is minimised.
- Provide mechanisms for uncontrolled vehicle activity on site.
- Ensure all persons entering the site report to the weighbridge and the quarry manager.
- Provide site induction for persons entering the site in line with the requirements of the Mines Safety and Inspection Act 1994.

Agreed dams, roads and infrastructure will remain and be maintained by the post mining landowner. All other disturbance will be rehabilitated as suggested in this closure plan.

8.0 RISK ASSESSMENT

8.1 Risk Assessment Methodology

There is potential to cause environmental impacts due to the nature of the operations, but with the correct design measures, and management of the site the impacts can be greatly reduced or eliminated.

WAB will ensure the environmental impacts identified will be managed in accordance with the legislative requirements, and control measures will be put in place.

A risk assessment method is used to determine the level of risk associated with each potential environmental impact. A Risk Rating Matrix is shown in Table 9. A Risk Assessment is presented in Table 10.

Any closure risks identified for the project will be addressed appropriately in Section 12 Management and Monitoring.

	LIKELIHOOD				
CONSEQUENCE	Rare	Unlikely	Possible	Likely	Almost Certain
Minor	L1	L2	L4	M7	M11
Moderate	L3	L5	M8	M12	H16
Serious	L6	M9	M13	H17	H20
Major	M10	M14	H18	H21	E23
Critical	M15	H19	H22	E24	E25

CONSEQUENCE								
Rating	Broad Definition	Occupational Health and Safety	Client	Employees	Environment and Heritage	Reputation and Community	Regulatory	Management Impact
Minor	Minor injuries. Low financial costs.	First aid injury	Compliant, Impact Local Site Only, Minor incident	Normal numbers of staff leave	Short term, negligible environmental onsite impact. Fully reversible	Community Impact, complaints but not action required. No negative coverage.	Non compliant action	Impact of event absorbed through normal activity.
Moderate	Medical treatment, on-site release contained immediately, medium financial lose.	Medical treatment	Not meeting contract requirements. Failure to renew contract	High staff turnover. General staff morale problems. Key employee leaves.	Medium environmental impact contained onsite. Fully reversible.	Brief local media coverage. Minor stakeholder complaints	Technical breach of regulation	Will require some attention by local management.
Serious	Serious medical treatment, on-site release contained immediately, medium financial lose.	Alternative work or lost time injury	Damage to reputation. Loss of premium building	Poor reputation as an employer.	Measureable environmental harm. Significant irreversible impact contained on site.	Negative local media. Sectional community impacts. Possible stakeholder and disciplinary action.	Legal issues due to non compliance	Require some local attention over several days.
Major	Extensive injuries, off site release contained immediately, major financial loss.	Serious or permanent injury	Loss of large client	Some key executives leave. Company not perceived as employer of choice.	Major Environmental hazard. Detrimental impact on and off site.	Consistent local negative attention. Public dissatisfaction. Disciplinary action likely	Breach of regulation with investigation or report to authority.	Significant event managed with careful attention. Response plan implemented
Critical	Death, toxic release with detrimental effect, huge financial loss.	Single fatality and/or serious or permanent injury to one or more people	Loss of market confidence	A large number of key executives or directors leave the company.	Catastrophic irreversible environmental harm, on and off site.	National media attention. Significant community impact. Management review.	Major breach in regulation. Shut down of Site.	Major event requires implementation of crisis and contingency plans.

LIKELIHOOD	
Rare	<1% probability, occurrence requires exceptional circumstances or only occur as a "100 year events"
Unlikely	1-20% probability, could occur but would not be expected, or could occur in years or decades
Possible	20-50% probability, might occur at some time, or could occur within "mouths to years"
Likely	50%-99% probability, will probably occur in most circumstances or could occur within "week or months"
Almost Certain	>99% probability, expected to occur in most circumstances, could occur within "days to weeks" or will occur repeatedly without corrective action being taken.

Table 9: Risk Rating Matrix

The following Risk Assessment (Table 10) is in accordance with AS/NZS ISO 31000:2009 Risk Management – Principles and Guidelines which provide a hierarchical framework to evaluate risks incorporating consequences, likelihood and control measures to prioritise the risk.

Aspect	Environmental Impact	Risk Score	Control Measures	Residual Risk
Overburden Bunds				
Landform instability	Erosion	M8	• Correct design stability. • Monitoring and inspection - weekly & monthly. • Geotechnical Stability assessment to confirm the integrity and stability of the landform. • Survey and imagery. • Progressive rehabilitation.	L4
Sediment flowing into Mundjedal Brook	Water quality	H18	• Catchment basins designed for a 1:100 year flood level. • Additional bunding to capture any drainage. • Direct runoff water to flow to sediment catchment basins. • Regular inspection of system to ensure efficient operation. • Pump water from water management dam to other storages. • Discharge as per approved licence. • Progressive rehabilitation.	L5
Overburden bund material exposed to weather conditions	Dust	M8	• Areas of exposed overburden will be stabilised and/or rehabilitated at the earliest opportunity to minimise the potential for dust emissions and erosion. • Water truck sprays used when required. • A 50 tonne dedicated water truck is maintained on site at all times during operations when dust lift off is a potential hazard. • Bunds do not normally generate dust, once they have been exposed to small amounts of rain, because the exposed particles are too coarse to blow. • Ongoing monitoring post-closure will be undertaken. • A record of all dust complaints will be retained together with the mitigation measures to be used to reduce the dust impacts.	L2
Road transport	Dust	M8	• Trucks will use designated access roads within the quarry. • Access roads are watered as necessary to reduce the generation of dust in the drier months. • Speed limit of 20km/h to be enforced within the yard.	L2
Overburden bund final landform	Visual	M8	• Operations are well set back from South Western Highway and are not visible from the Swan Coastal Plain or South Western Highway.	L1
Rehabilitation				
Poorly designed rehabilitation activities	Erosion	M8	• Follow the approved techniques outlined in the Rehabilitation Plan 2005. • Progressive rehabilitation. • Monitoring to determine strategies, species and growth media that are successful. • Mine closure plan will be continually updated to include advances in rehabilitation technology over the project's life.	L5

Aspect	Environmental Impact	Risk Score	Control Measures	Residual Risk
Rehabilitation unsuccessful results	Dust/Erosion	M8	• Follow the approved techniques outlined in the Rehabilitation Plan 2005. • WAB will monitor the rehabilitation for a period of three years. Then biennial or as required depending on performance. • Progressive rehabilitation. • Monitoring to determine strategies, species and growth media that are successful.	L5
Rehabilitation technique	Weeds	M7	• Pre-seeding weed control may be required after any potential weed seeds have been allowed to germinate. • Any weeds likely to significantly impact on the rehabilitation are to be sprayed with broad spectrum spray or grass specific spray depending on the species involved. • WAB has a weed control program in place for the existing quarry (lot 901) this will include M70/1240.	L2
Surface and Ground Water				
Sediment catchment basins overflow	Water quality	M8	• Catchment basins designed for a 1:100 year flood level. • Additional bunding to capture any drainage. • Direct runoff water to flow to sediment catchment basins. • Regular inspection of system to ensure efficient operation. • Pump water from water management dam to other storages. • Discharge as per approved licence. • Overflow periodically monitored from the spill way point. • Samples taken from the spill way point. • Monitoring and sampling on a monthly basis, until flow ceases (approx June through to October) each year.	L5
Lowering groundwater	Groundwater	L1	• A deep watertable is contained within the granitic basement, The water table is at depth, near or below the elevation of the local creeks. • No installation of bores for groundwater extraction. • Greater likelihood of infiltrating rain and water recharging.	L1
Contamination	Groundwater	L2	• All fuel is currently stored on Lot 901 with no hydrocarbons proposed to be stored within M70/1240. • Refuelling is carried out using dedicated mobile tankers. • Waste hydrocarbons collected by a licensed contractor and disposed of at approved licensed facilities. • All oils are removed from vehicles by an 'E-vac' system and stored on the service truck. • A fuel spill kit is carried on the truck for minor spills during re-fuelling. • All fluids are disposed from the fuel truck at appropriate licensed facilities.	L1
Dust Emissions				
Mining activities that have the potential to produce dust	Dust	L4	• No mining activities that have the potential to produce dust will be occurring. • Areas of exposed topsoil and	L2

Aspect	Environmental Impact	Risk Score	Control Measures	Residual Risk
			overburden will be stabilised and/or rehabilitated at the earliest opportunity to minimise the potential for dust emissions and erosion. • A 50 tonne dedicated water truck is maintained on site at all times during operations when dust lift off is a potential hazard. • Regular site inspections during temporary closures and ongoing monitoring post-closure will be undertaken.	
Flora and Fauna				
Progressive Clearing of the vegetation	Flora	M13	• Developed mitigation package involving substantial offsets. • Vegetation clearing to be progressive and minimised to that required for each stage of excavation. • Minimising the amount of ground open. • Maintain tree buffers.	M7
Progressive Clearing of the vegetation	Fauna	M13	• Vegetation clearing to be progressive and minimised to that required for each stage of excavation. • When clearing, clear towards remaining native vegetation in order to encourage large vertebrate fauna to move into un-cleared vegetation. • Avoid creating patches of isolated native vegetation (i.e. a patch of vegetation surrounding by cleared land). • Appropriate re-vegetation of the site should be undertaken after mining activities have finished.	M7
Clearing of the vegetation	Dust	M8	• Minimising the amount of ground open. • Maintain tree buffers. • Clearing during wetter times; April to October. • Cease operations during adverse weather conditions.	L2
Heritage				
Aboriginal sites disturbed	Heritage	M13	• No Registered Aboriginal Heritage Sites are located within or in close proximity to the subject site. • Aboriginal Heritage Survey completed by anthropologist R.O'Connor. Inspection revealed no Aboriginal sites within tenement. • Should any evidence of early aboriginal occupation be uncovered, development will be stopped pending an assessment by a recognised consultant.	L5
Public Access				
Unauthorised access to the mine site	Public health and safety	M13	• The disturbed areas within the tenement shall be made safe and the closure requirements of all relevant regulatory authorities are to be met. No unsafe areas will remain after closure whereby members of the general public and animals could be harmed. • Structures will be erected to prevent inadvertent public access to areas, including bund construction. • The site fenced with locked gates. • Warning signs maintained.	L5

Table 10: Risk Assessment

9.0 COMPLETION CRITERIA

Mine closure is an integral part of the overall design and management of the mining operations. WAB is highly experienced in the rehabilitation and closure of mining operations. This experience has led to the development of proven methodologies that are incorporated into all current and future operations.

9.2 Development of Completion Criteria

Final closure of this operation will not occur for at least 100 years. Consequently the completion criteria provided are to be considered as "Provisional" and are anticipated to be refined over the remaining life of the quarry.

9.3 Completion Criteria

Closure Objective	Indicative Completion Criteria	Completion Criteria	Measurement Tools
Compliance			
Disturbed areas to be made safe.	• Final landform design approved by landowner and key stakeholders.	• Reaching final landform surface and made safe.	• Post-completion ground survey and comparison against approved final landform design.
Closure requirements of all relevant regulatory authorities to be met.	• Tenement and licence conditions relevant to closure. • Commitments by WAB relevant to closure.	• Reaching compliance with statutory requirements and conditions. • Meeting commitments made.	• Audit of closure against relevant statutory requirements, conditions and commitments.
Landform			
The completed landform to be safe, stable and consistent with the post-mining landuse.	• Final landform design approved by landowner and key stakeholders.	• Reaching final landform surface and made safe.	• Post-completion ground survey and comparison against approved final landform design.
Revegetation			
Disturbed areas to be rehabilitated to a condition compatible with the post-mining landuse and adjoining State Forest.	• Revegetation composition is representative of the target ecosystem in species diversity and structure.	• Reaching agreed rehabilitation targets.	• Quantitative vegetation monitoring using recognised standard techniques. • Audit of records for sources of plant materials used in rehabilitation.
Water Management			
Surface and groundwater hydrological patterns/flows not adversely affected.	• No substantial change to surface hydrological patterns and flows from pre-mining condition. • No substantial changes to water flowing to Manjedal Brook.	• No substantial change to surface hydrological patterns and flows from pre-mining condition.	• Post-completion ground survey and comparison against approved final landform design. • Water quality testing of downstream watercourses.
Infrastructure & Waste Management			
All infrastructure to be removed from the site unless required for the post-mining landuse.	• All redundant infrastructure to be salvaged and disposed of appropriately.	• All buildings, concrete, steelwork, hardsand, roads, etc removed.	• All redundant infrastructure has been removed and disposed of appropriately.
Pollution / Contamination	• Disturbed areas to be left in a non-polluting and orderly state.	• No sites of contamination remain.	• Areas not classified as a 'contaminated site' as per the *Contaminated Sites Act 2003*.

Table 11: Completion Criteria

10.0 FINANCIAL PROVISIONING FOR CLOSURE

Financial provisioning at this time can only be indicative. Costs will change over the life of the operations, and costs outlined now will have to take account of inflation and other potential changes.

10.2 Mine Closure Cost Estimates

Financial estimates are based on the rehabilitation costs for the overburden bunded area. The costs provided are correct at the date of this plan in Table 12.

Monitoring and maintenance works have been estimated over a three year time frame; however rehabilitation maintenance will continue to be done pursuant to the monitoring results.

Activity	Equipment and Personnel	Rate	Cost
Earthmoving and landform shaping	D11 Dozer	$300/hr x 20 hrs	$6,000
	988 Loader	$200/hr x 20 hrs	$4,000
	Supervision	$100/hr x 40 hrs	$4,000
	Survey & Draft	$200/hr x 10 hrs	$2,000
Rehabilitation (1st year)	Environmental Consultant	$200/hr x 10 hrs	$2,000
	Tube stock Seed	$1.25/plant x 8400 50kg seed x $250/kg	$10,500 $12,500
	Planting Seeding	65/hr x 70 hrs 65/hr x 20hrs	$4,550 $1,300
	Weed control	$72.50/hr x 60	$4,350
Monitoring	Annual site inspections and reporting by environmental consultant	$3000/ 1yr x 3 years	$9,000
Maintenance works (2nd yr)	Weed control	$72.50/hr x 60	$4,350
	Tube stock Seed	$1.25/plant x 2,500 20kg seed x $250/kg	$3,125 $5,000
	Planting Seeding	65/hr x 20hrs 65/hr x 10 hrs	$1,300 $650
Maintenance works (3rd yr)	Weed control	$72.50/hr x 60	$4,350
	Tube stock Seed	$1.25/plant x 5,000	$6,250
	Planting Seeding	65/hr x 20 hrs 65/hr x 15hrs	$1,300 $650
		Total	**$87,175.00**

Table 12: Mine Closure Cost Estimates

10.3 Review of the Financial Position

The financial cost estimates are based on previous rehabilitation work for the project and WAB experience at other projects. Rehabilitation occurs progressively throughout the life of the project, which provides regular reviews of the financial costs of rehabilitation.

Independent consultants are also used to monitor and assess the performance of rehabilitated areas and their recommendations are incorporated back into future estimates and financial provisioning.

Reviews of the financial position for closure will be undertaken as part of the review schedule of this closure plan.

11.0 CLOSURE IMPLEMENTATION

Closure implementation planning will be updated from time to time as the excavation progresses, and as completion criteria and post-mining land use are refined. This will include both anticipated costs and procedures.

The following procedures will be used for closure implementation and pre-closure rehabilitation of disturbed areas no longer required for the mining operation.

11.2 Closure Work Program

The closure planning will be updated from time to time as the mining operations progress. This will include both anticipated costs and procedures.

The following procedures will be used for final closure and rehabilitation.

11.2.1 Vegetation Clearing

Every opportunity will be taken to utilise the vegetative material in areas to be cleared as a source of seed for propagation and for harvesting of brush for mulch.

Vegetation stripping of new areas of excavation and respreading onto completed areas will generally occur as a single operation. Double handling will be minimised. If this is impracticable, vegetation will be stockpiled in windrows or heaps for future re-use.

11.2.2 Topsoil Removal

Retention of topsoil is critical to successful revegetation. The topsoil is of major value for its nutrient content, water holding capacity, structural properties and the seed and vegetative material it contains.

Topsoil freshness is a factor of both age (storage) and handling methods. The following safeguards will be followed during topsoil handling to ensure its value is preserved:

- topsoil will be removed to a depth of approximately 100 to 150mm;
- topsoil removed will, wherever possible occur under dry soil conditions so that structural damage and dieback contamination is minimised;
- topsoil stripping and respreading will generally occur as a single operation. If temporary stockpiling is required this will be established on cleared ground where further disturbance is unlikely;
- stockpile heights will be minimised to reduce microbial and seed deterioration; and
- if stockpiles are to remain in place for an extended period, or if excessive dust lift-off occurs, the stockpiles will be mulched.

11.2.3 Landform Reconstruction

Following each campaign of overburden placement, the completed area will be rehabilitated at the earliest opportunity with native vegetation plantings and seed mix. This rehabilitation will stabilise the surface and prevent wind erosion.

The landform raising will occur in a series of stages. The material placement will only take place in the summer months due to the workability of the high clay content material. Revegetation and will predominantly take place in the winter months, which allows for maximum plant survival.

The species and rehabilitation techniques will have to reflect the changes in landform to be successful. The changes in landform mean that different rehabilitation aims and techniques are required when compared to shallow quarry rehabilitation. For example the direct spreading of topsoil from laterite gravel and duricrust is unlikely to lead to satisfactory revegetation because of a number of species will not be suited to the sloping clay based soils. Species from direct spreading will also not provide the desirable levels of geotechnical stability.

Completion criteria based on the local native vegetation communities has been less appropriate because the native vegetation communities contain significant proportions of small slower growing groundcover shrubs that provide little stability. The other factor is that soil conditions are significantly different to the natural communities. They are formed on overburden and as such as clay based, steeper sloping and in many cases moister and more shaded. The conditions will be similar to steeper natural valley sides, however the slopes can dry out in summer which can present problems to some local valley side vegetation.

Therefore other local provenance species have been added to the rehabilitation, such as Eucalyptus patens, E.laeliae, E.megacarpa (valley siders), Eucalyptus wandoo (dry clay based slopes), Viminaria juncea (most shaded soils), Calothamnus spp, Kunzea recurve and Melaleuca spp (fibrous root systems that are effective at holding soil structure).

11.2.4 Vegetation Establishment

A program of direct seeding and infill planting is to be undertaken. Seed and seedlings will be purchased from a commercial nursery comprising fast growing drought tolerant species indigenous to the local area.

Revegetated overburden bunds will contain the following:

- Soils and slope stability
- A self-sustaining cover of local native tree, shrub and groundcover species.
- Provide at least one deep rooted tree or shrub per 3m².
- Establishment includes 1200 tree stems per hectare.
- Provide a species richness of 10 species per 100m².
- Weed species at levels not likely to threaten the native species

All species listed in Table 13 are selected for rehabilitation of the clay bunds for seed mix and tube planting.

Local Species List	Tube Stock	Moist Areas
Acacia celastrifolia		
Acacia extensa		
Acacia latericola		
Acacia microbotrya		
Acacia pulchella		
Acacia saligna	T	W
Acacia urophylla		
Agonis linearifolia	T	W
Allocasuarina fraseriana		
Allocasuarina huegeliana		
Allocasuarina humilis		
Banksia grandis		
Calistemon phoeniceus	T	W
Calothamnus quadrifidus	T	W
Calothamnus rupestris	T	W
Dryandra sessilis		
Eucalyptus accedens	T	W

Eucalyptus calophylla	T	W
Eucalyptus laeliae	T	W
Eucalyptus megacarpa	T	W
Eucalytus marginata	T	W
Eucalyptus patens	T	W
Eucalyptus rudis	T	W
Eucalyptus wandoo	T	W
Hardenbergia comptoniana		
Kennedia coccinea		
Kennedia prostrata		
Kunzea recurva		
Leptospermum erubescens		
Melaleuca preissiana	T	W
Melaleuca rhaphiophylla	T	W
Melaleuca scabra		
Paraserianthes lophantha		
Viminea juncea		

Table 13: Species List

11.3 Closure Research and Trials

The proposed rehabilitation and closure methodology for the overburden bund is based on proven techniques. The environmental consultants used by WAB have more than 40 years' experience in the rehabilitation, closure and sequential land use throughout Western Australia.

WAB is ISO 14001 certified and operations are in accordance with the EMS. WAB consults regularly with ISO: 14001 accredited environmental specialists to plan conduct and monitor rehabilitation and closure activities. As a significant contributor to the major industry associations, WAB additionally has access to the latest available environmental research and trial results.

The completed rehabilitation and revegetation works are regularly assessed and used to refine methodologies for future rehabilitation and closure works.

The rehabilitation and closure methodology for the proposed overburden bund has previously been used to rehabilitate the neighbouring WAB quarry overburden areas throughout Lot 901. The main rehabilitation of Lot 901 was completed in 2005; the success of the site can be clearly seen in the attached photos in Appendix 7. Monitoring results of these sites (by Landform Research) show that the rehabilitation is preforming well and the species richness is comparable with the completion criteria (Rehabilitation Plan 2005).

11.4 Schedule of Rehabilitation Activity

The project has an estimated remaining life of mine of 100 years. Closure of the mining activities is progressive and will be based on the completion of stages, as shown in Proposed Disturbance Plan. Completed areas of the overburden bund will be rehabilitated at the earliest practicable opportunity.

Final decommissioning and closure of the project will occur upon the completion of mining operations. This will involve the removal of all equipment and infrastructure from the tenements and the removal of the hardstand and access road in preparation for returning the land to grazing.

11.5 Unexpected Closure

The implementation of an unexpected closure will depend on the circumstances which led to the requirement to close the operation unexpectedly as well as the progress of the quarry in excavating the available resource.

An unexpected mine closure will not affect the ability of WAB to rehabilitate the quarry (at the time) to a satisfactory standard.

In the event of an unexpected closure prior to the completion of excavation of all available resource, any undisturbed areas will be monitored and used as additional reference sites for assessing rehabilitation performance.

11.6 Temporary Closure

The nature of the temporary closure will depend on the circumstances and the time frame when activity is proposed to recommence.

Temporary Closure Objective	**Seasonal or Campaign Closure (Few months)**	**Care and Maintenance (Up to one year)**	**Care and Maintenance (More than one year)**
Compliance	• Ensure all legal conditions and commitments are complied with. • Complete activities to make the site safe. • Provide fences, bunding and warning signs above faces. • Provide locked gates or boulder access restraints.	• Ensure all legal conditions and commitments are complied with. • Complete activities to make the site safe. • Provide fences, bunding and warning signs above faces. • Provide locked gates or boulder access restraints.	• Ensure all legal conditions and commitments are complied with. • Complete activities to make the site safe. • Provide fences, bunding and warning signs above faces. • Provide locked gates or boulder access restraints.
Landform	• Provide fences, bunding and warning signs above faces. • Ensure the land surfaces are stable to erosion from wind and water. • Current working area to be left open to facilitate the recommencement of operations.	• Provide fences, bunding and warning signs above faces. • Ensure the land surfaces are stable to erosion from wind and water. • Current working area to be left open to facilitate the recommencement of operations.	• Provide fences, bunding and warning signs above faces. • Ensure the land surfaces are stable to erosion from wind and water. • Current working area to be left open to facilitate the recommencement of operations.
Re-vegetation	• Rehabilitate any areas that are no longer required. • Remove or spray environmental or declared weeds.	• Rehabilitate any areas that are no longer required. • Remove or spray environmental or declared weeds.	• Rehabilitate any areas that are no longer required. • Remove or spray environmental or declared weeds.
Infrastructure & Waste	• Secure the site and any plant to be left. • Remove all hydrocarbons and other fluids.	• Secure the site and any plant to be left. • Remove all hydrocarbons and other fluids.	• Secure the site and any plant to be left. • Remove all hydrocarbons and other fluids.
Water Management	• Maintain water management infrastructure. • Continue water testing program.	• Maintain water management infrastructure. • Continue water testing program.	• Maintain water management infrastructure. • Continue water testing program.
Monitoring	• Frequency: Occasionally. • Inspect all areas and ensure the land surfaces are stable to erosion from wind and water. • Inspect re-vegetation to determine its long term survival from environmental	• Frequency: Several times per year. • Inspect all areas and ensure the land surfaces are stable to erosion from wind and water. • Inspect re-vegetation to determine its long term	• Frequency: Once to twice per year. • Inspect all areas and ensure the land surfaces are stable to erosion from wind and water. • Inspect re-vegetation to determine its long term survival from environmental

	and fire impacts. • Inspect the site for environmental and declared weeds.	survival from environmental and fire impacts. • Inspect the site for environmental and declared weeds.	and fire impacts. • Inspect the site for environmental and declared weeds.

Table 14: Temporary Closure Management

11.7 Decommissioning Schedule

The project has an estimated remaining life of mine in excess of 100 years.

All disturbed areas no longer required for the mining operation are to be rehabilitated at the earliest opportunity.

Final decommissioning and closure of the project will occur upon the completion of mining operations. This will involve the removal of all infrastructure and equipment, access roads, etc that are not required for the post-mining land use.

12.0 CLOSURE MONITORING AND MAINTENANCE

12.1 Overburden placement

Ongoing performance assessment will be carried out in areas where overburden placement has been completed. In the initial stages monitoring and inspection will occur weekly & monthly. A Geotechnical Stability assessment will be completed to confirm the integrity and stability of the landform and as a matter of safety.

During monitoring particular attention will include:
• Monitoring of erosion and sedimentation during operations and during closure.
• Regular monitoring of surface water movement and quality as described in Section 4.5.1.

Water erosion may occur in newly rehabilitated areas. Should erosion be identified, remedial action will be taken. This may include:

- Additional application of mulch.
- Erosion gullies being repaired by filling with soil and subgrade material.
- Combining brush material with the soil and then packing this into the repaired area as protection.

12.2 Revegetation

Progressive rehabilitation and ongoing performance assessment will be carried out in areas where mining related operations have been completed and further disturbance is unlikely.

Monitoring procedures will be used to assess whether initial establishment has been successful, and rehabilitation is developing satisfactorily. Monitoring of rehabilitated areas is to be conducted on an annual basis for the first three years to determine initial establishment, then on a biennial basis to determine established completion criteria.

Areas should be monitored as soon as possible, in the appropriate season, following completion of any seeding/planting. Monitoring should be conducted each year to capture vegetation growth, and species richness.

The frequency of monitoring may to be increased or decreased depending on the outcomes of specific areas.

The following areas will be assessed by an approved environmental consultant:

- plant density
- species diversity
- plant growth (height, % cover)
- plant survival counts
- regeneration
- insect attack and disease
- weed infestation

Where necessary appropriate action will be taken to correct any problems identified. This may involve infill planting or seeding, spraying of weeds or other actions as required.

13.0 MANAGEMENT OF INFORMATION AND DATA

WAB has an ISO 9001:2008 and ISO 14001 certified data management system. This system and associated procedures ensure the retention of mining operation and mine closure records. Records of completed mining operations are archived for use in the design and operation of future projects.

In addition WAB conducts annual surveys and audits for all operating sites.

WAB maintains a library of all scientific studies and reports pertaining to its operations. This information is typically provided to state and national authorities through the approvals and ongoing compliance processes. Access to this information is available upon request.

BIBLIOGRAPHY

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Wilde, S., & Low, G. (1980). *Pinjarra Western Australia, Sheet SI/50-2 International Index.* Perth: Geological Survey of Western Australia 1:250 000 Geological Series.

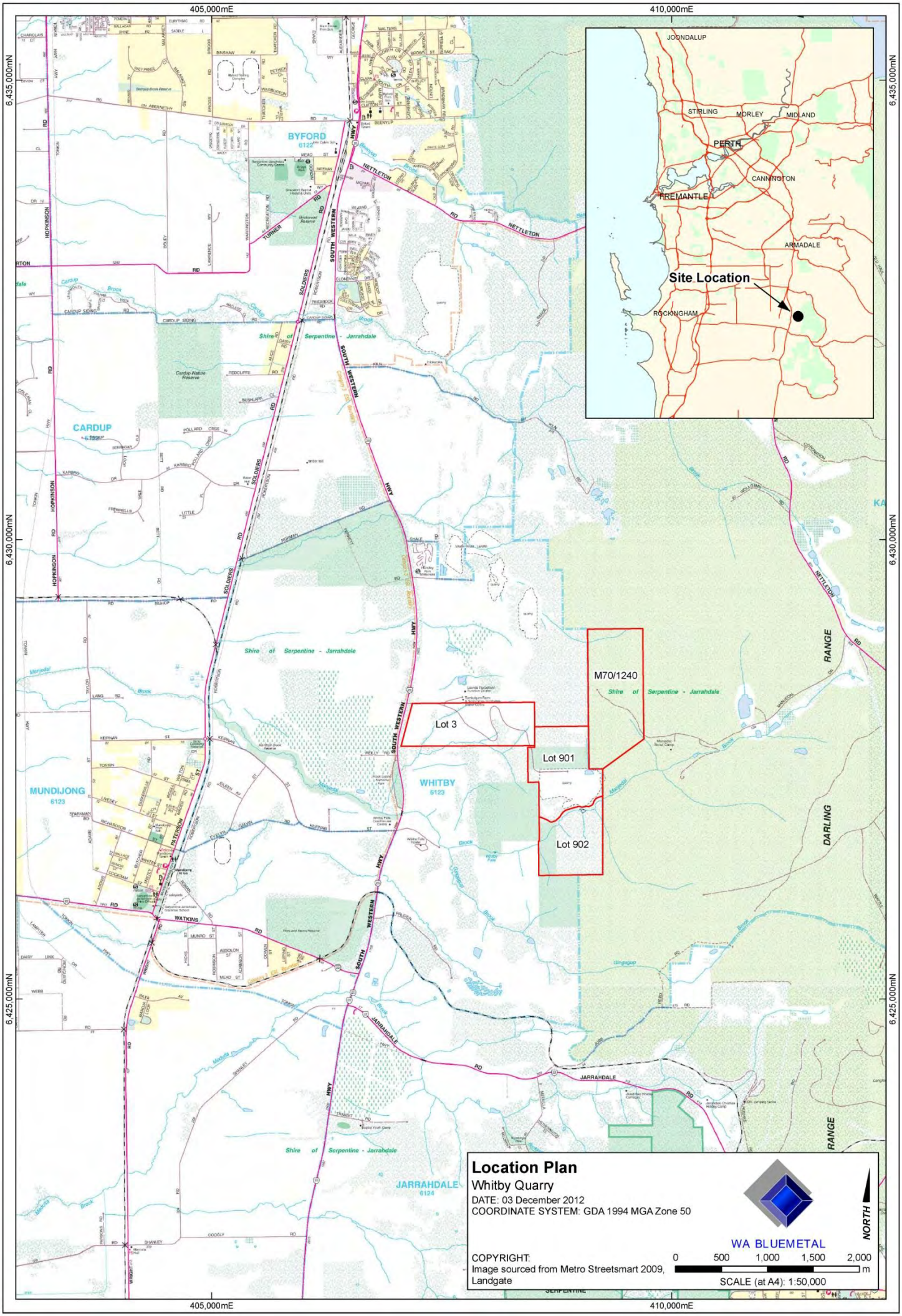


Figure 3: Location Plan

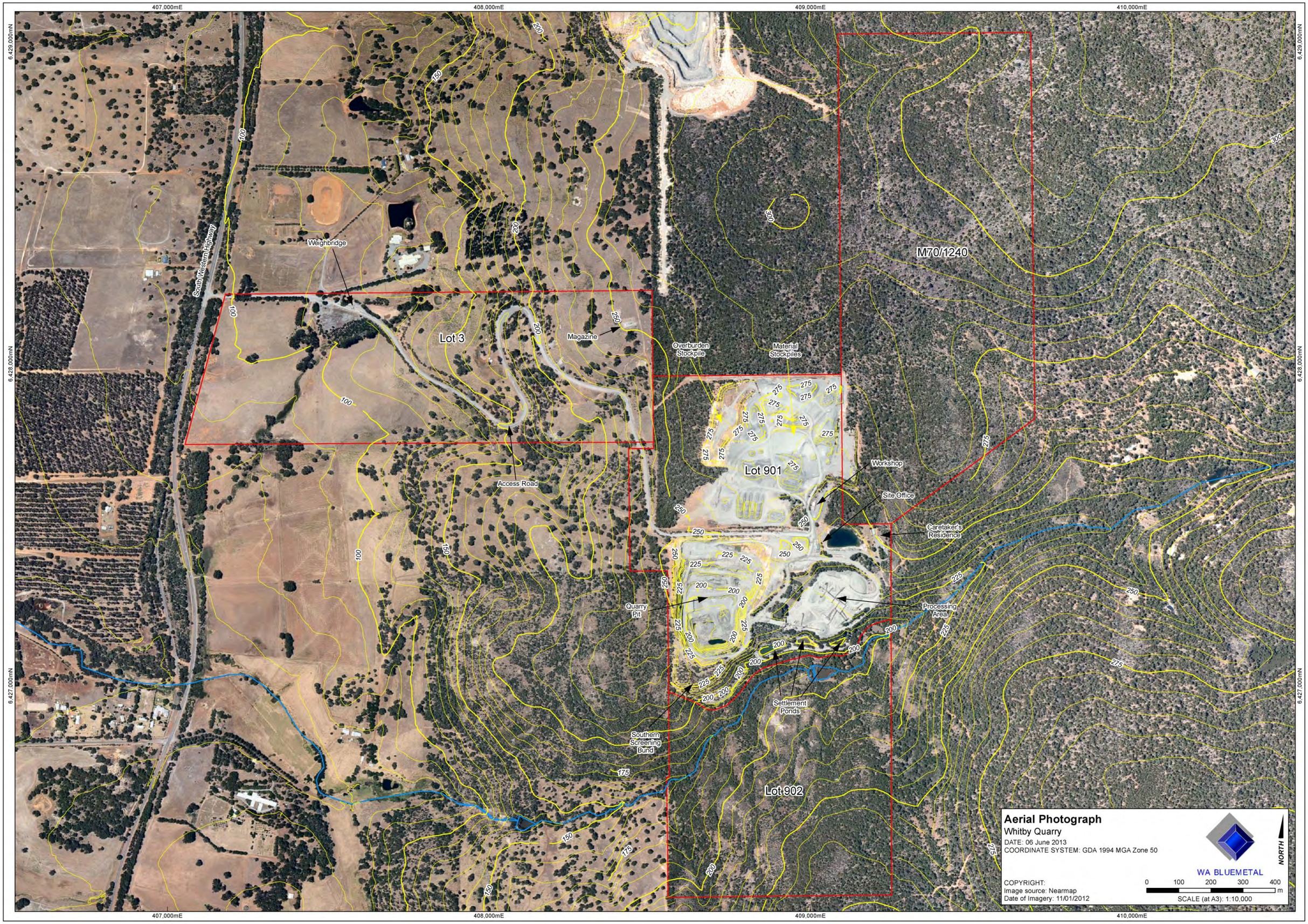


Figure 4: Site Plan

Figure 5: Proposed Site Plan

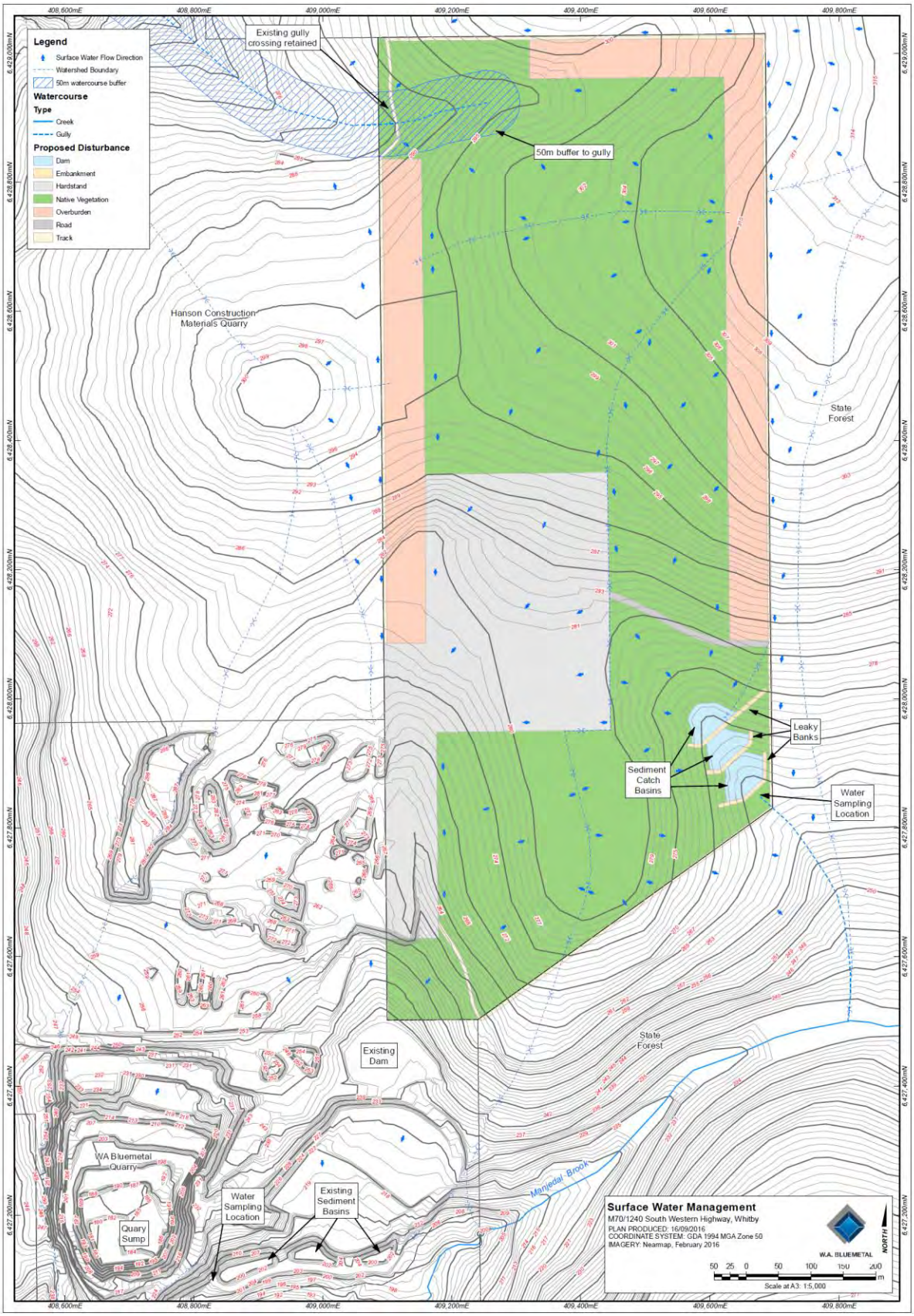


Figure 6: Surface Water Management Plan

Appendix 1
Stakeholder letters of support

Department of **Environment** and **Conservation**

Your Reference:
Our Reference: 2005F00287V01
Enquiry: Grant Lamb

Phone: 08 9334 0474
Fax: 08 9334 0140
Email: Grant.Lamb@dec.wa.gov.au

Denis Hill
WA Bluemetal
PO Box 1457
Bibra Lake WA 6965

Dear Denis

Proposed Land Swap

Thank you for your correspondence dated 22nd May 2007, including WA Bluemetal's negotiations with DoIR, Alcoa and Tiwest on the proposed changes to land tenure for Lot 500 Brand Highway, associated support letters and details of Hanson's neighbouring quarry operations.

I note from my previous correspondence dated 14 November 2006, that the request to WA Bluemetal's was to:

> Enter into negotiations with DoIR to obtain support at a senior level (see details below) for the land being relinquished by WA Bluemetal's to be added to the DEC managed estate as State forest and national park. A key element for DEC's support for this proposal is confirmation that DoIR would support tenure changes including State forest and national park over those two land holdings.

Both Lot 500 and Lot 344 are included in the lands being relinquished by WA Bluemetal's, yet only Lot 500 appears to have been investigated with DoIR. Confirmation of their position on this area is still required.

It is unfortunate that the DoIR does not agree to change the tenure of the 345 ha portion of Lot 500 Brand Highway. It is however encouraging to note that Tiwest does not believe there is any mineralisation present on Lott 500 and that they are likely to include this area in a forfeit of part of their tenement area.

Notwithstanding the afore mentioned requirements, DEC confirms its support for the land swap project to proceed.

Final documentation for the subdivision and rezoning application will require DEC sign off prior to submission. Please proceed with the subdivision applications, the development application and rezoning proposals for the project and continue to negotiate these outcomes with Environmental Management Branch's Project Coordinator, Grant Lamb.

Further to your previous correspondence dated 21 November 2006, you requested clarification of the following dot point 2:

WAB to transfer, as freehold land, approximately 48ha of Location 344 and approximately 345 ha of Lot 500 to DEC.(Grant, I was under the impression that Lot 500 was to be divided on the basis of hectare for hectare and the balance of the bush/wet land to be preserved for DEC by some means for the future "offsetting". Could you clarify this for me?)

The proposal can not be assessed on a hectare for hectare basis due to the differing conservation values. As such, the Conservation Commission accepted the swap package in its total as sufficient offset for loss of conservation values with its relinquishment of the portion of State forest and in agreement and support to DoIR for your proposed Mining Lease M70/1240.

Please do not hesitate contacting Grant Lamb for further discussion or clarification on this or any other points raised in this letter

Yours sincerely

for Keiran McNamara
DIRECTOR GENERAL

Thursday, 31 May 2007

Cc- M Garkaklis – DEC Swan Region
M Meinema – DEC Perth Hills District

Department of
Industry and Resources

Your ref:
Our ref: A0270/200701
Enquiries: Warren Ormsby - Ph 08 9222 3571 Fax 9222 3633
Email: warren.ormsby@doir.wa.gov.au

Mineral House
100 Plain Street, East Perth
Western Australia 6004
ABN 69 410 335 356

Telephone +618 9222 3333
Facsimile +618 9222 3862
www.doir.wa.gov.au

Mr Denis Hill
Surveyer
WA Bluemetal
PO Box 1457
BIBRA LAKE WA 6965

Dear Mr Hill

MINING LEASE APPLICATION M70/1240, COCKBURN SOUND LOCATION 344 SOUTH WEST HIGHWAY, WHITBY

Further to your letter dated 2 July 2007, you referred to DoIRs previous response of 8 May 2007 in which comment was made on Lot 500 Brand Highway, Beeramullah, but not on the above areas.

The omission was unintentional. We now confirm that DoIR have no objection in principle to the proposal of the southern portion (approx. 48 ha shown on the attached map) of Location 344 being transferred to State Forest 22, and for the part of State Forest 22 covered by mining lease application M70/1240 being transferred to freehold. When DoIR receives the formal Section 16(3) clearance requests, these transactions will be subject to the support of Alcoa Australia Ltd as the affected land is within State Agreement AML70/1, and all other tenement-related matters being in order.

Yours sincerely

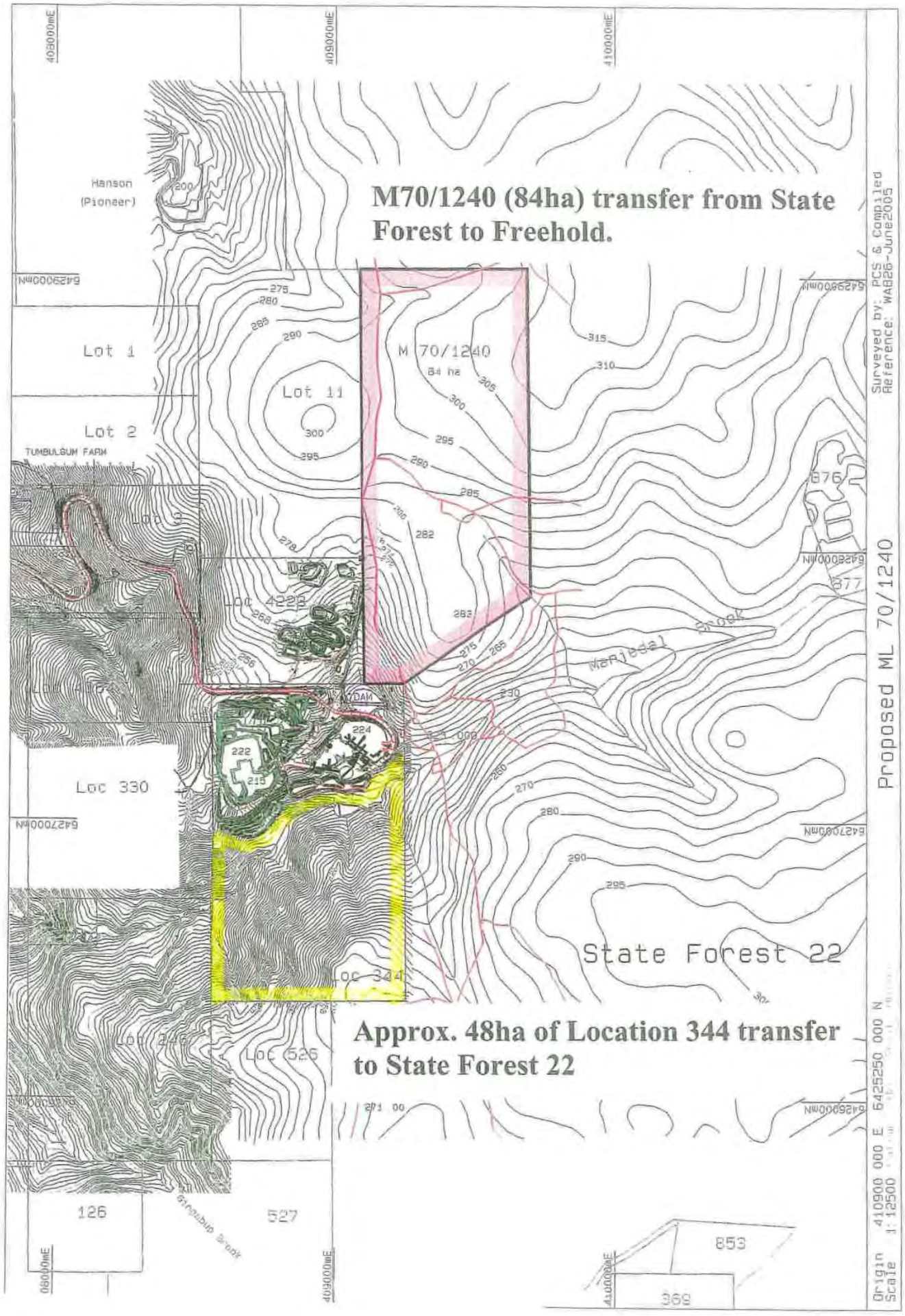
Tim Griffin
Executive Director
GEOLOGICAL SURVEY WESTERN AUSTRALIA

27 July 2007

000399.Warren.Ormsby.doc - Perth

Release Classification: - Addressee Use Only

Encl


M70/1240 (84ha) transfer from State Forest to Freehold.
Approx. 48ha of Location 344 transfer to State Forest 22
Proposed ML 70/1240
Surveyed by: PCS & Compiled
Reference: WA826-June2005
Origin 410900 000 E 6425250 000 N
Scale 1:12500
Hanson (Pioneer)
Lot 1
Lot 2
TUMBULGUM FARM
Lot 11
M 70/1240
84 ha
Loc 4228
Loc 330
Loc 344
Loc 526
Loc 345
State Forest 22
Marybel Brook
DAM
126
527
853
369
876
877

ALCOA

Alcoa World Alumina Australia

A global alliance between Alcoa and Alumina Limited

Mining Operations
Western Australia
Off Del Park Road
PO Box 172
Pinjarra, WA 6208
Tel: 618 9530 2804
Fax: 618 9530 2816

RECEIVED

BY:.....

23 September 2005

Peter Bullock
General Manager
W.A. Limestone
41 Spearwood Avenue
Bibra Lake
Western Australia, 6163

Dear Sir

Hard Rock Quarry – Lot 344 South Western Highway, Whitby

Alcoa has discussed your requests, as outlined in the correspondence of the 17 August 2005, both from our Mining and Legal viewpoints.

Alcoa has no objection to the granting of Mining Lease application number M70/1240, or to the eventual transfer of M70/1240 to freehold title with a zoning allowing quarrying operations.

However as to your second request to undertake some exploratory work, although we would like to assist in this, our Legal Department is of the opinion that this would contravene certain clauses in our State Agreement Act. This together with the fact that Alcoa has declined similar requests, albeit under different circumstances and without the merits of your request, requires that we maintain consistency in our dealings. Alcoa therefore must deny your request for exploratory work under Alcoa auspices.

Due to our inability to approve the exploration work, Alcoa is prepared to assist in any way possible that will expedite the granting of the Mining Lease and proposed land swap.

Yours sincerely

Phil Campbell
Manager of Mines

GOVERNMENT OF WESTERN AUSTRALIA

Environmental Protection Authority

The Atrium,
Level 8, 168 St Georges Terrace,
Perth, Western Australia 6000.
Telephone: (08) 6467 5000.
Facsimile: (08) 6467 5557.

Postal Address: Locked Bag 33,
Cloisters Square, Perth, Western Australia 6850.
Website: www.epa.wa.gov.au

Mr Denis Hill
WA Bluemetal
PO Box 1457
BIBRA LAKE WA 6965

Our Ref A326614
Enquiries Vanessa Angus 6467 5256

Dear Mr Hill

NOTICE UNDER SECTION 39A(3)(a)
Environmental Protection Act 1986

PROPOSAL:	**Extension of granite hardrock excavation**
LOCATION:	**Lots 3, 901 and 902 South West Highway**
LOCALITY:	**Whitby (Shire of Serpentine-Jarrahdale)**
PROPONENT:	**WA Bluemetal**
DECISION:	**Not Assessed - Managed under Part V of the EP Act (Clearing)**

Thank you for your letter of 20 August 2010 referring the above proposal to the Environmental Protection Authority (EPA) under section 38 of the *Environmental Protection Act 1986* (EP Act) for consideration of its likely environmental impacts.

This proposal raises a number of environmental issues. However, the overall environmental impact of the proposal is not so severe as to require assessment by the EPA, and the subsequent setting of formal conditions by the Minister for the Environment.

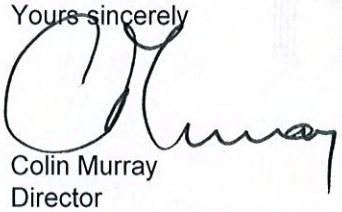
Nevertheless, in making its decision, the EPA recognises that the proposal involves the clearing of native vegetation. Please note the provisions of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* and the procedures in relation to applying for a Clearing Permit. Application forms and guidelines on how to apply for a Clearing Permit are available on the Department of Environment and Conservation's website at the following web address www.dec.wa.gov.au. The Department of Environment and Conservation will make a decision to grant or refuse a permit. The decision of the EPA to not assess your proposal carries no presumption about the outcome of an application for a Clearing Permit.

The EPA's decision to not assess the proposal is open to appeal. There is a 14-day period, closing on 27 September 2010, during which, on payment of the $10 appeal fee, an appellant may ask the Minister to consider directing the EPA to conduct a formal assessment. Information on the outcome of the appeals process is available through the Appeals Convenor's website, www.appealsconvenor.wa.gov.au, or by telephoning 6467 5190 after the closing date of appeals.

The information received regarding your proposal will be made publicly available on request. At the referral stage of the environmental impact assessment process, your attention was drawn to section 39(2) of the EP Act, which provides for a proponent to request that matters of a confidential nature not be kept on the public record. If you believe any part of the proposal information relates to a manufacturing process or trade secret which is commercially

confidential and should not be publicly available, please contact the Assessment officer cited above no later than 3 working days after the date of this letter. Any such request should be confirmed in writing.

Yours sincerely



Colin Murray
Director
Assessment and Compliance Services

13 September 2010

Government of **Western Australia**
Department of **Parks and Wildlife**
Parks and Visitor Services

Your ref:
Our ref: 2014/000221
Enquiries: Nicola Mincham
Phone: 9219 8777
Email: Nicola.Mincham@dpaw.wa.gov.au

Manager – Metropolitan and Peel
Department of Lands
PO Box 1143
WEST PERTH WA 6872

Attention: Joanne Lim

EXCISION FROM STATE FOREST NO. 22 TO FINALISE A LAND EXCHANGE BETWEEN THE STATE AND WA BLUEMETALS

CONSERVATION AND LAND MANAGEMENT 1984
(REVOCATION OF STATE FOREST)
ORDER (NO. 2) 2015

The Department of Parks and Wildlife writes to advise the Department of Lands that an order was published in the Government Gazette on Friday, 15 January 2016, which revoked the dedication of various portions of State Forest No. 14, 22, 23, 39, 49 and 65 associated with five distinct road proposals and a land exchange. A copy of this order is attached for your reference.

The six road proposals and the areas of revoked State forest are:
Area 1
Revocation of portions of State Forest No. 14 to facilitate upgrades to Pinjarra-Williams Road, Shire of Murray.

Area 2
Revocation of portions of State Forest No. 22 to finalise a land exchange between the State and WA Bluemetals, Shire of Serpentine Jarrahdale.

Area 3
Revocation of portions of State Forest No. 23 to facilitate upgrades to Pinjarra-Williams Road, Shire of Murray.

Area 4
Revocation of portions of State Forest No. 39 to facilitate upgrades to the intersection of the Vasse and South Western Highways, Shire of Manjimup.

Area 5
Revocation of portions of State Forest No. 49 to facilitate upgrades to the South Western Highway, Shire of Donnybrook-Balingup.

Area 6
Revocation of portions of State Forest No. 65 to facilitate the construction of Stage One of the Perth to Darwin National Highway, City of Swan.

Land Unit
Locked Bag 104, Bentley Delivery Centre, Western Australia 6983
Phone: (08) 9219 8777 Fax (08) 9334 0221] Email: Nicola.Mincham@dpaw.wa.gov.au
www.dpaw.wa.gov.au

As required under section 9(2) of the *Conservation and Land Management Act 1984* (CALM Act) this matter was tabled to each House of the Parliament of Western Australia and a motion was put and passed in both houses to support the proposed State Forest Revocation. The attached order finalises the requirements of section 9(2) of the CALM Act.

The Department of Parks and Wildlife now asks that the Department of Lands please undertake the necessary actions progress the proposed land exchange and transfer the area excised from State Forest No. 22 to WA Bluemetals, a trading entity of Ransberg Pty Ltd. The management of two areas of freehold land owned by WA Bluemetals was finalised in May 2012 as part of the proposed land exchange. To assist the Department of Lands with this I have attached copies of correspondence from various stakeholders.

If you require further information please contact Land Administration Officer Nicola Mincham on 9219 8777.

Yours sincerely

Nicola Mincham
Land Administration Officer

20 January 2016

cc. Stephen Chambers, WA Limestone

— PART 2 —

CONSERVATION

CO401*

CONSERVATION AND LAND MANAGEMENT ACT 1984

CONSERVATION AND LAND MANAGEMENT (REVOCATION OF STATE FOREST) ORDER (NO. 2) 2015*

Made under section 9(2) of the *Conservation and Land Management Act 1984* by the Governor in Executive Council.

1. Citation

This order may be cited as the *Conservation and Land Management (Revocation of State Forest) Order (No. 2) 2015.*

2. Background to this order

(1) In accordance with section 9(2) of the Act, a proposal dated 26 May 2015 that an area of 180.7743 hectares be revoked from State Forest No. 14, 22, 23, 39, 49 and 65 was laid before both Houses of Parliament.

(2) Resolutions that the proposal referred to in subclause (1) be carried out were passed by the Legislative Assembly on 9 September 2015 and by the Legislative Council on 17 September 2015.

(3) The land referred to in subclause (1) has been surveyed and is now described in Schedules 1, 2, 3, 4, 5 and 6.

3. Portions of State Forest No. 14, 22, 23, 39, 49 and 65 revoked

The areas described in Schedules 1, 2, 3, 4, 5 and 6 are declared to be no longer State forest.

Schedule 1—Land no longer part of State Forest No. 14

Upgrades to Pinjarra-Williams Road

All that portion of land situated about two kilometres south-east of Dwellingup and comprising of Lot 301 on Deposited Plan 400027.

Area: 1.9645 hectares

On Landgate plans: Dwellingup SW (2132-IV-SW).

Schedule 2—Land no longer part of State Forest No. 22*

Finalise land exchange with AA Bluemetals*

All that portion of land situated about six kilometres south-east of Byford and comprising of Lot 500 on Deposited Plan 405520.

Area: 83.9124 hectares

On Landgate plans: Jarrahdale NW (2133-III-NW).

Schedule 3—Land no longer part of State Forest No. 23

Widening of Pinjarra-Williams Road

All that portion of land situated about three kilometres west of Dwellingup and comprising of Lot 306 (1.9975 hectares) on Deposited Plan 19975 and Lots 309 (0.5593 hectares) and 310 (0.5207 hectares) on Deposited Plan 77320.

Area: 3.0775 hectares

On Landgate plans: Dwellingup SW (2132-IV-SW).

Schedule 4—Land no longer part of State Forest No. 39

Upgrades to the intersection of Vasse Highway and South Western Highway

All that portion of land situated about 12 kilometres south of Manjimup and comprising of Lot 531 on Deposited Plan 73515.

Area: 0.0825 hectares

On Landgate plans: Pemberton NE (2129-III-NE).

Schedule 5—Land no longer part of State Forest No. 49

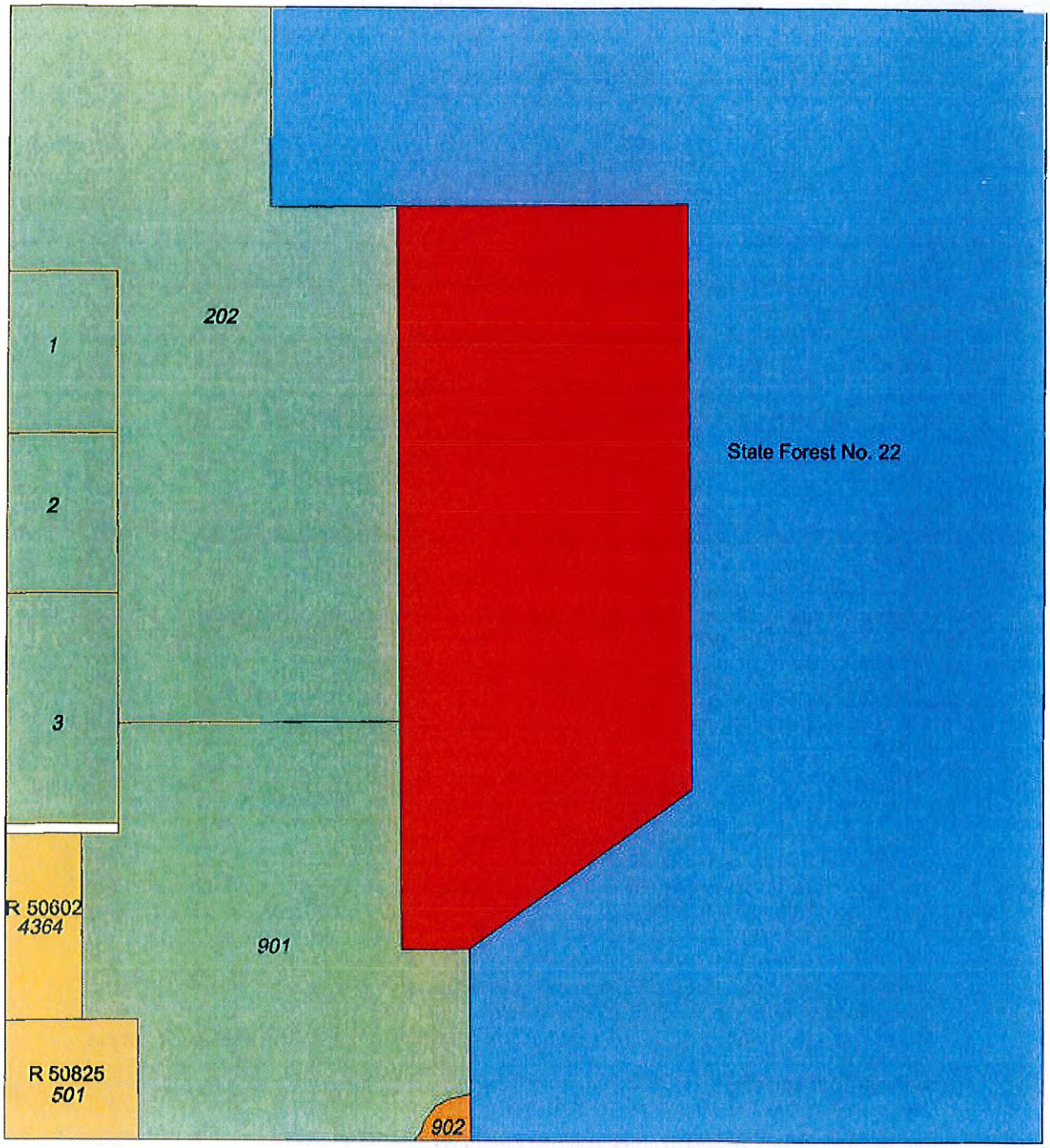
Widening of South Western Highway

All that portion of land situated about two kilometres south of Kirup and comprising of Lot 101 (0.3266 hectares) and Lot 102 (0.2090 hectares) on Deposited Plan 405330.

Area: 0.5356 hectares

On Landgate plans: Donnybrook SE (2030-I-SE).

AREA 2



PROPOSED EXCISION FROM STATE FOREST No. 22

LEGEND

1. Area to be excised from State Forest No. 22
2. State forest adjoining area subject of excision
3. Crown freehold land
4. Other crown reserve
5. Freehold land

SCALE 1 : 12 000

On Landgate plan: JARRAHDALE NW (2133-III-NW)
On Department of Parks and Wildlife plan: 2133 - II & III

2014/000221-1 142
A848390

Government of Western Australia
Department of Mines and Petroleum

Your ref:	2014/--221
Our ref:	JP: A1595/201401
Enquiries:	John Pagotto - Ph 9222 3235 Fax 9222 3790
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DEPARTMENT OF PARKS & WILDLIFE
24 DEC 2014
Corporate Information Services

Director General
Department of Parks and Wildlife
Locked Bag 104 Bentley Delivery Centre
BENTLEY WA 6983

Attention: Nicola Mincham

EXCISION FROM STATE FOREST 22 AND TRANSFER IN FREEHOLD TO WA BLUEMETALS FOR EXPANSION OF BYFORD QUARRY.

I refer to your letter dated 6 August 2014 requesting this Department's comments regarding the above.

Your letter provided copies of this Department's (DoIR) previous support for the proposal. This Department's position remains unchanged.

Likewise, Alcoa of Australia Ltd had no concerns at that time, and recently confirmed that there are no concerns regarding the quarry extension.

Conversion of the land to freehold will require approval pursuant to section 16(3) of the *Mining Act 1978* after the coinciding portion of the State Forest is cancelled and reverts to Crown land awaiting creation of the freehold title. This has been given subject to no mining interest being taken.

For Executive Director
Mineral Titles Division
Department of Mines and Petroleum

23 December 2014

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Telephone +61 8 9222 3333 Facsimile +61 8 9222 3862
www.dmp.wa.gov.au
ABN 69 410 335 356

Appendix 2

Flora & Vegetation Assessment - Mattiske Consulting

Appendix 3
Fauna Report - Western Wildlife

Appendix 4
Petalurid Survey - Wetlands Research

Appendix 5

Aboriginal Heritage Survey of M70/1240

Appendix 6

Rehabilitation Plan 2005

Appendix 7
Rehabilitation Photos

Appendix 8

Update to National Conservation Significant Fauna List
Western Wildlife

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