GOVERNMENT OF
WESTERN AUSTRALIA

CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

PERMIT DETAILS

Area Permit Number: CPS 9539/1
File Number: DWERVT9322
Duration of Permit: From 20 March 2024 to 20 March 2035

ADVICE NOTE

Offset - Revegetation and conservation covenant.

The revegetation offset and conservation covenant referred to in condition 6 and 8 of this permit is to facilitate the *revegetation* and *rehabilitation* of a total of 3.24 hectares of native vegetation that comprises significant foraging and future breeding habitat for Carnaby's cockatoo (*Zanda latirostris* (previously *Calyptorhynchus latirostris*)), forest red-tailed black cockatoo *(Calyptorhynchus banksii naso*), and Baudin's cockatoo (*Zanda baudinii* (previously *Calyptorhynchus baudinii*)), to be conserved in perpetuity.

PERMIT HOLDER

Vinci Gravel Supplies Pty Ltd

LAND ON WHICH CLEARING IS TO BE DONE

Lot 9 on Diagram 42350, Karragullen

AUTHORISED ACTIVITY

The permit holder must not clear more than 4.71 hectares of *native vegetation* within the area cross-hatched yellow in Figure 1 of Schedule 1.

CONDITIONS

1. Period during which clearing is authorised

The permit holder must not clear any *native vegetation* after 20 March 2029.

2. Avoid, minimise, and reduce impacts and extent of clearing

In determining the *native vegetation* authorised to be cleared under this permit, the permit holder must apply the following principles, set out in descending order of preference:

(a) avoid the clearing of *native vegetation*;

(b) minimise the amount of *native vegetation* to be cleared; and

(c) reduce the impact of clearing on any environmental value.

3. Weed and dieback management

When undertaking any clearing authorised under this permit, the permit holder must take the following measures to minimise the risk of introduction and spread of *weeds* and *dieback*:

(a) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;

(b) ensure that no known *dieback* or *weed*-affected soil, *mulch*, *fill*, or other material is brought into the area to be cleared; and

(c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

4. Wind erosion management

The Permit Holder shall not clear *native vegetation* unless extractive activities begin within 3 months of the clearing being undertaken.

5. Directional clearing

The permit holder must conduct clearing activities in a slow, progressive manner to allow fauna to move into adjacent *native vegetation* ahead of the clearing activity.

6. Offset - Revegetation

Within 12 months of the commencement of clearing activities authorised under this permit, for the area cross-hatched red in Figure 1 of Schedule 1, the permit holder must implement and adhere to the 'Environmental Management Plan – Lot 9 Brookton Highway, Karragullen'; dated August 2022 (by Emerge Associates), including but not limited to the following actions:

(a) commence *revegetation* and *rehabilitation* by;

  (i) ripping the ground on the contour to remove soil compaction;

  (ii) deliberately *planting* and/or *direct seeding* native vegetation at an *optimal time*, which provide suitable habitat for *black cockatoo species,* including a mixture of flora species listed in Schedule 2.

  (iii) ensuring only *local provenance* seeds and propagating material are used to *revegetate* and *rehabilitate*.

(b) Establish at least four 5 x 5 metre quadrat monitoring sites;

(c) undertake *weed* control activities prior to *planting* and/or *direct seeding*, and annually thereafter until completion criteria have been met;

(d) achieve the completion criteria listed in Table 1 after a five-year monitoring period for areas *revegetated* and *rehabilitate*d under this condition;

Table 1: completion criteria

Aspect	Completion targets	Completion criteria	Monitoring
1) Species richness	No less than 15 species of trees, shrubs and herbs	No less than 15 native flora species that have been planted persisting within the revegetation area.	The number of species occurring in quadrats, in the revegetation area, will be counted annually for 5 years.

2) Weeds	<10% weed cover, no declared pests or Weeds of National Significance (WoNS)	<10% weed cover, no declared pests or WoNS	Average weed cover across the site will be monitored annually during for 5 years
3) Marri tree density	Between 1 and 3 Marri trees established per 25 m^2	Persistence of 1 to 3 Marri trees on average per 25 m^2, within the revegetation area	The number of surviving Marri trees per 25 m^2 will be assessed annually for 5 years.
4) Species density/composition	A total native species stem density of at least 0.8 plants per 1 m^2	The revegetation area contains at least 0.8 native plants per 1 m^2	The average stem density of native species occurring in quadrats, in the revegetation area, will be assessed annually for 5 years.

(e) undertake remedial actions for areas *revegetated* and *rehabilitated*, where monitoring indicates that *revegetation/rehabilitation* has not met the completion criteria outlined in condition 6(d) of this permit, including;

(i) *revegetate/rehabilitate* the area by deliberately *planting* and/or *direct seeding native vegetation* that will result in the minimum completion criteria detailed in Table 1 and ensuring only *local provenance* seeds and propagating material are used;

(ii) additional *weed* control activities; and

(iii) annual monitoring of the *revegetated* and *rehabilitated* areas by an *environmental specialist*, until the completion criteria, specified in Table 1 are met.

7. Revegetation – mitigation

For any clearing authorised for *extraction activities* within the area cross-hatched yellow in Figure 1 of Schedule 1, the Permit Holder must:

(a) Retain the vegetative material and topsoil removed by clearing authorised under this Permit and stockpile the vegetative material and topsoil in an area(s) that has already been cleared.

(b) Immediately after the cessation of extraction activities, commence revegetation and rehabilitation of areas no longer required for extraction activities, by implementing and adhering to the 'Environmental Management Plan – Lot 9 Brookton Highway, Karragullen'; dated August 2022 (by Emerge Associates), including but not limited to the following actions:

(i) ripping the ground on the contour to remove soil compaction;

(ii) deliberately *planting* and/or *direct seeding* native vegetation at an *optimal time*, of which provides suitable habitat for *black cockatoo species,* including a mixture of species listed in Schedule 2.

(iii) ensuring only *local provenance* seeds and propagating material are used to *revegetate* and *rehabilitate*.

(c) Establish four 5 x 5 metre quadrat monitoring sites;

(d) Undertake *weed* control activities prior to *planting* and/or *direct seeding*, and annually thereafter until completion criteria have been met;

(e) Achieve the completion criteria listed in Table 1 after a five-year monitoring

period for areas *revegetated* and *rehabilitate*d under this condition; and

(f) Undertake remedial actions for areas *revegetated* and *rehabilitated* under condition 8 of this permit, where monitoring indicates that *revegetation/rehabilitation* has not met the completion criteria, outlined in Table 1 of condition 6(d) of this permit, including;

(i) *revegetate* the area by deliberately *planting* and/or *direct seeding native vegetation* that will result in the minimum targets detailed in the completion criteria specified in Table 1 and ensuring only *local provenance* seeds and propagating material are used

(ii) undertake additional *weed* control activities; and

(iii) annual monitoring of the *revegetated* and *rehabilitated* areas by an *environmental specialist*, until the completion criteria specified in Table 1 are met.

8. Offset – Conservation Covenant

Within 24 months of commencing *revegetation* and *rehabilitation* within the area cross-hatched red in Figure 1 of Schedule 1, in accordance with Condition 6 of this permit, the permit holder must:

(a) place a conservation covenant under section 30B of the *Soil and Land Conservation Act 1945,* setting aside the area hatched red on Figure 1 of Schedule 1 for the protection and management of vegetation in perpetuity; and

(b) provide the *CEO* a copy of the executed conservation covenant.

9. Records that must be kept

The permit holder must maintain records relating to the listed relevant matters in accordance with the specifications detailed in Table 2.

Table 2: Records that must be kept

No.	Relevant matter	Specifications
1.	In relation to the authorised clearing activities generally	(a) the species composition, structure, and density of the cleared area; (b) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to GDA2020, expressing the geographical coordinates in Eastings and Northings; (c) the date that the area was cleared; (d) the size of the area cleared (in hectares); (e) actions taken to avoid, minimise, and reduce the impacts and extent of clearing in accordance with condition 2; (f) actions taken to minimise the risk of the introduction and spread of *weeds* and *dieback* in accordance with condition 3; and (g) evidence supporting compliance with condition 4 and condition 5.

No.	Relevant matter	Specifications
2.	In relation to *revegetation* and *rehabilitation* pursuant to conditions 6 and 7	(a) the location of areas revegetated and rehabilitated recorded using a GPS unit set to GDA2020, expressing the geographical coordinates in Eastings and Northings or decimal degrees; (b) date that *revegetation* and *rehabilitation* activities were undertaken. (c) description of the *revegetation* and *rehabilitation* activities undertaken; (c) the size of the area *revegetated* and *rehabilitated* (in hectares); (d) remedial actions required to be undertaken; and (e) evidence supporting compliance with condition 6 and 7 of this permit.

10. Reporting

(a) The permit holder must provide to the *CEO*, on or before 30 June of each calendar year, a written report containing:
  (i) the records required to be kept under condition 9; and
  (ii) records of activities done by the permit holder under this permit between 1 January and 31 December of the preceding calendar year.

(b) If no clearing authorised under this permit has been undertaken, a written report confirming that no clearing under this permit has been undertaken, must be provided to the *CEO* on or before 30 June of each calendar year.

(c) The permit holder must provide to the *CEO*, no later than 90 calendar days prior to the expiry date of the permit, a written report of records required under condition 9, where these records have not already been provided under condition 10(a).

DEFINITIONS

In this permit, the terms in Table 3 have the meanings defined.

Table 3: Definitions

Term	Definition
Black cockatoo species	means one or more of the following species: (a) *Zanda latirostris* (Carnaby's cockatoo); (b) *Zanda Calyptorhynchus* (Baudin's cockatoo); and/or (c) *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo).
CEO	Chief Executive Officer of the department responsible for the administration of the clearing provisions under the *Environmental Protection Act 1986*.
clearing	has the meaning given under section 3(1) of the EP Act.
condition	a condition to which this clearing permit is subject under section 51H of the EP Act.
dieback	means the effect of *Phytophthora* species on native vegetation.
department	means the department established under section 35 of the *Public Sector Management Act 1994* (WA) and designated as responsible for the administration of the EP Act, which includes Part V Division 3.
direct seeding	means a method of re-establishing vegetation through the establishment of a seed bed and the introduction of seeds of the desired plant species.

Term	Definition
environmental specialist	means a person who holds a tertiary qualification in environmental science or equivalent, and has a minimum of 2 years work experience relevant to the type of environmental advice that an environmental specialist is required to provide under this permit, or who is approved by the CEO as a suitable environmental specialist.
fill	means material used to increase the ground level, or to fill a depression.
local provenance	means native vegetation seeds and propagating material from natural sources within 50 kilometres and the same IBRA subregion of the area cleared.
optimal time	means the period from May to July for undertaking planting.
rehabilitate / rehabilitated / rehabilitation	means actively managing an area containing native vegetation in order to improve the ecological function of that area.
revegetate / vegetated / revegetation	means the re-establishment of a cover of local provenance native vegetation in an area using methods such as natural regeneration, direct seeding and/or planting, so that the species composition, structure and density is similar to pre-clearing vegetation types in that area.
EP Act	*Environmental Protection Act 1986* (WA)
mulch	means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation.
native vegetation	has the meaning given under section 3(1) and section 51A of the EP Act.
planting	means the re-establishment of vegetation by creating favourable soil conditions and planting seedlings of the desired species.
weeds	means any plant – (a) that is a declared pest under section 22 of the *Biosecurity and Agriculture Management Act 2007*; or (b) published in a Department of Biodiversity, Conservation and Attractions species-led ecological impact and invasiveness ranking summary, regardless of ranking; or (c) not indigenous to the area concerned.

END OF CONDITIONS

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Juraj Galba
A/MANAGER
NATIVE VEGETATION REGULATION

Officer delegated under Section 20
of the Environmental Protection Act 1986

26 February 2024

SCHEDULE 1

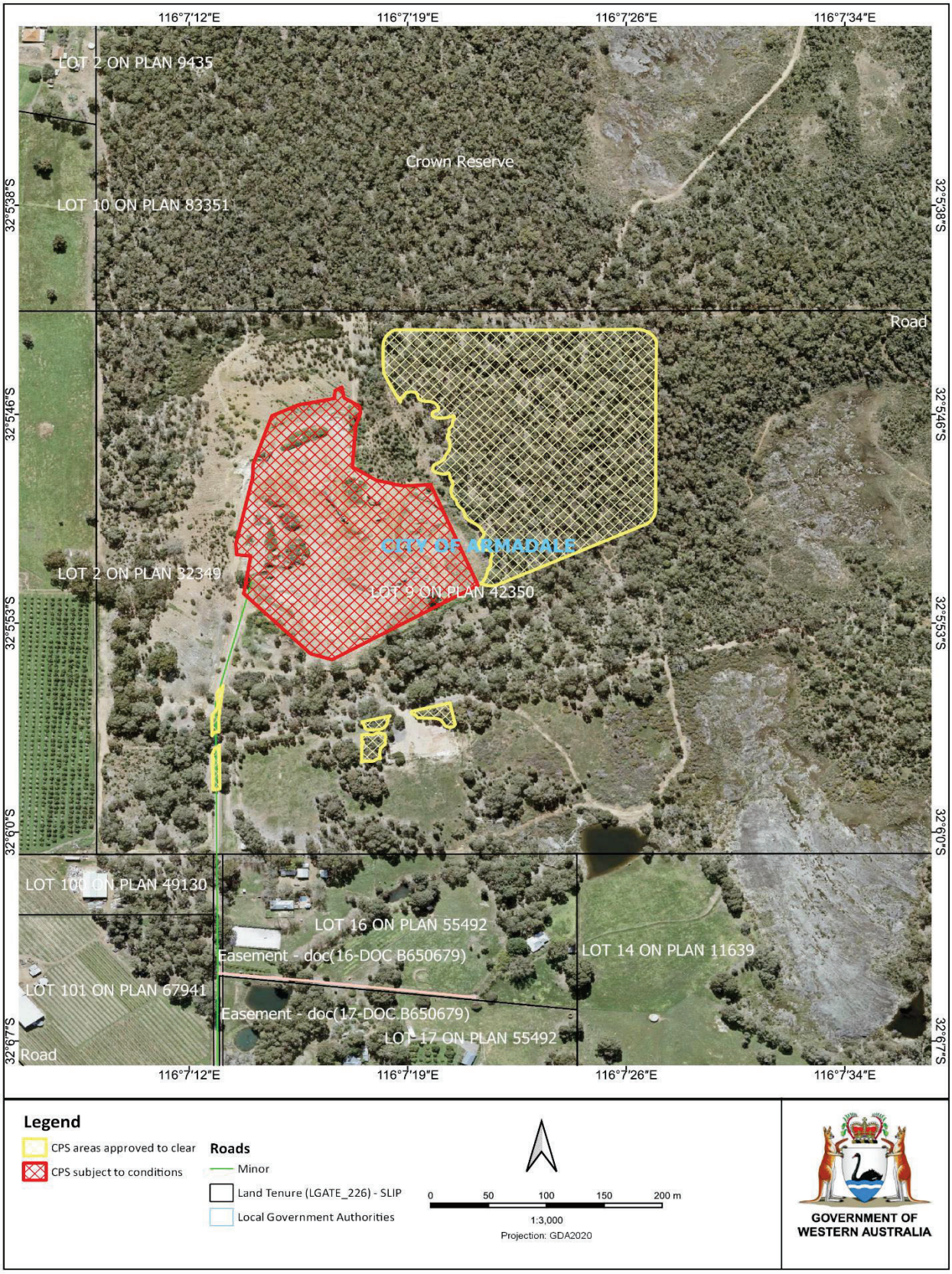


Figure 1: Map of the boundary of the area within which clearing may occur (cross-hatched yellow) and where certain permit conditions apply (cross-hatched red).

SCHEDULE 2

SPECIES LIST FOR REVEGETATION

Form	Species	
Groundcovers	*Hardenbergia comptoniana* *Kennedia coccinea* *Orthrosanthus laxus* *Dampiera linearis*	*Burchardia congesta* *Clematis pubescens* *Kennedia prostrata* *Conostylis aculeata*
Shrubs	*Allocasuarina humilis* *Calothamnus quadrifidus* *Hakea amplexicaulis* *Hakea lissocarpha* *Mirbelia dilatata* *Hakea petiolaris*	*Acacia drummondii* *Acacia huegelii* *Acacia preissiana* *Hemiandra pungens* *Hibbertia racemosa* *Acacia lateriticola* *Acacia pulchella*
Trees	*Eucalyptus patens* *Eucalyptus lane-poolei* *Eucalyptus laeliae*	*Eucalyptus wandoo* *Corymbia calophylla*

Government of Western Australia
Department of Water and Environmental Regulation

Clearing Permit Decision Report

1 Application details and outcome

1.1. Permit application details

Permit number:	CPS 9539/1
Permit type:	Area permit
Applicant name:	Vinci Gravel Supplies Pty Ltd
Application received:	21 December 2021
Application area:	4.71 hectares of native vegetation
Purpose of clearing:	Extractive industry
Method of clearing:	Mechanical
Property:	Lot 9 on Diagram 42350, Brookton Highway
Location (LGA area/s):	City of Armadale
Localities (suburb/s):	Karragullen

1.2. Description of clearing activities

The vegetation proposed to be cleared is distributed across eight separate areas, totalling 4.71 hectares, within Lot 9 on Diagram 42350, Brookton Highway, Karragullen (see Figure 1, Section 1.5). The area proposed to be cleared is for the purpose of expansion of an existing gravel excavation pit, the extension of the internal access track and the construction of a vehicle compound (Emerge Associates, 2021a).

1.3. Decision on application

Decision:	Granted
Decision date:	26 February 2024
Decision area:	4.71 hectares of native vegetation, as depicted in Section 1.5, below.

1.4. Reasons for decision

This clearing permit application was submitted, accepted, assessed and determined in accordance with sections 51E and 51O of the *Environmental Protection Act 1986* (EP Act). The Department of Water and Environmental Regulation (DWER) advertised the application for 21 days and received one submission. Consideration of matters raised in the public submission is summarised in Appendix B.

In making this decision, the Delegated Officer had regard for:

- the site characteristics (see Appendix C)
- relevant datasets (see Appendix H.1)
- the findings of flora and fauna surveys (Emerge Associates 2020; 2021b; 2021c; 2022c) (see Appendix G)
- advice from the Department of Biodiversity, Conservation and Attractions (DBCA) (DBCA, 2022a and 2022b)
- a revegetation plan consistent with DWER's *Guide to preparing revegetation plans for clearing permits* (Emerge Associates, 2022b)
- Environmental management plan prepared by Emerge Associates (2022b) to mitigate the impacts of the proposed activities on the environment

- the clearing principles set out in Schedule 5 of the EP Act (see Appendix D)
- an offset proposal (see Section 4); and
- relevant planning instruments and any other matters considered relevant to the assessment (see Section 3).

The Delegated Officer also considered the below information provided by the applicant demonstrating the public benefit provided by the clearing:

- The primary purpose/use for gravel is in road construction, most of these being public roads. The City of Armadale is one of the applicant's largest customers. The applicant sells directly to the City of Armadale but also to other parties (i.e. contractors) who are constructing public roads.
- The applicant runs a civil earthwork and gravel business that provides gravel and earthwork services for driveways, roadworks, house pads etc.

The assessment identified that:

- The proposed clearing may result in the introduction and spread of weeds and dieback into adjacent vegetation, which could impact on the quality of the adjacent vegetation and habitat values
- The proposed clearing area contains 4.67 hectares of black cockatoo foraging, potential breeding and roosting habitat. The impacts to black cockatoo foraging habitat are considered to be significant.
- The proposed clearing area provides suitable habitat for chuditch, southern death adder, Dell's skink, western brush wallaby, quenda, southwestern brush tail phascogale and peregrine falcon. Impacts to these species are unlikely to be significant.
- The clearing may result in impacts to nearby Korung National Park from weeds and dieback; and
- The clearing may result in land degradation in the form of wind erosion.

After consideration of the available information, as well as the applicant's minimisation and mitigation measures (see Section 3.1), the Delegated Officer determined that the above impacts can be minimised and managed through conditions on the permit such that they are unlikely lead to an unacceptable risk to environmental values, with the exception of impacts to black cockatoo foraging habitat, which are considered to be suitably mitigated through an offset (described in Section 4). The applicant has suitably demonstrated avoidance and minimisation measures.

The Delegated Officer decided to grant a clearing permit subject to conditions to:

- Avoid and minimise to reduce the impacts and extent of clearing
- Take steps to reduce the risk of the introduction and spread of weeds and dieback to minimise impacts to adjacent vegetation
- Undertake slow, progressive one directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity
- Manage wind erosion by commencing extractive activities within three months of the clearing being undertaken
- Revegetate areas cleared for extraction activities post extraction, with species suitable for foraging by black cockatoos; and
- Revegetate, and conserve in perpetuity under a conservation covenant, an additional 3.24 hectare area with black cockatoo foraging species, to offset residual environmental impacts to black cockatoo habitat (refer to Section 4).

1.5 Site map

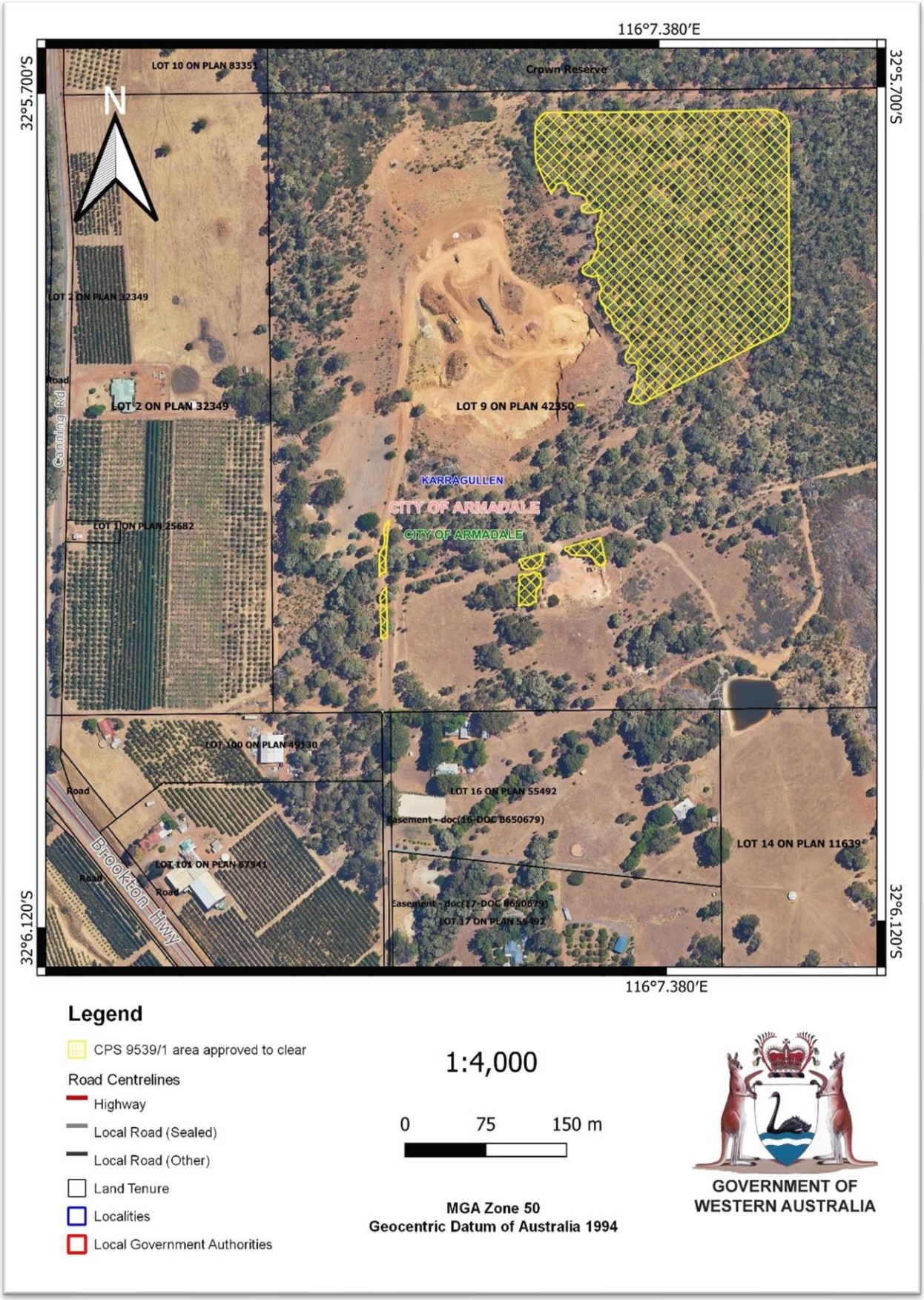


Figure 1: Map of the application area. The area crosshatched yellow indicates the areas authorised to be cleared under the granted clearing permit.

2 Legislative context

The clearing of native vegetation in Western Australia is regulated under the EP Act and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (Clearing Regulations).

In addition to the matters considered in accordance with section 51O of the EP Act (see Section 1.4), the Delegated Officer has also had regard to the objects and principles under section 4A of the EP Act, particularly:

- the precautionary principle
- the principle of intergenerational equity; and
- the principle of the conservation of biological diversity and ecological integrity.

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Planning and Development Act 2005* (WA) (P&D Act); and
- *Aboriginal Heritage Act 1972.*

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (DER, December 2013)
- *Procedure: Native vegetation clearing permits* (DWER, October 2019); and
- Technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016).

3 Detailed assessment of application

3.1. Avoidance and mitigation measures

The applicant has provided the following avoidance and mitigation measures:

Avoidance (Emerge Associates, 2021a):

- As part of the development process numerous alternative locations were initially considered. The land situated to the east and south of the current proposal were identified to contain gravel resource. However, due to the presence of granite outcrop plant communities in 'excellent' condition and the ephemeral Stinton Creek, these areas have been avoided.
- Avoidance through project design involves consideration of operational methods and infrastructure, in addition to the project layout. The project has been designed to limit the extent of disturbance by utilising, where possible, existing impacted areas and avoids splitting native vegetation and movement corridors.
- To prevent the disturbance to the Stinson's Creek tributary riparian vegetation, a waterway 'avoidance area' has been identified to a width of 30 meters either side of the Stinton Creek tributary.
- The utilisation of the land directly adjacent to the stage 4 quarry has been chosen to specifically avoid further fragmentation of contiguous remnant vegetation within the broader site and thus avoids splitting native vegetation and movement corridors. The location of the application area allows for the utilisation of already disturbed land, including the existing internal access track. Furthermore, those areas containing higher biodiversity, such as the areas of granite outcrop which are in excellent condition, have been avoided to ensure preservation of the community.
- Whilst 91 species are proposed to be removed, the broader Lot 9 will ensure the perpetuation of 150 species, an outcome that will ensure the current level of biodiversity is not negatively impacted.
- A total 30.83 hectares of native vegetation will be retained within the broader site. The extent of the clearing area will be clearly defined on the ground before any clearing activities commence to ensure there will be no inadvertent encroachment of disturbance into retained vegetation. vegetation. The vegetation proposed to be retained comprises native vegetation with high fauna habitat values suitable for a number of conservation significant fauna including the three species of black cockatoo and the chuditch, and includes:
  - A total 366 black cockatoo habitat trees, two with suitable breeding hollows.
  - At least 24.34 hectares of Carnaby's cockatoo foraging habitat, 22.14 hectares of Baudin's cockatoo foraging habitat and 20.30 hectares of forest red-tailed black cockatoo foraging habitat will be retained within the broader site.
  - A total 26.18 hectares of good quality consolidated habitat for the Chuditch will be retained within the broader site, contiguous with the similar jarrah/marri forest habitat within protected conservation reserves Korung National Park and Midgegooroo National Park located to the north and east.
- The extent of the clearing area will be clearly defined on the ground before any clearing activities commence to ensure there will be no inadvertent disturbance.

Mitigation (Emerge Associates, 2021a and 2022b):

- An Environmental Management Plan (EMP) has been prepared in support of the development approval (DA) and extractive industry licence (EIL) application and addresses the various mitigation measures to be implemented for the relevant environmental factors, which include flora and vegetation, fauna, water and social surroundings.
- The proposed mining process and operations within the expanded gravel pit will continue in accordance with existing operations. Extraction is to be undertaken on the following basis:
    - Topsoil will be removed (approximately 50 millimetres thick) and stockpiled in windrows. All topsoil and overburden stockpiles will be located within the general vicinity of its origin, and stockpiles associated with the stage 5 expansion will remain in the stage 5 extraction footprint. This is to prevent the potential spread of weeds and Phytophthora dieback.
    - A bulldozer will rip the laterite and then blade it into a raw material stockpile. No over-excavation is to be undertaken below pit finished floor levels.
    - The removal of gravel from the pit will include the use of a bulldozer, a rock breaker, excavators, a loader and a crusher
    - The raw gravel material will subsequently be crushed by way of a mobile (tracked) impact crusher.
    - Trucks will enter and cart material from the pit throughout the extraction period.
    - Upon completion of extraction, the pit floor will be ripped prior to overburden replacement and progressively rehabilitated.
- Clearing of native vegetation will occur progressively associated with extraction stages and progressively rehabilitated in alignment with the EMP.
- Native revegetation will be established within the site, post extraction, which will ultimately establish potential breeding and foraging habitat for a number of conservation significant fauna, including Baudin's cockatoo, Carnaby's cockatoo and forest red-tailed black cockatoo. Maintenance and monitoring will be conducted until completion criteria are met.
- A pre-disturbance dieback survey shall be undertaken to ensure the quality of black cockatoo foraging resources adjacent to the Disturbance Footprint is not impacted by dieback. Access within the quarry area will be controlled to reduce the spread of weeds and dieback to areas of retained vegetation especially off-road vehicle access. No soil or vegetation will be brought into the site apart from that to be used in rehabilitation which will be free of weeds and dieback.
- Phytophthora dieback and weed management (particularly those listed as a Weed of National Significance (WoNS)) will be undertaken within the application area to ensure there is no degradation of the neighbouring conservation reserves.
- A Stormwater and Erosion Management Plan has been prepared, outlining the mechanisms to control uncontrolled surface water runoff to the Stinton Creek tributary to ensure existing surface water flow patterns are maintained.
- Erosion control measures:
    - Existing access tracks or roads will be used wherever possible rather than creating new ones.
    - Clearing will only be undertaken as required for quarrying operations and will not be conducted in adverse and extreme weather conditions (e.g. excessive windy and dry conditions or during heavy rainfall).
    - Level or gently sloping areas will be selected as stockpile sites to minimise erosion and potential soil loss.
    - Appropriate sediment controls will be installed upslope of stockpiles to divert water around and downslope of the stockpiles to prevent soil loss.
    - Provide adequate erosion control structures on sloping ground such as spur drains or contour banks at suitable intervals.

The Delegated Officer was satisfied that the applicant has made a reasonable effort to avoid and minimise potential impacts of the proposed clearing on environmental values.

3.2. Assessment of impacts on environmental values

In assessing the application, the Delegated Officer has had regard for the site characteristics (see Appendix C), available databases, expert advice from DBCA, supporting information in the form of a fauna assessment and flora survey provided by the applicant and the extent to which the impacts of the proposed clearing present a risk to biological, conservation, or land and water resource values.

The assessment against the clearing principles (see Appendix D) identified that the risk of impacts of the proposed clearing to biological values (fauna, and adjacent flora and vegetation), and land and water resources required further consideration. The consideration of these impacts, and the extent to which they can be managed through conditions applied in line with sections 51H and 51I of the EP Act, is set out below.

3.2.1. Biological values (flora) - Clearing Principles (a) (c)

Flora

Assessment of available databases and desktop analysis found records of 41 conservation significant flora species within the local area. Of these, 31 species were listed as priority and ten were listed as threatened under the BC Act. None of these records were found within the area proposed to be cleared.

A flora and vegetation assessment was undertaken by Emerge Associates across the application area and broader property on 27 May, 2 June, 11 September, 21 October, 27 November (further Emerge correspondence to DWER noted that the report states 27 October in error) and 12 December 2020 (Emerge Associates 2021b). A total of 140 native and 19 non-native species were recorded within the site (Emerge Associates, 2021b).

Emerge Associates found that approximately 70 percent of the total survey area (33.88 hectares) supported plant communities dominated by native vegetation (Emerge Associates, 2021b). Eight plant communities were found throughout the total survey area. Only one occurred within the application area, that being marri and jarrah woodland in good to very good (Keighery, 1994) condition (Appendix E).

The majority of the threatened and priority flora species recorded within the local area are not considered to occur in the application area due to lack of suitable habitat. It is considered that the flora survey undertaken within the application area was consistent with the EPA guidance and was undertaken during the flowering period for the majority of the priority listed and threatened flora species. No conservation significant flora species were recorded during the flora survey (Emerge Associates, 2021b).

The survey states that it was unable to confirm the presence or absence of two priority flora species, *Eriochilus sp.* (G. Brockman 140) (priority 1) and *Paracaleana ferricola* (priority 2) as it was undertaken outside the flowering period for these two species (Emerge Associates, 2021b). The survey report stated that the flowering period for *P. ferricola* occurred in July. However, further advice was sought from DBCA and the applicant which confirmed that the flowering period for this species is late October to December (DBCA, 2022). It was also advised that this species has a highly restricted distribution and is located five kilometres northwest of the application area (Emerge Associates 2022c). As the flora survey was undertaken during the flowering time for this species and it was not identified within the site, it is considered unlikely for this species to be present within the application area.

Eriochilus sp. Roleystone (G. Brockman 1140) is known to flower between mid-June and July, but limited information is available on this species as only three records exist on DBCA's Florabase website (Western Australian Herbarium, 2021). These populations occur seven kilometres west of the application area within Banyowla Regional Park. This specie is a perennial geophytic orchid, occurring underground for most of the year and developing leaves and flowers above-ground only during a few months in order to reproduce. The flora survey was undertaken in early June just before the flowering period for this species. Further advice obtained from Emerge Associates advised that *Eriochilus* leaves would have been present if this species occurs on site (Emerge Associates 2022c). No *Eriochilus* leaves were recoding during the flora survey on 2 June 2020. Given this, it is not considered likely for this species to be present within the application area.

The flora survey did not identify any conservation significant flora species or threatened or priority ecological communities within the application area (Emerge Associates, 2022b). No other threatened or priority flora are considered likely to occur in the site.

Threatened and priority ecological communities (TEC/PECs)

Four conservation significant ecological communities have been recorded within the local area of the area proposed to be cleared. The closest to the application area is State listed PEC (P4) Central Granite Shrublands 'Central Northern Darling Scarp Granite Shrubland Community', which lays approximately 7.35 kilometres west-north-west of the application area. The other ecological communities within the local area include:

- Banksia WL SCP 'Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region' Priority three under the BC Act and Endangered EPBC Act.
- SCP20b '*Banksia attenuatta* and/or *Eucalyptus marginata* woodlands on the eastern side of the SCP' Endangered under the BC Act and EPBC Act; and
- SCP 3b '*Corymbia calophylla* and *Eucalyptus marginata* woodlands on sandy clay soils of the southern SCP' listed as Vulnerable under the BC Act.

The flora and vegetation survey did not identify any TECs or PECs within the application area (Emerge Associates, 2022a). In addition, the desktop assessment indicates that the TECs and PECs listed above do not occur within the Jarrah Bioregion in which the application area is located. Given this, it is not considered for the proposed clearing to impact on vegetation that is consistent with a PEC or TEC.

The flora survey identified the vegetation within the application area as CcEmBa (Open forest *Corymbia calophylla* and *Eucalyptus marginata* with *Allocasuarina fraseriana* over shrubland to tall shrubland *Banksia grandis* and *Bossiaea aquifolium* over shrubland *Xanthorrhoea preissii* over mixed native herbland *Platysace filiformis*, *Stylidium* spp. and *Scaevola* spp.) plant community is in very good (Keighery, 1994) condition (Figure 7) (Emerge Associates, 2021b).

The CcEmBa community is well reserved locally outside of the proposed application area and within the clearing avoidance footprint. A total 21.47 hectares of CcEmBa is situated along the eastern periphery and south-western portion of the broader site (Lot 9), along with six other plant community types in 'degraded' to 'excellent' (Keighery, 1994) condition.

Conclusion

Based on the above assessment, the proposed clearing will not result in impact to priority or threatened flora or vegetation that represents a TEC or PEC. However, the proposed clearing is likely to result in the introduction of weed and dieback to adjacent remnant vegetation in excellent (Keighery, 1994) condition.

Conditions

For the reasons set out above, it is considered that the impacts of the proposed clearing can be managed by the following condition:

- Weed and dieback management measures to minimise impacts to surrounding vegetation.

3.2.2. Biological values (Fauna) - Clearing Principle (b)

Assessment

According to available databases, nineteen conservation significant fauna species have been recorded in the local area (10 km radius from the application area). Of these species the closest and most abundantly recorded fauna species near the area proposed to be cleared are *Zanda latirostris* (Carnaby's black cockatoo), *Zanda baudinii* (Baudin's black cockatoo) and *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo), (referred to herein collectively as black cockatoos) which are listed as endangered and/or vulnerable under the BC Act and the Commonwealth EPBC Act.

A fauna assessment was undertaken across the application area on 2 May and 2 June 2020 (Emerge Associates, 2020) and a targeted black cockatoo field survey and assessment was undertaken across Lot 9 (encompassing the application area) on 11 September, 21 October, 27 November and 21 December 2020 (Emerge Associates 2021c). The fauna assessments found that the application area and adjacent vegetation supports native vegetation with high fauna habitat values associated with marri and jarrah forest, shrubland, granite outcrop, sedgeland and creek line (Emerge Associates, 2022b). Based on habitat requirements, species distribution and site conditions, the application area is likely to provide habitat for all three black cockatoo species as well as six other species of conservation significance.

Black cockatoo foraging

A total of 4.67 hectares of high value foraging habitat for black cockatoos occurs within the application area (Emerge Associates, 2022b). The best habitat for these species within the application area is considered to be within the marri and jarrah forest habitat type, which comprises 81.84 percent of the application area (Emerge Associates, 2021a). During the targeted black cockatoo survey, forest red-tailed black cockatoos were recorded within Lot 9 and Baudin's cockatoos were observed adjacent to Lot 9, and foraging evidence attributed to all three black cockatoo species was recorded across Lot 9 (Emerge Associates, 2021c).

Black cockatoos require sufficient food close to breeding areas, approximately 12 kilometres, in order to be able to forage during the day and return to feed nestling in order to successfully raise young (DBCA, 2022b). The application area is within 10 kilometres of two known confirmed breeding sites for white tailed black cockatoos and within 10 kilometres of 19 known roost sites for black cockatoos.

The application area represents 17.42 percent of the total black cockatoo foraging habitat identified within the property. Lot 9 on Diagram 42350, Brookton Highway, Karragullen, as a whole, contains suitable roosting, breeding and foraging habitat for black cockatoos including approximately 23.41 hectares of high value foraging habitat, 22.85 hectares of moderate foraging habitat and 23.46 hectares of low value foraging habitat, along with a total of 468 habitat trees, of which two contain hollows suitable for breeding (Emerge Associates, 2022b). On a regional scale, the removal of 4.67 ha of black cockatoo habitat within the application area constitutes a small proportion of the intact Yarragil and Dwellingup vegetation complexes (which provides potential foraging, roosting and breeding habitat) that extends over the Darling Scarp with over 80 per cent of the pre-European extent remaining. The proposed clearing represents 0.045 percent of the 10,451 hectares of available foraging habitat within six kilometres of the application

area, a proportion of which is protected within conservation reserves including Korung National Park and Midgegooroo National Park directly to the north and east of the site.

The loss of 4.67 hectares of black cockatoo foraging habitat is considered likely to result in impacts to significant habitat for black cockatoos. The applicant has committed to revegetating and rehabilitating areas cleared for extractive activities post extraction, which will partially mitigate the loss of this habitat. To offset the remaining impacts to black cockatoo foraging habitat, the applicant will revegetate a further 3.24 hectares of land adjacent to the application area (refer to Section 4 for further details). The above revegetation will be undertaken within the context of a total of 13.43 hectares of revegetation to occur within the property, some of which is required under previous approvals (refer to Figure 2 below).

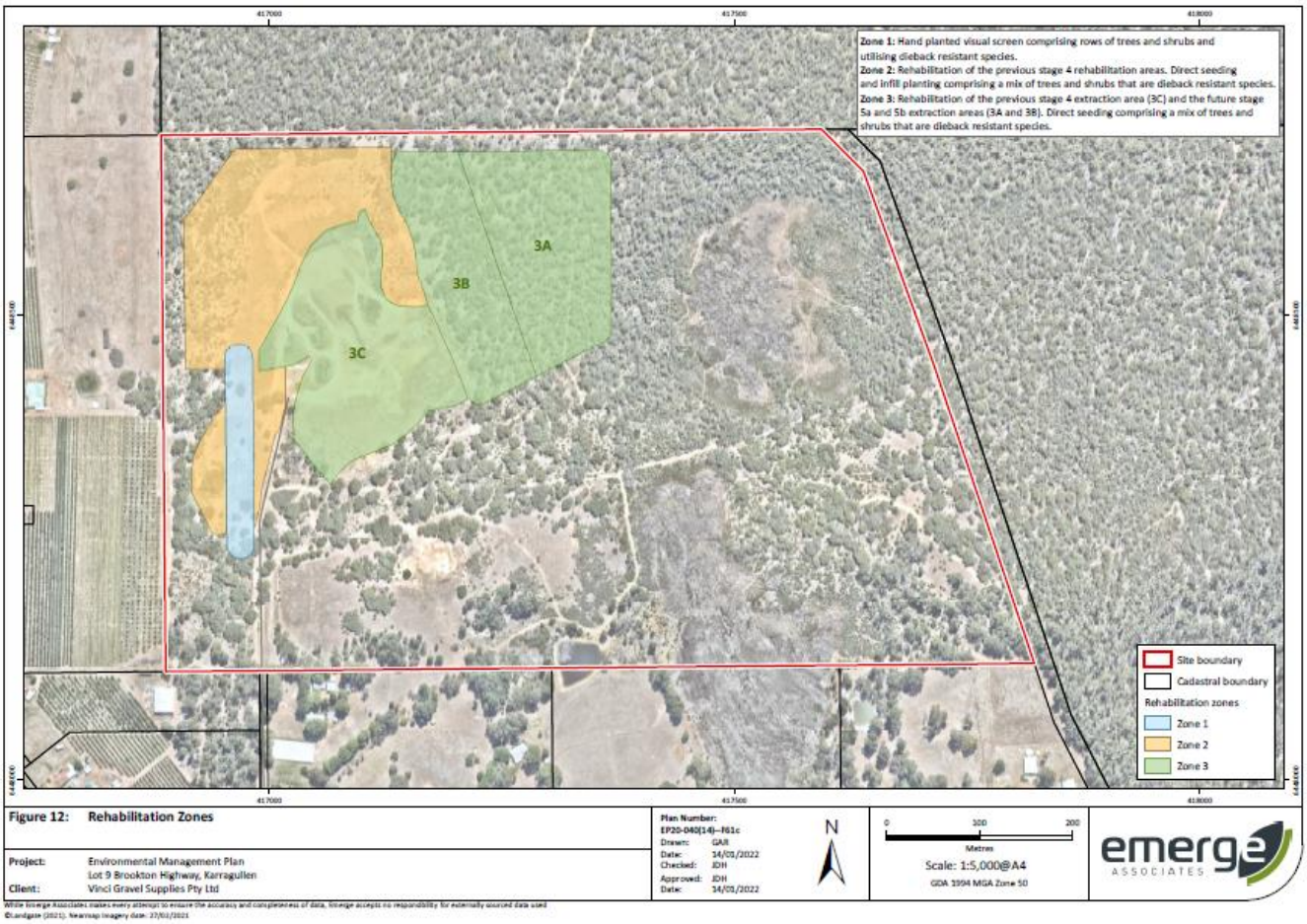


Figure 2 - Revegetation zones proposed within Lot 9.

Black cockatoo breeding and roosting

A total of 102 jarrah, marri and dead (stag) trees with a diameter at breast height (DBH) of 50 centimetres or greater were recorded in the application area. None of these contain a suitable hollow for black cockatoo breeding (Emerge Associates, 2022b). These trees are considered to be potential black cockatoo nesting trees, as defined by the former Commonwealth Department of Agriculture, Water and the Environment (DAWE) (2022). These potential nesting trees, together with other larger eucalyptus and marri trees within the application area, are also considered likely to provide roosting habitat for black cockatoo species (DAWE, 2022).

The applicant has proposed that to minimise the risk of disturbing active black cockatoo nesting hollows within the broader site and surrounding areas, clearing will be undertaken outside of the main breeding season where possible for Carnaby's and Baudin's black cockatoo to cause the least possible disruption to these species. The applicant has also advised that at least 366 habitat trees within the broader site will be retained, including two of which contain suitable breeding hollows (Emerge Associates, 2022b).

Noting the presence of other suitable roosting and potential breeding habitat for black cockatoos within the local area, the loss of this roosting and potential breeding habitat is not considered likely to result in significant impacts to black cockatoos. The revegetation and rehabilitation conditioned within and outside of the application area to mitigate impacts to black cockatoo foraging habitat will also reinstate black cockatoo breeding and roosting habitat.

Other conservation significant fauna

The application area is also considered likely to provide habitat for the following conservation significant fauna species, noting their habitat requirements:

- Chuditch (*Dasyurus geoffroii*) (Vulnerable) are found in a wide range of habitat from woodlands, riparian vegetation and deserts (DEC, 2012)
- Southern death adder (*Acanthophis antarcticus*) (Priority 3) mostly occur in woodland, grasslands and heaths. In the Darling Range this species usually occurs within Jarrah woodland adjacent to granite outcrops (Bush et. al. 2007)
- Dell's skink (*Ctenotus delli*) (Priority 4) inhabit jarrah and marri woodland with shrub dominated understorey (Nevill, 2005)
- Western brush wallaby (*Notamacropus irma*) (Priority 4) occur in dry sclerophyll forest, Banskia woodland and shrublands, and typically favour dense low vegetation that provides dense cover (Christensen and Strahan, 1983)
- Quenda (*Isoodon fusciventer*) (Priority 4) inhabit dense scrubby, often swampy, vegetation with dense cover and adjacent forest and woodland (DPAW, 2018).
- South western brush tailed phascogale (*Phascogale tapoatafa wambenger*) (Conservation Dependent) inhabit dry sclerophyll forests and open woodlands that contain hollow bearing trees but a sparse groundcover (DEC, 2012)
- Peregrine falcon (*Falco peregrinus*) (Other Specially Protected) typically nest on rocky ledges in tall, vertical cliff faces and gorges, or in tall trees associated with drainage lines, and can hunt in a range of habitat types including timbered watercourses, riverine environments, wetlands, plains, open woodlands, and pylons and spires of buildings (Australian Museum, 2021)

However, noting the following, the proposed clearing is not likely to result in significant impacts to the above species:

- the relatively small size of the proposed clearing area
- the application area is adjacent to an existing extraction pit
- the application area is surrounded by native vegetation (including conservation reserves) likely to provide suitable habitat for these species; and
- the wide distribution and range of habitats used by the peregrine falcon.

Revegetation of areas cleared for extraction activities within the application area and an additional 3.24 hectare offset area (as described above) will also reinstate habitat for the above species, and impacts to individuals of the above species will be mitigated through fauna management conditions placed on the permit.

Conclusion

Based on the above assessment, the application area contains foraging, roosting and breeding habitat for black cockatoo species, as well as habitat for chuditch, southern death adder, Dell's skink, western brush wallaby, quenda, south western brush tail phascogale and peregrine falcon. The clearing is considered to have a significant impact on black cockatoo foraging habitat, which will be mitigated by revegetation of the application area and revegetation of an additional 3.24 hectare offset area. Impacts to conservation significant fauna individuals will be mitigated through fauna management conditions placed on the permit.

Conditions:

- Implement slow and directional clearing to allow any fauna present to move into adjacent vegetation ahead of the clearing activity
- Implement weed and dieback management measures to mitigate impacts to adjacent vegetation and fauna habitat
- Revegetation of areas cleared for extraction activities post extraction; and
- Provision of an offset (Section 4) for the significant residual impacts to the loss of critical habitat for black cockatoos.

3.2.3. Conservation areas – Clearing Principle (h)

Assessment

Korung National Park is 20 metres north of the application area and is connected through continuous vegetation. The proposed clearing may result in spread of weeds and dieback to Korung National Park, although it is noted that no visual evidence of *Phytophthora* dieback was recorded within the application area in 2020. Wind erosion resulting from the clearing (refer to Section 3.2.4 below) may also result in the spread of wind-borne soil particles to Korung National Park. Conditions placed on the permit to manage weeds, dieback and wind erosion will reduce the risk of these impacts to Korung National Park. As a condition of the permit, areas cleared for extraction will be rehabilitated post extraction, which will then be expected to reduce the long-term risk of the above impacts. The applicant's

mitigation measures discussed in Section 3.1, including fencing of the site perimeter and erosion control measures will further reduce the likelihood of impacts of weeds, dieback and wind erosion to Korung National Park .

Conclusion

Based on the above assessment, and the avoidance and mitigation measures provided by the applicant (Section 3.1), while clearing may result in impacts from weeds, dieback and wind erosion to nearby Korung National Park, these impacts can be largely mitigated through conditions placed on the permit.

Conditions:

To address the above impacts, the following conditions have been placed on the clearing permit:

- Weed and dieback management conditions
- Manage wind erosion by commencing extractive activities within 3 months of the clearing being undertaken; and
- Revegetate areas cleared for extraction activities post extraction.

3.2.4. Land degradation – Clearing Principles (g)

Assessment

Soils within the application area have a high risk of wind erosion. Without appropriate ground cover, windbreaks or adequate dust suppression on exposed surfaces, the proposed clearing may cause appreciable land degradation. To minimise the degree of soil wind erosion, a wind erosion management condition, requiring the applicant to begin extractive activities within three months of the clearing being undertaken, has been placed on the permit. As a condition of the permit, areas cleared for extraction will be rehabilitated post extraction, which will then reduce the risk of wind erosion. The applicant's erosion control measures discussed in Section 3.1 will further reduce the likelihood of wind erosion.

Conclusion

Based on the above assessment, and the avoidance and mitigation measures provided by the applicant (Section 3.1), while clearing may result in short-term wind erosion impacts, these impacts can be largely mitigated in the long-term through conditions placed on the permit.

Conditions:
To address the above impacts, the following management measures will be required as conditions on the clearing permit:

- Manage wind erosion by commencing extractive activities within 3 months of the clearing being undertaken; and
- Revegetate areas cleared for extraction activities post extraction.

3.3. Relevant planning instruments and other matters

Other relevant authorisations required for the proposed land use include:

- Development approval under the *Planning and Development Act 2005* (issued by the City of Armadale and the Western Australian Planning Commission (WAPC))
- Extractive Industry Licence (issued by the City of Armadale)

The City of Armadale issued development approval for a five year period and an extractive industry licence for the proposed extraction relevant to this clearing permit in March 2022 (Emerge Associates, 2022a). These approvals include requirements for the applicant to adhere to an Environmental Management Plan (Emerge Associates, 2022b) and a Dust Management Plan relevant to the extractive activities. The Emerge (2022b) Environmental Management Plan outlines rehabilitation planned within the application area. WAPC also issued approval to commence the proposed extraction for a period of five years in March 2022 (Emerge Associates, 2022a).

The application area is zoned 'Rural' under the Metropolitan Region Scheme (MRS) and 'General Rural Armadale' under the City's Town Planning Scheme No. 4.

DWER granted a clearing permit CPS 8273/1 to the applicant on June 2019, approving the clearing of 1.5 ha of native vegetation adjacent to the CPS 9539/1 clearing area.

The proposal relevant to this clearing permit was referred to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) under the EPBC Act. On 23 March 2022 DCCEEW declared the proposal a controlled action and advised the project will be assessed by preliminary documentation (EPBC 2022/9142). As such the proposal will require assessment and approval under the EPBC Act before it can proceed. The assessment under the EPBC Act is still ongoing.

The relevant prescribed premise for the quarry operation, outlined in Schedule 1 of the *Environmental Protection Regulations 1987*, in category 70 (Part 2, Schedule 1). Category 70 applies to operations with a production or design capacity of 'more than 5,000 but less than 50,000 tonnes per year.' Should the annual extraction volumes of the proposed operations fall within this range, a prescribed premises registration will be sought pursuant to Part V, Division 3 of the EP Act.

No known Aboriginal sites of significance are mapped within the application area. It is the permit holder's responsibility to comply with the *Aboriginal Heritage Act 1972* (WA) and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

4 Suitability of offsets

Through the detailed assessment outlined in Section 3.2 above, the Delegated Officer has determined that the following significant residual impacts remain after the application of the avoidance and mitigation measures summarised in Section 3.1:

- The loss of 4.67 hectares of native vegetation representing foraging habitat for black cockatoo species.

The applicant has commitment to revegetation of the extraction area post extraction as mitigation. The revegetation of 4.71 hectares with black cockatoo foraging and potential nesting habitat will be completed in stages as the extractive industry progresses (Emerge Associates, 2022b).

The applicant has also committed to an environmental offset consisting of revegetation of 3.24 hectares adjacent to the application area. This area will be revegetated with black cockatoo foraging and nesting habitat and conserved in perpetuity under a conservation covenant under the *Soil and Land Conservation Act 1978*.

The objective is to revegetate a historically disturbed and future stabilised area with native vegetation to create a diverse, self-sustaining vegetation community. This will include direct seeding of over 15 dieback resistant species of tree, shrub and herbs and the implementation of a weed control program (Emerge Associates, 2022b).

The applicant has submitted a revegetation plan consistent with *DWER's guide to preparing revegetation plans for clearing permits* (DWER 2018) (Emerge Associates, 2022b). The revegetation plan includes site preparation, revegetation methodology, species lists, completion criteria, maintenance, monitoring and reporting, and management commitments.

The Delegated Officer concluded that the offset provided adequately counterbalances the significant residual impacts identified. The justification for the values used in the offset calculation is provided in Appendix F.

End

Appendix A. Additional information provided by applicant

Summary of comments	Consideration of comment
Information provided in response to DWER requests for further information regarding consideration of priority flora and flora survey methodology (Emerge Associates, 2022c)	Considered in Section 3.2.1
Provided Environmental Management Plan in line with EIL and DA requirements (Emerge Associates, 2022b)	Considered in Section 3.1 and Section 3.2

Appendix B. Details of public submissions

Summary of comments	Consideration of comment
Proponents have not proposed offsets or revegetation to mitigate their planned removal of both foraging and potential breeding habitat for these three threatened species of black cockatoos.	The Delegated Officer has considered the impacts the proposed clearing will have on critical habitat for all black cockatoo species. This impact has been addressed, and significant residual impact balanced by implementing offset conditions in the permit. Details outlined in Section 3.2.2 and Section 4 of this report.

Appendix C. Site characteristics

C.1. Site characteristics

The information provided below describes the key characteristics of the area proposed to be cleared and is based on the best information available to the department at the time of this assessment. This information was used to inform the assessment of the clearing against the Clearing Principles, contained in Appendix D.

Characteristic	Details
Local context	The application area consists of three distinct areas. The main area is for extractive industry to be conducted over two stages (2.82 and 1.72 hectares), widening of the internal access road (0.05 hectares) and an area for a vehicle compound (0.12 hectares). The application areas are surrounded by rural land and an existing approved extraction area occur immediately west. Korung National Park and Midedooroo National Park occur on the northern and eastern sides of the property. The proposed clearing area is part of a large area of vegetation connected to the neighbouring national parks. Spatial data indicates the local area (10-kilometre radius from the centre of the area proposed to be cleared) retains approximately 70 percent of the original native vegetation cover.
Climate	The climate of the site (which applies to the wider Perth region) is described as Mediterranean, with hot, dry summers and moderately wet, mild winters. An average of 1019.5 millimetres of rainfall is recorded annually from the Karragullen North weather station, which is the closest weather station, located approximately 800 metres north-east of the site (BoM, 2021). The majority of this rainfall is received between the months of May and September. Mean maximum temperatures at the Bickley weather station, which is the nearest temperature recording station approximately 10 kilometres north of the site, range from 15.1 degrees Celsius in July to 30.5 degrees Celsius in January and February, while mean minimum temperatures range from 7.3 degrees Celsius in July to 15.9 degrees Celsius in February (BoM, 2021).
Ecological linkage	The application area is one kilometre east of a Perth regional ecological linkage and is adjacent to a large track of native vegetation that consists of neighbouring national parks. Given this, the proposed clearing is not considered likely to impact the nearby ecological linkage.

Characteristic	Details
Conservation areas	Korung National Park occurs 20 metres to the north and Midedooroo National Park occurs 310 metres to the east of the application area and is connected through continuous vegetation. Stinton Cascades Nature Reserve occurs 600 metres southwest of the application area and is separated by roads and cleared rural land.
Vegetation description	The flora and vegetation survey (Emerge Associates 2021b) indicates the vegetation within the proposed clearing area consists of open forest of *Corymbia calophylla* (marri) and *Eucalyptus marginata* (jarrah) with *Allocasuarina fraseriana* over shrubland of *Banksia grandis* and *Bossiaea aquaifolium* over shrubland *Xanthorrhoea preissii* over mixed native herb land (4.71 hectares). The full survey descriptions and maps are available in Appendix G. This is consistent with the below mapped vegetation typeE (Heddle et al., 1980): • Vegetation complex Dwellingup (D2), which is described as open forest of *Eucalyptus marginata* subsp *marginata*, *Corymbia calophylla* on lateritic uplands in subhumid and semiarid zones; and • Vegetation complex Yarragil 1 (Yg1), which is described as 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.
Vegetation condition	The flora and vegetation survey (Emerge Associates, 2021b) indicates the vegetation within the proposed clearing area is in good to very good condition (Keighery, 1994). The full Keighery (1994) condition rating scale is provided in Appendix E. The full survey descriptions and mapping are available in Appendix G.
Soil description	The soil is mapped as: • Dwellingup 2 Phase: very gently to gently undulating terrain (<10%) with well drained, shallow to moderately deep gravelly brownish sands, pale brown sands and earthy sands overlying lateritic duricrust. • Cooke Subsystem: crests and upper slopes dominated by granite outcrop and very shallow yellow duplex soils, and yellow and brown massive earths. • Yarragil 1 Phase: very gentle to moderately inclined concave side slopes. Moderately well drained yellow duplex soils and yellow and brown massive earths and gravels. Woodland of *E. wandoo, E. marginata, E. Accedens*. *Casuarina obesa* on salt affected areas.
Land degradation risk	Main land degradation risk with the soils mapped within the application area is wind erosion. Land degradation table detailed in section C.6 of this report.
Waterbodies	The desktop assessment and aerial imagery indicated that no wetland or watercourse occur within the application area. The head of a tributary of the ephemeral Stinton Creek is located approximately 30 m south of the proposed quarry expansion and flows in a south-westerly to a dam in the central southern portion of the site (Emerge Associates, 2021a). The tributary remains dry for the majority of the year (Emerge Associates, 2021a). One multiple use wetland (MUW) (UFI 12355) occurs 210 metres to the west of the site, which is described as wetlands with few remaining wetland attributes and functions. The MUW has been previously cleared for agricultural purposes and contains pasture species with scattered paddock trees.
Hydrogeography	The application area does not occur within a CAWS Act or RIWI Act area or a Public Drinking Water Source Area (PDWSA). Groundwater within the site is expected to be in excess of 15 metres from the natural surface level and increases in depth in an easterly direction. Groundwater has not been

Characteristic	Details
	encountered during any of the excavation activities previously undertaken within the site (Emerge Associates, 2022a).
Flora	A total of 41 conservation species have been recorded within the local area of the application area. Of these, five are listed as Threatened, four are listed as Endangered, one is presumed Extinct, ten are listed as P4, 14 are listed as P3, four are listed as P2 and three are listed as P1. The closet records are *Pimeliea rara* (P4) located 0.94 kilometres south and *Amanita fibrillopes* (P3) located 1.40 kilometres north within the same soil and vegetation as the application area.
Ecological communities	Two TECs have been mapped within the local area, one being SCP20b '*Banksia attenuatta* and/or *Eucalyptus marginata* woodlands on the eastern side of the SCP (floristic community type 20b as originally described in Gibson et al. (1994)' (Endangered under the BC and EPBC Acts) and the other being SCP 3b: '*Corymbia calophylla* and *Eucalyptus marginata* woodlands on sandy clay soils of the southern SCP (floristic community type 3b as originally described in Gibson et al. (1994)', listed as Vulnerable under the BC Act. Two PECs have been mapped within the local area, one being 'Banksia Dominated Woodlands of the SCP IBRA Region' (listed as Priority three under the BC Act and Endangered under the EPBC Act) and the other being Central Granite Shrublands (Com 5, Markey) 'Central Northern Darling Scarp Granite Shrubland community' (listed as Priority four under the BC Act). No TECs or PECs are mapped within the application area.
Fauna	A total of 22 of conservation significant fauna species have been recorded within the local area with three being listed as endangered, four listed as vulnerable and one being listed as critically endangered under the BC Act. Two known confirmed breeding sites for white tailed black cockatoos have been recorded within the local area, one of them found six kilometres west and the other nine kilometres northeast of the application area. Available databases indicate that 19 roosts for black cockatoo's sites occur within the local area with the closest being within three kilometres north of the application area. A total of five roosts sites are located within six kilometres of the application area.

C.2. Vegetation extent

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA managed land
IBRA bioregion*					
Jarrah Forest	4,506,660.25	2,399,838.15	53.25	1,673,614.25	37.14
South West Forest (Heddle) Vegetation Associations in IBRA Bioregion**					
Darling Plateau - Dwellingup 2**	86,128.33	71,055.96	82.50	58,975.34	68.47
Darling Plateau - Yarragil 1, Yg1**	80,202.95	64,927.06	80.95	59,063.57	73.64
Local Area					

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA managed land
10km radius from application area	32,983.57	25,881.45	78.47	-	-

*Government of Western Australia (2019a)

**Government of Western Australia (2019b)

C.3. Flora analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix H.1), and biological survey information (Emerge Associates, 2021b and 2022c), impacts to the following conservation significant flora required further consideration.

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
Threatened listed							
Drosera oreopodion	T	N	N	Y	3.87	2	N
Diuris drummondii	T	N	Y	N	4.52	1	N
Conospermum undulatum	T	N	Y	N	4.81	1	N
Grevillea thelemanniana	T	N	Y	N	5.63	1	N
Diuris purdiei	EN	N	Y	N	5.79	1	N
Acacia anomala	T	Y	Y	Y	6.77	12	Y
Thelymitra stellata	T	Y	Y	Y	6.82	7	Y
Darwinia apiculata	T	Y	Y	Y	9.30	6	Y
Goodenia arthrotricha	EN	N	N	N	8.78	3	N
Darwinia apiculata	EN	Y	Y	Y	9.30	6	Y
Acacia aphylla	T	N	Y	Y	9.69	1	N
Priority Listed							
Pimelea rara	4	Y	Y	Y	0.94	56	Y
Andersonia sp. Blepharifolia (F. & J. Hort 1919)	2	Y	Y	Y	3.27	6	Y
Lasiopetalum bracteatum	4	Y	Y	Y	3.69	4	Y
Paracaleana ferricola	2	Y	Y	Y	4.88	5	Y
Acacia horridula	3	Y	Y	Y	5.03	6	Y
Lasiopetalum glutinosum subsp. glutinosum	3	Y	Y	Y	5.08	9	Y
Thysanotus glaucus	4	Y	Y	Y	5.08	1	Y
Stylidium striatum	4	Y	Y	Y	5.20	8	Y

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
Eriochilus sp. Roleystone (G. Brockman 1140)	1	Y	Y	Y	6.64	3	Y
Asteridea gracilis	3	Y	Y	Y	6.78	5	Y
Banksia kippistiana var. paenepeccata	3	Y	Y	Y	7.28	2	Y
Acacia oncinophylla subsp. patulifolia	4	Y	Y	Y	7.45	11	Y
Thysanotus anceps	3	Y	Y	Y	7.65	2	Y
Beaufortia purpurea	3	Y	Y	Y	7.73	2	Y
Calothamnus accedens	4	Y	Y	Y	8.38	2	Y
Calothamnus graniticus subsp. leptophyllus	4	Y	Y	Y	8.50	2	Y
Halgania corymbosa	3	Y	Y	Y	8.83	2	Y
Allocasuarina grevilleoides	3	Y	Y	Y	9.50	2	Y

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority

C.4. Fauna analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix H.1), and biological survey information (Emerge Associates, 2020 and 2021c), impacts to the following conservation significant fauna required further consideration.

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
Zanda latirostris (Carnaby's cockatoo)	EN	Y	Y	0.33	154	Y
Notamacropus irma (Western brush wallaby)	P4	Y	Y	0.33	5	Y
Dasyurus geoffroii (chuditch)	VU	Y	Y	0.50	36	Y
Isoodon fusciventer (quenda)	P4	Y	Y	0.60	311	Y
Calyptorhynchus banksii naso (forest red-tailed black cockatoo)	VU	Y	Y	1.04	42	Y
Ctenotus delli (Dell's skink)	P4	Y	Y	1.41	3	Y
Zanda baudinii (Baudin's cockatoo)	EN	Y	Y	1.96	206	Y
Phascogale tapoatafa wambenger (South-western brush-tailed phascogale, wambenger)	CD	Y	Y	2.24	20	Y
Falco peregrinus (peregrine falcon)	OS	Y	Y	3.78	8	Y

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority, OS: other specially protected

C.5. Ecological community analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix H.1), and biological survey information (Emerge Associates, 2021b), impacts to the following conservation significant ecological communities required further consideration.

Community name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
Central Granite Shrublands (Com 5, Markey)	P4	N	N	N	7.35	1	Y
Banksia WL SCP	P3	N	N	N	8.82	1	Y
SCP20b	EN	N	N	N	9.07	1	Y
SCP3b	VU	N	N	N	9.66	1	Y

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority

C.6. Land degradation risk table

Risk categories	*Dwellingup 2 Phase*	*Cooke Subsystem*	*Yarragil 1 Phase*
Wind erosion	H2: >70% of map unit has a high to extreme wind erosion risk	L1: <3% of map unit has a high to extreme wind erosion risk	M2: 30-50% of map unit has a high to extreme wind erosion risk
Water erosion	L1: <3% of map unit has a high to extreme water erosion risk	M1: 10-30% of map unit has a high to extreme water erosion risk	L1: <3% of map unit has a high to extreme water erosion risk
Water logging	L1: <3% of map unit has a moderate to very high waterlogging risk		
Water Repellence	L1: <3% of map unit has a high water repellence risk		
Sub-surface Acidification	H2: >70% of map unit has a high subsurface acidification risk or is presently acid	H1: 50-70% of map unit has a high subsurface acidification risk or is presently acid	H2: >70% of map unit has a high subsurface acidification risk or is presently acid
Phosphorous export	L1: <3% of map unit has a high to extreme phosphorus export risk	M2: 30-50% of map unit has a high to extreme phosphorus export risk	L2: 3-10% of map unit has a high to extreme phosphorus export risk
Salinity	L1: 30-50% of map unit has a moderate to high salinity risk or is presently saline		
Flooding	L1: <3% of the map unit has a moderate to high flood risk		

Appendix D. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: biological values		
Principle (a): *"Native vegetation should not be cleared if it comprises a high level of biodiversity."* Assessment: The area proposed to be cleared does not contain locally or regionally significant flora, fauna, habitats, assemblages of plants.	Not likely to be at variance	Yes *Refer to Section 3.2.1, above.*
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."* Assessment: The area proposed to be cleared contains foraging and roosting habitat for conservation significant black cockatoo species.	At variance	Yes *Refer to Section 3.2.2, above.*
Principle (c): *"Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."* Assessment: An appropriately timed flora and vegetation survey did not identify any threatened flora species within the application area. The area proposed to be cleared is unlikely to contain suitable habitat for threatened flora species listed under the BC Act.	Not likely to be at variance	Yes *Refer to Section 3.2.1, above.*
Principle (d): *"Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community."* Assessment: A flora and vegetation survey of the application area did not identify a TEC. The area proposed to be cleared does not contain species that can indicate a threatened ecological community.	Not likely to be at variance	No
Environmental value: significant remnant vegetation and conservation areas		
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."* Assessment: The extent of the mapped vegetation type and the native vegetation in the local area is consistent with the national objectives and targets for biodiversity conservation in Australia. The vegetation proposed to be cleared is not considered to be part of a significant ecological linkage in the local area.	Not likely to be at variance	No
Principle (h): *"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."* Assessment: Given the distance to the nearest conservation area, the proposed clearing may have an impact on the environmental values of adjacent conservation areas through the spread of weeds and dieback.	May be at variance	Yes *Refer to Section 3.2.3, above.*

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: land and water resources		
Principle (f): *"Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland."* Assessment: No wetlands, watercourses or riparian vegetation are present within the application area.	Not likely to be at variance	No
Principle (g): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation."* Assessment: The mapped soils are highly susceptible to subsurface acidification and wind erosion. The risk of water erosion, nutrient export and salinity is largely low to medium. Noting the location of the application area and rehabilitation plan, the proposed clearing is not likely to have an appreciable impact on land degradation.	May be at variance	Yes *Refer to Section 3.2.4, above.*
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."* Assessment: Given the distance to the nearest watercourse and the mitigation measures proposed to protect this watercourse, and that no other sensitive surface or groundwater sources are close to the application area, the proposed clearing is unlikely to impact surface or ground water quality.	Not likely to be at variance	No
Principle (j): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding."* Assessment: No water courses or wetlands are recorded within the application area. The proposed clearing is unlikely to contribute to waterlogging.	Not likely to be at variance	No

Appendix E. Vegetation condition rating scale

Vegetation condition is a rating given to a defined area of vegetation to categorise and rank disturbance related to human activities. The rating refers to the degree of change in the vegetation structure, density and species present in relation to undisturbed vegetation of the same type. The degree of disturbance impacts upon the vegetation's ability to regenerate. Disturbance at a site can be a cumulative effect from a number of interacting disturbance types.

Considering its location, the scale below was used to measure the condition of the vegetation proposed to be cleared. This scale has been extracted from Keighery, B.J. (1994) *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc). Nedlands, Western Australia.

Measuring vegetation condition for the South West and Interzone Botanical Province (Keighery, 1994)

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

Appendix F. Offset Calculation – Justification table

Calculation	Score (Area)	Rationale
Conservation significance		
Description	Native vegetation that is representative of significant black cockatoo foraging habitat	Application area contains 4.67 hectares of significant foraging habitat for Carnaby's cockatoo, forest red-tailed black cockatoo and Baudin's cockatoo.
Type of environmental value	Species (Fauna)	
Conservation significance of environmental value	Rare/threatened species – endangered	Carnaby's cockatoo, Baudin's cockatoo are listed as endangered under the BC Act and EPBC Act, highest conservation ranking used.
Landscape-level value impacted	yes/no	Yes
Significant impact		
Description	Native vegetation that is representative of significant black cockatoo foraging habitat	Moderate to good quality foraging habitat was identified within the application area.
Significant impact (hectares) / Type of feature	4.67	Based on the available information, the proposed clearing area includes 4.67 hectares that represents moderate to good value foraging habitat for black cockatoos.
Quality (scale) / Number	7	A habitat assessment determined moderate to good value foraging habitat for black cockatoo species within application area. Foraging habitat is located in close proximity to known breeding and roosting habitat and consists of Marri and Jarrah woodland with Banksia species.
Rehabilitation credit		
Description	Revegetation post extractive industry	Revegetation and rehabilitation of the extraction site with black cockatoo foraging habitat.
Proposed rehabilitation (area in hectares)	4.67	4.67 hectares is proposed to be revegetated with suitable black cockatoo habitat.
Current quality of rehabilitation site	0	Condition of revegetation site in a completely degraded (Keighery, 1994) condition with minimal value for black cockatoos
Future quality without rehabilitation	0	Condition of revegetation site in a completely degraded (Keighery, 1994) condition with minimal value for black cockatoos. Condition not likely to change without intervention.
Future quality with rehabilitation	6	It is expected for vegetation to improve to good condition (Keighery, 1994) and provide moderate to good quality foraging habitat in 12 years due to the species to be planted which include Hakea and Marri. It is assumed that the benefits of revegetation of Carnaby's cockatoo foraging habitat will be available after 10 years. This is a conservative measure based on available literature (e.g., Lee et al. (2013) who identified evidence of foraging on marri and Banksia in rehabilitated mine pit areas, ranging from 8-14 years of age).
Time until ecological benefit (years)	12	10 years minimum to achieve foraging resource, plus two years for revegetation to commence.

Calculation	Score (Area)	Rationale
Confidence in rehabilitation results (%)	80	There is a moderate level of confidence that the offset will achieve the predicted result given revegetation and rehabilitation will be undertaken in accordance with a Project Revegetation Plan prepared following DWER's *Guide to preparing revegetation plans for clearing permits* (2018).
Offset		
Description	Revegetation and conservation covenant.	Revegetation and rehabilitation of 3.24 hectares of existing cleared areas with black cockatoo foraging habitat. This revegetation area will be conserved in perpetuity under a conservation covenant.
Proposed offset (area in hectares)	3.24	3.24 hectares is proposed to be revegetated with suitable black cockatoo habitat.
Current quality of offset site / Start number (of type of feature)	0	Condition of revegetation site in a completely degraded (Keighery, 1994) condition with minimal value for black cockatoos.
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	0	Condition of revegetation site in a completely degraded (Keighery, 1994) condition with minimal value for black cockatoos. Condition not likely to change without intervention.
Future quality WITH offset (scale) / Future number WITH offset	6	It is expected for vegetation to improve to good condition (Keighery, 1994) and provide moderate to good quality foraging habitat in 12 years due to the species to be planted which include Hakea and Marri. It is assumed that the benefits of revegetation of Carnaby's cockatoo foraging habitat will be available after 10 years. This is a conservative measure based on available literature (e.g., Lee et al. (2013) who identified evidence of foraging on marri and Banksia in rehabilitated mine pit areas, ranging from 8-14 years of age).
Time until ecological benefit (years)	12	10 years minimum to achieve foraging resource, plus 2 years for revegetation to commence.
Confidence in offset result (%)	80	There is a moderate level of confidence that the offset will achieve the predicted result given revegetation and rehabilitation will be undertaken in accordance with a Project Revegetation Plan prepared following DWER's *Guide to preparing revegetation plans for clearing permits* (2018).
Duration of offset implementation (maximum 20 years)	20	The offset site will be conserved in perpetuity under a conservation covenant. Therefore, the maximum of 20 years is applied.
Time until offset site secured (years)	2	Two years after commencement of revegetation.
Risk of future loss WITHOUT offset (%)	15%	The offset site is currently zoned as Rural under the Perth Metropolitan Scheme. Therefore, there is a moderate likelihood that the site could otherwise be cleared over the next 20 years.
Risk of future loss WITH offset (%)	5%	The future conservation (in perpetuity) of the offset site under a conservation covenant would result in increased security and substantially reduce the risk of loss.
Percentage of mitigation and offset that counterbalances impacts (%)	100%	

Appendix G. Biological survey information excerpts

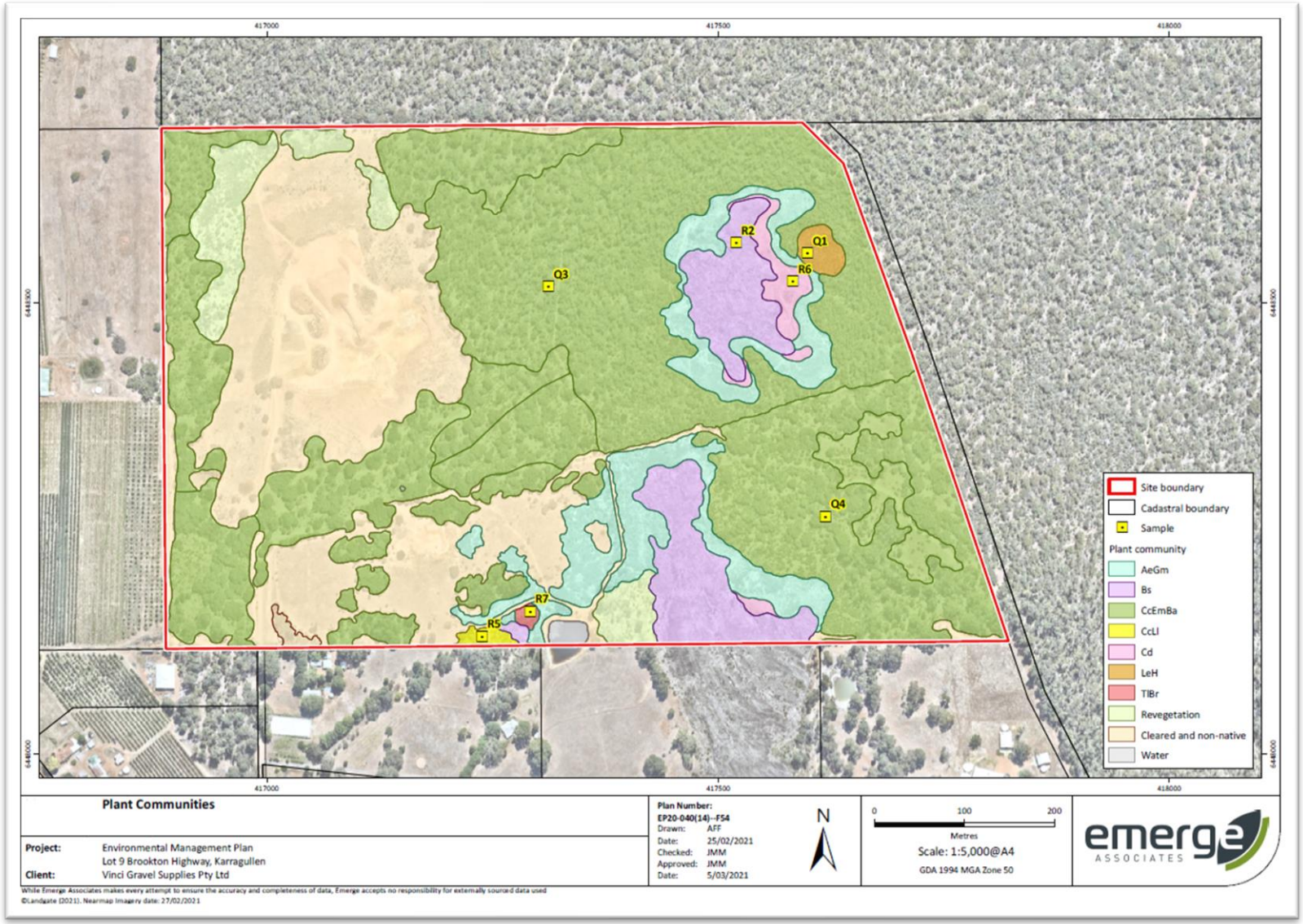


Figure G-1: Mapped plant communities within Lot 9 on Diagram 42350, Brookton Highway, Karragullen (Emerge Associates, 2021b).

Plant Community	Vegetation Condition	Clearing Footprint (ha)	Entire site (ha)	% of vegetation removed
CcEmBa	Very Good	4.54	12.93	36.64%
	Good – Very Good	0.006	6.99	0.09%
	Good	0.16	4.24	3.78%
	Degraded	0	2.10	0%
Revegetation	N/A	0.007	1.81	0.39%
Cleared and non-native	Completely degraded	1.03	12.44	8.28%

Figure G-2: Extent of flora and vegetation conditions within the proposed stage 5 quarry footprint and across the remainder of the site (Emerge Associates, 2022b).

Plant community	Description	Area (ha)
AeGm	Closed shrubland *Acacia ephedroides* and *Grevillea manglesii* subsp. *manglesii* (**Plate 1**).	3.70
Bs	Granite outcrop comprising bare rock surfaces and bryophytes and herbland dominated by *Borya sphaerocephala* (**Plate 2**).	3.02
Cd	Low shrubland *Calytrix depressa* over mixed open native herbland (**Plate 3**).	0.51
CcEmBa	Open forest *Corymbia calophylla* and *Eucalyptus marginata* with *Allocasuarina fraseriana* over shrubland to tall shrubland *Banksia grandis* and *Bossiaea aquifolium* over shrubland *Xanthorrhoea preissii* over mixed native herbland *Platysace filiformis*, *Stylidium* spp. and *Scaevola* spp. (**Plate 4**).	26.25
CcLl	*Corymbia calophylla* over scattered shrubs *Taxandria linearifolia* over closed sedgeland *Lepidosperma longitudinale* (**Plate 5**).	0.12
LeH	Tall shrubland *Leptospermum erubescens* and *Hakea undulata* over shrubland *Xanthorrhoea preissii*, *Melaleuca trichophylla*, *Allocasuarina humilis* and *Hakea erinacea* over low shrubland *Gastrolobium villosum* over mixed open herbland *Stylidium* spp. (**Plate 6**).	0.22
TlBr	Tall open shrubland *Taxandria linearifolia* over closed sedgeland *Baumea rubiginosa* (**Plate 7**).	0.06
Revegetation	Planted vegetation - closed shrubland dominated by *Calothamnus quadrifidus* (**Plate 8**).	1.81
Cleared and non-native	Cleared areas and predominantly scattered non-native plants including patches of non-native planted trees (**Plate 9**).	12.43

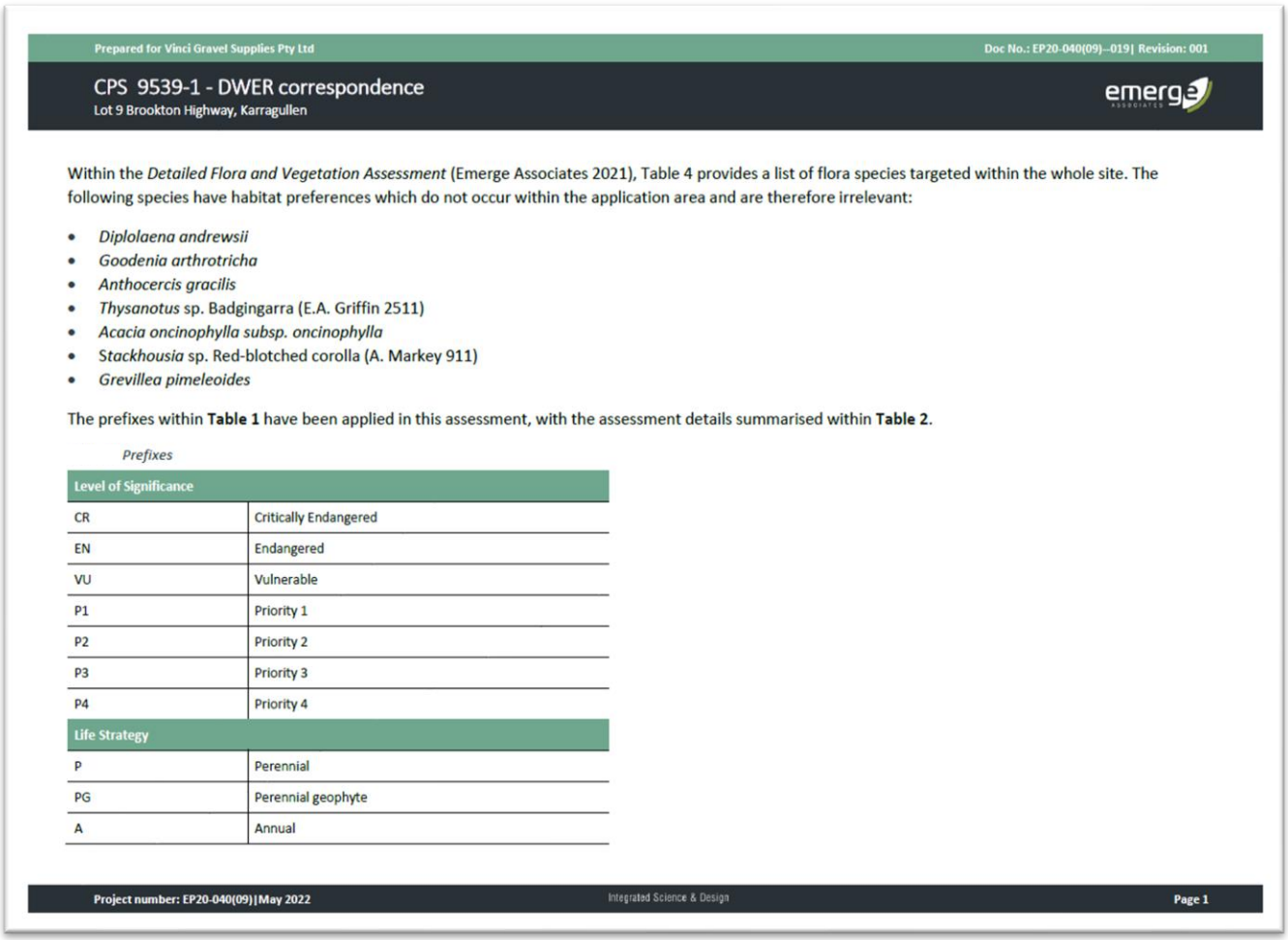
Figure G-3: The description and extent of plant communities, identified by Emerge Associates, within application area CPS 9539/1 (Emerge Associates, 2022b).

Form	Species	
Groundcovers	*Hardenbergia comptoniana*	*Burchardia congesta*
	Kennedia coccinea	*Clematis pubescens*
	Orthrosanthus laxus	*Kennedia prostrata*
	Dampiera linearis	*Conostylis aculeata*
Shrubs	*Allocasuarina humilis*	*Acacia drummondii*
	Calothamnus quadrifidus	*Acacia huegelii*
	Hakea amplexicaulis	*Acacia preissiana*
	Hakea lissocarpha	*Hemiandra pungens*
	Mirbelia dilatata	*Hibbertia racemosa*
	Hakea petiolaris	*Acacia lateriticola*
		Acacia pulchella
Trees	*Eucalyptus patens*	*Eucalyptus wandoo*
	Eucalyptus lane-poolei	*Corymbia calophylla*
	Eucalyptus laeliae	

Figure G-4: Revegetation plant list for revegetation plan associated with clearing permit CPS 9539/1 (Emerge Associates, 2022b).

	Black cockatoo species and foraging habitat area (ha)								
	Carnaby's			Baudin's			Forest red-tailed		
	Clearing Footprint (ha)	Entire site (ha)	% removed	Clearing Footprint (ha)	Entire site (ha)	% removed	Clearing Footprint (ha)	Entire site (ha)	% removed
High	4.67	23.41	19.95	4.61	22.85	20.18	4.67	23.46	19.95
Medium	N/A	0.26	0	N/A	0.30	0	N/A	0.26	0
Low	0.002	5.34	0.04	0.06	3.66	3.70	N/A	1.25	0
Total	**4.67**	**29.01**	**16.10**	**4.67**	**26.81**	**17.42**	**4.67**	**24.97**	**18.70**

Figure G-5: Extent of black cockatoo habitat conditions within application area CPS 9539/1 and across the remainder of Lot 6 on Diagram 42350 Brookton Highway (Emerge Associates, 2022b).



Within the *Detailed Flora and Vegetation Assessment* (Emerge Associates 2021), Table 4 provides a list of flora species targeted within the whole site. The following species have habitat preferences which do not occur within the application area and are therefore irrelevant:

- *Diplolaena andrewsii*
- *Goodenia arthrotricha*
- *Anthocercis gracilis*
- *Thysanotus* sp. Badgingarra (E.A. Griffin 2511)
- *Acacia oncinophylla subsp. oncinophylla*
- *Stackhousia* sp. Red-blotched corolla (A. Markey 911)
- *Grevillea pimeleoides*

The prefixes within **Table 1** have been applied in this assessment, with the assessment details summarised within **Table 2**.

Prefixes

Level of Significance	
CR	Critically Endangered
EN	Endangered
VU	Vulnerable
P1	Priority 1
P2	Priority 2
P3	Priority 3
P4	Priority 4
Life Strategy	
P	Perennial
PG	Perennial geophyte
A	Annual

Figure G-6: List of flora excluded from Emerge Associates (2021b) flora survey, due to habitat preferences incompatible with the application area and a prefix guide for Figures 9a to 9c (Emerge Associates, 2022c).

Species	Level of Significance		Life Strategy	Flowering Period	Applicable 2020 Survey Date						Survey Location
	State	EPBC Act			27-May	2-Jun	11-Sep	21-Oct	27-Nov#	21-Dec	
Lasiopetalum pterocarpum	CR	EN	P	Aug-Nov	+	+	✓	✓	✓	+	All of application area that represents suitable habitat (riparian vegetation)
Darwinia apiculata	EN	EN	P	Oct-Nov	+	+	+	✓	✓	+	All of application area
Thelymitra stellata	EN	EN	PG	Sep-Nov			✓	✓	✓		All of application area
Verticordia fimbrilepis subsp. fimbrilepis	VU	EN	P	Oct-Dec/Jan	+	+	+	✓	✓	✓	All of application area
Acacia anomala	VU	VU	P	Aug-Sep	+	+	✓	+	+	+	All of application area
Eleocharis keigheryi	VU	VU	P	Aug-Dec			✓	✓	✓	✓	All of application area
Eriochilus sp. Roleystone (G. Brockman 1140)	P1	-	PG	Mid-June		✓					All of application area using relatively wide transect spacing (note disturbed individual patches in southern portion do not represent suitable habitat).
Thelymitra magnifica	P1	-	PG	Sep-Oct			✓	✓			All of application area (note disturbed individual patches in southern portion do not represent suitable habitat)
Bossiaea modesta	P2	-	P	Oct-Dec				✓	✓	✓	All of application area that represents suitable habitat (wet areas of vegetation)
Paracaleana ferricola	P2	-	PG	Late Oct-early Dec				✓	✓	✓	Part of application area

Figure G-7a: Assessment of the survey timing and location for species deemed 'likely to be found' within the application area or part of, due to habitat preferences (Emerge Associates, 2022c).

Species	Level of Significance		Life Strategy	Flowering Period	Applicable 2020 Survey Date						Survey Location
	State	EPBC Act			27-May	2-Jun	11-Sep	21-Oct	27-Nov#	21-Dec	
Andersonia sp. blepharifolia (F. & J. Hort 1919)	P2	-	P	Sep-Nov	+	+	✓	✓	✓	+	All of application area
Acacia horridula	P3	-	P	May-Aug	✓	✓	+	+	+	+	All of application area
Banksia kippistiana var. *paenepeccata*	P3	-	P	Oct-Nov	+	+	+	✓	✓	+	All of application area
Beaufortia purpurea	P3	-	P	Oct-Feb	+	+	+	✓	✓	✓	All of application area
Gonocarpus pycnostachyus	P3	-	A	Oct				✓			All of application area that represents suitable habitat (wet depression)
Meionectes tenuifolia	P3	-	P	Oct-Dec				✓	✓	✓	All of application area that represents suitable habitat (clay loam/seasonally wet areas)
Thysanotus anceps	P3	-	P	Oct-Dec				✓	✓	✓	Part of application area
Allocasuarina grevilleoides	P3	-	P	Sep-Nov	+	+	✓	✓	+	+	All of application area
Asteridea gracilis	P3	-	A	Sep-Dec			✓	✓	✓	✓	All of application area
Grevillea manglesii subsp. *dissectifolia*	P3	-	P	Jun, Sep/Nov	+	✓	✓	✓	✓	+	All of application area
Halgania corymbosa	P3	-	P	Aug-Nov			✓	✓	✓		All of application area

Figure G-7b: Continued - Assessment of the survey timing and location for species deemed 'likely to be found' within the application area or part of, due to habitat preferences (Emerge Associates, 2022c).

Species	Level of Significance		Life Strategy	Flowering Period	Applicable 2020 Survey Date						Survey Location
	State	EPBC Act			27-May	2-Jun	11-Sep	21-Oct	27-Nov#	21-Dec	
Lasiopetalum glutinosum subsp. *glutinosum*	P3	-	P	Sep-Dec	+	+	✓	✓	✓	✓	All of application area
Calothamnus graniticus subsp. *leptophyllus*	P4	-	P	Jun-Aug	+	✓	+	+	+	+	All of application area
Pimelea rara	P4	-	P	Dec-Jan	+	+	+	+	✓	✓	All of application area
Stylidium striatum	P4	-	P	Oct-Nov				✓	✓		Part of application area
Thysanotus glaucus	P4	-	P	Oct-Mar				✓	✓	✓	Part of application area
Acacia oncinophylla subsp. *patulifolia*	P4	-	P	Aug-Nov/Nov-Dec	+	+	✓	✓	✓	✓	All of application area
Boronia tenuis	P4	-	P	Aug-Nov	+	+	✓	✓	✓	+	All of application area
Calothamnus accedens	P4	-	P	Sep-Jan	+	+	✓	✓	✓	✓	All of application area
Lasiopetalum bracteatum	P4	-	P	Aug-Nov	+	+	✓	✓	✓	+	All of application area

+ indicates outside of flowering period but species is a perennial so would have been visible if present
# report incorrectly states survey was 27 October 2020

Figure G-7c: Continued - Assessment of the survey timing and location for species deemed 'likely to be found' within the application area or part of, due to habitat preferences (Emerge Associates, 2022c).

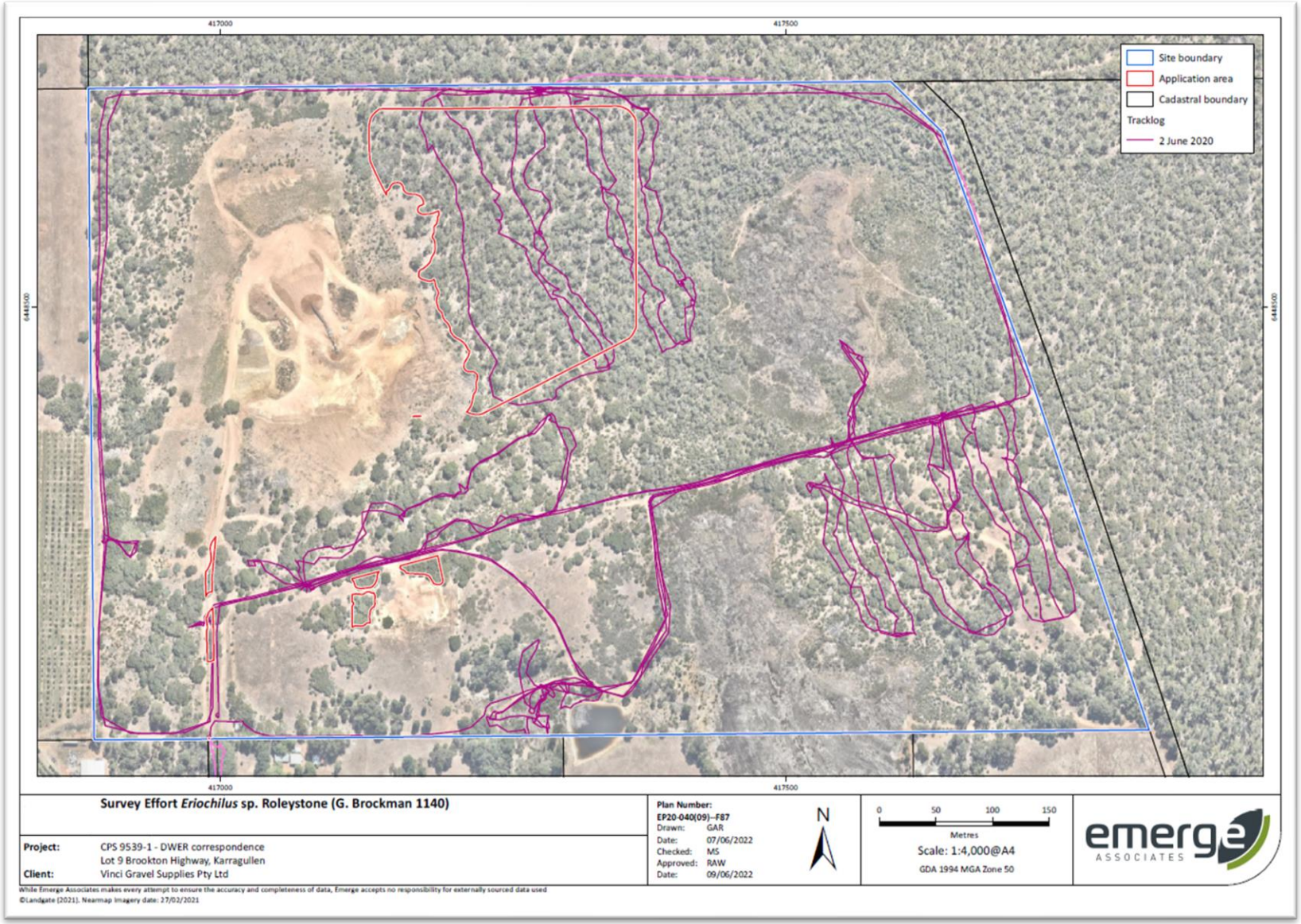


Figure G-8: Survey effort/track log, taken place on 2 June 2020, for a targeted survey on the identification of priority one species *Eriochilus* sp., within Lot 9 on Diagram 42350, Brookton Highway, Karragullen (Emerge Associates, 2022c)

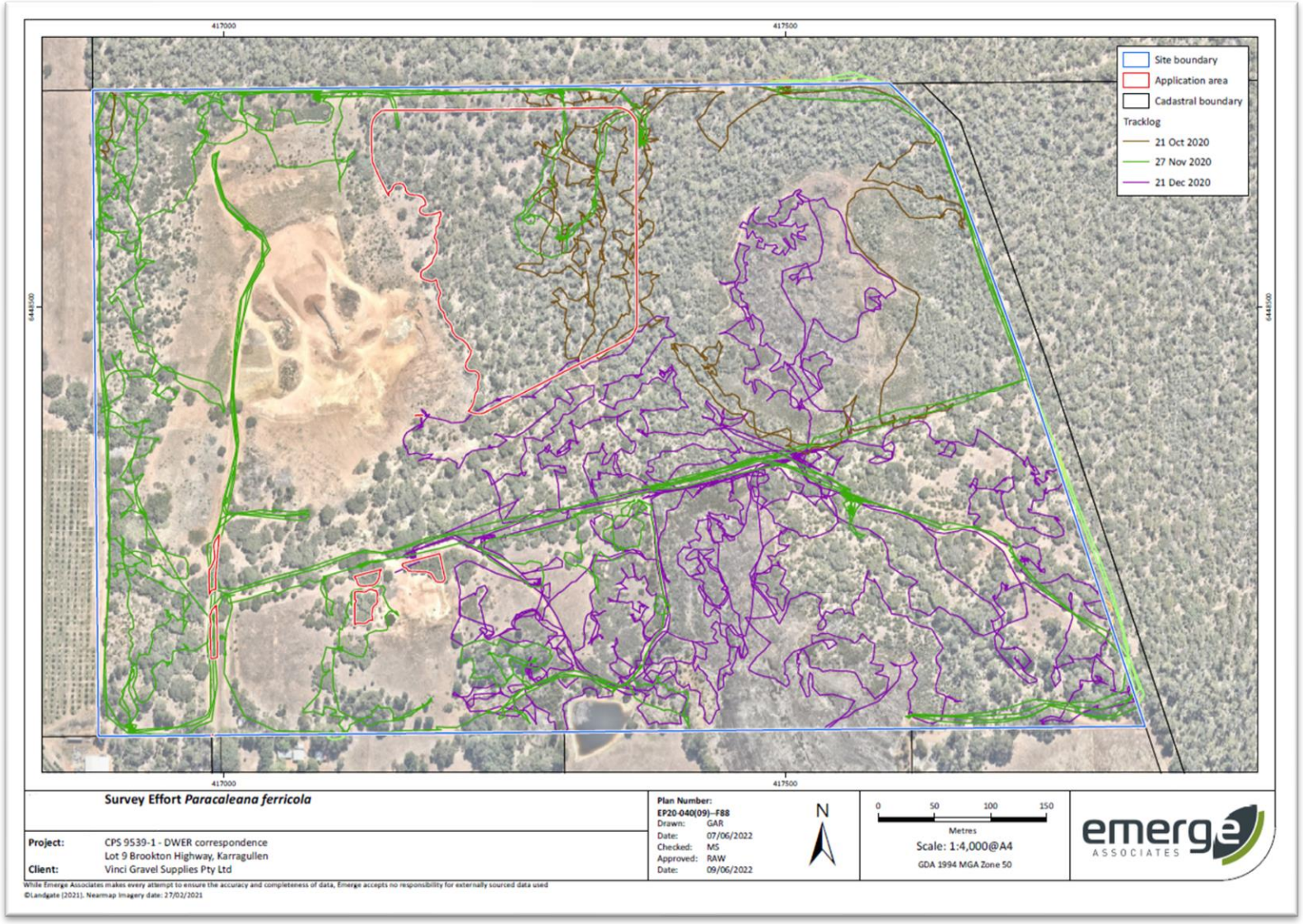


Figure G-9: Survey effort/track log, taken place on 21 October, 27 November and 21 December 2020, for a targeted survey on identification of priority two species *Paracaleana ferricola,* within Lot 9 on Diagram 42350, Brookton Highway, Karragullen (Emerge Associates, 2022c).

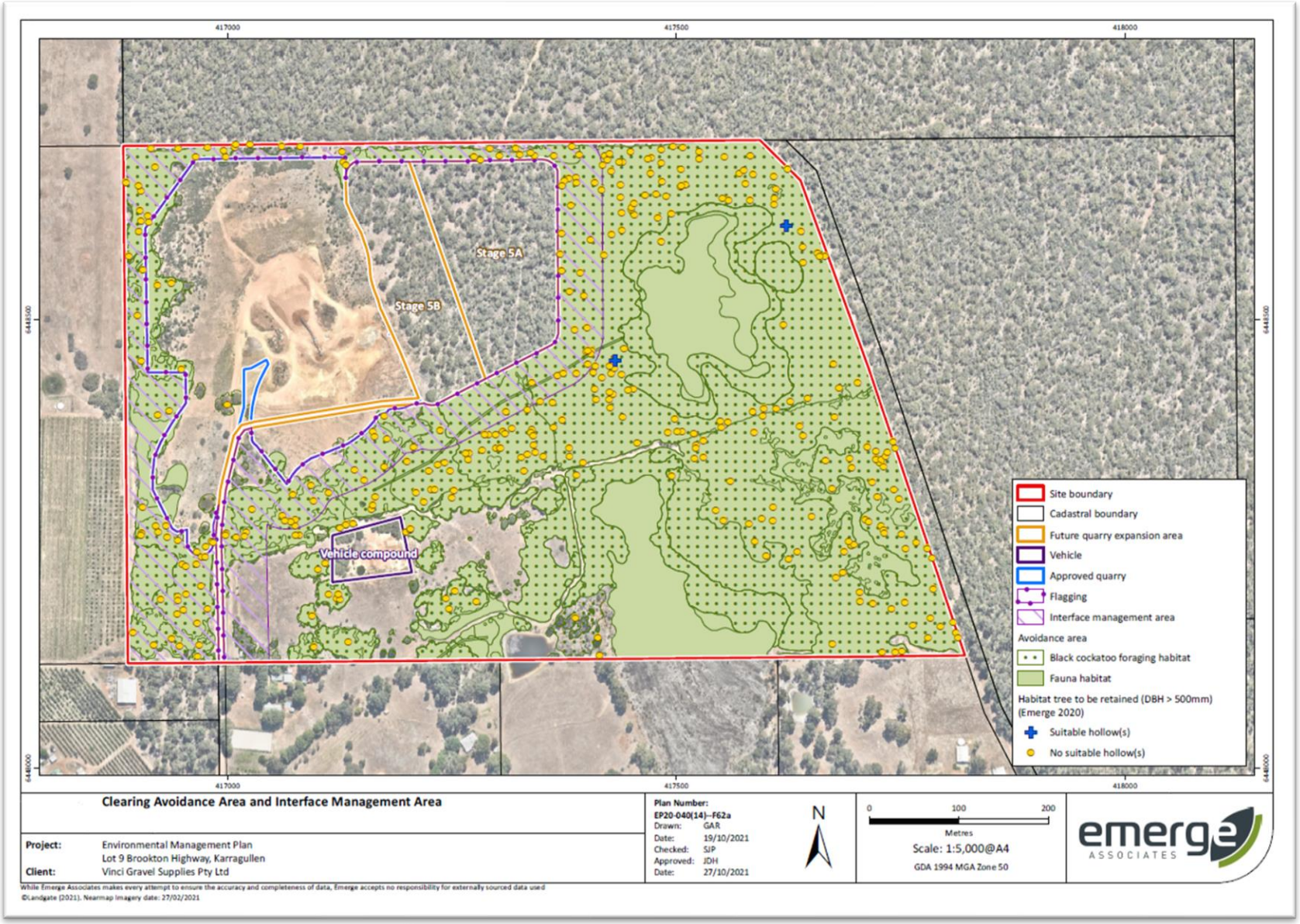


Figure G-10: Clearing avoidance area and interface management area, within Lot 9 on Diagram 42350, Brookton Highway, Karragullen (Emerge Associates, 2022b).

Plant community **AeGm** in 'very good' condition

Plant community **Bs** in 'excellent' condition

Plant community **Cd** in 'very good' condition

Plant community **CcEmBa** in 'very good' condition

Plant community **CcLl** in 'very good' condition

Plant community **LeH** in 'very good' condition

Figure G-11: Photos of six plant communities and their condition (Keighery, 1994) identified within application area CPS 9539/1 (Emerge Associates, 2021b).

*Plant community **TIBr** in 'excellent' condition*

*Plant community **Revegetation** in 'degraded' condition*

*Plant community **Cleared** in 'completely degraded' condition*

Figure G-12: Photos of a plant community, a revegetated and a cleared area, within application area, including their conditions (Keighery, 1994) (Emerge Associates, 2021b).

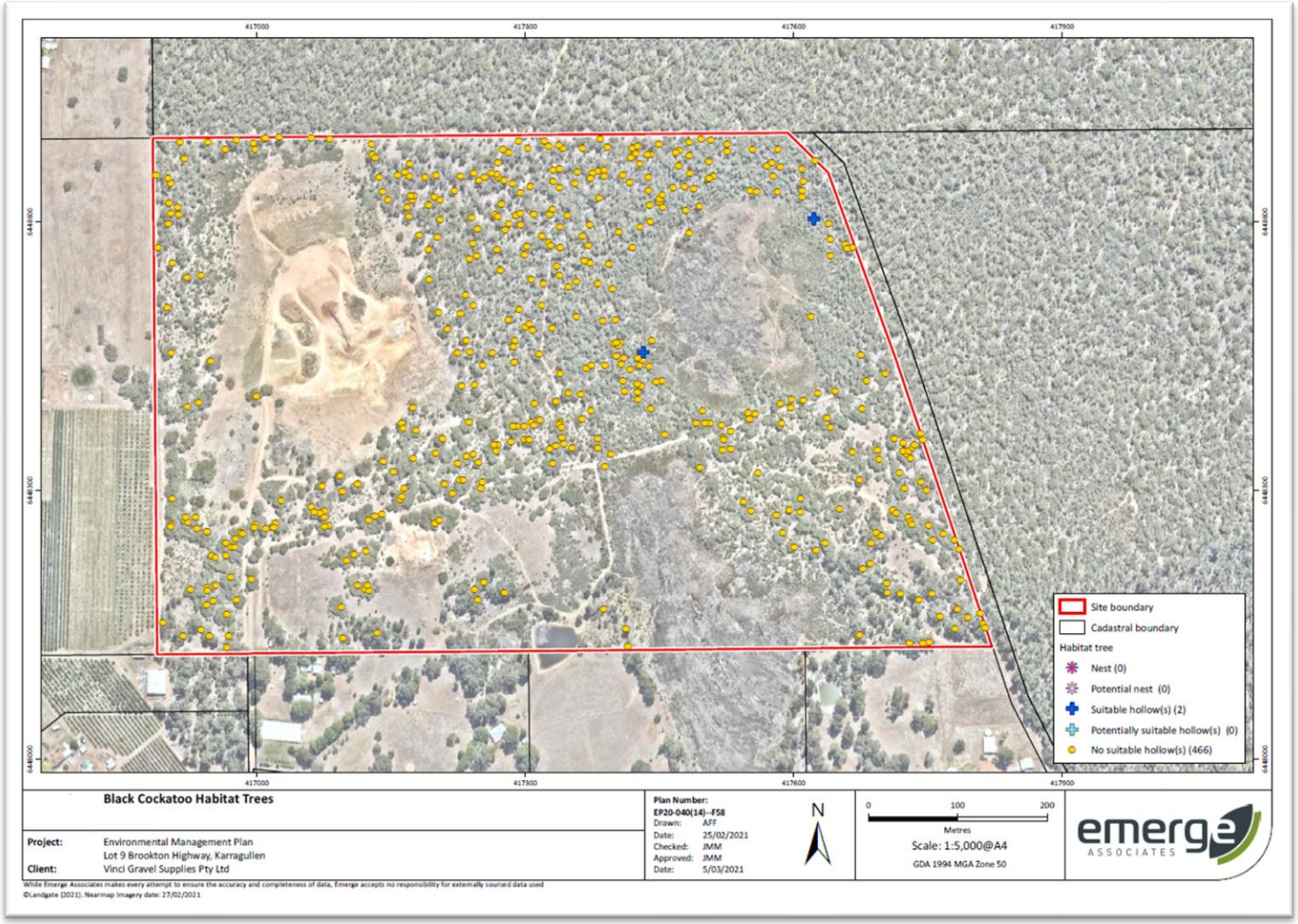


Figure G-13: Black cockatoo habitat trees identified in Emerge Associates 2021c survey, within Lot 9 on Diagram 42350, Brookton Highway, Karragullen (Emerge Associates, 2022b).

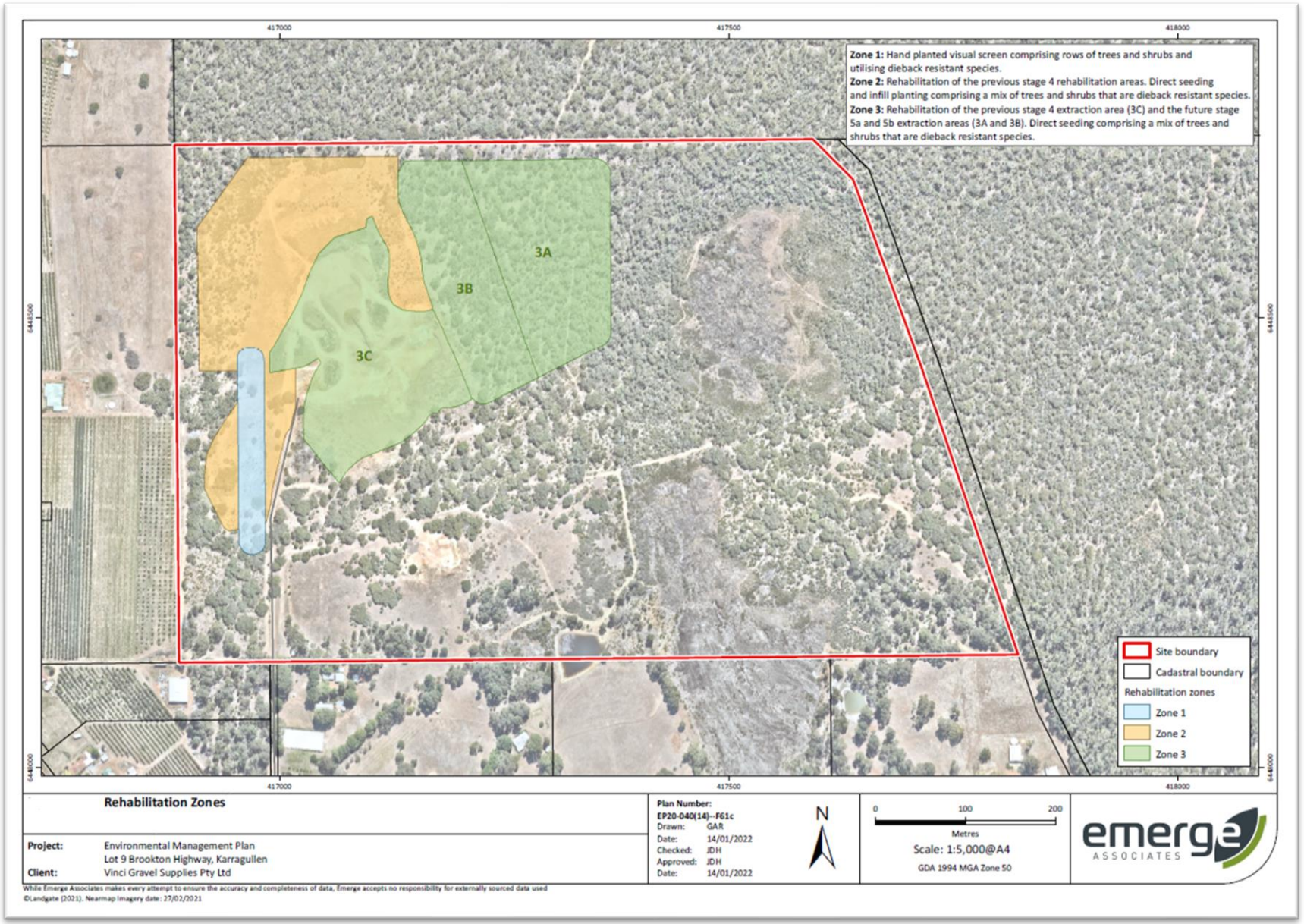


Figure G-14: Rehabilitation zones within Lot 9, Brookton Highway, Karragullen (Emerge Associates, 2022b).

Timing	Action	Purpose/Frequency
Site preparation		
March – May	Herbicide application pre-planting	To target new autumn weeds
March – May or post quarry closure.	Fence installation	Upon completion of quarry activities
December – February	Order seeds on species list for zone 3	
Revegetation		
March – May	Seed pre-treatment and batching Ripping and re-contouring	Prior to direct seeding and may include aerosol smoke treatment, mechanical scarification and hot water treatment, depending on species Prior to planting
April – June	Seed hand broadcasting	Hand broadcasting ensures even dispersal of all seed types
Maintenance		
September – November March – May	Monitoring for weed invasion, seedling survival, plant pests and other factors affecting seedling survival	Every two years
September – November	Herbicide application	To target spring weeds before seeds set
December – April	Watering seedlings during the first summer	Every second week at an approximate rate of two litres per plant
December – February	Herbicide application	To target late summer weeds.
March – May	Herbicide application	To target new autumn weeds.
June – August	Infill planting – 30% required density	N/A
September – November	Herbicide application	To target spring weeds before seeds set.
December – February	Herbicide application	To target late summer weeds.
March – May	Herbicide application	To target new autumn weeds.
June – August	Infill planting – 15% required density	N/A

Figure G-15: Rehabilitation plan for 3A and 3B in zone 3 within Lot 9, Brookton Highway, Karragullen (Emerge Associates, 2022b).

Appendix H. Sources of information

H.1. GIS databases

Publicly available GIS Databases used (sourced from www.data.wa.gov.au):

- 10 Metre Contours (DPIRD-073)
- Aboriginal Heritage Places (DPLH-001)
- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)
- Cadastre Address (LGATE-002)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- Hydrography – Inland Waters – Waterlines
- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Imagery
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Native Title (ILUA) (LGATE-067)
- Offsets Register – Offsets (DWER-078)
- Pre-European Vegetation Statistics
- Public Drinking Water Source Areas (DWER-033)
- Ramsar Sites (DBCA-010)
- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems
- Wheatbelt Wetlands Stage 1 (DBCA-021)

Restricted GIS Databases used:

- ICMS (Incident Complaints Management System) – Points and Polygons
- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities

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