**RTA Yarwun Pty Ltd**

# EPBC 2018/8381 Annual Compliance Report

## 1 November 2022 to 31 October 2023

**Document Revision & Approval History:**

| Rev | Date | Description | Prepared | Reviewed | RTA Yarwun Approved |
|---|---|---|---|---|---|
| 1.0 | 23 Nov 2023 | EPBC 2018/8381 Annual Compliance Report | Senior Environment Advisor | Principal Advisor - Approvals & Compliance, Environment Superintendent | Business Partner HSE |

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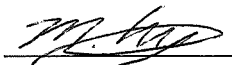
In making this declaration, I am aware that sections 490 and 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) make it an offence in certain circumstances to knowingly provide false or misleading information or documents. The offence is punishable on conviction by imprisonment or a fine, or both. I declare that all the information and documentation supporting this compliance report is true and correct in every particular. I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.

Signed 

Full name (please print) Melissa Hymus

Position (please print) HSE Business Partner

Organisation (please print including ABN/ACN if applicable) RTA Yarwun Pty Ltd (ACN 137266301)

Date 23 / 11 / 23

# 1. Description of activities

RTA Yarwun Pty Ltd (RTA Yarwun) operates the Yarwun Alumina Refinery at Yarwun near Gladstone, and the associated Residue Management Area (RMA 1) at Aldoga approximately 15 km west of the refinery. The RMA 1 is a disposal area for red mud (a by-product of refining alumina via the Bayer process).

RTA Yarwun have an *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC) approval (EPBC 2018/8381; Expansion of borrow pits) for the development and operation of borrow pits on Lot 7 SP228453 (Lot 7) immediately west of the RMA 1 site. The Lot 7 borrow pits provide clay, rock and general fill (borrow material) to service the existing RTA Yarwun RMA 1. The development of the borrow pits involves the clearing of vegetation for the operation of borrow pit areas, as well as associated haul roads, stockpiles and water management infrastructure. The approval has effect until 30 June 2045.

The Lot 7 borrow pit development includes the direct disturbance of remnant, non-remnant vegetation and cleared areas. The action was commenced on 1 November 2019. An impact assessment of the development identified the following significant residual impacts to Matters of National Environmental Significance (MNES):

- Direct and indirect impacts to 96.0 ha of habitat of the vulnerable Koala (*Phascolarctos cinereus*) (Note: Koala has now been listed as Endangered – date effective 12 Feb 2022).
- Direct and indirect impacts to 162.2 ha of habitat of the vulnerable Squatter Pigeon (*Geophaps scripta scripta*).

The approval (EPBC 2018/8381) requires offsets to be secured to compensate for the significant residual impacts to Koala and Squatter Pigeon.

Figures showing the location and extent of disturbance of Koala and Squatter Pigeon habitat during the reporting period are shown in Annexure 1. A schedule of all plans prepared and in existence in relation to the conditions during the reporting period are provided in Annexure 2.

# 2. Purpose and Scope

## 2.1 Purpose

This annual compliance report has been produced to align with the annual reporting requirements of Condition 15 of EPBC 2018/8381 (reproduced below). This report describes the status of compliance with the conditions of approval from 1 November 2022 to 31 October 2023.

> 15. The approval holder must prepare a **compliance report** for each 12 month period following the date of **commencement of the action**, or otherwise in accordance with an annual date that has been agreed to in writing by the **Minister**. The approval holder must:
>
> a. publish each **compliance report** on the **website** within 20 **business days** following the relevant 12 month period;
>
> b. notify the **Department** by email that a **compliance report** has been published on the **website** and provide the weblink for the **compliance report** within 5 **business days** of the date of publication;

c. keep all **compliance reports** publicly available on the **website** until this approval expires;

d. exclude or redact **sensitive ecological data** from **compliance reports** published on the **website**; and

e. where any **sensitive ecological data** has been excluded from the version published, submit the full **compliance report** to the **Department** within 5 **business days** of publication.

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

**Bold** text has a definition attached to the approval.

## 2.2 Scope

This annual compliance report presents the compliance status with the conditions of EPBC 2018/8381. Amendments were made to EPBC 2018/8381 on 14 August 2023, within the reporting period. For completeness, this compliance report has assessed compliance against the previous and amended (current) conditions of approval in Table 1.

This report has been prepared in accordance with the Department of Climate Change, Energy, the Environment and Water (DCCEEW) Annual Compliance Report Guideline (https://www.environment.gov.au/epbc/publications/annual-compliance-report-guidelines) (herein referred to as the DCCEEW Guideline). Compliance descriptors used are consistent with the DCCEEW Guideline including:

- **Compliant**: 'Compliance' is achieved when all the requirements of a condition have been met, including the implementation of management plans or other measures required by those conditions.

- **Non-compliant**: A designation of 'non-compliant' must be given where the requirements of a condition, including the implementation of management plans and other measures, have not been met.

- **Not applicable**: A designation of 'not applicable' must be given where the requirements of a condition or elements of a condition, fall outside of the scope of the current reporting period. For example, a condition which applies to an activity that has not yet commenced.

Supporting information for EPBC 2018/8381 included an impact assessment by Ecosure (2018)[1]. This assessment defined 'indirect impacts' to habitat as extending 50 m from cleared areas of habitat for Koala and Squatter Pigeon, as well as fragmentation resulting in <50 ha patches of habitat (for Koala only). A technical and expert review (refer Annexure 3) has identified that indirect impacts from the development of the borrow pits for both these species does not constitute a significant impact, and recommended that quantification of the maximum disturbance limits (Part A, Condition 1 of EPBC 2018/8381) are limited to those areas of direct impact from clearing only. It is unlikely that any impacts associated with edge effects can be accurately measured, in line with the definition of 'impact' from EPBC 2018/8381, due to the very minor impact of these edge effects on both Koala and Southern Squatter Pigeon.

This report will be published on the RTA Yarwun website (https://www.riotinto.com/Operations/australia/yarwun) until this approval expires (30 June 2045). RTA Yarwun will notify DCCEEW by email that a compliance report has been published on the website and provide the weblink for the compliance report to

[1] Ecosure, 2018. Impact Assessment – RTY Lot 7 Borrow Pits EPBC 2017/8107

DCCEEW within 5 business days of the date of publication, consistent with Condition 15 (b).

# 3. Compliance Assessment

There were no non-compliances during the reporting period. All conditions and commitments of EPBC 2018/8381 were met. The compliance status for all conditions of EPBC 2018/8381 are presented in Table 1.

**Table 1: Compliance Report for EPBC 2018/8381 (1 November 2022 to 31 October 2023)**

| Condition number and Condition | Compliance Status | Comments/Evidence |
|---|---|---|
| **Part A – Conditions specific to the action** | | |
| **Maximum Impact Limits** | | |
| *Condition 1 November 2022 to 13 August 2023, prior to amendment:*<br>1. The approval holder must not impact more than:<br>a. 96 hectares (ha) of Koala (*Phascolarctos cinereus*) (combined populations of Qld, NSW and the ACT) habitat; and<br>b. 162.2 ha of Squatter Pigeon (southern) (*Geophaps scripta scripta*) habitat.<br><br>*Condition 1, 14 August 2023 to 31 October 2023, after amendment*<br>1. Within the project area, the approval holder must not impact more than:<br>a. 96 hectares (ha) of Koala (*Phascolarctos cinereus*) (combined populations of Qld, NSW and the ACT) habitat; and<br>b. 162.2 ha of Squatter Pigeon (southern) (*Geophaps scripta scripta*) habitat. | Compliant | The impacts as of 31 October 2023 were:<br>• 34.1 ha of Koala habitat<br>• 65.2 ha of Squatter Pigeon habitat<br>Figures showing the location and extent of impacts to Koala and Squatter Pigeon habitat from the commencement of the activity to the end of this reporting period are shown in Annexure 1. |
| **Offset Management Plan** | | |
| *Condition 4 November 2022 to 13 August 2023, prior to amendment:*<br>4A. The approval holder must submit for the written approval of the Minister an Offset Area Management Plan (OAMP) for one or more environmental offsets to compensate, in accordance with the Environmental Offsets Policy, for the impact of the action on the Koala and Squatter Pigeon (southern) as permitted in condition 1. The approval holder must not clear within borrow area 1 or borrow area 6 (except to establish erosion and sediment control structures) until the OAMP has been approved by the Minister.<br>*Condition 4, 14 August 2023 to 31 October 2023, after amendment*<br>4A. The approval holder must submit for the written approval of the Minister an Offset Area Management Plan (OAMP) for one or more Environmental Offsets to compensate, in accordance with the Environmental Offsets Policy, for the impact of the action on the Koala and Squatter Pigeon (southern) as permitted in condition 1. The approval holder must not clear within borrow area 4, borrow area 12, borrow area 13 or the Haul route | Not applicable | The requirement for an OAMP to be approved by the Minister is not applicable within the current reporting period, either prior to, or after amendment of Condition 4A.<br>As detailed in Annexure 2, a Draft OAMP was submitted to DCCEEW in May 2023. A conditional contract for purchase of a property has been executed with approval of the OAMP by DCCEEW a condition of the contract. In September 2023, comments were received from DCCEEW on the OAMP. RTA Yarwun is currently addressing these comments on the Draft OAMP.<br>Clearing (except to establish erosion and sediment control structures) has not yet occurred within borrow area 1, borrow area 6, borrow area 4, borrow area 12 or borrow area 13. Therefore, the requirement for an OAMP to be approved by the Minister is not applicable. |

| Condition number and Condition | Compliance Status | Comments/Evidence |
|---|---|---|
| (except to establish erosion and sediment control structures) until the OAMP has been approved by the Minister. | | within the current reporting period. |
| 5A. The OAMP/s must be consistent with the Environmental Management Plan Guidelines, and must include the following:<br>a. A summary of the residual impacts to protected matters that will be compensated for by the offset(s) specified in the particular OAMP. This summary must include the area(s) of habitat for protected matters and its condition and quality at all impact sites which the particular offset is to address<br>b. The environmental objectives, relevant protected matters and a reference to the EPBC Act approval conditions to which the particular OAMP refers<br>c. A table of commitments made in the OAMP to achieve the environmental objectives, and a reference to where the commitments are detailed in the OAMP<br>d. Reporting and review mechanisms, and documentation standards to demonstrate compliance with the commitments in the OAMP<br>e. An assessment of risks to achieving environmental objectives and risk management strategies that will be applied<br>f. A monitoring program, which must include:<br>i. measurable performance indicators<br>ii. trigger values for corrective actions and<br>iii. the timing and frequency of monitoring to detect trigger values and changes in the performance indicators<br>g. Proposed corrective actions, if trigger values are reached and<br>h. Links to referenced plans and applicable conditions of approval (including State approval conditions). | Not applicable | Not applicable within the current reporting period as detailed in Condition 4A. |
| 7. Within 3 months of the date the OAMP is approved by the Minister, the approval holder must commence implementing the approved OAMP. | Not applicable | Not applicable within the current reporting period as an OAMP has not yet been approved by the Minister. |
| **Offset Securement** | | |
| 8. To compensate for impacts on listed threatened species as identified in condition 1, the approval holder must have irrevocably submitted an application for the legal security of | Not applicable | Not applicable within the current reporting period as an OAMP has not yet been approved by the Minister. |

| Condition number and Condition | Compliance Status | Comments/Evidence |
|---|---|---|
| each offset area specified in the approved OAMP within 6 months of the date of approval of the OAMP by the Minister.<br><br>The OAMP implemented under this condition must be attached to the land title of the relevant offset area via the legal security mechanism implemented as required under this condition. | | |
| **Part B – Standard administrative conditions** | | |
| **Notification of date of commencement of the action** | | |
| 9. The approval holder must notify the Department in writing of the date of commencement of the action within 10 business days after the date of commencement of the action. | Compliant | RTA Yarwun notified DAWE that the action had commenced on 1 November 2019 (the day of the Commencement of the Action) |
| **Compliance records** | | |
| 10. The approval holder must maintain accurate and complete compliance records. | Compliant | RTA Yarwun have maintained accurate and complete compliance records relevant to the Conditions of this approval. |
| 11. If the Department makes a request in writing, the approval holder must provide electronic copies of compliance records to the Department within the timeframe specified in the request.<br>Note: Compliance records may be subject to audit by the Department or an independent auditor in accordance with section 458 of the EPBC Act, and/or used to verify compliance with the conditions. Summaries of the result of an audit may be published on the Department's website or through the general media. | Not applicable | No requests have been received by RTA Yarwun. |
| **Preparation and publication of plans** | | |
| 12. The approval holder must:<br>a. when submitting plans to the Department, submit plans electronically;<br>b. publish each plan on the website within 20 business days of the date the plan is approved by the Minister or Department, or of the date a plan is submitted to the Minister or Department, unless otherwise agreed to in writing by the Minister;<br>c. exclude or redact sensitive ecological data from plans published on the website or provided to a member of the public; and | Not applicable | No final OAMPs have been submitted to the Department within the reporting period. |

| Condition number and Condition | Compliance Status | Comments/Evidence |
|---|---|---|
| d. keep plans published on the website until the end date of this approval. | | |
| 13. The approval holder must ensure that any monitoring data (including sensitive ecological data), surveys, maps, and other spatial and metadata required under condition 4A of this approval is prepared in accordance with the Department's Guidelines for biological survey and mapped data (2018). This data must be submitted electronically to the Department within 5 years of the legal security of the offset area being executed, and for every subsequent 5 year period, or otherwise in accordance with a recurring date that has been agreed to in writing by the Minister. | Not applicable | Offset area monitoring (under Conditions 4A, 5A and 7) has not commenced and no monitoring data has been prepared to date. |
| 14. If the approval holder wishes to carry out any activities otherwise than in accordance with the approved management plan required under condition 4A, the approval holder must submit to the Department for the Minister's written approval a revised version of that management plan. The varied activity must not commence until the Minister has approved the varied management plan in writing. The Minister will not approve a varied management plan unless the revised management plan would result in an equivalent or improved environmental outcome over time. If the Minister approves the revised management plan that management plan must be implemented in place of the management plan originally approved. | Not applicable | No OAMPs associated with this approval have been approved by the Minister. |
| **Annual compliance reporting** | | |
| 15. The approval holder must prepare a compliance report for each 12 month period following the date of commencement of the action, or otherwise in accordance with an annual date that has been agreed to in writing by the Minister. The approval holder must:<br>a. publish each compliance report on the website within 20 business days following the relevant 12 month period;<br>b. notify the Department by email that a compliance report has been published on the website and provide the weblink for the compliance report within 5 business days of the date of publication;<br>c. keep all compliance reports publicly available on the website until this approval expires; | Compliant | RTA Yarwun prepared the third annual compliance report during the current reporting period. The report was published within 20 business days of the end of the reporting period. The report was published on 25 November 2022. DCCEEW were notified of the publication on 29 November 2022. The compliance report is available on the RTA Yarwun website (website provided above in Section 2). No sensitive ecological data was required to be excluded from the annual compliance report.<br>DCCEEW Compliance and Enforcement Branch acknowledged that the report met the reporting requirements under condition 15 via email on 28 June 2023, and was that this was 'noted' in their records. |

| Condition number and Condition | Compliance Status | Comments/Evidence |
|---|---|---|
| d. exclude or redact sensitive ecological data from compliance reports published on the website; and<br>e. where any sensitive ecological data has been excluded from the version published, submit the full compliance report to the Department within 5 business days of publication.<br>Note: Compliance reports may be published on the Department's website. | | |
| **Reporting non-compliance** | | |
| 16. The approval holder must notify the Department in writing of any: incident; non-compliance with the conditions; or non-compliance with the commitments made in plans. The notification must be given as soon as practicable, and no later than 10 business days after becoming aware of the incident or non-compliance. The notification must specify:<br>a. any condition which is or may be in breach;<br>b. a short description of the incident and/or non-compliance; and<br>c. the location (including co-ordinates), date, and time of the incident and/or non-compliance. In the event the exact information cannot be provided, provide the best information available. | Compliant | No non-compliances occurred during the reporting period. |
| 17. The approval holder must provide to the Department the details of any incident or non-compliance with the conditions or commitments made in plans as soon as practicable and no later than 10 business days after becoming aware of the incident or non-compliance, specifying:<br>a. any corrective action or investigation which the approval holder has already taken or intends to take in the immediate future;<br>b. the potential impacts of the incident or non-compliance; and<br>c. the method and timing of any remedial action that will be undertaken by the approval holder. | Compliant | No non-compliances occurred during the reporting period. |
| **Independent audit** | | |
| 18. The approval holder must ensure that independent audits of compliance with the conditions are conducted as requested in writing by the Minister. | Not applicable | RTA Yarwun did not receive a request for independent audit during the reporting period. |

| Condition number and Condition | Compliance Status | Comments/Evidence |
|---|---|---|
| 19. For each independent audit, the approval holder must:<br>a. provide the name and qualifications of the independent auditor and the draft audit criteria to the Department;<br>b. only commence the independent audit once the audit criteria have been approved in writing by the Department; and<br>c. submit an audit report to the Department within the timeframe specified in the approved audit criteria. | Not applicable | RTA Yarwun did not receive a request for independent audit during the reporting period. |
| 20. The approval holder must publish the audit report on the website within 10 business days of receiving the Department's approval of the audit report and keep the audit report published on the website until the end date of this approval. | Not applicable | RTA Yarwun did not receive a request for independent audit during the reporting period. |
| **Completion of the action** | | |
| 21. Within 30 days after the completion of the action, the approval holder must notify the Department in writing and provide completion data. | Not applicable | The action has not been completed and the requirement to provide notification or completion data has not been triggered. |

# 4. Assessment of new environmental risks

In accordance with section 3.9 of the DCCEEW Guideline, the compliance report must discuss any new environmental risks that have become apparent during the reporting period.

No new environmental risks related to EPBC 2018/8381 approval became apparent during the reporting period.

# Annexure 1 Disturbance Plans

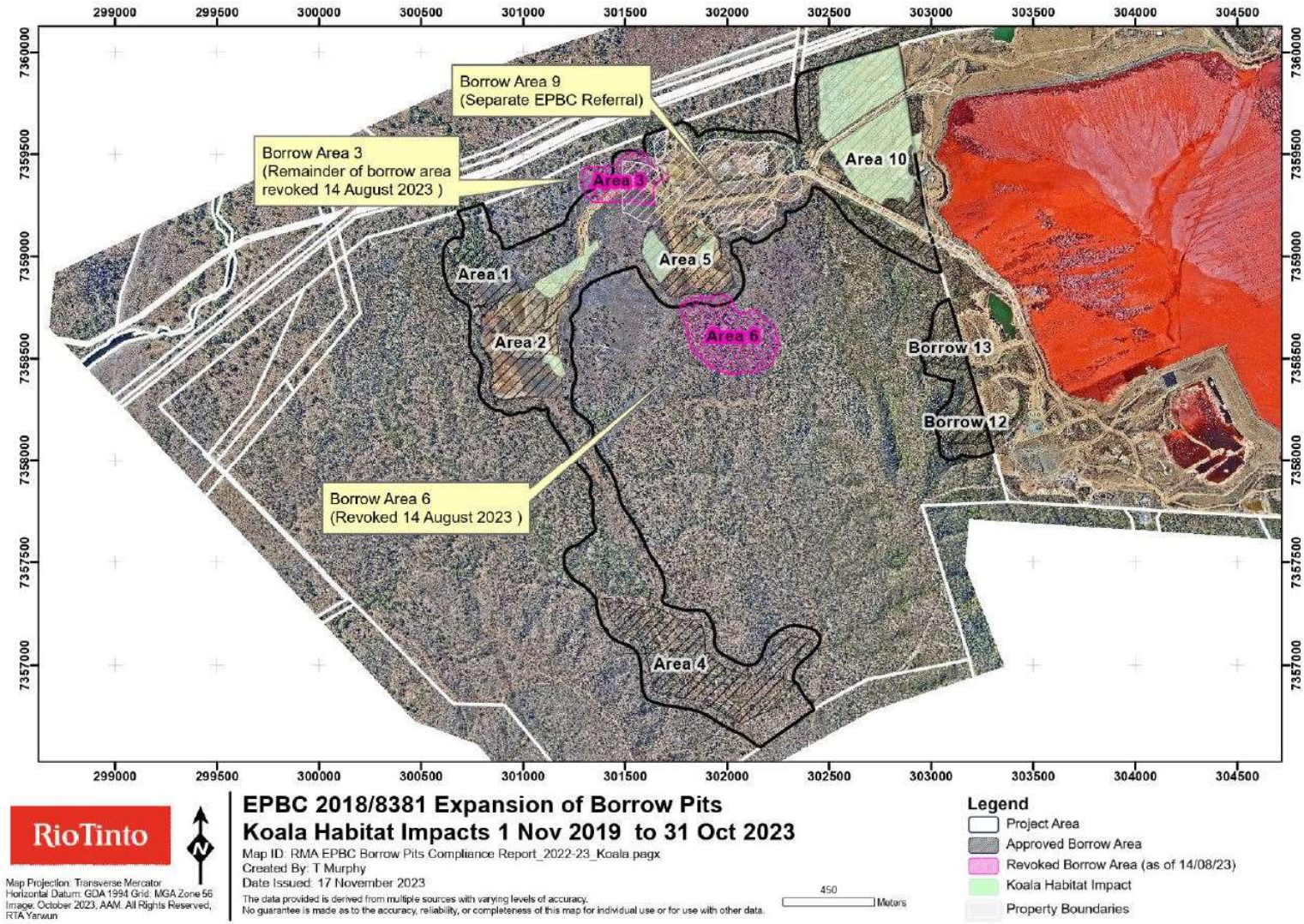



Figure A1.1 Koala habitat disturbance and impacts as of 31 October 2023

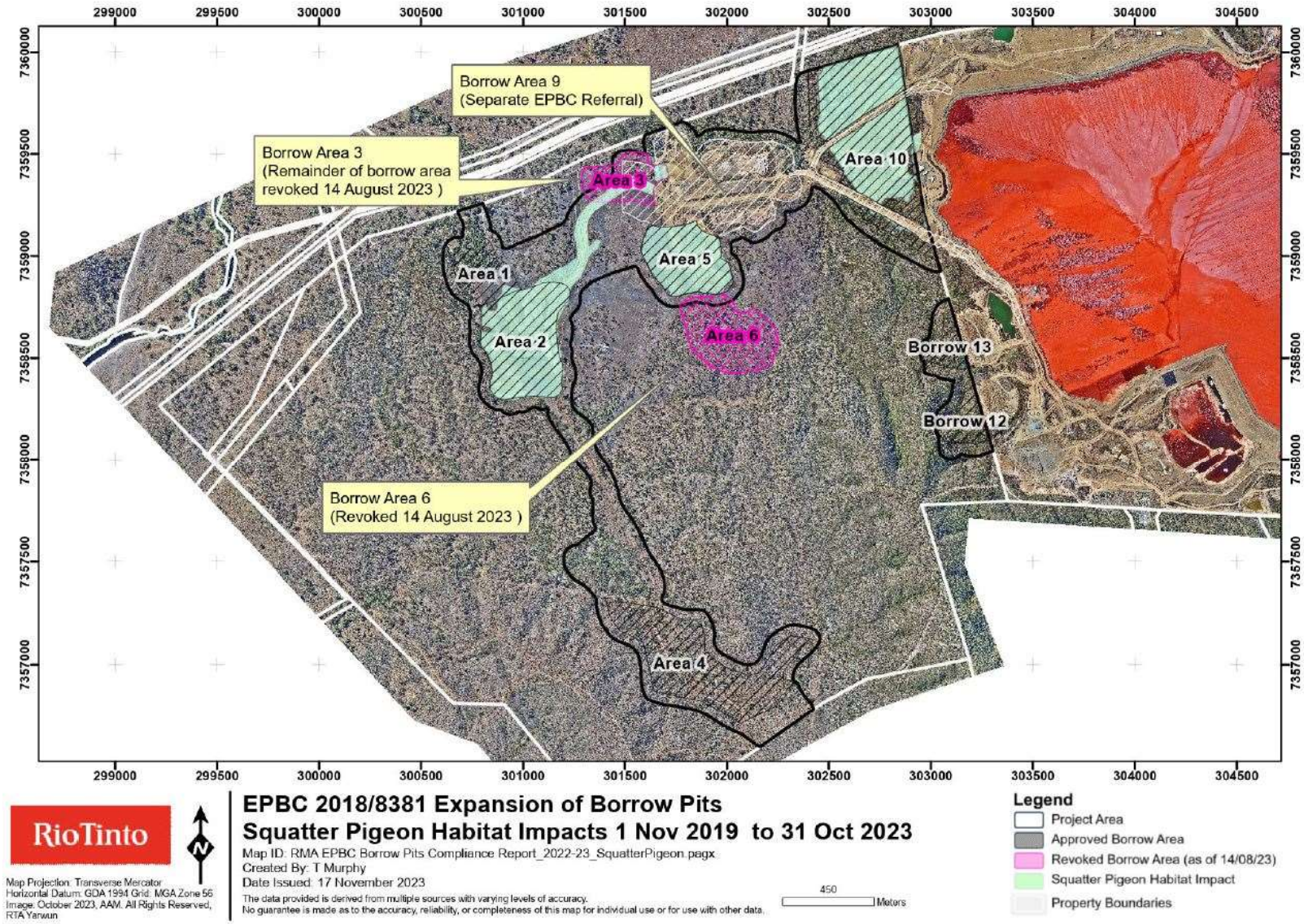



Figure A1.2 Squatter Pigeon habitat disturbance and impacts as at October 2023

## Annexure 2 Schedule of Plans

| Management Plan Name | Date | Status |
|---|---|---|
| Management Plan for Offset Delivery RTY Lot 7 Borrow Pits – Property C | 11 April 2019 | Management plan approved by DAWE.<br><br>Management plan has not been implemented. |
| Management Plan for Offset Delivery RTY Lot 7 Borrow Pits – Property T | 11 April 2019 | Management plan approved by DAWE.<br><br>Management plan has not been implemented. |
| Expansion of borrow pits, Lot 7 Aldoga Road, Aldoga, Queensland: EPBC 2018/8381 Offset Management Plan | 9 July 2021 | Draft<br><br>Management plan has not been implemented. |
| RTA Yarwun Pty Ltd: Expansion of borrow pits, Lot 7 Aldoga Road, Aldoga (EPBC 2018/8381). EPBC Offset Area Management Plan. | 15 May 2023 | Draft<br><br>Initial comments received from DCCEEW on draft OAMP 21 September 2023. A subsequent request/comment was received from DCCEEW via email on 23 October 2023. |

# Annexure 3 Review of habitat indirect impacts

Level 9
260 Queen Street
Brisbane, QLD 4000
Australia

T +61 7 3839 8393

**erm.com**

# MEMO

| | |
|---|---|
| TO | Tim Murphy, Senior Environmental Advisor, RTA Yarwun |
| FROM | Matt Davis, Principal Ecologist |
| DATE | 23 November 2023 |
| REFERENCE | 0659630 |
| SUBJECT | RMA 1 borrow pits indirect impacts review |

## 1. INTRODUCTION AND PURPOSE

RTA Yarwun holds existing Queensland State and *Environment and Biodiversity Conservation Act 1999* (EPBC Act) approvals for borrow pits to source material to complete the earthworks to contain the bauxite residue in RMA1.

Under the current EPBC Act approval (2018/8381), RTA Yarwun is permitted to develop specific borrow pit areas, as shown in the approval documentation. Condition 1 of the EPBC Act approval requires that RTA Yarwun does not impact on more than:

- 96.0 ha of Koala (*Phascolarctos cinereus)* habitat; and
- 162.2 ha of Southern Squatter Pigeon (*Geophaps scripta scripta)* habitat.

The term 'impact' (verb) is defined in the EPBC Act approval as *any measurable direct or indirect disturbance or harmful change as a result of any activity associated with the action.* Impact (noun) *means any measurable direct or indirect disturbance or harmful change as a result of any activity associated with the action.*

Supporting information and assessment submitted for the EPBC Act approval included an *Impact Assessment – RTY Lot 7 Borrow Pits EPBC 2017/8107* (Ecosure, November 2018), which defined indirect impacts extending 50m from cleared area into areas of habitat for Koala (*Phascolarctos cinereus*) and Southern Squatter Pigeon (*Geophaps scripta scripta*), as well as fragmentation resulting in <50ha patches of habitat (for Koala only). By adopting this method of calculating indirect impacts, this has resulted in these indirect impacts contributing to the maximum disturbance limits, as equally as areas that are subject to direct clearing. The extent of indirect impacts can be difficult to measure accurately and the application of a standard 50m buffer into areas of retained habitat around the clearing footprint does not consider the species-specific responses to these potential edge effects.

This memorandum provides a review of this assumption and method of calculating indirect impacts, applying current understanding of Koala and Squatter Pigeon

ecology, current conservation advice and habitat definitions for these species published by DCCEEW and the EPBC Act significant impact guidelines. Both these species can occur in modified and disturbed habitats, showing some resilience towards edge effects and there is an opportunity to better define indirect impacts so that maximum disturbance limits are linked to measurable significant impacts that can be quantified under the EPBC Act. While indirect impacts can result in degradation of habitat values for Koala and Southern Squatter Pigeon, they do not result in a total loss of habitat as occurs during direct impacts associated with clearing.

The scope of this memorandum is to:

- Review of current, available publications regarding the Koala and Squatter Pigeon and their habitat utilisation and sensitivity to edge effects and other indirect impacts;
- Review of current guidelines relating to species habitat from the DCCEEW Species Profile and Threat database, including a focus on range of habitat types used by Koala and Squatter Pigeon;
- Advice on the suitability of applying a 50m buffer and habitat patch limit of less than 50ha for quantifying indirect impacts; and
- Recommendations for alternative approaches to quantifying maximum disturbance limits.

To complete this review, the specific indirect impacts associated with fragmentation and edge effects on Koala and Squatter Pigeon are summarised and recommendations provided for likely mitigation and management measures to reduce these impacts. Following this review, the types and magnitudes of the indirect impacts are assessed against the *Significant Impact Guidelines 1.1 – Matters of National Environmental Significance (*DEWHA, 2013) to assess the likely significance of these impacts. The intent of this process is to further present the nature, magnitude and effect of these indirect impacts to assess if they are likely to contribute to a significant impact on Koala and Southern Squatter Pigeon for Project and therefore contribute to the calculations against the maximum disturbance limits.

# 2. KOALA AND SOUTHERN SQUATTER PIGEON HABITAT DEFINITIONS

This section provides a summary of the current habitat definitions for Koala and Southern Squatter Pigeon from DCCEEW guidelines.

## 2.1 SOUTHERN SQUATTER PIGEON (*GEOPHAPS SCRIPTA SCRIPTA*)

The Southern Squatter Pigeon listed as Vulnerable under the EPBC Act.

The Southern Squatter Pigeon is a ground-dwelling pigeon and the southern subspecies can be differentiated from the northern subspecies by its larger body, and the skin around the eyes being predominantly blue-grey compared with yellowy-orange to orange-red in the northern subspecies (TSSC, 2015).

The southern squatter pigeon inhabits open-forests to sparse, open-woodlands and scrub that are mostly dominated in the overstorey by *Eucalyptus, Corymbia, Acacia* or *Callitris* species, on sandy or gravelly soils, within approximately 3 km of a suitable, permanent or seasonal waterbody. Specifically in Queensland, foraging and breeding habitat is known to occur on well-draining, sandy or loamy soils on low, gently sloping, flat to undulating plains and foothills, and lateritic (duplex) soils on low 'jump-ups' and escarpments within 1 km of watercourses. The squatter pigeon (southern subspecies) nests on the ground where it forages for seeds among sparse and low grass. It roosts in low trees at night (TSSC, 2015).

Key threats to the Squatter Pigeon include (TSSC, 2015):

- Vegetation clearance and fragmentation;
- Overgrazing of habitat by livestock and feral herbivores such as rabbits (*Oryctolagus cuniculus*);
- Introduction of weeds;
- Inappropriate fire regimes;
- Thickening of understorey vegetation;
- Predation by feral cats (*Felis catus*) and foxes (*Vulpes vulpes*);
- Trampling of nests by domestic stock; and
- Illegal shooting.

Squatter pigeon has been recorded at various locations across the borrow pit areas, indicating that there is a resident population present. The majority of the habitat mapped by Aurecon across the borrow pit areas has been classified as dispersal habitat, which has been defined as any forest or woodland occurring between patches of foraging or breeding habitat which facilitates movement between patches of foraging habitat, breeding habitat and/or waterbodies.

The approved borrow pit areas 4 (including haul route and drainage infrastructure), 12 and 13 have been mapped as containing 105.6 ha of Southern Squatter Pigeon dispersal habitat (**Figure 1**).

## 2.2 KOALA (*PHASCOLARCTOS CINEREUS*)

The koala (*Phascolarctos cinereus*) is currently listed as Endangered under the EPBC Act, as of the 12 February 2022. The koala is generally found in temperate to tropical forests as well as woodlands and semi-arid communities dominated by eucalyptus species (Martin & Handasyde, 1999). The species can be found in habitat broadly defined as woodlands and open forests, as long as food trees are present (DAWE, 2022a). The Koala has one of the broadest distributions of threatened terrestrial species under the EPBC Act with a range extending from north-eastern Queensland to the south-east corner of Southern Australia. The biological species distribution is widespread in coastal and inland areas that extends over approximately one million square kilometres (Martin & Handasyde, 1999).

Under the revised *Conservation Advice for Phascolarctos cinereus (koala) combined populations of Queensland, New South Wales and the Australian Capital Territory* (DAWE, 2022b), released on 12 February 2022, habitat by Koala is described as:

*Koala habitat includes both coastal and inland areas that are typically characterised by Eucalyptus forests and woodlands. Biophysical habitat attributes for the Koala include places that contain the resources necessary for individual foraging, survival (including predator avoidance), growth, reproduction and movement.*

Habitat critical to the survival of the species is defined as those that the species relies on to avoid or halt decline and promote the recovery of the species. Under the EPBC Act, the following factors are considered when identifying habitat that is critical to the survival of the species:

*(a) Whether the habitat is used during periods of stress (examples: flood, drought or fire);*

*(b) whether the habitat is used to meet essential life cycle requirements (examples: foraging, breeding, nesting, roosting, social behaviour patterns or seed dispersal processes);*

*(c) the extent to which the habitat is used by important populations;*

*(d) whether the habitat is necessary to maintain genetic diversity and long-term evolutionary development;*

*(e) whether the habitat is necessary for use as corridors to allow the species to move freely between sites used to meet essential life cycle requirements;*

*(f) whether the habitat is necessary to ensure the long-term future of the species or ecological community through reintroduction or re-colonisation;*

*(g) any other way in which habitat may be critical to the survival of a listed threatened species or a listed threatened ecological community.*

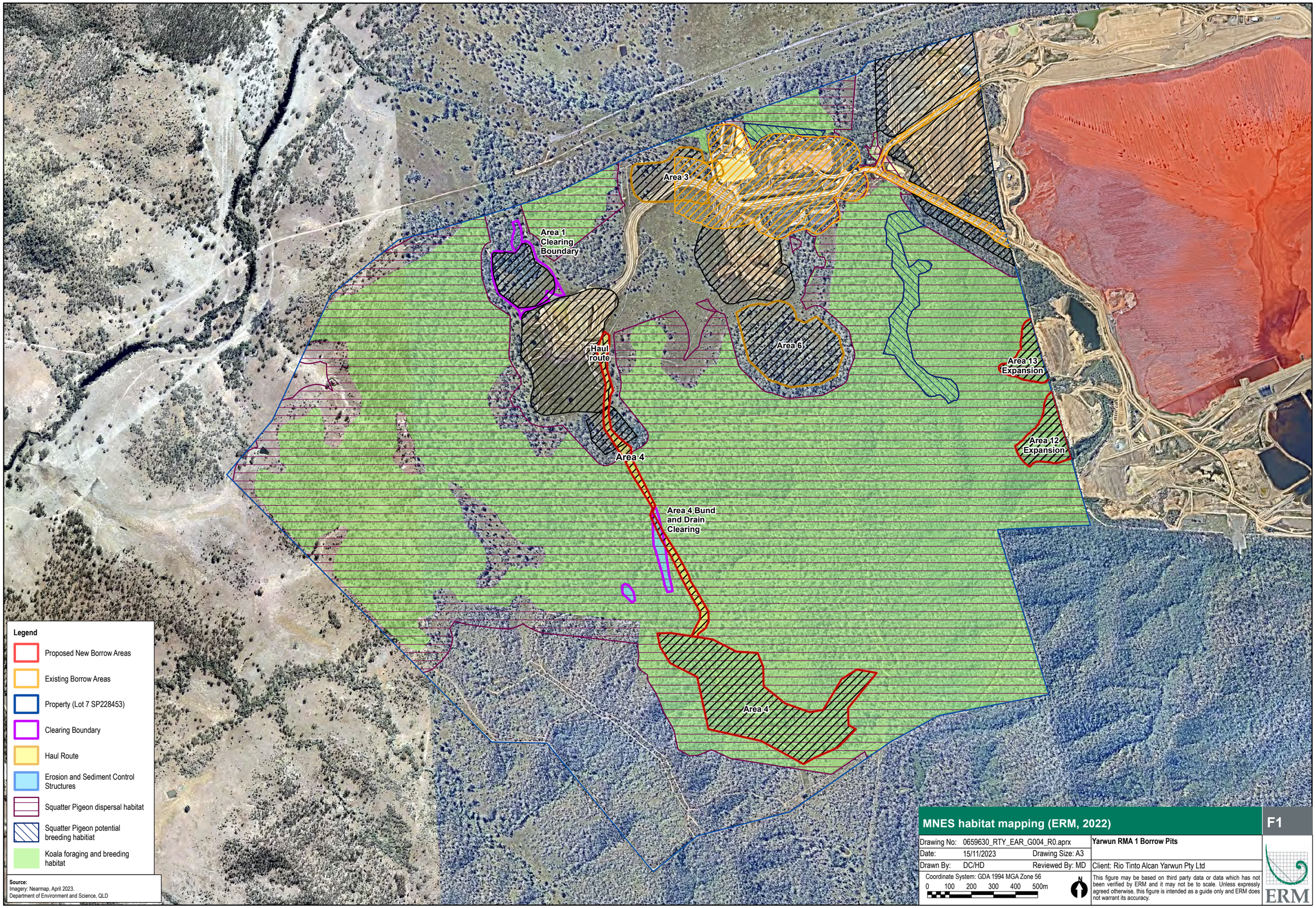
Koala food trees are typically considered to be those of the following genus: *Angophora, Corymbia, Eucalyptus, Lophostemon* and *Melaleuca*.

Key threats to the koala include:

- Climate change;
- Diseases, specifically Koala retrovirus and Chlamydia;
- Land clearing; and
- Mortality due to encounters with vehicles and dogs.

Previous field surveys from 2016 and 2018, as summarised in Aurecon (2020) identified Koala scats in several locations across the Project Area. There is remnant and regrowth eucalypt forest habitat within the Project Area that provides suitable foraging and breeding habitat for koala. The remainder of the cleared or modified landscapes in the surrounding locality would also be considered as dispersal habitat for koalas. Field surveys completed in 2022 (ERM, 2023) have determined that additional koala habitat is also likely to be impacted by the approved Area 4 borrow pit and associated haul route and drainage infrastructure.

The approved borrow pit areas 4 (including haul route and drainage infrastructure), 12 and 13 have been mapped as containing 89.3ha of Koala habitat (**Figure 1**).




# MNES habitat mapping (ERM, 2022)

F1

| | | | |
|---|---|---|---|
| Drawing No: | 0659630_RTY_EAR_G004_R0.aprx | | Yarwun RMA 1 Borrow Pits |
| Date: | 15/11/2023 | Drawing Size: A3 | |
| Drawn By: | DC/HD | Reviewed By: MD | Client: Rio Tinto Alcan Yarwun Pty Ltd |

Coordinate System: GDA 1994 MGA Zone 56

0 100 200 300 400 500m

N



ERM

# 3. POTENTIAL INDIRECT IMPACTS ASSOCIATED WITH EDGE EFFECTS

The *Impact Assessment – RTY Lot 7 Borrow Pits* report (Ecosure, 2018) identified a 50m 'edge effect zone', extending from the edge of the clearing footprint for each borrow pit and associated infrastructure and defined impacts associated with edge effects as: changes related to changes in air moisture or temperature; solar radiation levels; soil moisture or soil temperature; soil chemical composition; wind speed and pattern; changes in canopy cover; species abundance (including weed abundance) and distribution; seed dispersal; herbivory and seed predation.

In the assessment to quantify areas of MNES habitat subject to a significant impact completed for the referral and subsequent EPBC Act approval for the borrow pits, this zone of indirect impact was considered equally with the area of indirect impact from clearing and removal of habitats. It is acknowledged that these identified indirect impacts have the potential to degrade the condition of adjacent retained habitats, however these impacts should be considered in the context of the effect on Koala and Squatter Pigeon. Direct loss of habitat through clearing and the proposed development will result in a complete loss of habitat and these areas should contribute to the maximum disturbance limits, however an assessment of the significance of indirect impacts is recommended and completed in this memorandum.

The impact of edge effects, has the potential to contribute to degradation of habitats in different ways for each species. Both Koala and Squatter Pigeon may also have some resilience to identified edge effect impacts. Table 3-1 provides a summary of the relevant fragmentation and edge effect impacts associated with the RMA 1 Borrow Pit project, with a summary of relevant considerations for both Koala and Southern Squatter Pigeon.

## TABLE 3-1 POTENTIAL EDGE EFFECT IMPACTS AND SPECIES-SPECIFIC CONSIDERATIONS

| Potential indirect edge effect impacts | Koala considerations | Southern Squatter Pigeon considerations |
|---|---|---|
| Fragmentation of connectivity areas | Koalas can persist in highly fragmented landscapes and will utilise cleared areas and the ground for dispersal between areas of eucalypt open forest and woodland used for foraging and breeding (Youngentob et al, 2022). The proposed clearing and direct impact areas for the borrow pits will not cause any patches of isolated or fragmented habitats to occur, with connectivity between retained eucalypt open | The management of creating barriers to movement and dispersal will ensure that the Southern Squatter Pigeon is able to still move and disperse throughout the Project Area. Additionally, the approved action will not remove or isolate habitat patches altogether, only clearing in the areas necessary for proposed borrow pits and access tracks.<br><br>This species also often favours disturbed |

| Potential indirect edge effect impacts | Koala considerations | Southern Squatter Pigeon considerations |
|---|---|---|
| | forest and woodlands maintained. | landscapes. Therefore, the indirect impact is likely to be minimised so as not to cause an indirect residual impact to the southern squatter pigeon. |
| Noise, blasting, dust, runoff and erosion, including impacts to downstream environments affecting adjacent habitat areas | Koalas occur in urban and industrial areas, despite high levels of human activity and disturbance (McAlpine et al. 2015). This indicates some resilience to noise-generating activities in areas of adjacent, retained habitats. Impacts associated with these construction activities are more applicable to direct impacts that cause mortality through clearing activities or construction vehicle movements. | There may be negligible, localised disturbances to Southern Squatter Pigeons occurring in adjacent, retained habitats during construction activities. Noise-generating activities may temporarily disturb birds, however they can readily move into adjoining habitats outside the zone of noise disturbance. |
| Introduction or spread or weed and pest species | The introduction of weeds in the ground or shrub layer at clearing edges is less likely to have an impact on Koala foraging and breeding habitat quality, as the preferred forage trees will be retained in these edges. | Degradation of foraging habitat through introduction of exotic pasture grasses for livestock grazing is a recognised threat to Southern Squatter Pigeon, as is overgrazing of native grasses by livestock (TSSC, 2015).<br><br>The approved action is unlikely to increase the cover of exotic pasture grasses at the clearing edges, although there may be narrow areas directly on the edge of the clearing footprint where exotic grasses, particularly Thatch Grass (*Hyparrhenia rufa*) that is common across the Project Area, could increase in cover due to changes in the edge environment. |
| Mortality or injury to native fauna during construction and operations | Koalas are most susceptible to mortality during the direct impacts associated with clearing activities. Once vegetation clearing has been completed the operational phase associated with removal of borrow material is unlikely to result in further clearing of eucalypt trees, causing direct mortality to | Squatter Pigeons are highly mobile and are likely to move away from construction vehicles when not breeding. Nesting occurs in the dry season, and pre-clearing surveys should be completed to identify any potential nests if vegetation clearing in suitable breeding habitat is |

| Potential indirect edge effect impacts | Koala considerations | Southern Squatter Pigeon considerations |
|---|---|---|
| | Koalas. There is a potential for impacts from construction vehicles, however these can be managed through appropriate controls such as the RMA's traffic management plan. | completed during the breeding season. |
| Changes in canopy cover | Changes in tree canopy composition has the potential to contribute to degradation of Koala habitat and is recognised as a key threat to the species (DAWE, 2022a). It is unlikely that canopy tree species will be altered or removed within the area subject to potential edge effects associated with the development of the borrow pit areas. | Southern Squatter Pigeon can utilise disturbed landscapes, including modified pastures, road reserves, easements and settlements (TSSC, 2015)<br><br>Changes to canopy cover may alter the composition of the ground and shrub layers so they are more open with less cover, providing favorable opportunities for Southern Squatter Pigeon foraging behavior. There may be some increase in shrub cover at the clearing footprint edges, reducing habitat suitability for Southern Squatter Pigeon, however this is only likely to occur directly at the edge of the cleared zone and the retained habitat areas. |

# 4. MANAGEMENT AND MITIGATION OF INDIRECT IMPACTS

The indirect impacts to Koala and Southern Squatter Pigeon habitat will be minimised and mitigated through standard construction-phase environmental controls, reducing the significance of the impacts to adjacent areas of retained. These mitigation measures must be considered when assessing the potential residual impacts associated with habitat fragmentation and edge effects, as they will reduce the significance of the impacts (Table 4-1).

TABLE 4-1 MANAGEMENT AND MITIGATION MEASURES FOR INDIRECT IMPACTS

| Indirect Impact | Management of Indirect Impacts | Residual Impact on the MNES habitat (i.e. Impact on Habitat Quality). |
|---|---|---|
| Creating barriers to movement and dispersal | • Construction activities and machinery will occur and stay within discrete work zones and not impact adjacent vegetation.<br>• Rehabilitation of borrow pits will occur involving planting/natural regeneration of native species that are habitat for listed threatened species in the Project Area.<br>• Infrastructure will be located to first avoid and then minimise the impacts of edge effects or dissecting tracts of native vegetation so that species dispersal is not significantly impeded. | • The layout of the areas of direct impact across the Project Area will maintain the ability for Koala and Southern Squatter Pigeon to move and disperse throughout the Project Area. Additionally, the approved action will not remove or isolate habitat patches altogether, only clearing in the areas necessary for the approved action. Therefore, the indirect impact is likely to be minimised so as not to cause an indirect residual impact to MNES habitat. |
| Noise, blasting, dust, runoff and erosion, including impacts to downstream environments affecting adjacent habitat areas | • Dust will be minimised through engineering controls on machinery and other available dust suppression controls, such as using on water trucks on haul routesetc. Additionally, vehicles will adhere to speed limits to reduce dust generation.<br>• Staff and contractors will be made aware through general site induction and training of the potential to generate dust emissions and mitigation and management measures that should be implemented.<br>• Where required, watercourse crossing points will be adequately stabilised to prevent erosion. Construction activities must not interfere | • The management measures proposed are likely to result in the reduction of the indirect impacts. Noise and dust will be minimised such that they are unlikely to disrupt the behaviours of the species. Impacts to watercourses will be stabilised to prevent erosion, and only occur in discrete work areas. These measures will ensure that the indirect impact is minimised so as to not cause an indirect residual impact to Koala and Southern Squatter Pigeon. |

| Indirect Impact | Management of Indirect Impacts | Residual Impact on the MNES habitat (i.e. Impact on Habitat Quality). |
|---|---|---|
| | or block natural drainage e.g. disturbing channel contours.<br>• Sediment and erosion control to be managed in accordance with an Erosion and Sediment Control Plan prepared by a Certified Professional in Erosion and Sediment Control | |
| Introduction or spread of weed and pest species | • A Weed and Pest Management Plan has been developed for the RMA site. This includes measures such as vehicle wash downs, weed hygiene declarations and obligations to stick to access tracks throughout the Project Area.<br>• Activities will be planned so that movement of vehicles, plant, machinery and equipment avoid moving between properties as required.<br>• Weed management and control methods will depend upon the location, weed species identified, the degree of the infestation, and local, state and national regulatory requirements.<br>• Imported material able to transport weed seed will be assessed to ensure they are free of contamination, disease and invasive weeds. | • The management of the introduction or spread of weed and pest species through relevant Biosecurity measures including the weed washdowns, and monitoring procedures to identify and remove weed species. This is such that the indirect impact is likely to be minimised so as not to cause an indirect residual impact to the Koala and Southern Squatter Pigeon. |
| Mortality or injury to native fauna during construction and operations | • Where required, a qualified fauna spotter-catcher will conduct a search immediately prior to clearing of vegetation for the presence of fauna species. Where fauna are detected, the spotter catcher will assess and implement the most appropriate method to avoid or minimise impacts on that fauna as a result of clearing.<br>• No driving will occur in unauthorised areas and will be carried out at safe speeds that are designated for the disturbance footprint.<br>• Injured, sick or dead fauna will be recorded and reported, during and after | • The management measures to mitigate direct fatality or injury during construction and operation will result in the successful avoidance of impact to the species. This is such that if any Koalas are found within the disturbance footprint in pre-clearance surveys will be translocated to safer habitat such that no indirect residual impact will result to the Koala. |

| Indirect Impact | Management of Indirect Impacts | Residual Impact on the MNES habitat (i.e. Impact on Habitat Quality). |
|---|---|---|
| | the construction and operation phases. This can be carried out by a fauna spotter-catcher during periods where disturbance is expected to occur (primarily construction activities). Where injured or sick fauna is detected, individuals will be taken to the nearest wildlife carer or veterinarian if practical. | |
| Fragmentation of connectivity areas | • Clear marking of areas to be impacted and non-impacted, ensuring that the clearing footprint does not extend further than expected to create unnecessary fragmentation. | • The management of potential indirect fragmentation will ensure that the Koala and Southern Squatter Pigeon habitat is still connected throughout the Project Area. Additionally, the approved action will not remove or isolate habitat patches altogether, only clearing in the areas necessary for approved action infrastructure and will not fragment habitat connectivity. Therefore, the indirect impact is likely to be minimised so as not to cause an indirect residual impact to the Koala and Southern Squatter Pigeon.<br>• Any security fencing required to be installed to ensure that the Koala would be still able to move and disperse throughout the Project Area. Security fencing will be designed to maintain potential movement of Koalas within and across the Project Area. |

# 5. SIGNIFICANT IMPACT ASSESSMENT OF INDIRECT IMPACTS ASSOCIATED WITH EDGE EFFECTS

Given the difference in impacts associated with potential indirect impacts, when compared with the direct impacts of clearing, the contribution of potential fragmentation and edge effects to the significance of the impacts should be considered. The direct loss of a maximum of 96ha of Koala habitat and 162.2ha of Southern Squatter Pigeon habitat has been assessed to have a significant impact to these two species. The extent to which potential indirect impacts associated with habitat fragmentation and edge effects is summarised in Table 5-1, with an assessment against each criteria from the *Significant Impact Guidelines 1.1 – Matters of National Environmental Significance (*DEWHA, 2013)

TABLE 5-1: ASSESSMENT OF SIGNIFICANCE OF INDIRECT IMPACTS TO KOALA AND SOUTHERN SQUATTER PIGEON

| Criteria | Description | Criteria Triggered by Indirect Impacts |
|---|---|---|
| *An action is likely to have a significant impact on an endangered species if there is a real chance or possibility that it will:* | | |
| Lead to a long-term decrease in the size of a population, | **Koala**<br>A maximum of 96ha of Koala foraging and breeding habitat is approved to be impacted, contributing to a significant impact to the species.<br>It is unlikely that the potential indirect impacts associated with fragmentation and edge effects will contribute to the significance of this impact. Foraging and breeding habitat in the form of eucalypt open forests and woodlands will be preserved, and the location and layout of the impact areas will ensure dispersal habitat retains connectivity value.<br>Edge effects associated with construction noise and habitat degradation will be temporary in nature and any Koalas occurring in adjacent, retained habitats will not be significantly impacted by these activities. The composition of the canopy in these edges will also not be altered, with foraging trees retained in these edges. | Unlikely |
| | **Southern Squatter Pigeon**<br>A maximum of 162.2ha of Southern Squatter Pigeon habitat is approved to be cleared, contributing to a significant impact to the species. The layout of the proposed borrow pits will also allow for connected patches of suitable foraging, breeding and dispersal habitat across the Project Area.<br>There may be some negligible alteration to edge habitats adjacent to the clearing areas, through thickening of the shrub layer or changes to the species composition of forage grass species for Southern Squatter Pigeon. These impacts are likely to be | |

| Criteria | Description | Criteria Triggered by Indirect Impacts |
|---|---|---|
| | restricted to the immediate edge of the retained habitats and are unlikely to contribute to a long-term decrease in the size of the population, resulting in no measurable impact to the population of Southern Squatter Pigeon utilising the Project Area. | |
| Reduce the area of occupancy of the species, | **Koala**<br>State government and CSIRO mapping and records from 2000 indicate koala's area of occupancy at approximately 19,428 $km^2$ across Queensland, New South Wales and the Australian Capital Territory (DAWE, 2022a). This species has a wide extent of habitat present throughout the surrounding the Project Area.<br>Potential habitat alteration associated with edge effects does not remove the function of this habitat for Koala through the retention of feed trees in these edges, nor does it or create a barrier to movement as there is a large quantity of viable koala habitat throughout the Project Area that maintains dispersal opportunities for the species. | Unlikely |
| | **Southern Squatter Pigeon**<br>This species' area of occupancy is roughly estimated at 10,000 $km^2$, with a presumed low reliability in this figure (Garnett & Crowley, 2000).<br>It is unlikely that the direct and potential indirect impacts associated with the Project will lead to a reduced area of occupancy of the species. The clearing of Southern Squatter Pigeon habitat across the landscape will not remove habitat patches entirely or reduce the dispersal ability of the species throughout the Project Area given the species preferences for highly modified or degraded landscapes. There may be some negligible changes in habitat quality at the edges of retained habitat areas, however this impact is unlikely to contribute to a measurable reduction in the area of occupancy for the species. | |
| Fragment an existing population into two or more populations, | **Koala**<br>The home range for the koala is highly variable, however evidence suggest it can range from anywhere between 3 to 500 ha (Wilmott, 2020). It is not expected the clearing of koala habitat will fragment existing populations. This clearing impact will only remove discrete areas of habitat for the development of the borrow pits and linear sections for haul routes within the Project Area. Due to the isolated and discrete nature of clearing it is expected that the koala will still be able to disperse across tracks and small cleared areas within the Project Area once the construction phase has been completed. Additionally, the large quantity of suitable dispersal and movement habitat in the Locality ensures species populations are able to traverse the area and surrounds without impediment from the approved action. | Unlikely |

| Criteria | Description | Criteria Triggered by Indirect Impacts |
|---|---|---|
| | **Southern Squatter Pigeon**<br>Clearing will largely occur within discrete areas associated with the borrow pit areas within the Project Area and the direct impacts associated with this clearing will not cause fragmentation to the extent that populations will be disconnected. This will ensure that southern squatter pigeon habitat remains connected, both within and outside of the Project Area.<br>Potential indirect impacts associated with edge effects will be limited to the edge of the direct clearing boundaries, and will not further increase fragmentation or a reduction in habitat connectivity across the Project Area. | |
| Adversely affect habitat critical to the survival of a species, | **Koala**<br>Koala habitat within the Project Area is habitat critical to the survival of the species as it provides foraging, breeding and dispersal functions. The direct loss of a maximum of 96ha of Koala habitat has contributed to the significance of the impact.<br>The proposed borrow pits will not reduce the ability for koalas to disperse through the landscape.<br>Other indirect impacts and edge effects on koala are likely to be negligible. Koalas occur in landscapes that are subject to human disturbance, and the maintenance of eucalypt trees in the canopy layer on these edges will allow for the retention of habitat values in these areas. The implementation of mitigation measures like pre-clearance surveys, as well as maintenance of connection to suitable habitat within and surrounding the Project Area, it is unlikely the indirect impacts associated with the approved action will adversely affect habitat critical to the survival of the species. | Unlikely |
| | **Southern Squatter Pigeon**<br>The direct impact to a maximum of 162.2ha of Southern Squatter Pigeon habitat has been assessed to adversely affect habitat critical to the survival of the species. Potential indirect impacts associated with edge effects and habitat fragmentation are not likely to contribute to the significance of this impact. Habitat connectivity is maintained throughout the Project Area, with the layout of the impact areas for each borrow pit allowing for maintenance of connected patches of suitable habitat.<br>Edge effects may result in negligible, temporary impacts associated with construction noise and sediment runoff, however these are unlikely to cause a significant impact to Southern Squatter Pigeon habitat utilisation in the Project Area.<br>There may be some negligible impacts associated with changes in the composition of the shrub and ground layers at the edges of retained Southern Squatter Pigeon habitat, including thickening in the shrub layer and changes to the composition of the grass species to favour edge-specialist species. | |

| Criteria | Description | Criteria Triggered by Indirect Impacts |
|---|---|---|
| Disrupt the breeding cycle of a population, | **Koala**<br>The habitat that will be directly impacted by the borrow pits construction meets the definition of potential breeding habitat for Koala given the presence of areas of open forests and woodland dominated by eucalypts. The layout of the borrow pits will allow for connectivity to be maintained between areas of retained breeding habitat across the Project Area, with no barriers to movement caused by the layout.<br>Edge effects associated with the borrow pits clearing may impact on the shrub and ground layers, however the canopy trees that would be utilised as foraging and breeding habitat are unlikely to be impacted by these edge effects. | Unlikely |
| | **Southern Squatter Pigeon**<br>Given the small percentage of this species' breeding habitat being impacted by the approved action, retention of connectivity values, the species' ability to breed throughout the year (TSSC, 2015) and it is unlikely the breeding cycle of southern squatter pigeon will be disrupted by the development of the borrow pits.<br>There may be some negligible alteration of habitat on edges of the clearing footprints through thickening of the shrub layer, reduced foraging habitat value on these edges, however this is unlikely to disrupt the breeding cycle of Southern Squatter Pigeons using the Project Area. | |
| Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, | **Koala**<br>The direct maximum disturbance to Koala habitat as a result of the development of the borrow pits is 96ha, which was assessed as having the potential to contribute to the decline of the species in the Project Area.<br>The layout of the borrow pits has not resulted in isolated or fragmented patches that are isolated from other areas of habitat, with connectivity between retained areas of habitat maintained. The extent of edge effects when adjacent to the clearing footprint for the borrow pits are also unlikely to result in the degradation of foraging and dispersal habitat for Koalas, given the retention of the eucalypt canopy on these edges. | Unlikely |
| | **Southern Squatter Pigeon**<br>The direct maximum disturbance to Southern Squatter Pigeon habitat as a result of the development of the borrow pits is 162.2ha, which was assessed as having the potential to contribute to the decline of the species in the Project Area.<br>The layout of the borrow pits has not resulted in isolated or fragmented patches that are isolated from other areas of habitat, with connectivity between retained areas of habitat maintained. Some edge | |

| Criteria | Description | Criteria Triggered by Indirect Impacts |
|---|---|---|
| | effects may cause a negligible decline in Southern Squatter Pigeon habitat quality, due to thickening of the shrub layer and an increase in the cover of grass cover. Alternatively, the opening of the edge habitat through clearing may also create more favourable conditions for Southern Squatter Pigeon with an open grass layer at edges. These impacts on the edges of retained habitats are unlikely to contribute to the decline in Southern Squatter Pigeons across the Project Area. | |
| Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat | **Koala**<br>Invasive species such as feral cats (*Felis catus*) and wild dogs (*Canis lupus*) are common pests encountered Queensland and are particularly harmful to native, threatened mammals. Both of these invasive species are known to occur in the Project Area. The approved action activities during construction and operation will adopt and follow the Site's Weed and Pest Management Plan that will ensure that further invasive species are not introduced into the Project Area. | Unlikely |
| | **Southern Squatter Pigeon**<br>Invasive species such as feral cats (*Felis catus*) and feral dogs (*Canis lupus*) are common pests encountered Queensland and are particularly harmful to native, threatened birds. Both of these invasive species are known to occur in the Project Area. The approved action activities during construction and operation will adopt and follow the Site's Weed and Pest Management Plan measures that further manage the risk of invasive species being introduced into the Project Area. | |
| Introduce disease that may cause the species to decline, or | **Koala**<br>Koala populations are known to be impacted by diseases, specifically koala retrovirus (KoRV) and Chlamydia (*Chlamydia pecorum*). There is no evidence to suggest the construction and/or operational activities would introduce a disease, such as Chlamydia, that would cause the species to be at risk of illness and subsequent population decline. Additionally, precautions will be taken to ensure that the spread of disease does not occur, as detailed in a Biosecurity Management Plan. This includes following biosecurity measures and ensuring proper personal protection equipment is worn by construction workers and vehicle washdowns before entering any sites near koala habitat. | Unlikely |
| | **Southern Squatter Pigeon**<br>Both the direct impact associated with clearing and any indirect impacts are not expected to introduce any diseases that are a threat to Southern Squatter Pigeon. | |

| Criteria | Description | Criteria Triggered by Indirect Impacts |
|---|---|---|
| Interfere with the recovery of the species. | **Koala**<br>The koala (combined populations of Qld, NSW and the ACT) has an adopted Recovery Plan that has been recently updated (April 2022) (DAWE, 2022a).<br>The objectives from this recovery plan are a focus to be achieved by 2032 state:<br>• The area of occupancy and estimated size of populations that are declining, suspected to be declining, or predicted to decline are instead stabilised then increased (Objective 1A);<br>• The area of occupancy and estimated size of populations that are suspected and predicted to be stable are maintained or increased (Objective 1B);<br>• Metapopulation processes are maintained or improved (Objective 2); and<br>• Partners, communities and individuals have a greater role and capability in listed Koala monitoring conservation and management (Objective 3).<br>As the layouts of the borrow pits allow for connectivity and dispersal between areas of retained habitats, the approved development is unlikely to interfere with the element of the recovery plan that focuses on metapopulation processes. | Unlikely |
| | **Southern Squatter Pigeon**<br>There are no formally adopted recovery plans for this species. However, small, spread out clearing of habitat patches do not affect the recovery of this species. Additionally, the Project Area will remain connected to adjacent areas of suitable habitat. This will enable the species to be able to continually traverse the landscape, ensuring genetic viability of the population. The approved action is also unlikely to restrict access, or limit the availability of current breeding habitat (habitat adjacent to known permanent and ephemeral waterbodies such as farm dams and watercourses). | |

# 6. CONCLUSION AND RECOMMENDATIONS

This memorandum has completed a review of the potential indirect impacts associated with the RMA 1 borrow pits project (the approved action), with a focus on habitat fragmentation and connectivity and the contribution that these impacts are likely to have to the significance of the impact under the EPBC Act.

The approach to quantifying the maximum disturbance limits to date has included the application of an arbitrary 50m buffer to the edge of the disturbance footprints for each borrow pit and assuming complete loss of habitat values for Koala and Southern Squatter Pigeon in this buffer area. Although the 50m buffer referenced published literature (Murcia, 1995 and McAline et al 2007) regarding the extent to which edge effects can penetrate into a habitat patch, there was limited analysis of the potential for these edge effects to contribute to the significance of the impact as defined under the EPBC Act SIG 1.1. This approach has resulted in an overestimation of the total area of impact, by treating the direct loss associated with clearing the same way as potential indirect impacts associated with edge effects.

The assessment presented in this memorandum provides evidence that the types and magnitude of indirect impacts are unlikely to contribute to a significant impact to both Koala and Southern Squatter Pigeon, as there are no impacts associated with habitat fragmentation and the negligible habitat alterations associated with edge effects will not result in a measurable impact to these species. Construction-phase indirect impacts associated with noise and sediment runoff will be temporary and short-term, and given the connectivity of adjacent habitat and the mobility of the two species, are unlikely to contribute to a significant impact.

There is a potential for changes to the structure of the retained areas of eucalypt open woodland to occur at the edges of the clearing footprint, primarily with an increased density of shrubs due to increased light and changes to the species composition of grasses in the ground layer. These impacts are considered unlikely to contribute to a significant impact to Koala, as the canopy trees composed of eucalypts will be retained at these edges. There may be a negligible impact at the edges to the quality of Southern Squatter Pigeon habitat, with thickening of the shrub layer reducing the availability of preferred forage grass species. This impact is unlikely to penetrate 50m into the retained habitat patch, and is likely to be restricted to the immediate edge of the patch and having a negligible measurable impact on these retained habitats.

Based on the findings presented in this memorandum, it is recommended that quantification of the maximum disturbance limits for the Project are limited to those areas of direct impact from clearing only. It is unlikely that any impacts associated with edge effects can be measured, in line with the definition of 'impact' from the EPBC Act approval due to the negligible impact of these edge effects on both Koala and Southern Squatter Pigeon.

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