ADDITIONAL INFORMATION FOR PRELIMINARY DOCUMENTATION (2020/8684)

ECOLOGY MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

WARRILL VIEW QUARRY

Prepared for
SLR on behalf of Neilsens Quality Gravels Pty Ltd

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Date: 15/06/2026



Director

ECOLOGY ASSESSMENT OF MNES
ADDITIONAL INFORMATION – PRELIMINARY DOCUMENTATION (2020/8684)
WARRILL VIEW HARD ROCK QUARRY

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Table of Terms and Abbreviations

ALA	Atlas of Living Australia
AU	Assessment Unit
BAAM:	Biodiversity Assessment and Management Pty Ltd
BC	BioCondition
BoM	Bureau of Meteorology
DAF	Queensland Department of Agriculture and Fisheries
DBH	diameter at breast height
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
DETSI	Queensland Department of Environment, Tourism, Science and Innovation
EA	Environmental Authority
EDL	Ecologically dominant layer
EMP	Environmental Management Plan
EP Act	Queensland *Environmental Protection Act 1994*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
ESD	Ecologically Sustainable Development
FMP	Fauna Management Plan
FSC	Fauna Spotter Catcher
GPS	Global Positioning System
ha	Hectare(s)
HVR	High Value Regrowth
KBA	Key Biodiversity Area
KRA	Key Resource Area
LGA	Local Government Area
MHQA	Modified Habitat Quality Assessment
MNES	Matters of National Environmental Significance
NRM	Natural Resource Management
PMAV	Property Map of Assessable Vegetation
PMST	EPBC Protected Maters Search Tool
QPWS	Queensland Parks and Wildlife Service
RE	Regional Ecosystem
SEQ	South East Queensland
SOP	Standard Operating Procedure
SRC	Somerset Regional Council
TEC	Threatened Ecological Community
VM Act	Queensland *Vegetation Management Act 1999*

1.0 GENERAL

This document addresses a request from the Department of Climate Change, Energy, the Environment and Water (DCCEEW) for additional information required for assessment by preliminary documentation, relating to development of a hard rock quarry at Warrill View, Queensland (EPBC Ref: 2020/8684).

Table 1.1 provides references for each item raised by DCCEEW and the location where information relating to specific requests for further information can be located within this document.

Table 1.1. Reference table indicating which sections of the report fulfils the requested information.

Reference Point	Matter	Where addressed in report
Description of the action	Location, boundaries and size of disturbance footprint (incl. access road)	Section 2.1., Figure 2.1
	Description of proposed action	Section 2.2
	Indicative layout plan	Appendix 1
	Description of current environment	Section 3.1, Figure 3.1, Figure 3.2, Appendix 5, Appendix 6, Appendix 7
	Potential MNES	Section 3.2, Appendix 3, Appendix 4
	Information on potential species	Section 3.3, Figure 3.3, Figure 3.4
	Assessment methodologies	Section 3.4, Figure 3.5, Figure 3.6, Figure 3.7,
Quantification of impacts	Post development land use	Section 4.1
	Impact areas and retained areas	Section 4.2, Figure 4.1
	Area of habitat impacted	Section 4.3
	Quality of habitat impacted	Section 4.4, Figure 4.2
	Assessment of impacts	Section 4.5
Avoidance and mitigation	Description of measures to avoid and mitigate impacts	Section 5.0, Tables 5.1-5.3, Figures 5.1-5.4, Appendix 2, Appendix 8, Appendix 10
	Responsibilities	Section 5.0, Table 5.5, Appendix 8
	Assessment of effectiveness	Section 5.0, Tables 5.3-5.4
Proposed offsets	Proposed offsets and offset suitability	Section 6.0, Figures 6.1-6.2, Appendix 11
Economic & social matters	Social & economic costs and/or benefits	Section 7.1
	Public stakeholder consultation	Section 7.2
	Indigenous stakeholder consultation	Section 7.3, Appendix 12
Ecologically sustainable development	Ecologically sustainable development assessment	Section 8.0

2.0 DESCRIPTION OF THE ACTION

2.1 LOCATION, BOUNDARIES AND SIZE OF DISTURBANCE FOOTPRINT

The address of the site is 299 Hayes Road, Silverdale QLD 4307. The land is described as Lot 1 on RP 51909, and Lots 2, 7, 8, 10 and 18 on RP 50377 (hereafter collectively referred to as the "project area") (**Figure 2.1**). The total land area, including the proposed public road construction ("access road"), is 457 hectares (ha).

The proposed disturbance footprint (including quarry pits, access road and ancillary operations areas [**Appendix 1**]) have a combined area of approximately 260 ha, representing 57% of the project area, with approximately 197 ha (43%) being retained. No additional clearing will be required in relation to asset protection or for any other purpose beyond this proposed disturbance footprint.

The primary purpose of the proposed action involves two separated quarry pits within the project area, referred to as the east pit and west pit (**Appendix 1**). Both pits have been designed to ensure there is a separation of approximately 50 metres to the 1 in 100 year flood event line for Warroolaba Creek.

The proposed action also includes the construction of a new access road within an existing road reservation area. The proposed new access road will run from the Cunningham Highway in the east to the entrance of the proposed quarry (**Figure 2.1**). Neilsens Quality Gravels Pty Ltd is the party proposing the road construction to support the quarry activity, and will be responsible for associated residual impact obligations.

2.2 PROPOSED ACTION

The proposed action comprises the development of a greenfield quarry at Warrill View, Queensland. The activity is authorised under an Environmental Authority (EA) regulated by the Queensland Department of Environment, Tourism, Science and Innovation (DETSI) and Planning Permit regulated by Scenic Rim Regional Council to extract and screen up to 3.8 million tonnes per annum across two (2) pits.

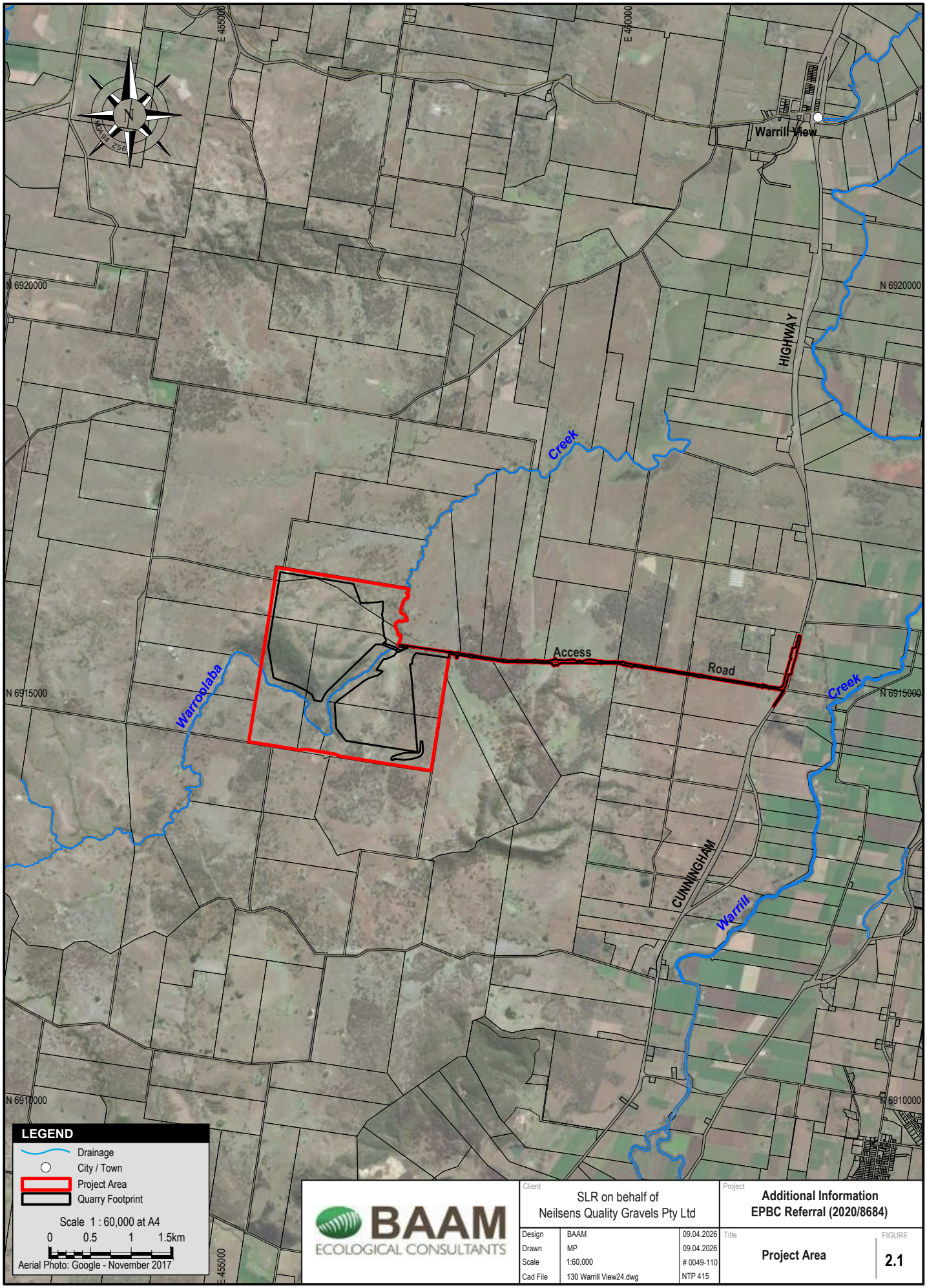
2.2.1 Project summary

The quarry operations comprise the following basic elements:

- Clearing of vegetation and stripping of topsoil and overburden material via mechanical means (i.e. bulldozer or excavator). Stockpiling topsoil and overburden for later use as saleable general fill, incorporation into on-site rehabilitation works, or construction of stormwater controls (e.g. perimeter banks).
- Drilling and blasting the exposed underlying rock from the developed quarry benches to reduce the material into a manageable size for relocation of the materials to the quarry pit or bench below, ready for transfer to the processing area.
- Transferring raw material from the quarry face or pit floor to the crushing and screening plant / stockpile area using off-road haul truck(s) loaded by an excavator or front-end loader.
- Crushing and screening the raw material using mobile or fixed crushing and screening plant.
- Stockpiling the final products using a front-end loader and/or haul truck before the material is sold and loaded into road trucks for transportation off-site for use.
- Rehabilitating disturbed areas progressively once the terminal quarry benches have been established.

Blasting will typically occur on an 'as needs' basis and will be dependent upon the market demand and production requirements for the site. Explosives will not be stored on-site, but will be transported onto the site for immediate use by a blasting contractor, as required.

Unsealed, internal access roads will be utilised to facilitate the movement of personnel, plant, equipment, and light vehicles into and out of the site. Unauthorised vehicle access will be prevented by the use of a minimum of 3 strand rural wire perimeter fencing, and clearly displayed signage at the access road entrance and also at 50m intervals around the perimeter of the project area stating "Do no enter – Quarry operations".



BAAM ECOLOGICAL CONSULTANTS

Client	SLR on behalf of Neilsens Quality Gravels Pty Ltd	
Project	Additional Information EPBC Referral (2020/8684)	
Design	BAAM	09.04.2026
Drawn	MP	09.04.2026
Scale	1:60,000	# 0049-110
Cad File	130 Warrill View24.dwg	NTP 415
Title	Project Area	FIGURE 2.1

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The quarry has set hours of operation for various aspects of the operation. Product Sales are permitted to occur 24/7, however will predominantly occur during day time hours of 7am to 6pm. At a maximum production of 3.8 million tonnes per annum, which is likely to take many years to established depending on market demand, the peak hourly truck volumes in and out of the site using the unnamed road were calculated by Traffic and Transport Plus in 2018 to be 73 vehicles per hour (approximately 950 heavy vehicles / day would be entering and exiting the quarry at peak capacity). This is expected to be a conservative operational scenario which would seldom occur, given that the development traffic generation peak and the road peak are unlikely to occur simultaneously. The vehicles are expected to comprise a mix of tandem truck (20%), truck and dog (75%) and B-double (5%). Light vehicles will access the site across the 24 hour period, again expected to predominantly occur during daytime hours.

The hours of operation for the site are replicated below, and were determined to meet determined noise criteria for a quarry producing 3.8 million tonnes per annum across the east and west pit. It will take a number of years, if not decades, for the site to achieve a market of this nature. Hours of operation as conditioned in the Planning Permit regulated by Scenic Rim Regional Council are:

a) 6:00am to 7:00am seven (7) days per week – extraction, processing, product sales and site/equipment maintenance. No blasting. No rock drilling operations;

b) 7:00am to 6:00pm seven (7) days per week – Generally full operation, including rock drill operation, extraction, processing, product sales and site/equipment maintenance;

c) 6:00pm to 10:00pm seven (7) days per week - extraction, processing, product sales and site/equipment maintenance. No rock drilling operations;

d) 10:00pm to 6:00am seven (7) days per week – product sales and site/equipment maintenance. No blasting or rock drilling operations. No extraction and/or processing.

The operation will be scaled to meet market demand and available construction resource. It is anticipated that the full extent of disturbance will not be reached for in order of 100-150 years, with progressive disturbance and rehabilitation of operational areas to occur in line with operational needs. For this reason, anticipating timing and duration of the components of the proposed action have a wide range, as follows:

- Site connection – commence mid 2026 for a period of 18 to 24 months.
- East Pit site establishment – commence end 2026 for a period of 18 to 24 months
- East Pit extraction and sales commence early 2028. Pit to develop progressively over a period of 50-100 years.
- West Pit site establishment (including creek crossing) – commence in 40-50 years for a period of 12 months.
- West Pit extraction and sales commence in 40-50 years. Pit to develop progressively over a period of 50-100 years.
- Progressive rehabilitation – occurs as terminal benches are achieved, to be completed within 5 years of the activity ceasing.

2.2.2 Project details

Site connection will commence in mid-2026. This works relates to the connection of the site to the existing road network and supporting site infrastructure. The works will occur over a period of 18 to 24 months, and will comprise:

- Clearing of the area adjacent to the Cunningham Highway.
- Construction of the intersection at the Cunningham Highway.
- Clearing of the unnamed road reserve between the Cunningham Highway and the site access.
- Establishment of rural access to the land adjacent to the unnamed road reserve and construction of nominated fencing.
- Construction of the unnamed road and intersection at the Cunningham Highway, including associated batters, culverts and signage.

- Survey work to support road works and easement documentation as needed along the unnamed road reserve.

Quarrying activities will commence in the east pit, with a smaller-scale mobile or fixed processing and screening plant to be established in the proposed operations area located at the northern end of the east pit (**Appendix 1**).

To support these activities, and possibly concurrently with the construction of the access road, initial clearing and site commencement works will be undertaken comprising:

- Clearing of vegetation and stripping of topsoil and overburden material via mechanical means (i.e., bulldozer or excavator) to establish an initial operations area, equipment storage area and manage stormwater from newly disturbed areas.
- Drilling and blasting to establish the approved ancillary operations area of the east pit.
- Crushing and screening of raw material using mobile screening plant, some of the material will be used in site development activities or stored for future sale to market.
- Implementing erosion and sediment control measures on areas disturbed during construction of the access road, internal access routes, ancillary operations area and associated stormwater infrastructure.

The east pit will generally be worked from the northern end in a south-western fashion, although as is typically with quarries, a number of quarry faces will be worked at the same time, due to topography and depending on the different products/materials sought by the market. The east pit provides approximately 50-100 years of essential construction material.

Once need for the quarry material and/or the operations area associated with the west pit is established, a bridge crossing will be installed over Warroolaba Creek in the location shown in **Appendix 1**. Connection to the west pit is therefore not envisaged until year 40-50, after the initial phase of operations and market demand is established. The west pit will then provide approximately 50-100 years of essential construction material.

A bridge crossing has been designed in a manner that does not alter the flow of the creek, or require works within the bed and banks of the creek (as required under State waterway, vegetation management and fish passage legislation), or impede Koala movement. Until such time, crossing of the Warroolaba Creek will be limited to infrequent light vehicle movements (via a bed level crossing) associated with the management of the western land parcels and/or ongoing rural activities (which do not form part of the proposed action).

For both pits, there is no limitation imposed under the Planning Permit or EA relating to the progressive clearing or disturbance of the area within the east pit. It is standard practice for the quarry activity to progressively clear ahead of operational needs, with corresponding implementation of erosion and sediment control devices, acoustic treatments (where required) and rehabilitation of terminal faces.

Stockpiling of material will occur within the nominated operations area, as well as within the active quarry workings, in accordance with operational requirements.

Onsite effluent will be collected and managed by a suitably licensed contractor for transport and disposal at an approved offsite facility, unless sufficient information is provided to DCCEEW demonstrating that an onsite treatment and irrigation system will not adversely impact MNES. This will include:

- confirmation of system capacity and irrigation area extent;
- identification and mapping of the irrigation area, including buffers and exclusion zones relative to MNES habitat and sensitive areas;
- assessment of potential impacts to vegetation condition, hydrology and habitat function, and how these will be avoided or minimised;
- description of irrigation method and any operational risks to MNES; and
- outline of maintenance requirements and associated impacts to habitat values.

2.2.3 Disturbance considerations

As previously identified, the proposed disturbance footprint (including quarry pits, access road and ancillary operations areas [**Appendix 1**]) represent 56% of the project area, with approximately 199 ha being retained. The disturbance footprint considered and responded to the identified areas of environmental significance.

Based on the findings of ecological assessments, significant concessions in disturbance area, and access to essential construction material, have been nominated by the Proponent. Areas in proximity to Warroolaba Creek, the northern section of the west pit nominated operations area and the easternmost boundary of the east pit have all been modified / reduced in order to balance the environmental values present with a viable and workable quarry design. An estimated 120 hectares of land with known quarry resources has been removed from the extent of proposed disturbance areas and extraction footprints, so as to retain larger portions of identified higher value fauna habitat within the project area.

These surface-level concessions significantly reduce the volume of essential construction material able to be extracted, not only due to the associated benching requirements but also because the reduced footprint limits the ability to maintain optimal pit geometry, setback buffers, and safe working areas. The smaller disturbance area restricts internal configuration such as the placement of haul roads and access ramps, reduces opportunities to follow the full extent of the resource, and requires additional areas of in-situ material to be left in place for geotechnical stability along the perimeter. Collectively, these factors sterilise otherwise accessible resource and materially diminish the long-term yield of the quarry.

The access road will be constructed within a currently unnamed road reserve. This access road will traverse traverses rolling terrain with multiple undulations, shallow curves, and embankment transitions. The design, and associated earthworks and cut/fill, has been considered to address slope instability and the need for high retaining structures or long batter transitions, but in some locations may require cut and fill approaching 5 metres. The access road will incorporate fauna fencing and underpasses, and signage to alter drivers to wildlife presence (refer **Section 5.0**).

The new unnamed road, once constructed, will be predominantly used by the quarry for access to the site. Access locations have been incorporated into the road design for the adjacent land owners, and their access and use of the road will not be restricted.

The start date is anticipated to be in mid-2026; Neilsen's has invested a large capital expenditure outlay for the site's processing plant, as well as the proposed construction of the access road and the Cunningham Highway intersection works. TA specific end date for the proposed quarry activities is not able to be provided; however, Neilsens have advised that the best estimate is in the order of 100 to 150 years. As previously identified, progressive disturbance of the footprint will occur over the life of the operation, guided by market demand and best quarry practice. As a result, the proposed offset targets for the project will be reached well in advance of the ultimate disturbance occurring.

3.0 DESCRIPTION OF ENVIRONMENT AND MNES

3.1 PROJECT AREA DESCRIPTION

3.1.1 Current Land Use/s

The project area is currently being used for rural pursuits, primarily for grazing of cattle. The predominant use for surrounding properties is also for cattle grazing. The majority of the project area (aside of the non-navigable steep sections and a band of vegetation associated with Warroolaba Creek) have been historically cleared and used for cattle grazing. The flatter sections of the site remain heavily disturbed and contain evidence of long periods of grazing activities. A number of horses are also kept on the property.

The project area also contains a dwelling with ancillary sheds, which are proposed to be retained as a caretaker's residence. No additional roads or access tracks are proposed as part of the proposed action.

3.1.2 Topography and Hydrology

The topography of the project area consists of two Tertiary volcanic plugs, or hills, consisting mainly of trachytic and basaltic lava flows. The east pit varies in elevation from RL 85 metres AHD to a peak of RL 155 metres AHD. The west pit varies in elevation from RL 80 metres AHD to a peak of RL 250 metres AHD. Warroolaba Creek is defined through the site, by almost canyon scale cuttings, which are near vertical (up to 100 metre vertical elevation across 30 metres lateral distance). Warroolaba Creek enters the project area at approximately RL 95 metres AHD and drops to approximately 70 metres AHD at the lowest point of the project area. The steep nature of the creek results in the majority of this watercourse being dry for the most part of the year, with a number of ponds and standing water areas along the extent being present during wet periods.

The proposed activity intersects with drainage features identified under the *Water Act 2000*. Extractive industry operations are typically required to contain and treat water to acceptable levels, prior to release. The overland flow water that falls inside disturbed areas of the proposed operation would be used in the day-to-day operations (e.g. dust management, product specifications, etc.). In this regard, implications on downstream hydrology are an inevitable consequence of an extractive industry operation.

The SLR Stormwater Management Plan (SMP) (Section 2.2.6) provides an analysis of the broader catchment and the implications of the proposal in this regard (refer **Appendix 2**).

The hydrology calculation results are included in Table 6 – Downstream Impact Assessment of **Appendix 2** and confirm that given the extremely large upstream catchment, there will be a negligible change on surface water hydrology (average reduction in runoff of approximately 7 to 8 percent).

It should also be noted that the above assessment has been based on a worst-case scenario, or the largest possible quarry footprint area, which will not occur on the project area for some time. The progressive disturbance of the site will also incorporate clean water diversion bunds, as required. The working of the quarry faces into a hill usually results in the clean water naturally falling away from the working areas. In addition, the SMP assessment is also overly conservative as it does not factor in the likely treatment and de-watering of the sediment basins and/or quarry sumps following a rainfall event.

The overriding priority in this consideration is the containment and treatment of water from disturbed areas of the operation, which is a requirement placed on all EA permits for extractive industry uses.

It is re-iterated that typical of most hard-rock extractive industry operations, all overland flow water that falls within the disturbed areas of the project area is required to be collected, treated and re-used in accordance with the measures proposed in the SMP. As also identified in the Planning Assessment Report, the *Water Act 2000* contains provisions that allow the taking of overland flow water, where such action accords with an EA. It is noted that an EA is held by Neilsens for Environmentally Relevant Activities (extraction and screening) as required under the *Environmental Protection Act 1994.*

In relation to groundwater assessment, there is no use of groundwater proposed as part of this activity. The initial construction and early stages of the operation will be supported by the importation of water, via water trucks. Once the sediment basins for the operation are established, they will become a source of water supply for dust suppression, watering of planted trees and operational needs.

In relation to groundwater, SLR was commissioned by Neilsens in early 2011 to further investigate the resource potential of the aegirine-augite trachyte and quartz trachyte ('source rocks') for the project area, as well as to gain a better understanding of the depth of free drainage and/or groundwater interception. The proposed drilling program consisted of a number of core holes, ranging in depth from 60 metres to 160 metres.

The assessment confirmed that all core holes terminated in free draining media and did not intercept groundwater at any point. The depth reached for the west pit was approximately RL 60 metres AHD and the depth reached for the east pit was approximately RL 65 metres AHD. The non-porous nature of the source rocks, combined with the low transmissivity and storativity are also factors which reinforce these findings, in relation to the absence of groundwater.

Based on the geological knowledge of the project area to date, the proposed activity will not intercept groundwater at the depths investigated.

3.1.3 Vegetation Community and Habitat Types

Vegetation communities within the project area tended to be influenced by topographic relief, resulting in seven distinct communities and habitat types as described below and shown on **Figure 3.1**, with representative photographs provided in **Table 3.1**.

1. Floodplain

The floodplain includes low-lying, alluvial land (below 80 metres ASL) adjacent to Warroolaba Creek that may become inundated in flood events.

Floodplains in the project area tended to be dominated by Forest Red Gum *Eucalyptus tereticornis*, a primary food tree for Koala and Grey-headed Flying Fox. Many of these trees were very large, old growth trees that featured both large and small hollows. Higher groundwater levels are likely to provide higher leaf moisture content in these eucalypts; hence why Koala show a preference for these areas.

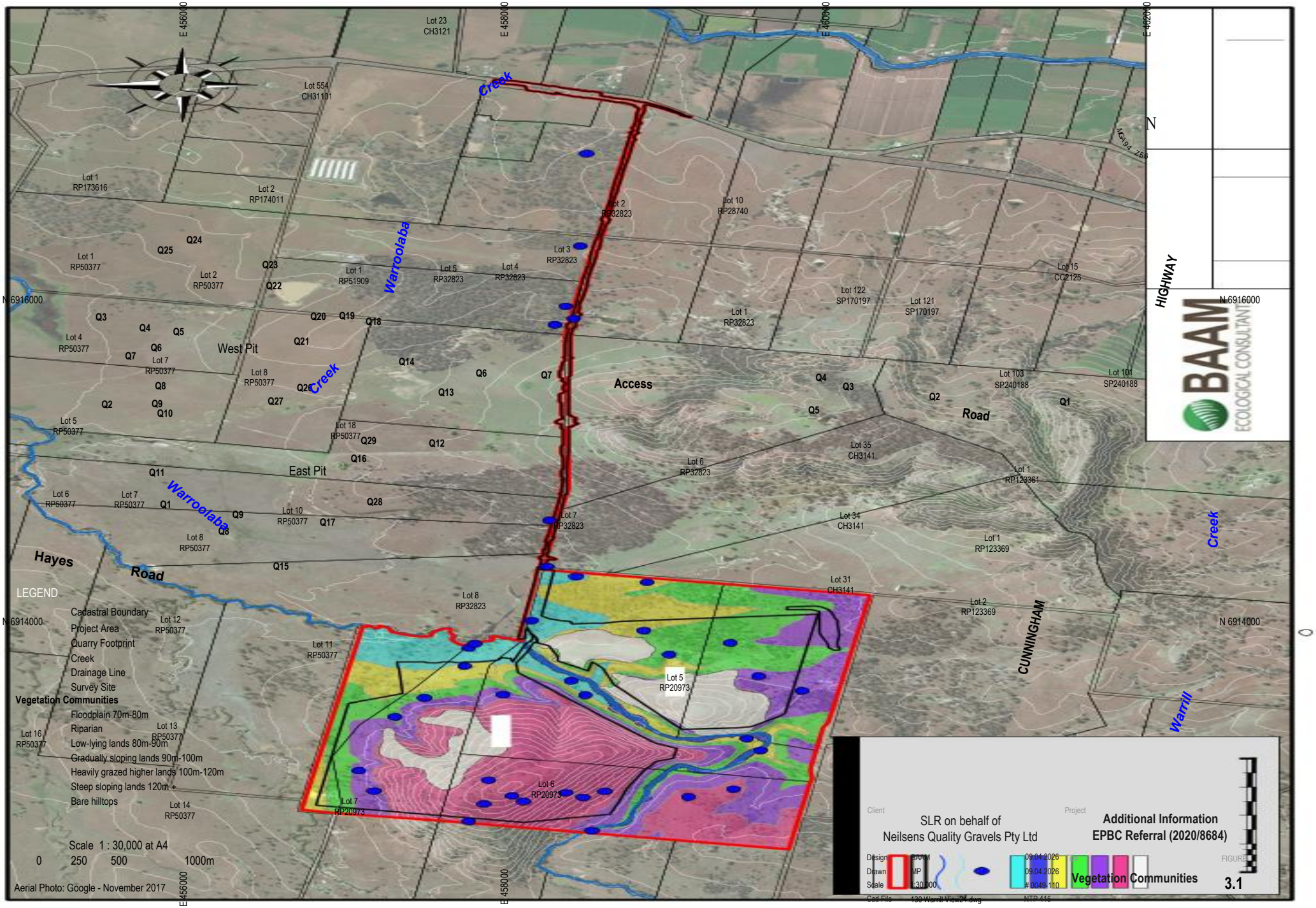
The groundlayer tended to be dominated by native grasses such as Kangaroo Grass *Themeda triandra* and Blady Grass *Imperata cylindrica*. Cattle grazing was recorded in these areas. No areas of permanently inundated wetlands areas featuring sedges/rushes were recorded.

2. Riparian

Riparian community vegetation incudes the strip of vegetation lining Warroolaba Creek, which was generally very narrow. Riparian trees were dominated by Forest red Gum, Water Gum *Tristaniopsis laurina,* River She-oak *Casuarina cunninghamiana* and Weeping bottlebrush *Melaleuca viminalis.* Canopy vegetation offers primary foraging resources for Koala and Grey-headed Flying Fox.

The understorey displayed disturbance from cattle trampling and grazing and included exotics such as Lantana *Lantana camara*; however, also included occasional large hollow logs and potential cover for ground dwelling species including marginal habitat for Spotted-tail Quoll.

Some Forest Red Gum present in riparian areas were very large and displayed hollows, offering habitat resources for hollow dependant fauna.



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3. Low-lying lands

Low-lying lands occur adjacent to floodplains and riparian areas between contour levels 80 and 90 metres ASL. These areas were generally dominated by non-remnant canopy trees including *Eucalyptus tereticornis, E. crebra, Angophora subvelutina* and *Corymbia tessellaris*, over heavily grazed, sparse shrub and groundcovers layers.

It is expected these lower lying lands would afford a higher moister content in eucalypts present, which would provide good foraging resources for Koala, and Grey-headed Flying Fox when in flower.

Given the heavily grazed and disturbed understorey, habitat resources for ground dwelling fauna are very limited.

4. Gradually sloping lands

Gradually sloping lands (between 80 and 90 metres ASL) include the lower slopes of the hills located in the eastern and western portions of the Study Site. These lands tended to feature non-remnant woodlands composed of *Eucalyptus crebra, Corymbia tessellaris, Corymbia intermedia* and *. tereticornis* in varying degrees of dominance. The presence of *Eucalyptus tereticornis* affords this vegetation habitat value to Koala (scats were recorded in these areas); as well as foraging resources for Grey-headed Flying Fox.

Given the heavily grazed and disturbed understorey, habitat resources for ground dwelling fauna are very limited.

5. Heavily grazed higher lands

Heavily grazed, higher lands (90 - 100 metres ASL) featured an overstorey of scattered Silver-leafed Ironbark *Eucalyptus melanophloia* and *E. crebra* over a disturbed, grazed understorey. Understorey grasses included an element of exotic species (e.g. Red Natal Grass *Melinis repens*); but also native grasses (e.g. Black Spear Grass *Heteropogon contortus* and Kangaroo Grass *Themeda triandra*).

The heavily grazed higher lands offer limited shelter and foraging opportunities for MNES.

6. Steep sloping lands

Steep sloping lands above 120 metres ASL surround the proposed west pit. These slopes feature a small area of remnant vegetation, as well as native regrowth. Canopy dieback was observed along these slopes; the areas where this was most prevalent are shown on **Figure 3.2**. The cause is unknown, although no evidence of Myrtle Rust or human-induced disturbance was observed; hence, it is assumed to be a symptom of drought conditions experienced across the region during the years leading up to the survey.

Remnant vegetation on steep sloping lands was dominated by canopy species including *Eucalyptus melanophloia, E. crebra, Corymbia tessellaris* over a sub-canopy of saplings of these species as well as Red Ash *Alphitonia excelsa*, Bats Wing Coral Tree *Erythrina vespertilio* and the exotic Prickly Pear *Opuntia tomentosa.* The groundcover tended to be dominated by taller, native grasses.

Lantana has infested some areas, as shown on **Figure 3.2**.

Bare hilltops.

The bare hilltops were devoid of tree or shrub canopy cover and were vegetated with both exotic and native grasses. Given the very low structural diversity displayed by this vegetation, habitat values for MNES are very limited.

Table 3.1. Representative photographs of vegetation communities and habitat types throughout the project area (refer to Figure 3.7 for locations of BC sites where photos were taken)



Photo 3.1. Vegetation in low-lying floodplain areas at BC9. High value habitat for MNES



Photo 3.2. Riparian Habitats. High value shelter and foraging for Koala.



Photo 3.3. Low-lying areas provide habitat for MNES.



Photo 3.4. Gradual sloping land provide habitat for MNES.



Photo 3.5. Sparse canopy cover providing poor shelter for Koala at higher lands (BC3, 5 and 12).



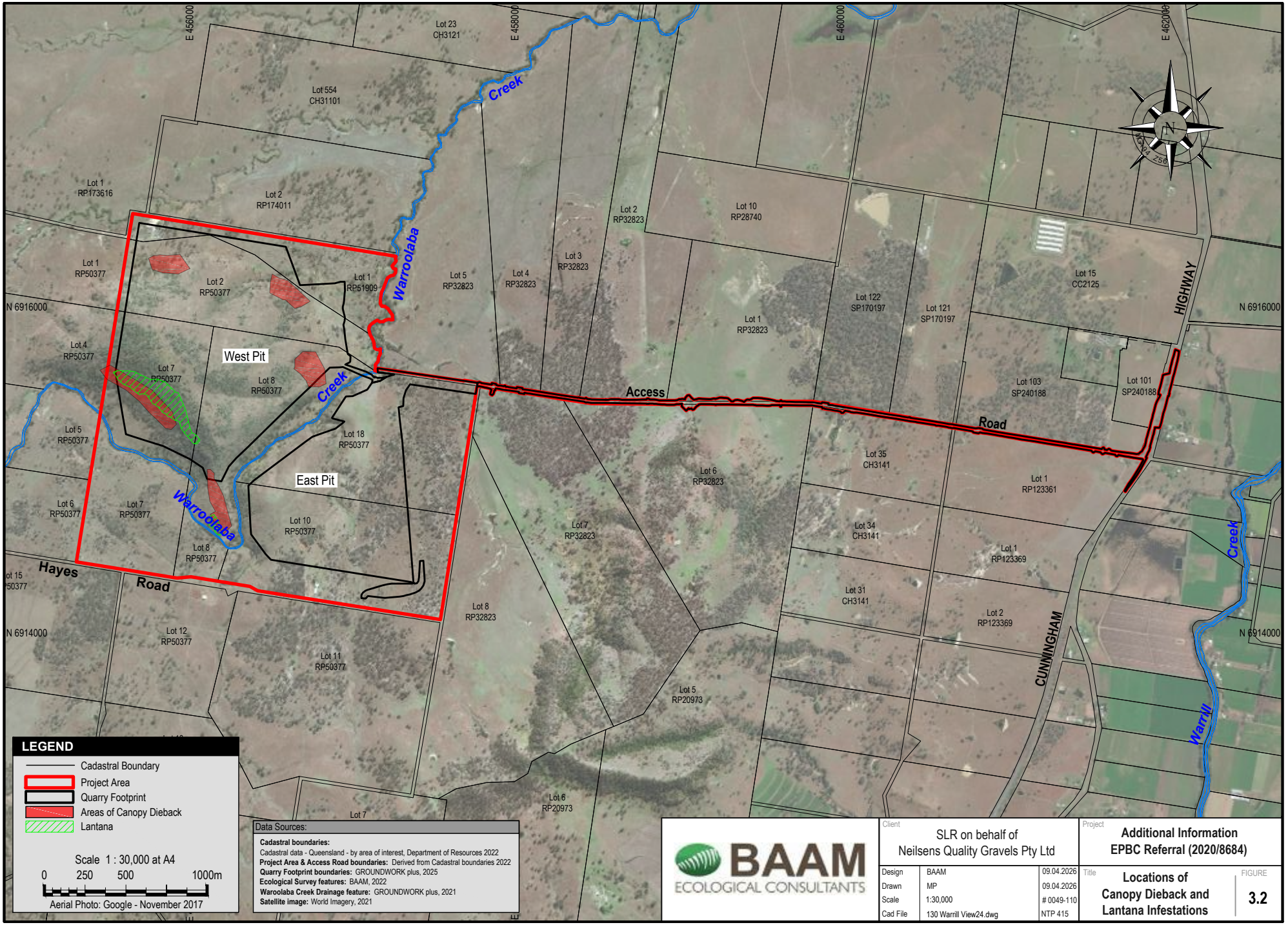
Photo 3.6. Canopy dieback at BC2 resulting in dense weed infestations. Poor shelter and foraging for MNES



Photo 3.7. Cleared grazing land at BC 7. No habitat values for MNES



Photo 3.8. Deep pool in Warroolaba Creek.



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3.2 DESCRIPTION OF POTENTIAL MNES

3.2.1 Threatened Ecological Communities

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool (PMST) (**Appendix 3**) indicates five EPBC listed Threatened Ecological Communities (TECs) may occur within the area:

- Grey box-grey gum wet forest of subtropical eastern Australia (listed as Endangered under the EPBC Act);
- Lowland Rainforest of Subtropical Australia (Critically Endangered);
- Poplar Box grassy woodland on alluvial plains (Endangered);
- Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions (Endangered); and
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered).

The Grey box-grey gum wet forest TEC and the Subtropical eucalypt floodplain forest and woodland TEC were not listed under the EPBC Act at the time of the referral decision (28/07/2020); hence, these TECs have been excluded from further assessment.

No vegetation communities or species indicative of the remaining TECs are identified within or adjacent to the project area on State vegetation mapping (**Appendix 4**), and field surveys (refer **Section 3.4**) have confirmed these TECs do not occur within or adjacent to the project area.

3.2.2 Threatened Flora Species

The PMST (**Appendix 3**) indicates 11 EPBC Act listed threatened flora species **(listed at the time of the referral decision [28/07/2020])** have potential to occur in the local area.

The Queensland WildNet database (**Appendix 3**) has records for one of the PMST predicted species within 10 km of the Site, this being *Cupaniopsis tomentella* Boonah Tuckeroo (Vulnerable). The ALA lists a single record of this species from 1998 within 10 km of the project area (ALA 2024).

The request for additional information also lists one other flora species, *Lychnothamnus barbatus* Green Alga (Endangered), which has potential to be present within creeks associated with the proposed action. The ALA lists two records from 1960 for Green Alga within 10 km of the project area (ALA 2024).

BAAM Senior Botanist Shelley Trevaskis surveyed the project area on five occasions between 2017 and 2021, for a total of 34 survey hours. No threatened flora species were recorded during these surveys and, based on current and historical land uses and the types and conditions of habitat present (refer **Section 3.2**), no threatened flora species are expected to be present within the project area.

3.2.3 Threatened Fauna Species

The PMST (**Appendix 3**) indicates numerous EPBC Act listed threatened fauna species have potential to occur in the local area. However, for some of these species, the project area is outside their currently known range, habitats utilised by the species are not present within the project area (refer **Section 3.2.3**), and/or they were not listed as threatened under the EPBC Act at the time of the referral decision (28/07/2020); hence, the following species have been excluded from further assessment:

<u>Species with current distributions outside the local area (based on lack of recent, local records):</u>

- Large-eared Pied Bat *Chalinolobus dwyeri*
- Ghost Bat *Macroderma gigas*
- Red Goshawk *Erythrotriorchis radiatus*
- Grey Falcon *Falco hypoleucos*
- Squatter Pigeon *Geophaps scripta scripta*
- Painted Honeyeater *Grantiella picta*
- Collared Delma *Delma torquata*
- Dunmall's Snake *Furina dunmalli*

<u>Shorebirds and wetland birds:</u>

- Australasian Bittern *Botaurus poiciloptilus*
- Sharp-tailed Sandpiper *Calidris acuminata*
- Curlew Sandpiper *Calidris ferruginea*
- Latham's Snipe *Gallinago hardwickii*

- Australian Painted Snipe *Rostratula australis*
- Common Greenshank *Tringa nebularia*

Wet/dry rainforest, wet sclerophyll, wallum/heath and swamp species

- Coxen's Fig-Parrot *Cyclopsitta diophthalma coxeni*
- Black-breasted Button-quail *Turnix melanogaster*

Cliffs and steep rocky slopes/gorges:

- Brush-tailed Rock-wallaby *Petrogale penicillata*

Species not listed as threatened under the EPBC Act at the time of the referral decision:

- South-eastern Glossy Black-Cockatoo *Calyptorhynchus lathami lathami*
- Brown Treecreeper *Climacteris picumnus victoriae*
- Grey Snake *Hemiaspis damelii*
- Yellow-bellied Glider *Petaurus australis australis*
- Diamond Firetail *Stagonopleura guttata*

The likelihood of occurrence of the remaining PMST predicted species is discussed in **Table 3.2**, based on the following criteria:

- **Known to occur**: the species was detected during recent or past surveys in the project area, and is not now considered locally extinct.
- **Likely to occur**: a medium to high probability the species occurs in, or regularly visits, the project area because suitable habitat occurs, the project area is within the known distribution of the species, there are past records of the species in the vicinity, and the species is not considered locally extinct.
- **Potential to occur**: either: (a) there are no past records of the species in the vicinity but suitable habitat occurs and there is insufficient information on the distribution of the species (e.g. it is naturally rare and/or difficult to detect) to categorise the species as likely or unlikely to occur; or (b) there are past records of the species in the vicinity of the project area but habitat in the project area is marginal or spatially limited, meaning that the species' presence on the project area would be transitory at best.
- **Unlikely to occur**: a very low probability the species occurs because: (a) suitable habitat does not occur; (b) there are no local records and the project area is outside the known distribution of the species; (c) the species is considered locally extinct; or (d) the species has not been observed despite sufficient spatial and temporal survey effort for detecting the species.

Table 3.2. Habitat preferences for species listed as likely or known to occur in the PMST report.

Species	EPBC Act Status	Preferred Habitat	Likelihood of Occurrence
Phascolarctos cinereus Koala	Vulnerable[1]	Koalas have a distinct association with eucalypt woodland and forest habitat types containing suitable food trees (Hume and Esson 1993; Moore and Foley 2000).	**Known to occur:** Koala were observed during field surveys.
Pteropus poliocephalus Grey-headed Flying-Fox	Vulnerable	A canopy-feeding frugivore and nectarivore that utilises vegetation including rainforests, open eucalypt forests, woodlands, melaleuca swamps and banksia woodlands.	**Potential to occur:** One WildNet record within 10km. The project area does not support a roost site, but supports food resources and is well within the known

[1] Since the referral of the Project, the status of Koala and Greater Glider under the EPBC Act have been upgraded to Endangered. However, as the Project was referred prior to these upgraded listings, it is understood the Project continues to be assessed on the basis of these species being listed as Vulnerable.

Species	EPBC Act Status	Preferred Habitat	Likelihood of Occurrence
			distribution of this species.
Dasyurus maculatus maculatus Spotted-tail Quoll	Endangered	Use rock caves and large hollow logs or trees for shelter, with basking sites usually nearby (Menkhorst and Knight 2004). Populations persist in areas with relatively extensive, intact forest.	**Potential to occur:** One WildNet record within 10km, and two ALA records within 10km (from 1930 and 1991), and the project area supports potential habitats.
Anthochaera phrygria Regent Honeyeater	Critically Endangered	Mostly inhabits inland slopes of the Great Dividing Range, in areas of low to moderate relief with moist, fertile soils. Most commonly associated with box-ironbark eucalypt woodland and dry sclerophyll forest but also inhabits riparian vegetation such as sheoak (*Casuarina* spp) where it feeds on needle-leaved mistletoe and sometimes breeds (Franklin et al., 1989; Higgins et al., 2001).	**Potential to occur**: No local records, although the project area supports potential habitats.
Hirundapus caudacutus White-throated Needletail	Vulnerable	This is an aerial species, typically occurring over open, inland habitats, but occasionally over coastal areas (Higgins 1999; Pizzey and Knight 2003).	**Potential to occur:** Three WildNet records within 10km, and two ALA records within 10km (from 1913 and 2024).
Lathamus discolor Swift Parrot	Critically Endangered	Woodlands, riparian vegetation and remnant patches of mature eucalypts in agricultural areas, though they prefer dry sclerophyll forest. It is infrequently, though possibly annually, recorded in south-eastern Queensland (Higgins 1999; NPWS 2003).	**Potential to occur**: No local records, although the project area supports potential habitats.
Petauroides volans Greater Glider	Vulnerable[2]	Eucalypt forests and woodlands, relying on live and dead hollow-bearing trees for denning, feed trees, large trees, and habitat connectivity across the landscape (Eyre et al 2022). Occupancy of small patches (i.e. < 20 ha) is reliant on landscape context and connectivity to other patches (Eyre et al 2022), given the species has little dispersal ability to move through cleared areas between fragments (DCCEEW 2022). Critical habitat is defined as either: • large, contiguous areas of eucalypt forest, which contain mature hollow-bearing trees and a diverse range of the species' preferred food species in a particular region; • smaller or fragmented habitat patches connected to larger patches of habitat, that can facilitate dispersal of the species and/or that enable recolonization; • cool microclimate forest/woodland areas (e.g. protected gullies, sheltered high elevation areas, coastal lowland areas, southern slopes); • areas identified as refuges under future climate changes scenarios; • short-term or long-term post-fire refuges (i.e. unburnt habitat within or adjacent to recently burnt landscapes) that allow the species to persist, recover and recolonise burnt areas (DCCEEW 2022). Sites lacking important habitat features, including habitat connectivity across the landscape, are not considered habitat (Eyre et al 2022). Greater Gliders are sensitive to habitat loss and fragmentation, and although they have small home ranges, their low reproductive rate and sensitivity to disturbance means they tend to become locally extinct in small and fragmented habitat patches; they disperse poorly across vegetation that is not native forest, and so do not readily recolonise isolated sites from which they have been lost (DCCEEW 2022).	**Unlikely to occur.** Despite there being some potential habitat values present, the site and surrounding landscape lacks extensive and/or sufficiently connected forest to maintain occupancy or be defined as critical habitat. No WlidNet records within 10km, and the closest ALA record is from Flinders Peak/Undullah, 25km east of the project area.

3.3 INFORMATION ON RELEVANT MNES

The following sections provide further detail on threatened species known, considered likely or considered to have potential to occur within the project area, including relevant ecological characteristics and threats, known or potential habitat in the project area, and known or potential occurrence in the project area.

Species considered unlikely to occur but specifically identified in DCCEEW's request for further information are also addressed.

Details on survey methodologies are provided in **Section 3.4**.

3.3.1 Threatened Species Known to Occur

Koala Phascolarctos cinereus

EPBC Act Status (at time of referral decision): Vulnerable.

Ecology and Habitat: Koalas have a distinct association with eucalypt woodland and forest habitats containing suitable food trees (Hume and Esson 1993; Moore and Foley 2000; Martin *et al.* 2008), particularly those growing on alluvial or other fertile soils (Moore *et al*. 2004, Crowther *et al.* 2009). They are not necessarily restricted to bushland or remnant areas and are known to occur and breed within farmland and the urban environment (Dique *et al.* 2004), and move across rural land and through suburbs (Martin *et al.* 2008).

Koalas use a variety of trees for feeding and resting (Dique *et al.* 2004; Martin *et al.* 2008). They do, however, have distinct, localised feeding preferences throughout their range (Pahl and Hume 1990).

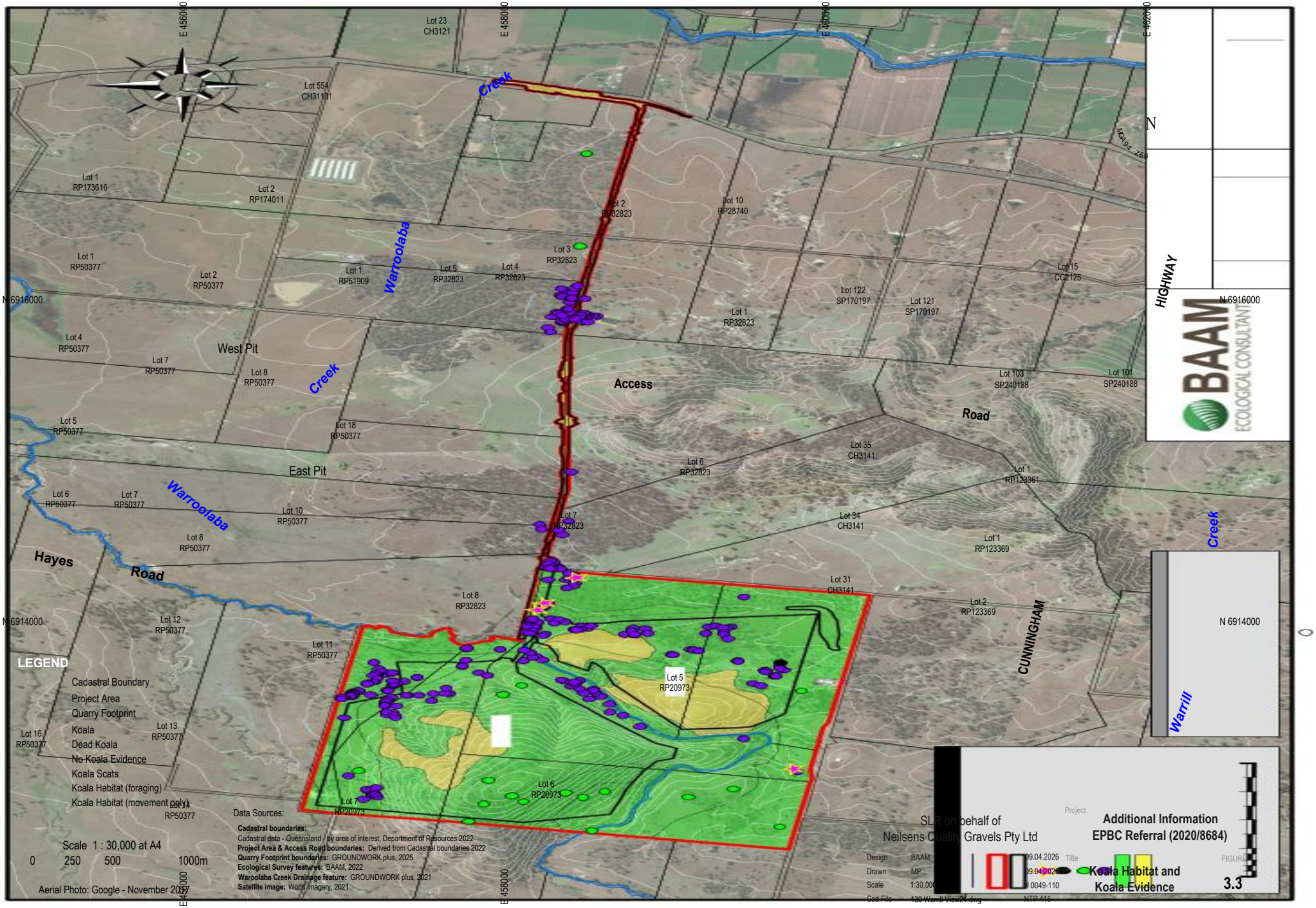
In the Scenic Rim local government area, *Eucalyptus tereticornis* and *E. microcorys* are recognised as primary Koala feed trees, whist *E. biturbinata, E. exserta, E. melliodora, E. moluccana* and *E. propinqua* are listed as secondary food trees (AKF 2015). Koalas tend to select trees with higher leaf moisture (Wu *et al*. 2012). Primary food trees tend to have significantly higher usage than secondary food trees (Callaghan *et al.* 2011).

GPS tracking of 40 Koala over three years showed they used more feed trees at night and selected taller trees with more shelter in the day compared to night (Crowther *et a*l. 2014). In consideration of climate change predictions, this research highlights the importance of retaining taller trees and non-feed trees that provide shadier/more dense foliage.

Threats: The Koala is threatened by climate change impacts (including increased frequency and intensity of drought and high temperatures, increasing prevalence of weather conditions which promote bushfire, and a shrinking climatically suitable area), diseases (Koala Retrovirus and Chlamydia *Chlamydia pecorum*), habitat loss resulting from land clearance, and mortality due to encounters with vehicles and dogs (DAWE 2022a).

Habitat in the project area: All vegetation communities in the project area represent potential habitat for Koala. Higher value habitats are located where Forest Red Gum *Eucalyptus tereticornis* (preferred Koala food tree species [AKF 2015]) and suitable shelter trees occur along the banks of Warroolaba Creek and some small drainage lines in the floodplain areas located east of the proposed west pit area, and low-lying areas within and adjacent to the proposed east pit and in the north-west corner of the project area (**Figure 3.3**). Koala evidence was also recorded in gradual sloping lands, although not as frequently and no Koala were observed. No evidence of Koala was recorded in lands above the 120 m contour or from completely cleared pasture on slopes, although these areas are conservatively mapped as habitat on the basis that they offer potential foraging opportunities or allow the movement of Koala between areas of foraging habitat. The result is that all land within the site is mapped as Koala habitat (**Figure 3.3**).

Known Records within 10 km: The WildNet database lists 96 records of Koala within a 10 km radius of the project area, since 1980 (**Appendix 3**). Atlas of Living Australia lists 148 records within 10km, 24 records within 5 km, and no records within 1 km.



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A study conducted on behalf of the Queensland Department of Environment and Heritage Protection (now DETSI) suggests Koala densities in south-east Queensland are low in most areas, particularly those with low forest cover, low rainfall and high temperatures (Rhodes *et al.* 2015). This study suggests Koala population densities in the project area to be between 0.007 and 0.013 per hectare. If we use the highest estimated density (0.013), Koala abundance within the project area is estimated to be between 3 and 4 individuals.

Survey Results: **Figure 3.3** shows the locations where three individual Koala were observed during field surveys, one of which was found dead at the base of a heavily browsed tree (cause unknown). **Figure 3.3** also shows the location where a Koala was captured on a camera trap, and the locations where Koala scats were recorded. The recorded scats indicate Koala are mainly associated with low-lying areas where *Eucalyptus tereticornis* is present within the project area. **Figure 3.3** also shows where targeted Koala surveys were undertaken but no Koala or evidence was observed.

Site/Project Relevance: This species is known to occur within the project area, and known habitat occurs within and adjacent to the proposed development footprint. Consequently, potential impacts on this MNES are addressed in **Section 4.0**.

3.3.2 Threatened Species with Potential to Occur

Grey-headed Flying-Fox *Pteropus poliocephalus*

EPBC Act Status (at time of referral decision): Vulnerable.

Ecology and Habitat: Grey-headed Flying-fox are usually found on coastal lowlands and slopes below altitudes of 200 m (DAWE 2021). Two habitat characteristics are important for Grey-headed Flying-foxes: foraging resources and roosting sites.

The species is a canopy-feeding frugivore and nectarivore, utilising rainforests, open eucalypt forests, woodlands, melaleuca swamps and banksia woodlands. As none of the vegetation communities used by the Grey-headed Flying-fox produce continuous foraging resources throughout the year, the species has adopted complex migration traits in response to ephemeral and patchy food resources. Coastal lowlands in northern New South Wales and southern Queensland provide relatively reliable winter flowering forage, with important winter and spring habitats including vegetation communities that contain *Eucalyptus tereticornis, E. albens, E. crebra, E. fibrosa, E. melliodora, E. paniculata, E. pilularis, E. robusta, E. siderophloia, Banksia integrifolia, Castanospermum australe, Corymbia citriodora citriodora, C. eximia, C. maculata, Grevillea robusta* or *Melaleuca quinquenervia* (DAWE 2021).

Roosts are commonly within dense vegetation close to water, primarily rainforest patches, stands of melaleuca, mangroves or riparian vegetation, but colonies may use exotic vegetation in urban areas (Birt *et al.* 1998). The species congregates in large camps of up to 200,000 individuals during summer, with the number of bats within a camp being influenced by the availability of blossom in the surrounding area. Adults normally disperse during the winter and can migrate up to 750 km as individuals or small groups, with the young forming winter camps (Churchill 2008).

Grey-headed Flying-fox have been known to fly as far as 40 km to feed (DAWE 2021), although they usually feed within 6-28 km of the roost site (DAWE 2021).

Threats: The most severe threat to Grey-headed Flying-foxes is loss of habitat (DAWE 2021). It has been suggested this resulted in a 50% decline in the population by the 1930s (Duncan *et al.* 1999). The loss of habitat, particularly important habitat such as reliable winter resources along the east coast, has continued to lead to population decline. Other threats include climate change related impacts, camp disturbance (including from public misunderstanding of disease risk), mortality in commercial fruit crops, entanglement in netting and barbed wire fencing and electrocution on power lines (DAWE 2021).

Habitat in the project area: The project area does not support a roost site, although flowering eucalypts throughout the project area provide potential food resources for Grey-headed Flying-fox. *Melaleuca* species associated with the riparian vegetation alongside Warroolaba Creek also provide potential foraging resources, when in flower.

Potential habitat for Grey-headed Flying-Fox has been mapped where important winter foraging resources are present (**Figure 3.4**).

Known Records within 10 km: There is one (1) WildNet record for Grey-headed Flying-fox within 10 km of the Site. The Atlas of Living Australia also lists one (1) record within 10km, but no records within 5 km.

The National Flying-fox monitoring viewer shows the nearest roost sites near Boonah (13-20 km south-east of the project area) can support 2,5000-10,000 Grey-headed Flying-foxes when active.

Survey Results: Targeted surveys for this species were not undertaken due to personal safety risks during nocturnal activities; the project area presents numerous trip/fall hazards due to steep slopes, while vehicle access throughout the project area is limited.

Site/Project Relevance: The project area is within the typical flying distance of known roosts, so a precautionary approach has been taken such that it is assumed Grey-headed Flying-fox would visit the project area during flowering events of important winter/spring feed trees. Consequently, potential impacts on this MNES are addressed in **Section 4.0**.

Spotted-tail Quoll (SE mainland) *Dasyurus maculatus maculatus*

EPBC Act Status: Endangered

Distribution, Ecology and Habitat: This species occurs in eastern Australia from south-east Queensland to western Victoria, in fragmented and isolated populations (Commonwealth of Australia 2024). They are solitary animals and occur at low densities. Habitat range for males has been estimated to be as large as 2200 ha. Females are protective of dens and their home range is between 700-850 ha (Claridge *et al*. 2005).

This species has a preference for mature wet forest habitat (Belcher 2000; Watt 1993) but has been recorded from a wide range of habitats. Habitat requirements include suitable den sites such as hollow logs, tree hollows, rock outcrops or caves (NSW NPWS 1999).

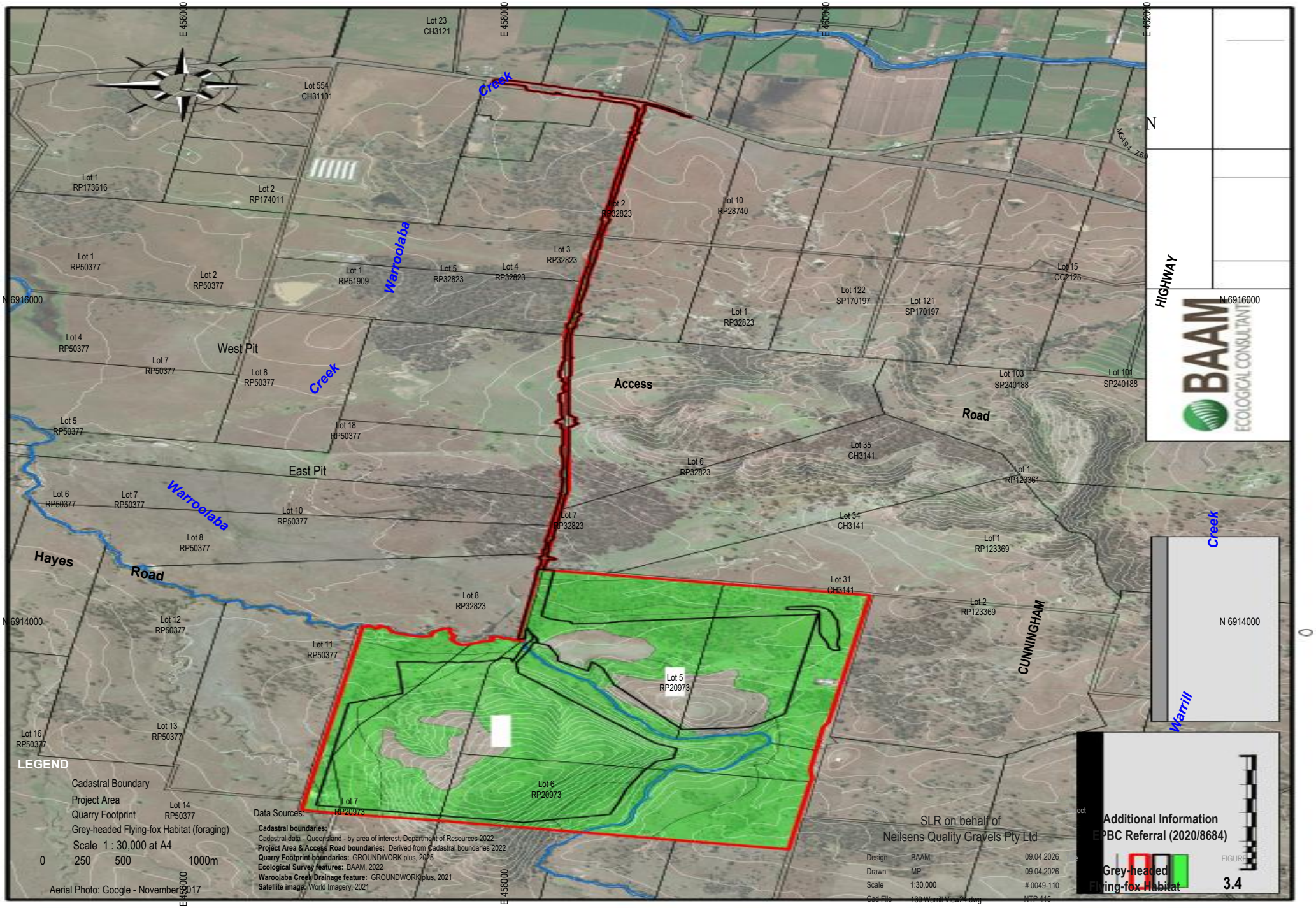
Threats: Threats impacting Spotted-tailed Quoll are habitat loss and fragmentation, invasive species (i.e. due to predation/competition, and poisoning from cane toads and baits targeting non-native species), increased fire frequency/intensity, and purposeful killing (TSSC 2020). This species is also known to be subject to vehicle strikes within urbanised areas.

Habitat in the project area: Riparian habitats and flood plain areas (refer **Figure 3.1**) support the only locations where mature wet forest occurs within the project area, and it is predicted this is where Spotted-tailed Quoll would most likely be found, if present. The field surveys identified 22 hollow-bearing trees or stags, the majority of which are located within floodplain areas (**Figure 3.5**).

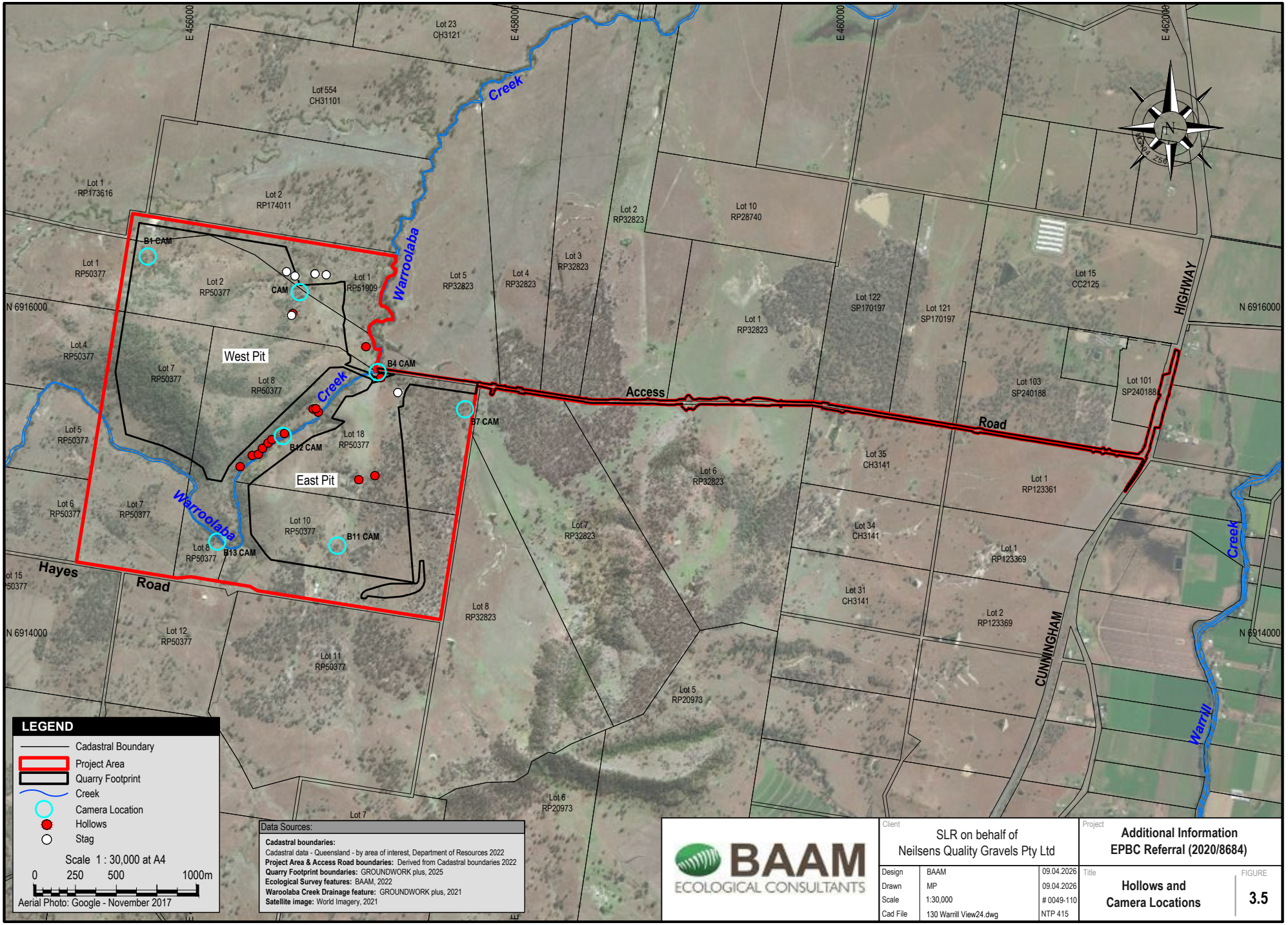
Known Records within 10 km: There is one (1) WildNet record for Spotted-tail Quoll within 10 km of the project area. The Atlas of Living Australia also lists two (2) records within 10km (including one record from 1991 and one record from 1930), but no records within 5 km.

Survey Results: Seven wildlife detection cameras were installed within the project area (refer **Figure 3.5**) and left for fourteen nights. Daytime searches for scats, latrine sites and potential denning sites were also undertaken continuously whilst conducting vegetation assessments and targeted fauna surveys.

No Quoll were detected on wildlife detection cameras or in any hollow logs searched, and no scats or latrine sites were observed. The detection cameras recorded wild and free-roaming dogs within the project area, which reduces the suitability of the project area for quolls.



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Survey guidelines state that Spotted-tail Quoll is commonly associated with gullies, rocky escarpments and outcrops. They den during the day in caves, among rocks, hollow logs, low tree hollows and burrows. Survey guidelines suggest 10 cameras per hectare should be deployed for at least 14 nights. Survey guidelines also state sampling units of 5 hectares are not appropriate for this wide ranging species; sampling units of 100 hectares are more appropriate.

Due to the paucity of denning sites, the lack of scats or latrine sites observed, the presence of known threats (dogs/foxes) and large areas of totally cleared lands within the project area, together with the low probability that Spotted-tailed Quoll would be present, it was considered installing 10 cameras per hectare (.e. 25 cameras) was not warranted. Instead, seven cameras were installed in locations considered to provide some potential habitat values for this species. It is considered these strategically placed cameras provided sufficient coverage to detect Quoll, if present.

Site/Project Relevance: This species has not been recorded on the project area during targeted surveys, and there are no recent records in the local landscape. Habitats across the majority of the project area are generally unsuitable for habitation due to a lack of denning features, and while riparian and floodplain habitats may provide some shelter/refuge, the known presence of wild and free-roaming dogs reduces the suitability of the project area for quolls.

Consequently, it is considered unlikely that Spotted-tail Quoll would rely on the project area for breeding, foraging or dispersal, and this species is not considered further as part of this preliminary documentation response.

Regent Honeyeater *Anthochaera phrygria*

EPBC Act Status: Critically Endangered

Distribution, Ecology and Habitat:

The Regent Honeyeater has a patchy distribution between south-east Queensland and central Victoria, although is only found regularly at a few localities in NSW and Victoria where most of the sightings have been recorded, and the four known key breeding areas are in NSW and Victoria (TSSC 2015).

The species mostly inhabits inland slopes of the Great Dividing Range, in areas of low to moderate relief with moist, fertile soils. It is most commonly associated with box-ironbark eucalypt woodland and dry sclerophyll forest, but also inhabits riparian vegetation such as sheoak (*Casuarina* spp) where it feeds on needle-leaved mistletoe and sometimes breeds. It sometimes utilises lowland coastal forest, which may act as a refuge when its usual habitat is affected by drought. It also uses a range of other habitats including remnant patches in farmland and urban areas, roadside reserves and travelling stock routes (TSSC 2015).

The Regent Honeyeater's diet primarily consists of nectar, which it obtains chiefly from eucalypts and mistletoe, and it prefers taller and larger diameter trees for foraging, as these typically produce more nectar (TSSC 2015).

Habitat critical for the survival of the species includes any breeding or foraging areas where the species is likely to occur, and any newly discovered breeding or foraging locations (Commonwealth of Australia 2016):

Threats: The decline of the Regent Honeyeater is thought to be mainly due to the clearing, fragmentation and degradation of its habitat. The species relies on a range of different food resources, and is particularly vulnerable to the removal of large, mature trees which are important feeding and breeding habitat. Competition for resources with more aggressive honeyeaters, particularly the Noisy Miner *Manorina melanocephala* and Noisy Friarbird *Philemon corniculatus* may also be a factor in its decline (TSSC 2015).

Habitat in the project area: There is suitable, potential foraging habitat onsite in the form of eucalypt open forest communities within the project area, although larger, more mature trees that the species prefers are generally restricted to riparian and floodplain areas.

Known Records within 10 km: There are no WildNet or ALA records within 10 km of the project area. The closest ALA records are approximately 20km to the north (near Grandchester, in 2022), and approximately 25km to the east (in Flinders Peak Conservation Park in 2019), west (in Main Ranger Conservation Park in 2000) and south (near Mt Alford [undated]).

Survey Results: This species was not observed during the field surveys, but has the potential to occur within the project area on very rare occasions when visiting south-east Queensland.

Site/Project Relevance: Mapping provided in the National Recovery Plan (Commonwealth of Australia 2016) indicates the project area is within an area where the species "may" occur (but is not "likely" to occur), and there are very few records in the broader landscape, and none within 10-20km, such that the project area and surrounds would not be considered habitat critical for the survival of the species, and any occurrence of the species in the project area is expected to be very rare. Furthermore, areas within the project area where larger, more mature trees (i.e. that the species prefers) occur are generally restricted to riparian and floodplain areas, much of which will be retained within the balance of the site.

Overall, Regent Honeyeater is not expected to occur within the local area or utilise the habitats currently available in the project area to such an extent that a significant impact on the species would result from the proposed action. Accordingly, this species is not considered further as part of this preliminary documentation response.

White-throated Needletail *Hirundapus caudacutus*

EPBC Act Status: Vulnerable.

Ecology and Habitat: White-throated Needletail is mostly aerial, from heights of less than 1 m up to more than 1000 m above the ground (Coventry 1989; Tarburton 1993). Although they occur over most types of habitat, they are recorded most often above wooded areas, including open forest and rainforest, and may also fly below the canopy between trees or in clearings (Higgins 1999).

Habitat in the project area: Being an aerial species, the entire project area could be described as potential habitat.

Known Records within 10 km: There are three (3) WildNet records for White-throated Needletail within 10 km of the project area. The Atlas of Living Australia also lists two (2) records within 10km (including one record from 2013 and one record from 2014), but no records within 5 km.

Survey Results: This species was not observed during the field surveys, but is expected to fly over the site on occasion.

Site/Project Relevance: As this is a wide-ranging, mostly aerial species, the proposed removal of terrestrial habitat within the project area will not have a significant impact on this species' persistence in the landscape, and it is not addressed further in this report.

Swift Parrot *Lathamus discolor*

EPBC Act Status: Critically Endangered

Ecology and Habitat: The Swift Parrot breeds in Tasmania during the summer and the entire population migrates north to mainland Australia for the winter. Whilst on the mainland, they disperse widely to forage on flowers and psyllid lerps in eucalypt species, with the majority being found in Victoria and New South Wales. Small numbers of swift parrots are observed in south-eastern Queensland on a regular basis (TSSC 2016).

Inland box-ironbark habitat is the principal wintering habitat of the species on the mainland, where they feed preferentially in the largest trees available. *Eucalyptus robusta* and spotted gum *Corymbia maculata* woodland is also utilised when in flower; otherwise often in coastal forests from eastern Victoria to the central New South Wales coast (TSSC 2016).

Foraging habitat on the Australian mainland representing habitat critical for the survival of the species includes preferred foraging species within known and likely foraging habitat; i.e. Yellow Gum *Eucalyptus leucoxylon*, Red Ironbark *E. tricarpa*, Mugga Ironbark *E. sideroxylon*, Grey Box *E. macrocarpa*, White Box *E. albens*, Yellow Box *E. melliodora*, Swamp Mahogany *E. robusta*, Forest Red Gum *E. tereticornis*, Blackbutt *E. pilularis* and Spotted Gum *Corymbia maculata* (DCCEEW 2024).

The global Key Biodiversity Area (KBA) partnership currently recognises 18 KBAs as important for Swift Parrot conservation and to support the long-term persistence of the species, all of which occur in New South Wales, Victoria and Tasmania (DCCEEW 2024).

Threats: Ongoing habitat loss, particularly within the primary breeding areas in Tasmania, represents the single biggest threat to the survival of the Swift Parrot in the wild, particularly as it appears to enhance nest predation by introduced Sugar Gliders. The primary conservation action for Swift Parrots is, therefore, to prevent further habitat destruction from land clearance, grazing and forestry activities in high quality Swift Parrot summer nesting and breeding habitat (TSSC 2016).

Habitat in the project area: All vegetation communities in the project area represent potential habitat for Swift Parrot, particularly riparian, floodplain and lower lying areas where *Eucalyptus tereticornis* is present.

Known Records within 10 km: There are no WildNet or ALA records within 10 km of the project area. The closest ALA records are approximately 20km to the north (near Ipswich, in 2018) and approximately 25km to the south-west (near Cunningham's Gap in 1992).

Survey Results: This species was not observed during the field surveys, but has the potential to occur within the project area on very rare occasions when visiting south-east Queensland.

Site/Project Relevance: The National Recovery Plan (DCCEEW 2024) notes that the species' opportunistic habitat use means survey data and historical records need to be considered when assessing the relative importance of a local area or region for Swift Parrots.

According to the National Recovery Plan, key considerations in assessing environmental impacts include protecting KBAs and targeting enhancement and restoration measures at these productive sites, and avoiding the destruction of habitat critical to the survival of the species, while strategies to achieve recovery objectives include maintaining known Swift Parrot breeding and foraging habitat at the local, regional and landscape scales (DCCEEW 2024).

The project area is not within, or in proximity to, a recognised KBA, and areas within the project area that are dominated by preferred foraging species (i.e. which may indicate the presence of habitat critical to the survival of the species) are largely restricted to riparian, floodplain and lower lying areas, much of which will be retained within the balance of the site.

Furthermore, there are very few records in the broader landscape, and none within 10-20km, such that the project area and surrounds are not considered "known" foraging habitat, and any occurrence of the species in the project area is expected to be very rare.

Overall, Swift Parrot is not expected to occur within the local area or utilise the habitats currently available in the project area to such an extent that a significant impact on the species would result from the proposed action. Accordingly, this species is not considered further as part of this preliminary documentation response.

3.3.3 Threatened Species Unlikely to Occur

Table 3.2 identified one species as unlikely to occur (Greater Glider). Further details on why this species is not expected to occur is provided below.

DCCEEW's request for further information identified significant impacts may arise from the proposed action on three additional plant species. Reasons why these species are not expected to occur are also provided in this section.

Greater Glider *Petauroides volans*

EPBC Act Status (at time of referral decision): Vulnerable.

Ecology and Habitat: The Greater Glider (southern and central) is an arboreal, nocturnal marsupial, predominantly solitary and largely restricted to eucalypt forests and woodlands of eastern Australia.

It is typically found in highest abundance in taller, montane, moist eucalypt forests on fertile soils, with relatively old trees and abundant hollows – e.g. north-eastern NSW (Andrews et al. 1994), – but also occurs in drier habitats in south-eastern Queensland (Eyre et al 2022).

The Greater Glider is primarily folivorous, with a diet mostly comprising eucalypt leaves supplemented by buds and flowers (Kehl & Borsboom 1984; Kavanagh & Lambert 1990; van der Ree et al. 2004). It feeds from a restricted range of eucalypt species across its range and in south-eastern Queensland (Smith et al. 2007), with preferentially selected species for foraging by Greater Gliders in Queensland

including *Corymbia citriodora, Eucalyptus moluccana, E. tereticornis, E. crebra, C. intermedia* and *E. portuensis* (Eyre et al 2022). Size of trees is also important for Queensland Greater Gliders, with trees > 30 cm diameter at breast height (DBH) preferentially selected for foraging and > 50 cm DBH for denning (i.e. trees > 50 cm DBH are more likely to contain suitable hollows for sheltering by Greater Gliders) (Eyre et al 2022).

The species' distribution can be patchy even in continuous areas of habitat. It is likely that only a proportion of forest in potential habitat areas is suitable for the species, as the structural attributes of the forest overstorey and forage quality it relies on vary considerably across the landscape (Eyre et al 2022; Youngentob et al. 2012).

Occupancy of small patches (i.e. < 20 ha) is reliant on landscape context and connectivity to other patches (Eyre et al 2022), given the species has little dispersal ability to move through cleared areas between fragments (DCCEEW 2022).

Critical habitat is defined in DCCEEW (2022) as either:

- large, contiguous areas of eucalypt forest, which contain mature hollow-bearing trees and a diverse range of the species' preferred food species in a particular region;
- smaller or fragmented habitat patches connected to larger patches of habitat, that can facilitate dispersal of the species and/or that enable recolonization;
- cool microclimate forest/woodland areas (e.g. protected gullies, sheltered high elevation areas, coastal lowland areas, southern slopes);
- areas identified as refuges under future climate changes scenarios;
- short-term or long-term post-fire refuges (i.e. unburnt habitat within or adjacent to recently burnt landscapes) that allow the species to persist, recover and recolonise burnt areas.

Sites lacking important habitat features, including habitat connectivity across the landscape, are not considered habitat (Eyre et al 2022).

Threats: Key threats to Greater Glider are frequent and intense bushfires, inappropriate prescribed burning, climate change, land clearing and timber harvesting (DCCEEW 2022).

Greater Gliders are sensitive to habitat loss and fragmentation, and although Greater Gliders have small home ranges, their low reproductive rate and sensitivity to disturbance means they tend to become locally extinct in small and fragmented habitat patches; they disperse poorly across vegetation that is not native forest, and so do not readily recolonise isolated sites from which they have been lost (DCCEEW 2022).

Habitat in the project area: Some of the vegetation within the project area is consistent with that used by Greater Glider; there are trees suitable for denning and suitable foraging resource, particularly alongside Warroolaba Creek (refer **Figure 3.5**).

Known Records within 10 km: There are no WildNet records within 10km of the project area. The closest ALA record is from Flinders Peak/Undullah, 25km east of the project area.

Survey Results: Targeted surveys for this species were not undertaken due to personal safety risks during nocturnal activities; the project area presents numerous trip/fall hazards due to steep slopes, while vehicle access throughout the project area is limited.

Site/Project Relevance: While potentially suitable habitat for this species occurs within the project area, this species has not been recorded in the local landscape for over 40 years. Ongoing habitat clearing and fragmentation for rural land uses prior to and during this time has effectively prevented the species from accessing and persisting in the local landscape.

Based on the lack of recent records in the local area, and the lack of adequate habitat connectivity across the local landscape that would effectively prevent re-establishment of the project area, the project area is not considered to represent habitat critical for the survival of the species, nor is it considered to be critical to the recovery of the species.

Consequently, the proposed action is not expected to result in a significant impact on this species, and it is not addressed further in this report.

Green Alga *Lychnothamnus barbatus*

EPBC Act Status: Endangered

Distribution, Ecology and Habitat: *Lychnothamnus barbatus* is known from two locations only: Warrill Creek/Washpool Gully and Wallace Creek in the Peak Crossing-Boonah area of south-east Queensland (Commonwealth of Australia 2024). It was located submerged in 50–130 cm clear flowing water (Cassanova, 1997). It occurs in clear flowing water, and populations can be decimated during high turbid flows (McCourt *et al*. (1999).

Habitat in the project area: The only potential habitat for this alga within the project area is along Warroolaba Creek, as all other drainage lines remain dry except during extended rainfall events. However, the creek and creek banks have been impacted by cattle trampling and defaecation (**Photo 3.9**). Due to these impacts and surrounding land uses, it is likely water within the creek would become very turbid during strong flow events as a result of sedimentation.

Known Records within 10 km: There are two (2) ALA records within 10km of the project area, both from 1960.



Photo 3.9. Dry bed of Warroolaba Ck. Poor quality habitat for Green Algae

Survey Methodology and Adequacy: *Lychnothamnus barbatus* is difficult to detect and is best identified by an algal specialist. Surveys should be confined to semi-permanent or permanent creeks and rivers (Commonwealth of Australia 2024). Extensive surveys of all waterways were conducted by ESP in 2018. In addition, flora surveys conducted along Warroolaba Creek involved searching the banks and waterway for threatened species in accordance with the Qld *Protected Plants – flora survey guidelines* (DES 2020).

It is considered the ESP aquatic survey, together with the BAAM flora/vegetation surveys, were adequate to detect this species, if it was present.

Survey Results: This alga was not recorded during the flora or aquatic surveys.

Site/Project Relevance: Past and ongoing disturbances to the creek system would make this unsuitable for this species. Consequently, this MNES is not expected to be impacted by the project, and is not considered further as part of this preliminary documentation response..

Yellow Satinheart *Bosistoa transversa*

EPBC Act Status: Vulnerable

Distribution, Ecology and Habitat: Yellow Satinheart is found from north of Lismore in New South Wales to near Gladstone in Queensland (Commonwealth of Australia 2024). This species is associated with lowland sub-tropical rainforest with notophyll vine forest and up to an altitude of 300m.

Known Records within 10 km: There are no Wildnet (**Appendix 3**) or ALA records for this species within 10 km of the project area.

Survey Methodology and Adequacy: Searches for threatened plant species was continuous during all vegetation assessment surveys, which had a total survey effort of 34 person hours. There are no published guidelines for surveying for this species, but this is a readily recognisable tree up to 22 m in height, and it is considered the survey effort was sufficient to detect this species, if it was present.

Survey Results: *Bosistoa transversa* was not recorded during the field surveys.

Site/Project Relevance: The project area does not support low-land rainforest or any associated vegetation listed in the Approved Conservation Action Advice (DEWHA 2008a). Consequently, this MNES is not expected to be impacted by the project, and is not considered further as part of this preliminary documentation response..

Lloyd's Olive *Notelaea lloydii*

EPBC Act Status: Vulnerable

Distribution, Ecology and Habitat: Lloyd's Olive is known from five locations within south-east Queensland (Commonwealth of Australia 2024), the closest of which is in the Boonah district approximately 30 km south east from the project area.

Lloyd's Olive commonly occurs in open eucalypt forest, often near the margins of vine thickets, vine forests and softwood scrub at altitudes between 80 and 480m. It is usually found on stony, shallow and rocky soils derived from sandstone or acid volcanic rocks, often on steep slopes, or near drainage lines (Queensland Herbarium, 2008).

Habitat in the project area: The project area does support some areas of open eucalypt forest, but there were no vine thickets or vine forests within the project area. In addition, the TEC which overlaps with this species listed in the Approved Conservation Action Advice is not present (DEWHA 2008b).

Known Records within 10 km: There are no Wildnet (**Appendix 3**) or ALA records for this species within 10 km of the project area.

Survey Methodology and Adequacy: Searches for threatened plant species was continuous during all vegetation assessment surveys, which had a total survey effort of 34 person hours. There are no published guidelines for surveying for this species, but it is considered the survey effort was sufficient to detect this species, if it was present.

Survey Results: Lloyd's Olive was not recorded within the site.

Site/Project Relevance: Based on the lack of survey records, this MNES is not expected to be impacted by the project and is not considered further as part of this preliminary documentation response.

3.4 MNES ASSESSMENT METHODOLOGIES

3.4.1 Desktop Assessment

The desktop assessment comprised a search of online mapping and databases and an analysis of information for conservation significant vegetation communities and species with reference to the project area locality. The information reviewed included:

- The PMST, to identify any MNES protected under the EPBC Act that may occur within the project area (**Appendix 3**).
- The Queensland Wildlife Online and ALA databases, to determine if any species listed under the EPBC Act have been previously recorded in the vicinity of the project area (**Appendix 3**).
- State mapping of vegetation and habitats, to identify if important habitats for species listed under the EPBC Act may occur within or near the project area (**Appendix 4**).
- Reference material on the target flora and fauna species to confirm habitat requirements and distinguishing features to assist field identification.

3.4.2 Flora Survey

The flora survey involved foot traverses over the site by BAAM Senior Ecologist Shelley Trevaskis on 5 April and 24 May 2016; 14 November 2017; 5 and 7 July 2019; 4 and 16 December 2020; and 30 and 31 March 2021. The focus of the flora survey was to verify State mapped vegetation, compile vegetation community descriptions, undertake targeted searches for the presence of threatened flora species and their preferred habitats, and collect site-based attribute data for habitat quality assessments using the BioCondition methodology (refer **Section 3.4.3**). Threatened flora species searches were undertaken in accordance with the *Flora Survey Guidelines – Protected Plants* (DES, 2020), which included timed meander surveys.

Vegetation Community Descriptions

In order to describe vegetation communities within the project area, Quaternary site survey data were taken at representative locations in accordance with the methodology described in Neldner *et al.* (2019). Quaternary surveys measured the height, canopy cover and dominant species present in each stratum of a vegetation community and informed the applicable remnant status and RE type. Rapid data collection (usually entailing a record of dominant canopy and sub-canopy elements) was also completed during site traverses.

The locations of all quaternary survey sites are shown on **Figure 3.6**, and descriptions of the vegetation communities and representative photographs for each quaternary site are provided in **Appendix 5**. Survey sites were chosen on the basis of their representation of each type and condition of vegetation community present across the project area.

A total of 34 hours have been expended to assess vegetation condition/composition and search for threatened flora species throughout the project area (refer **Table 3.3**).

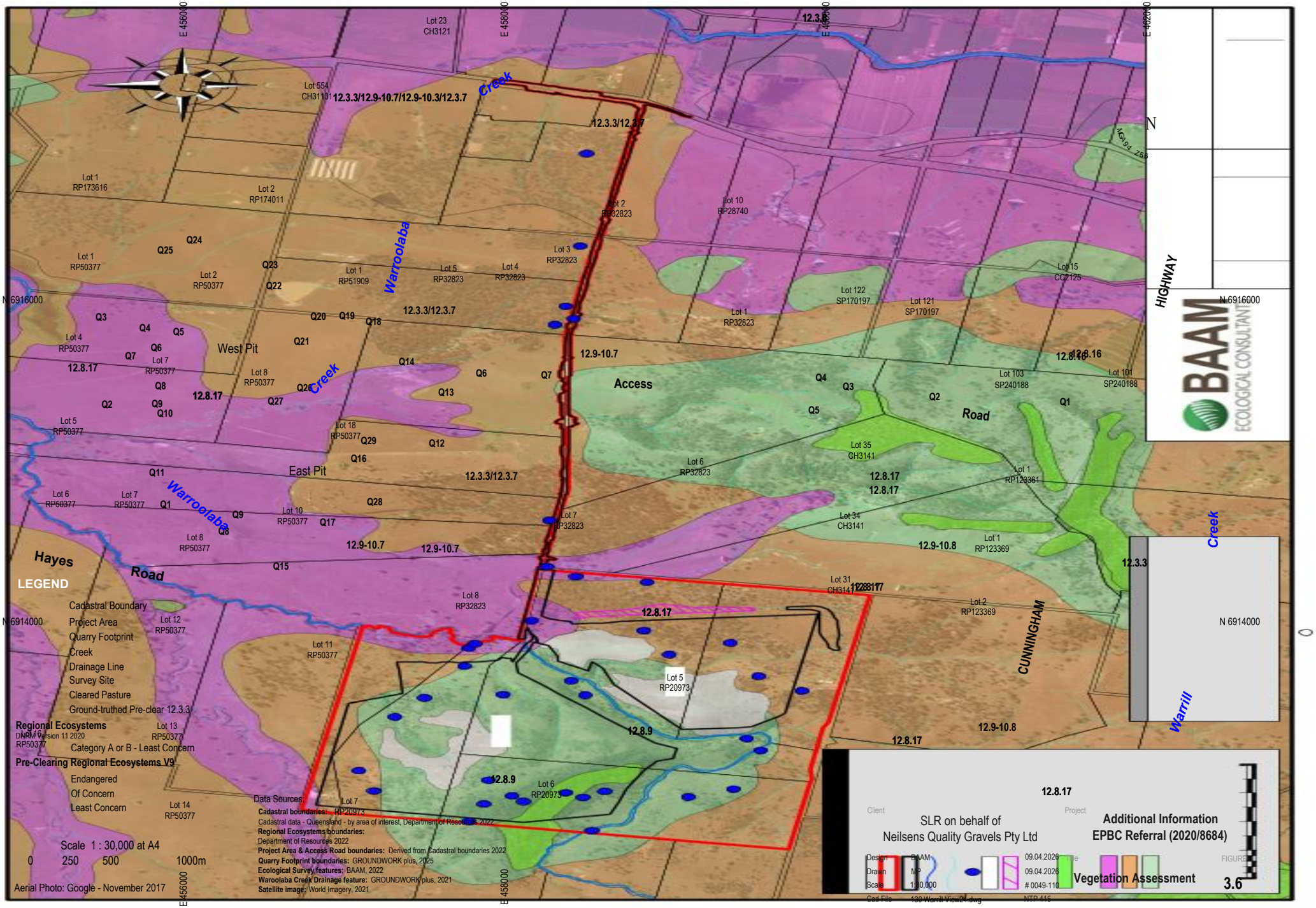
3.4.3 Biocondition Assessments

In order to quantify the relative condition of project area vegetation and associated habitats, BioCondition surveys were undertaken in accordance with Eyre *et al.* (2015) - *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual. Version 2.2*.

As per the prescribed methodology, the project area was divided into Assessment Units (AUs), these being areas of relatively homogenous vegetation defined by a distinct Regional Ecosystem and broad condition state, with sampling sites chosen on the basis of their representation of each AU.

Table 3.3. Survey effort for vegetation and habitat quality assessment

Survey Method	Date/s	Total Survey Effort (hours)
Flora surveys, Vegetation Assessment using Quaternary assessment guidelines and BioCondition Surveys	20/01/2016	5
	24/05/2016	5
	24/11/2017	6
	30-31/3/2021	18
	Total	**34**



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Table 3.4 summarises the AUs assigned over the project area, the areas of each AU, the BioCondition (BC) transects sampled within each AU, and the average BioCondition score for each AU. The location of each AU and associated BC site is shown in **Figure 3.7**[2]. Data collected at each BC site is provided in **Appendix 6**, while **Tables 3.5-3.8** provide the results for each BioCondition attribute at each site, and associated scores against the relevant RE benchmarks.

The results indicate vegetation across the site varies from moderate-good condition in areas comprising remnant and regrowth vegetation (6-8 out of 10), to poor in areas comprising cleared pasture (2-3 out of 10). BioCondition site data was also used to determine overall habitat quality scores for relevant MNES, as outlined in **Section 4.4**.

3.4.4 Fauna Survey

BAAM Wildlife Specialist Adrian Caneris or BAAM Senior Ecologist (Fauna) Dr Jo Chambers accompanied BAAM Senior Ecologist (flora) Shelley Trevaskis during the 2016, 2017, 2021 surveys, and Project Ecologist Lizzy Buckby accompanied Shelley during the 2020 flora/Koala surveys.

Fauna searches and habitat assessments were conducted at each Quaternary and BioCondition site (given their representation of the various types and condition of vegetation and associated habitat present across the project area), as well as opportunistically whilst traversing between sites.

The ground surface beneath trees was searched for the distinctive scats of Koala, Greater Glider *Petauroides volans*, Spotted-tailed Quoll (SE Mainland) *Dasyurus maculatus maculatus* and Long-nosed Potoroo *Potorous tridactylus tridactylus* (SE Mainland). Notes were kept on availability of food resources and shelter for MNES.

Trees were searched for presence of fauna or breeding places (nests, hollows) and ground surface was searched for breeding/refuge habitat for MNES (hollow logs).

In addition, targeted Koala surveys involving transect and direct searches were conducted by Dr Jo Chambers on 5 and 11 July 2019 and by BAAM Project Ecologist Lizzy Buckby on 4 and 16 December 2020.

Bird surveys involving direct sighting or listening for distinctive calls was continuous throughout all fauna surveys.

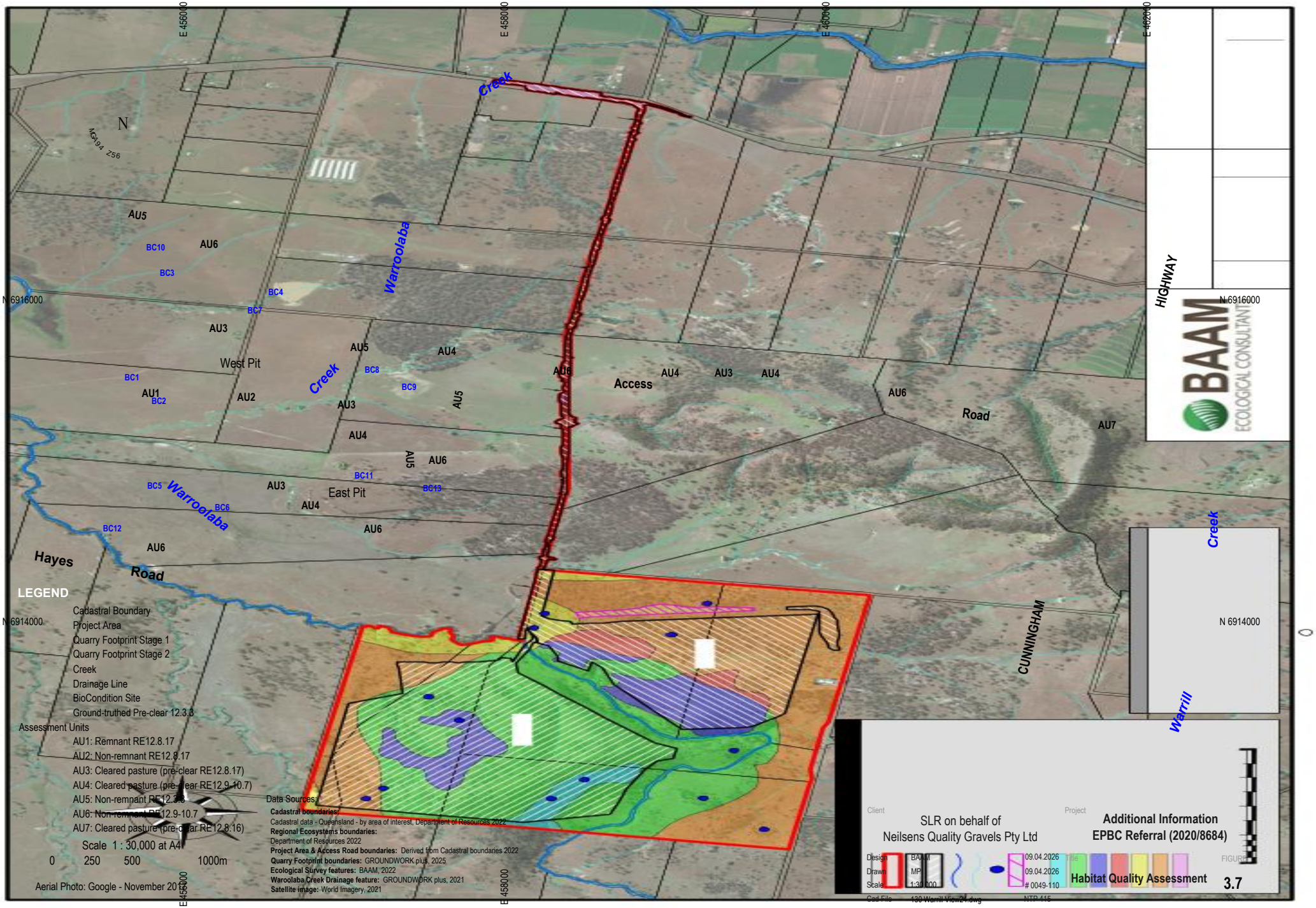
Camera traps were baited with tinned tuna in oil and installed at strategic locations (e.g. near watercourses) (refer **Figure 3.6**) throughout the site on 4 December 2020 and retrieved on 18 December 2020. Fauna recorded at each camera trap are shown in **Appendix 7**.

Spotlighting was not undertaken due to personal safety risks during nocturnal activities; the project area presents numerous trip/fall hazards due to steep slopes, while vehicle access throughout the project area is limited.

Overall, a total of 62 person hours and 330 camera trap hours have been undertaken for the targeted fauna surveys. **Table 3.9** provides dates and times relating to the multiple surveys that have been undertaken.

Table 3.10 summarises the suitability of the surveys for the target species against recognised survey guidelines, other than for species known (i.e. Koala) or assumed to occur (i.e. Grey-headed Flying-fox and White-throated Needletail).

[2] Stages 1 and 2 identified on **Figure 3.7** and referenced in **Table 3.6** relate to the proposed staging of offsets, as discussed in **Section 4.0**.



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Table 3.4. Assessment Units and BioCondition Sites assigned over the project area

Assessment Unit	Pre-clear RE and current state	Area (ha)						BC sites established and location (impact or retained)	Average BC Score (out of 10)
		Quarry (Stage 1)	Road (Stage 1)	Total Impact (Stage 1)	Total Impact (Stage 2)	Total Impact	Total Retained		
AU1a[3]	Remnant RE12.8.17 (with canopy dieback)	0	0	0	4.58	4.58	1.71	BC1 - impact	**3.31**
AU1b[3]	Remnant RE12.8.17 (without canopy dieback)	0	0	0	4.58	4.58		BC2 - impact	**7.63**
AU2	Non-remnant RE12.8.17 (with regrowth/scattered trees)	5.93	0	5.93	107.66	113.59	67.44	BC3 - impact BC4 - impact BC5 - retained BC6 – retained	**6.13**
AU3	Cleared pasture (pre-clear RE12.8.17)	32.93	0.76	24.69	16.81	41.50	3.23	BC7 was the only transect assessed for the 'cleared pasture' condition state. This result was extrapolated for all other 'cleared pasture' AUs on site (i.e. AU4 and AU7)	**2.13**
AU4	Cleared pasture (pre-clear RE12.9-10.7)	10.11	2.59	12.71	0	12.71	0	BC7 (refer above)	**2.44**
AU5	Non-remnant RE12.3.3 (with regrowth/scattered trees)	5.50	0.40	5.91	0.40	6.30	20.05	BC8 - impact BC9 - retained	**6.47**
AU6	Non-remnant RE12.9-10.7 (with regrowth/scattered trees)	46.11	4.43	50.54	20.41	70.95	105.20	BC10 - impact BC11 - impact BC12 - retained BC13 – retained	**6.72**
AU7	Cleared pasture (pre-clear RE12.8.16)	0	5.48	5.48	0	5.48	0	AU7 is too narrow to accommodate a BC plot; therefore, the BC7 site attribute results were applied.	**2.56**

[3] AU1a and AU1b were originally combined as AU1, but were subsequently split into separate AUs due to the presence of canopy dieback in AU1a, which affected the BioCondition score.

Table 3.5. BioCondition Results – AUs 1a, 1b, 3, 4 and 7

Attribute	Benchmark	AU 1a – Remnant RE 12.8.17 (with canopy dieback)			AU 1b – Remnant RE 12.8.17 (without canopy dieback)			AU 3 – Cleared Pasture (pre-clear RE 12.8.17)			Benchmark	AU 4 – Cleared Pasture (pre-clear RE 12.9-10.7)			Benchmark	AU 7 – Cleared Pasture (pre-clear RE 12.8.16)		
		BC01			BC02			BC07				BC07				BC07		
	12.8.17	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	12.9-10.7	Raw Data	% Benchmark	Score	12.8.16	Raw Data	% Benchmark	Score
Recruitment of woody perennial species in EDL	100	50	50	3	100	100	5	0	0	0	100	0	0	0	100	0	0	0
Native plant species richness - trees	7	5	71	2.5	9	129	5	0	0	0	3	0	0	0	7	0	0	0
Native plant species richness - shrubs	5	3	60	2.5	6	120	5	1	20	0	5	1	20	0	7	1	14	0
Native plant species richness - grasses	12	6	50	2.5	6	50	2.5	2	17	0	8	2	25	2.5	7	2	29	2.5
Native plant species richness - forbs	27	10	37	2.5	16	59	2.5	10	37	2.5	26	10	38	2.5	29	10	34	2.5
Tree canopy height (average of canopy, sub-canopy)	15	9	57	3	15	103	5	3	30	1.5	16	3	30	1.5	14	3	38	2.5
Tree canopy cover (average of canopy, sub-canopy)	34	20	94	2.5	31	102	5	0	0	0	24	0	0	0	29	0	0	0
Shrub canopy cover	5	0	0	0	2	40	3	1	20	3	3	1	33	3	4	1	25	3
Native grass cover	32	26	81	3	30	94	5	76	238	5	61	76	125	5	45	76	169	5
Organic litter	21	0	0	0	0	0	0	0	0	0	20	0	0	0	21	0	0	0
Number of large trees (ha)	24	0	0	0	30	125	15	0	0	0	18	0	0	0	33	0	0	0
Coarse woody debris (m/ha)	234	442	189	5	271	116	5	0	0	0	272	0	0	0	592	0	0	0
Non-native plant cover	0	80		0	30		3	10		5	0	10		5	0	10		5
BioCondition Score				26.5			61			17				19.5				20.5
MAX BioCondition Score				*80*			*80*			*80*				*80*				*80*
BioCondition Score - out of 10				**3.31**			**7.63**			**2.13**				**2.44**				**2.56**

Table 3.6. BioCondition Results – AU2

Attribute	AU2 – Non-remnant RE 12.8.17 (with regrowth/scattered trees)														
	Benchmark	BC03			BC04			BC05			BC06			Average % benchmark	**Average Score**
	12.8.17	Raw Data	% Benchmar	**Score**	Raw Data	% Benchmar	**Score**	Raw Data	% Benchmar	**Score**	Raw Data	% Benchmar	**Score**		
Recruitment of woody perennial species in EDL	100	100	100	5	75	75	5	50	50	3	100	100	5	81	4.5
Native plant species richness - trees	7	7	100	5	4	57	2.5	2	29	2.5	4	57	2.5	61	3.125
Native plant species richness - shrubs	5	5	100	5	3	60	2.5	2	40	2.5	4	80	2.5	70	3.125
Native plant species richness - grasses	12	7	58	2.5	8	67	2.5	4	33	2.5	4	33	2.5	48	2.5
Native plant species richness - forbs	27	13	48	2.5	20	74	2.5	17	63	2.5	9	33	2.5	55	2.5
Tree canopy height (average of canopy, sub-canopy)	15	13	90	5	13	90	5	12	79	5	8	49	3	77	4.5
Tree canopy cover (average of canopy, sub-canopy)	34	29	81	5	27	101	3	14	47	4	12	25	1	51	3
Shrub canopy cover	5	4	80	5	6	120	5	0	0	0	0	0	0	50	2.5
Native grass cover	32	92	288	5	33	103	5	90	281	5	50	156	5	207	5
Organic litter	21	0	0	0	34	162	5	0	0	0	0	0	0	40	1.25
Number of large trees (ha)	24	4	17	5	4	17	5	6	25	5	10	42	5	25	5
Coarse woody debris (m/ha)	234	265	113	5	174	74	5	270	115	5	182	78	5	95	5
Non-native plant cover	0	5		5	0		10	1		10	30		3	0	7
BioCondition Score															49
MAX BioCondition Score															*80*
BioCondition Score - out of 10															**6.13**

Table 3.7. BioCondition Results – AU 5

Attribute	AU5 – Non-remnant RE 12.3.3 (with regrowth/scattered trees)								
	Benchmark	BC08			BC09			Average % benchmark	**Average Score**
	12.3.3	Raw Data	% Benchmark	**Score**	Raw Data	% Benchmark	**Score**		
Recruitment of woody perennial species in EDL	100	100	100	5	100	100	5	100	5
Native plant species richness - trees	5	2	40	2.5	2	40	2.5	40	2.5
Native plant species richness - shrubs	5	4	80	2.5	3	60	2.5	70	2.5
Native plant species richness - grasses	9	7	78	2.5	8	89	2.5	83	2.5
Native plant species richness - forbs	25	13	52	2.5	8	32	2.5	42	2.5
Tree canopy height (average of canopy, sub-canopy)	17	16	94	5	17	105	5	100	5
Tree canopy cover (average of canopy, sub-canopy)	24	22	105	5	34	330	2.5	218	3.75
Shrub canopy cover	4	0	0	0	0	0	0	0	0
Native grass cover	52	53	102	5	19	37	1	69	3
Organic litter	20	21	105	5	33	165	5	135	5
Number of large trees (ha)	14	20	143	15	4	29	5	86	10
Coarse woody debris (m/ha)	588	521	89	5	551	94	5	91	5
Non-native plant cover	0	5		5	5		5	0	5
BioCondition Score									51.75
MAX BioCondition Score									*80*
BioCondition Score - out of 10									**6.47**

Table 3.8. BioCondition Results – AU6

Attribute	AU6 – Non-remnant RE 12.9-10.7 (with regrowth/scattered trees)														
	Benchmark	BC10			BC11			BC12			BC13			Average % benchmark	**Average Score**
	12.9-10.7	Raw Data	% Benchmark	**Score**	Raw Data	% Benchmark	**Score**	Raw Data	% Benchmark	**Score**	Raw Data	% Benchmark	**Score**		
Recruitment of woody perennial species in EDL	100	100	100	5	100	100	5	67	67	3	100	100	5	92	4.5
Native plant species richness - trees	3	6	200	5	2	67	2.5	3	100	5	3	100	5	117	4.375
Native plant species richness - shrubs	5	5	100	5	7	140	5	3	60	2.5	2	40	2.5	85	3.75
Native plant species richness - grasses	8	6	75	2.5	10	125	5	8	100	5	8	100	5	100	4.375
Native plant species richness - forbs	26	18	69	2.5	5	19	0	11	42	2.5	12	46	2.5	44	1.875
Tree canopy height (average of canopy, sub-canopy)	16	16	103	5	13	80	5	8	49	3	13	83	5	79	4.5
Tree canopy cover (average of canopy, sub-canopy)	24	21	186	3	28	84	4	23	68	4	17	83	5	105	3.625
Shrub canopy cover	3	0	0	0	0	0	0	1.5	50	5	1	33	3	21	2
Native grass cover	61	70	115	5	60	98	5	55	90	5	22	36	1	85	4
Organic litter	20	8	40	3	10	50	5	16	80	5	18	90	5	65	4.5
Number of large trees (ha)	18	8	44	5	8	44	5	14	78	10	2	11	5	44	6.25
Coarse woody debris (m/ha)	272	241	89	5	248	91	5	249	92	5	164	60	5	83	5
Non-native plant cover	0	0		10	5		5	10		5	<5		0	0	5
BioCondition Score															53.75
MAX BioCondition Score															*80*
BioCondition Score - out of 10															**6.72**

Table 3.9. Fauna and Fauna Habitat Assessment Survey Effort.

Survey Method	Date/s	Hours	Total Survey Effort (hours)
Targeted Fauna Surveys included active searching trees for fauna and breeding habitat (nests, hollows), searching ground for scats, transect surveys for Koala evidence, continuous listening for bird calls.	20/01/2016	5	5
	24/05/2016	5	5
	24/11/2017	6	6
	11/07/2019	6/person	12
	4/12/2020	8/person	16
	30-31/3/2021	18	18
Total fauna survey effort			**62**
Camera Trapping	4-18/12/2020		**330**

Table 3.10. Suitability of Fauna Survey Approach for Target Species

Species	Relevant Survey Guideline and Recommended Survey Technique(s), Effort and Timing	Appraisal of Current Survey Approach
Spotted-tail Quoll	From Commonwealth of Australia (2011): Daytime searches for potentially suitable habitat resources, such as areas associated with a gully or a ridge and potential den sites (caves, hollow logs or even dense understorey vegetation such as Lantana species that provides suitable cover), and signs of activity, scats and latrines. Recent surveys have found remote cameras to be the most cost-effective technique and allow concurrent data to be collected on other carnivores, particularly cats and foxes. Timing: during the breeding season, with peak activity occurring between May and August. Surveys conducted during April to August may detect males in areas where they may not usually occur, either as they move in search of females to mate with or move away from other more competitive males. The locations of these records may indicate important supplementary habitats such as corridors within fragmented landscapes. Effort guide: (general camera trapping guidelines): 10 cameras per hectare should be deployed for at least 14 nights.	Daytime searches for potentially suitable habitat resources, scats, latrine sites and potential denning sites were undertaken continuously whilst conducting vegetation assessments and targeted fauna surveys. Seven wildlife detection cameras were installed within the most suitable habitat for Spotted-tail Quoll within the project area (i.e. riparian and floodplain areas) and left for fourteen nights. The relevant survey guidelines state sampling units of 5 hectares are not appropriate for this wide ranging species; sampling units of 100 hectares are more appropriate. Due to the paucity of denning sites, the lack of scats or latrine sites observed, the presence of known threats (dogs/foxes) and large areas of totally cleared lands within the project area, together with the low probability that Spotted-tailed Quoll would be present, it was considered installing 10 cameras per hectare (.e. 25 cameras) was not warranted. Instead, seven cameras were installed in locations considered to provide the most likely habitat values for this species. It is considered these strategically placed cameras provided sufficient coverage to detect Quoll, if present.
Regent Honeyeater	From Commonwealth of Australia (2010): Area searches in suitable habitat, preferably in the morning but other times may also be appropriate. Detection by call is possible when birds are most vocal (outside the breeding season). Otherwise, detection is by sighting. Targeted searches of woodland patches with heavily flowering trees is useful, especially around waterpoints such as dams and creeklines. Also check among flocks of other blossom nomads such as lorikeets and other honeyeaters. Timing: autumn to late winter Effort guide: 20 hours over 5-10 days.	Bird surveys involving direct sighting or listening for distinctive calls (including for non-target bird species present that share similar foraging preferences) was continuous throughout all fauna surveys, including 29 hours over four days in autumn to late winter. This survey effort is considered adequate, given the lack of recent records in the local area, and the very low probability the species would occur.
Swift Parrot	From Commonwealth of Australia (2010): Area searches or transect surveys of suitable habitat, preferably in the early morning and afternoon when birds are most active and vocal. Detection by sighting or call. Slow-moving vehicle transects also effective in expansive areas,	Bird surveys involving direct sighting or listening for distinctive calls (including for non-target bird species present that share similar foraging preferences) was continuous throughout all fauna surveys, including 29 hours over four days between March and July.

Species	Relevant Survey Guideline and Recommended Survey Technique(s), Effort and Timing	Appraisal of Current Survey Approach
	detecting loud, distinctive 'clinking' call that can be heard over noise of engine. Targeted surveys of patches of heavily flowering eucalypts may be useful. Timing: surveys on the mainland should be conducted between March and July. Effort guide: 20 hours over 8 days.	This survey effort is considered adequate, given the lack of recent records in the local area, and the very low probability the species would occur.
Greater Glider	From DSE (2011): Greater Gliders are readily identifiable by experienced observers, by direct observation using spotlighting surveys. A standardised approach is recommended whereby observers conduct spotlight transects on foot covering a total distance of 1 km. Transects should be positioned in a way that maximizes coverage of the study site. Depending on the dimensions of the study site, it may be more suitable to change the configuration of the transect to enable more complete coverage the target area, for example several (independently located) 200 m transects rather than a single 1 km transect. Transects located off roads or tracks require approximately 10 mins per 100 m length of transect to accommodate navigation through rough terrain. Observers should thoroughly search each tree. Spotlight transects should be conducted well after dark, as Greater Gliders may not emerge from their hollows as early as some other species. Generally the transects should be conducted in the first half of the night as little is known about when they return to their hollows before dawn. Timing: optimal conditions are warm temperatures with no rain, fog or bright moonlight Effort guide: Where Greater Glider surveys are conducted under optimal conditions, a minimum of 2 repeat visits is recommended for a 40 min / 2 ha transect. In areas containing lower quality habitat and/or under colder temperatures, five or more repeat visits of the 40 min / 2 ha transect are needed to provide an equivalent probability of detection of Greater Gliders.	Targeted nocturnal surveys for this species were not undertaken due to personal safety risks during nocturnal activities; the project area presents numerous trip/fall hazards due to steep slopes, while vehicle access throughout the project area is limited. The ground surface beneath trees was searched for the distinctive scats of Greater Glider, and trees were searched for presence of fauna or breeding places (nests, hollows). While potentially suitable habitat for this species occurs within the project area, this species has not been recorded in the local landscape for over 40 years. Ongoing habitat clearing and fragmentation for rural land uses prior to and during this time has effectively prevented the species from accessing and persisting in the local landscape. Based on the lack of recent records in the local area, and the lack of adequate habitat connectivity across the local landscape that would effectively prevent re-establishment of the project area, the project area is not considered to represent habitat critical for the survival of the species, nor is it considered to be critical to the recovery of the species.

3.4.5 Survey Limitations

The main limitation of the surveys was the lack of safe access across much of the project area for vehicles or for nocturnal surveys on foot, due to steep and rough terrain. This was overcome through the use of representative sampling in more accessible areas, as well as survey techniques and likelihood of occurrence assessments that are less reliant on comprehensive survey access (e.g. habitat suitability assessment, analysis of local records, camera trapping).

4.0 QUANTIFICATION OF IMPACTS

4.1 DESCRIPTION OF LAND USES POST DEVELOPMENT

The proposed action forms part of a very long-term extractive industry project, which is predicted to have a life-span of at least 100 years.

In Queensland, land use planning is currently assessed under the provisions of the *Planning Act 2016*, and the relevant local government Planning Scheme. Under the *Scenic Rim Planning Scheme 2020*, the land is identified in the *rural zone*. The site and surround land have a long history of rural land use, primarily for cattle grazing, poultry farming and cropping, which remains the dominant land use in the locality.

The nominated post-quarrying land use for the disturbance areas will align with the definition of rural uses and activities, as permitted under the Rural Zone Code (section 6.2.17 of the Scenic Rim Planning Scheme 2020). Rural uses and activities which do not require further approval from the local authority, include:

- Aquaculture (minor)
- Animal husbandry
- Animal keeping
- Cropping
- Intensive animal industry
- Intensive horticulture
- Permanent plantation
- Roadside stall
- Rural industry (less than 200sqm GFA)
- Wholesale nursery (less than 5000sqm development footprint)

Retention of the exclusion/management zones described in **Section 5.4** will maintain an ecological corridor around the perimeter of the disturbance area, supporting fauna movement and maintaining landscape connectivity. The continued presence of this corridor will also assist in directing fauna toward designated crossing points and retained habitat areas.

Retention of site fencing will also contribute to long-term site safety following quarry operations by reducing the potential for accidental entry into areas comprising with steep slopes, benches, and other quarry landforms.

As part of the State Government's EA requirements for the operation, a rehabilitation strategy is required to be outlined and documented as part of the operation (condition L1). Section 4.7 of the site EMP (**Appendix 8**) includes a Land Management Plan that outlines the requirements and measures to be adopted to assist with site rehabilitation and protection of non-operational areas. The EMP is not a static document and is required to be regularly reviewed and updated, to ensure it reflects the progress of the operations and best practice management measures, as required. The EMP will also be updated to include any conditional requirements associated with this action.

The identified rehabilitation outcomes for the disturbed areas, approved under the EA and Planning Permit, currently align with the land use intent of the rural zone, requiring the land to be safe, stable and self-sustaining at cessation of the use. The land is freehold, and presently owned by the proponent. The proponent, or future party, will be required to uphold any conditions within the EA, Planning permit and EPBC Decision during operation and to demonstrate that the activity has ceased (i.e., transfer of obligations to continue under EA and EPBC Decision).

In terms of decommissioning, the EA cannot be surrendered until the regulatory agency has suitable evidence to confirm the rehabilitation obligations have been achieved, including demonstrating that there are no ongoing land management or mitigation obligations for the proponent, or landowner, beyond those relevant for the post quarrying land use (Rural activities). Once the use has ceased, all plant and equipment/infrastructure relating to the quarry activities will be removed, other than standard site utility connections. Ongoing management of the site will then become the responsibility of the landowner, as is standard practice for freehold land.

Once constructed, the unnamed road reserve and intersection at the Cunningham Highway becomes a Council asset, including fencing, culverts and signage. This infrastructure will remain irrespective of the ongoing operation of the quarry.

4.2 IDENTIFY DEVELOPMENT FOOTPRINT AND RETAINED HABITAT

Figure 4.1 shows the development footprint and retained habitat within the project area. For the purposes of enabling proposed offset to be delivered in two stages, two corresponding impact stages have been identified, as follows:

Stage 1: Clearing for the development of the access road, the East Pit and associated ancillary operations area, and a creek diversion around the south-eastern corner of the East Pit. As discussed in **Section 2.2**, this is due to commence in mid-2026 (site connection works), with extraction commencing in 2028 and progressive extraction and rehabilitation activities occurring over a period of 50-100 years.

Stage 2: Construction of the bridge over Warroolaba Creek, and clearing for the development of the West Pit and associated ancillary operations area. As discussed in **Section 2.2**, this will commence around year 40-50, with progressive extraction and rehabilitation activities occurring over a period of 50-100 years.

Proposed management/use of the retained areas is discussed in **Section 5.0**.

4.3 AREA OF HABITAT IMPACTED

Of the total land area (457 ha), the proposed project footprint covers 259.7 ha, including 105.3 ha associated with Stage 1 and 154.4 ha associated with Stage 2; however, not all of the footprint area supports habitats for all relevant MNES (refer **Section 4.4**).

The proposed action includes a 50 m wide buffer to adjacent properties to the north and west, and management actions are proposed to ensure the proposed action does not significantly impact retained habitats within the project area (refer **Section 5.0**).

4.4 QUANTITY AND QUALITY OF SUITABLE HABITAT WITHIN PROPOSED ACTION AREA

4.4.1 Quantity of Suitable Habitat for Relevant MNES

The entire impact area (259.7 ha, including 105.3 ha for Stage 1 and 154.4 ha for Stage 2) represents potential foraging and/or dispersal habitat for Koala (refer **Figure 3.3**), while 200 ha of the impact area (including 62.4 ha for Stage 1 and 137.6 ha for Stage 2) represents potential foraging habitat for Grey-headed Flying-fox (i.e. excluding areas of cleared pasture) (refer **Figure 3.4**).

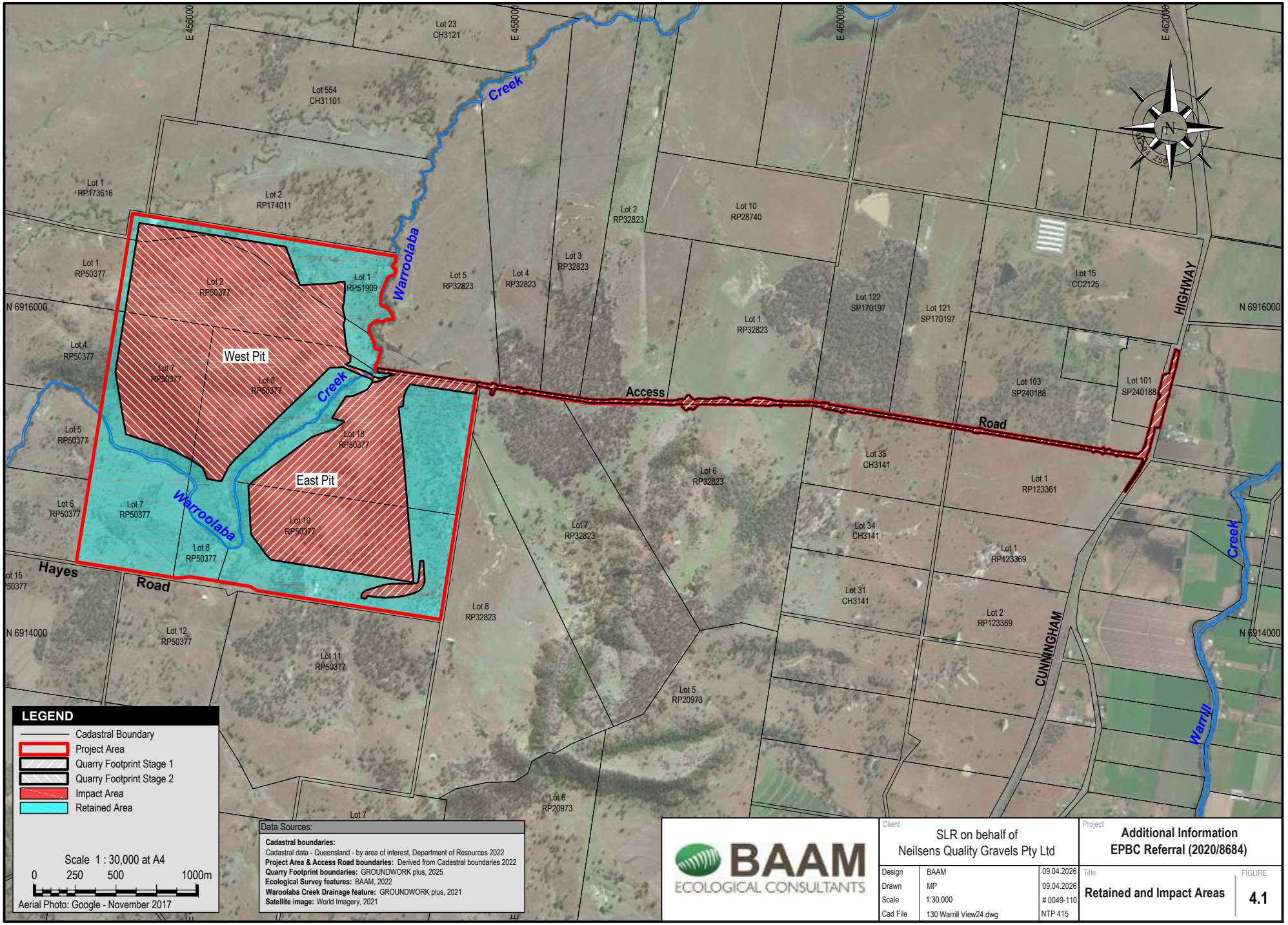
4.4.2 Quality of Suitable Habitat for Relevant MNES

The method used to quantify habitat quality is a Modified Habitat Quality Assessment (MHQA) method, recognised by DCCEEW as a best-practice approach to derive habitat quality scores for input to the EPBC Offset Assessment Guide (offset calculator). The offset calculator is a component of the EPBC Environmental Offset Policy that is applied to environmental assessments under parts 7 – 9 of the EPBC Act. The MHQA method is accompanied by an Excel spreadsheet for entering measured attribute data, benchmark values and recording each attribute score.

DCCEEW's How to use the Offsets Assessment Guide[4] provides overarching guidance on the development and application of Habitat Quality Scoring methods. These methods are intended to generate a habitat quality score that represents key habitat values provided by a site (Site Condition) and values of its surrounding landscape (Site Context). When applied to threatened species, habitat quality scores also quantify the value of both the site and the species population (Species Stocking Rate). More specifically:

Site condition is the condition of a site in relation to the ecological requirements of a threatened species or ecological community. This includes vegetation condition, structure and diversity, and the number of relevant habitat features.

[4] DCCEEW. 2020. How to use the Offsets assessment guide (dcceew.gov.au)



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Site context is the relative importance of a site in terms of its position in the landscape, taking into account the connectivity needs of a threatened species or ecological community. This includes considerations such as movement patterns of the species, the proximity of the site in relation to other areas of suitable habitat, and the role of the site in relation to the overall population or extent of a species or community.

Species stocking rate is the usage and/or density of a species at a particular site. The principle acknowledges that a particular site may have a high value for a particular threatened species, despite appearing to have poor condition and/or context. It includes considerations such as survey data for a site in regard to a particular species population. It also includes consideration of the role of the site population in regard to the overall species population viability or community extent.

The term 'modified' arises from the MHQA's origin in the Queensland State government offset policy framework, and further modification by DCCEEW to meet the requirements of the EPBC Environmental Offset Policy. Given this origin, the MHQA draws heavily from the Queensland Guide to Determining Terrestrial Habitat Quality Version 1.2 (State of Queensland 2017) and Regional Ecosystem descriptions and benchmark values associated with *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual. Version 2.2* (Eyre et al. 2015).

Consistent with the Queensland State government offset policy framework, the EPBC Environmental Offset Policy also applies habitat quality scores that:

- represent the quality of a defined area of threatened species habitat using indicators that measure and combine relevant habitat attributes which influence the viability of the species.
- Are rounded to the nearest whole number (scores between 0 to 10).

Under the EPBC Environmental Offset Policy framework, habitat quality scores at both impact and land-based offset site(s) are applied in the offset calculation, using habitat quality score values which represent:

- the quality of the impact site – representing the impact site habitat quality score at the time of the EPBC Assessment.
- the start quality of the offset site – representing the offset site habitat quality score at the time of the EPBC Assessment (or commencement date in the case of Advanced Offsets)
- projected future quality (without offset) at the offset site – representing the continuation of current land management practices (e.g., the status quo) at time until ecological benefit (generally, a maximum of 20 years or less).
- projected future quality (with offset) at the offset site – representing the habitat quality score associated with the management of the offset site and resulting conservation benefits at the time until ecological benefit (generally, a maximum of 20 years)

To maximise alignment between Commonwealth and State government habitat quality score methods, the MHQA modifies the weighting of individual attribute scores and each components contribution to the final HQS. The MHQA adopts default weightings for the MHQA, which are Site Condition (30%) + Site Context (30%) + SSR (40%).

The scoring methods for individual attributes of each component are described in the following sections.

Site Condition

For both species, all 13 x BioCondition attributes and corresponding assessment methods, scoring matrices and associated biodiversity and spatial information are applied to derive a BioCondition score at each sampling site in accordance with Eyre et al. (2015), using the most recent Queensland Herbarium Biocondition Benchmarks (Version 3.6, released in 2025). The assessment units (AUs) determined in accordance with Eyre et al. (2015), and the associated sampling sites established in each AU, were summarised in **Table 3.4** and shown on **Figure 3.7** in **Section 3.4.4**. Results of the BioCondition transects are provided in **Tables 3.5-3.8** in **Section 3.4.4**.

Scores for Quality and Availability of Food and Foraging habitat and Quality and Availability of Shelter were then applied, as described below.

All Site Condition scores were derived from the data collected at each Biocondition site.

Koala Site Condition: Quality and availability of Koala food and foraging habitat

Scoring shown in **Table 4.1** takes into account the following information:

- Existing/pre-clear REs that are ranked as either ' 'High', 'Medium' or 'Low' suitability in the report *Spatial modelling for koalas in South East Queensland V4.0* (State of Queensland 2023a);
- Koalas' preference for trees in the larger size classes of 25-30 cm diameter-at-breast-height (dbh) and above (Phillips and Wallis 2016). While Koalas are known to feed on trees of all sizes that can support their weight (Youngentob *et al.* 2021), they generally prefer trees in the larger size classes of 25-30 cm diameter-at-breast-height (dbh) and above (Phillips and Wallis 2016).
- Presence of high canopy cover as yielding more forage resources.

Table 4.1. Scoring for quality and availability of Koala food and foraging habitat

Score	Description
10 (high)	Biocondition sites with existing/pre-clear RE ranked as "High", and >50% of the RE benchmark for attribute 'number of large trees' and/or 'canopy cover'
5 (moderate)	Biocondition sites with existing/pre-clear RE is ranked as "High", and 25-50% of the RE benchmark for attribute 'number of large trees' and/or 'canopy cover'
	Biocondition sites with existing/pre-clear RE is ranked as "Medium", and >50% of the RE benchmark for attribute 'number of large trees' and/or 'canopy cover'
1 (low)	Biocondition sites with existing/pre-clear RE is ranked as "High", and <25% of the RE benchmark for attribute 'number of large trees' and/or 'canopy cover'
	Biocondition sites with existing/pre-clear RE is ranked as "Medium", and <50% of the RE benchmark for attribute 'number of large trees' and/or 'canopy cover'
	Biocondition sites with existing/pre-clear RE is ranked as "Low"

Grey-headed Flying-fox Site Condition: Quality and availability of Grey-headed Flying-fox food and foraging habitat

Scoring shown in **Table 4.2** takes into account the following information:

- Important winter food trees Grey-headed Flying-fox listed in the *National Recovery Plan for the Grey-headed Flying-fox 'Pteropus poliocephalus'* (DAWE 2021). Coastal lowlands in northern New South Wales and southern Queensland provide relatively reliable winter flowering forage, with important winter and spring habitats including vegetation communities that contain *Eucalyptus tereticornis, E. albens, E. crebra, E. fibrosa, E. melliodora, E. paniculata, E. pilularis, E. robusta, E. siderophloia, Banksia integrifolia, Castanospermum australe, Corymbia citriodora citriodora, C. eximia, C. maculata, Grevillea robusta* or *Melaleuca quinquenervia*.
- Whether or not the above species are dominant canopy species (i.e. comprise ≥ 50% of the canopy at each Biocondition site).
- Presence of larger/taller trees and high canopy cover as yielding more forage resources.

Table 4.2. Scoring for quality and availability of Grey-headed Flying-fox food and foraging habitat

Score	Description
10	Biocondition sites containing important winter food trees as dominant canopy species, and >75% of the RE benchmark for at least two of 'number of large trees', 'canopy cover' and 'canopy height'
5	Biocondition sites containing important winter food trees as dominant canopy species, and >50% of the RE benchmark for at least two of 'number of large trees', 'canopy cover' and 'canopy height' (but not >75%)
1	Biocondition sites not meeting the above criteria

Koala Site Condition: Quality and availability of Koala shelter

Larger, tall trees and high canopy cover in ecosystems supporting known Koala food species are important factors for measuring the quality of shelter for Koalas while resting, feeding and dispersing. Briscoe *et al.* (2014) found that large trees may be important in some landscapes for thermoregulation due to their effects on local microclimates, greater canopy cover and larger thermal mass (cited in Youngentob *et al.* 2021), and studies have indicated that smaller trees are often preferred for feeding at night and larger trees for resting during the day (Youngentob *et al.* 2021). A recent remote sensing study in south-east Queensland also found that Koalas prefer areas of higher tree canopy height within their home ranges (Mitchell *et al.* 2023).

Scoring for 'high', 'medium' and 'low' quality and availability of shelter is shown in **Table 4.3** and relies on combinations of ecosystem measurements providing scaled levels of two or more attributes that are important for quality and availability of shelter.

Table 4.3. Scoring for Quality and Availability of Shelter for Koalas

Score	Description
10	Biocondition sites with >25% of the RE benchmark for attributes 'number of large trees', 'canopy cover' and 'canopy height', and >75% of the RE benchmark for at least two of these three attributes.
5	Biocondition sites with >25% of the RE benchmark for attributes 'number of large trees', 'canopy cover' and 'canopy height', and >50% of the RE benchmark for at least two of these three attributes (but not >75%)
1	Biocondition sites not meeting the above criteria

Grey-headed Flying-fox Site Condition: Quality and availability of Grey-headed Flying-fox shelter

Scoring shown in **Table 4.4** takes into account the following information:

- Presence of a roost or suitable roosting conditions (i.e. dense vegetation close to water, primarily rainforest patches, stands of melaleuca, mangroves or riparian vegetation).
- Presence of larger/taller trees and high canopy cover as providing more shelter.

Table 4.4. Scoring for Quality and Availability of Shelter for GHFFs

Score	Description
10 (high)	Site contains a roost or suitable roosting conditions = 10.
5 (moderate)	Sites with >25% of the RE benchmark for attributes 'number of large trees', 'canopy cover' and 'canopy height', and >75% of the RE benchmark for at least two of these three attributes = 5.
1 (low)	Sites not meeting the above criteria = 1.

Site Context

Koala Site Context: Patch size, Connectivity, Context and Ecological Corridors

Statutory documentation for Koala indicates local information must be used when determining Koala habitat. For this reason, either Queensland State reporting or scientific publications that describe Koala food and shelter habitat in the south-east Queensland (SEQ) region were used to collate information and classify Koala habitat to apply to Patch Size, Connectivity and Context analyses.

REs were classified as Koala habitat based on the report: *Spatial Modelling for Koalas in South East Queensland V4.0* (State of Queensland 2023a); REs ranked as High, Medium and Low Koala suitability were incorporated as Koala habitat. REs that did not fit these criteria were excluded as Koala habitat. Koala habitat was then classified as either:

- Koala breeding/foraging habitat – remnant and regrowth vegetation with Koala suitable REs, or
- Koala dispersal habitat – non-remnant/cleared vegetation for which the State Government's pre-clear mapping indicates a Koala suitable RE historically occurred (i.e. prior to clearing).

For all classifications, the ground-truthed vegetation mapping was used within the Site, and the Queensland Government's RE mapping outside of the Site.

A "patch" includes all Koala breeding, foraging and dispersal habitat within and directly connected to the AU polygon within which Biocondition sites are located, which is bordered by "breaks", such as major roadways, rail lines and major waterways, and excludes industrial developments and intensive cropping areas. Consequently, it can extend well beyond the AU polygon.

Table 4.5. Scoring of Patch Size for Koala

Description	Score
≥201 ha Koala breeding/foraging/dispersal habitat within and directly connected with the AU polygon	10
101-200 ha Koala breeding/foraging/dispersal habitat within and directly connected with the AU polygon	7
≥25-100 ha Koala breeding/foraging/dispersal habitat within and directly connected with the AU polygon	5
≥5-25 ha Koala breeding/foraging/dispersal habitat within and directly connected with the AU polygon	2
<5 ha Koala breeding/foraging/dispersal habitat within and directly connected with the AU polygon	0

Connectivity is scored using the perimeter of the AU polygon within which each Biocondition site is located.

Table 4.6. Scoring of Connectivity for Koala

Description	Score
The AU polygon is connected with adjacent Koala breeding/foraging habitat along >75% of its perimeter **OR** includes >500 ha Koala breeding/foraging habitat.	5
The AU polygon is connected with adjacent Koala breeding/foraging habitat along 50% to 75% of its perimeter.	4
The AU polygon is connected with adjacent Koala breeding/foraging habitat along >10% to <50% of its perimeter; OR Is connected with adjacent Koala breeding/foraging habitat along <10% of its perimeter AND is connected with adjacent Koala dispersal habitat >25% of its perimeter	2
The AU polygon is not connected using any of the above descriptions.	0

Context for Koala is scored by spatially analysing all land within a 20km radius of each Biocondition site. The use of a 20km radius to inform the scoring of context for Koala is based on previous advice from the Commonwealth Government on how to calculate habitat quality for Koala, taking into account typical home ranges and dispersal ability.

Table 4.7. Scoring of Context for Koala

Description	Score
Land within a 20km radius of the Biocondition site comprises:	
≥76% Koala breeding/foraging/dispersal habitat	5
31-5% Koala breeding/foraging/dispersal habitat	4
10-30% Koala breeding/foraging/dispersal habitat	2
<10% Koala breeding/foraging/dispersal habitat	0

Scores for ecological corridors are based on the proximity of each AU polygon within which each Biocondition site is located to corridors identified as part of the Queensland Government's biodiversity planning assessment for south-east Queensland (https://www.qld.gov.au/environment/plants-animals/biodiversity/southeast-qld), which can be accessed via Queensland Globe (https://qldglobe.information.qld.gov.au/) (refer **Figure 4.2**).

Table 4.8. Ecological Corridors scoring

Score	0	4	6
Description	Not within	Sharing a common boundary	Within (whole or part)

Grey-headed Flying-fox Site Context: Patch size, Connectivity, Context and Ecological Corridors

For the purposes of determining patch size, connectivity and context, "Grey-headed Flying-fox habitat" is defined as remnant or regrowth REs that contain flora species known to be food sources of Grey-headed Flying-fox as per Eby and Law (2008), Eby et al (2019), DAWE (2021), with ground-truthed vegetation mapping was used within the Site, and the Queensland Government's RE mapping outside of the Site.

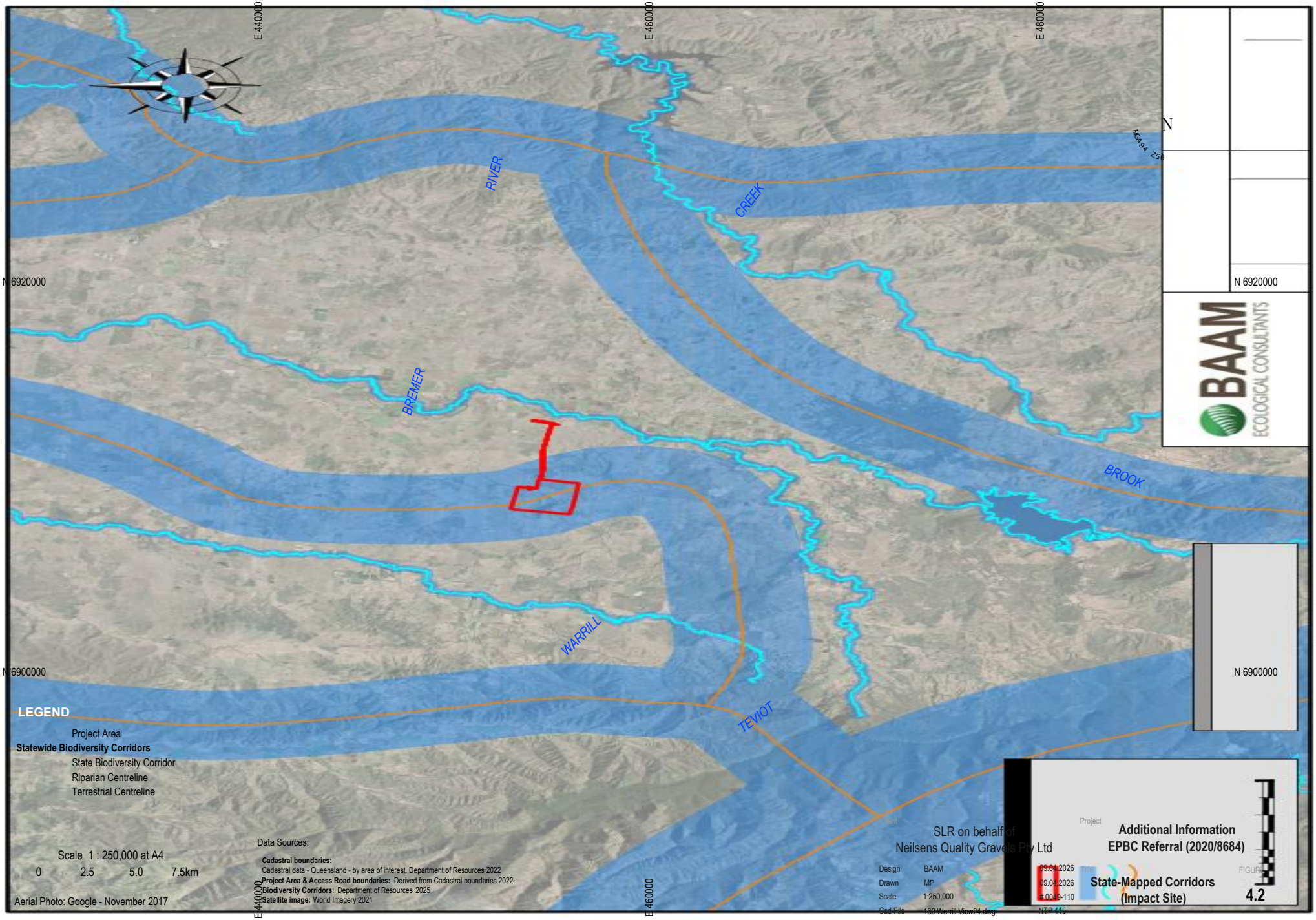
Limiting the definition of Grey-headed Flying-fox breeding/foraging habitat to areas mapped as remnant and regrowth vegetation is considered appropriate for the purposes of this

landscape scale analysis, where the ground-truthing of all Grey-headed Flying-fox habitat within the area subject to analysis (e.g. a 20km radius for measuring context) is not practical. It is reasonable to consider that areas comprising denser, more mature vegetation are of significantly higher value for Grey-headed Flying-fox and more representative of typical habitat for the species, at least for the purposes of a landscape scale analysis.

A "patch" includes all Grey-headed Flying-fox habitat within and directly connected to the AU polygon within which each Biocondition site is located, which is bordered by ground-truthed or State-mapped non-remnant vegetation. Consequently, it can extend well beyond each AU polygon, depending on where ground-truthed or State-mapped non-remnant vegetation occurs. Conversely, AU polygons not comprising Grey-headed Flying-fox habitat are not considered part of a patch, and score 0 for this attribute.

Table 4.9. Scoring of Patch Size for Grey-headed Flying-fox

Description	Score
≥201 ha remnant Grey-headed Flying-fox habitat within and directly connected with the AU polygon	10
101-200 ha remnant Grey-headed Flying-fox habitat within and directly connected with the AU polygon **OR** >200 ha remnant and regrowth Grey-headed Flying-fox habitat within and directly connected with the AU polygon **OR** >200 ha regrowth Grey-headed Flying-fox habitat within and directly connected with the AU polygon	7
26-100 ha remnant Grey-headed Flying-fox habitat within and directly connected with the AU polygon **OR** ≥25 – 200 ha remnant and regrowth Grey-headed Flying-fox habitat within and directly connected with the AU polygon **OR** ≥25 – 200 ha regrowth Grey-headed Flying-fox habitat within and directly connected with the AU polygon	5
5-25 ha remnant **AND/OR** regrowth Grey-headed Flying-fox habitat within and directly connected with the AU polygon	2
<5 ha remnant **AND/OR** regrowth Grey-headed Flying-fox habitat within and directly connected with the AU polygon OR No remnant or regrowth Grey-headed Flying-fox habitat within the AU polygon	0



c Biodiversity Assessment and Management Pty Ltd. While every care is taken to ensure the accuracy of this data, Biodiversity Assessment and Management makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation liability in negligence) for all expenses, losses, damages (including indirect consequential damage) and costs which might be incurred as a result of the data being inaccurate or incomplete in any way and for any reason.

Connectivity was determined on the basis of the number of recognised Grey-headed Flying-fox roost camps (including inactive camps) occurring within a 20km radius, using Grey-headed Flying-fox camp data obtained from the DAWE National Flying-fox monitoring viewer (https://www.environment.gov.au/webgis-framework/apps/ffc-wide/ffc-wide.jsf).

Table 4.10. Scoring of Connectivity for GHFF

Description	Score
>5 GHFF habitat camps (including inactive camps) within a 20km radius	5
3 – 5 GHFF habitat camps (including inactive camps) within a 20km radius	4
1 – 2 GHFF habitat camps (including inactive camps) within a 20km radius	2
No GHFF habitat camps (including inactive camps) within a 20km radius	0

Context for Grey-headed Flying-fox is scored by spatially analysing all land within a 20km radius of each Biocondition site. The use of a 20km radius to inform the scoring of context for Grey-headed Flying-fox is considered appropriate, given the species typically travels distances of 6-28 km to forage (DAWE 2021).

Table 4.11. Scoring of Context for Grey-headed Flying-fox

Description	Score
Land within a 20km radius of the Biocondition site comprises:	
≥76% Grey-headed Flying-fox habitat	5
31-5% Grey-headed Flying-fox habitat	4
10-30% Grey-headed Flying-fox habitat	2
<10% Grey-headed Flying-fox habitat	0

Scores for ecological corridors are based on the proximity of each AU polygon within which each Biocondition site is located to corridors identified as part of the Queensland Government's biodiversity planning assessment for south-east Queensland, which can be accessed via Queensland Globe (https://qldglobe.information.qld.gov.au/).

Table 4.12. Ecological Corridors scoring

Score	0	4	6
Description	Not within	Sharing a common boundary	Within (whole or part)

Koala Site Context: Role of site location to species overall population in the State

This score takes into account the observed usage of habitat within the AU polygon within which each Biocondition site is located during targeted Koala surveys, the presence of breeding/foraging habitat, and likely movement pathways for dispersal, as shown in **Table 4.13**.

Table 4.13. Role of site location scoring for Koalas

Score	Description
5	Critical to species survival – AU polygons with evidence of usage
4	Likely to be critical to species' survival - AU polygons without evidence of usage, but providing breeding/foraging habitat and/or likely to be used for dispersal
1	Not or unlikely to be critical to species' survival - AU polygons without evidence of usage, not providing breeding/foraging habitat, and unlikely to be used for dispersal

Grey-headed Flying-fox Site Context: Role of site location to species overall population in the State

Scoring shown in **Table 4.14** takes into account the following information for each AU polygon within which each Biocondition site is located:

- Important winter food trees listed in the *National Recovery Plan for the Grey-headed Flying-fox 'Pteropus poliocephalus'* (DAWE 2021). Coastal lowlands in northern New South Wales and southern Queensland provide relatively reliable winter flowering forage, with important winter and spring habitats including vegetation communities that contain *Eucalyptus tereticornis, E. albens, E. crebra, E. fibrosa, E. melliodora, E. paniculata, E. pilularis, E. robusta, E. siderophloia, Banksia integrifolia, Castanospermum australe, Corymbia citriodora citriodora, C. eximia, C. maculata, Grevillea robusta* or *Melaleuca quinquenervia*.
- Whether or not the above species are dominant canopy species (i.e. comprise ≥ 50% of the canopy at each Biocondition site).
- Presence of larger/taller trees and high canopy cover as yielding higher densities of forage resources.

- Presence of a roost or suitable roosting conditions (i.e. dense patches of rainforest, melaleuca, mangroves or other riparian vegetation close to water).

Table 4.14. Role of site location scoring for Grey-headed Flying-foxes

Score	Description
5	Critical to species survival - AU polygon contains a roost or suitable roosting conditions AND/OR contains important winter food trees as dominant canopy species, and >75% of the RE benchmark for at least two of 'number of large trees', 'canopy cover' and 'canopy height'
4	Likely to be critical to species' survival - AU polygon contains important winter food trees as dominant canopy species, and >50% of the RE benchmark for at least two of 'number of large trees', 'canopy cover' and 'canopy height' (but not >75%)
1	Not or unlikely to be critical to species' survival - AU polygons not meeting the above criteria

Koala Site Context: Absence of threats

Threats to Koala were assessed based on the key threats identified in the EPBC Koala Conservation Advice (DAWE 2022a). These threats are climate change and associated threats (drought, heat waves, high intensity bushfires), and human related activities (clearing/fragmentation of habitat, disease, mortality from vehicle strike and dogs).

The project area is currently being used for rural pursuits, primarily for grazing of cattle, and the predominant use for surrounding sites is also for cattle grazing. The majority of the project area has been historically cleared and used for cattle grazing, while the flatter sections of the site remain heavily disturbed and contain evidence of long periods of grazing activities.

Camera traps employed during a survey in December 2020 detected wild and free-roaming domestic dogs at different locations within the project area.

Queensland Government Koala Hospital records from 2016-2022 within 10km of the project area show 31 records of sick Koalas (wasted, conjunctivitis and/or cystitis).

Table 4.15 assigns relative risk ratings for each of the key threats, with the maximum risk rating for each key threat reflecting the overall risk assigned to each key threat in Table 2 of the current Koala Conservation Advice (DAWE 2022a). The maximum risk rating across all key threats then determines the score for the Absence of Threats attribute, as summarised in **Table 4.16**. Further details regarding the risk rating criteria are as follows:

- Climate change is predicted to impact Koalas through an increase in the frequency of extreme drought and heatwaves (DAWE 2022b), with Queensland expected to experience a median 79% decline in Koala habitat by 2070. Current and future climate change projections indicate a progressive eastward and southwards contraction in the Koala's suitable climate envelope and consequent suitable habitat (Adams-Hosking et al. 2011 [cited in DAWE 2022a]). This is illustrated in Figure 6 of the recovery plan (DAWE 2022b), and the Site's location on this climate suitability map is used to determine the relative risk from climate change and associated impacts, which is applied across all AUs.
- Habitat clearing is a major historical, current and future threat to Koalas, the risk of which is influenced by recent/current uses of the Site, statutory regulations and protection mechanisms, and future development plans/zonings for the Site and surrounding area. Clearing of habitat in the adjacent landscape can also threaten the viability of Koalas using the Site. Consequently, the relative risk of habitat clearing is based on a combination of these factors, as they relate to each AU polygon within which each Biocondition site is located.

- Queensland Koala Hospital records (https://www.data.qld.gov.au/dataset/koala-hospital-data) indicate disease is a ubiquitous issue in the south-east Queensland Koala population, although the prevalence of disease has been found to increase following extreme stress from hot weather, drought, habitat loss and fragmentation (Lunney et al. 2012; Davies et al. 2013 [cited in DAWE 2022a]). The relative risk of disease is based on site observations of Koala health, Koala Hospital records for the local area (i.e. within 10km of the project area), and whether the prevalence of disease is likely to have been exacerbated by recent changes in local landscape conditions (i.e. drought, habitat loss and fragmentation), with the determined risk rating applied across all AUs.
- Mortality from dog attack and vehicle strike is assessed as a combined threat in the current Koala Conservation Advice, with an overall moderate risk (i.e. individuals are adversely affected but there is no effect at the population level) (DAWE 2022a). Consequently, relative risk ratings of low and medium are assigned as per **Table 4.15**, based on any site observations of mortality from dog attack and/or vehicle strike, Koala Hospital records within the project area and surrounding properties/roads, the presence of unrestrained dogs and/or high/volume roads on/adjacent to the Site, and whether there are formal measures in place to minimise the risk of dog attack and/or vehicle strike. The determined risk rating is applied across all AUs.

Table 4.15. Threat risk ratings for Koala

Key Threat	Risk Rating Criteria	Risk Rating
Climate change and associated impacts	The Site is within an area that 0-2 species distribution models predict will be climatically suitable for Koalas in 2070 under a high global emissions scenario (i.e. yellow or pale green on Figure 6 in DAWE [2022b]).	**high - very high**
	The Site is within an area that 3-6 species distribution models predict will be climatically suitable for Koalas in 2070 under a high global emissions scenario (i.e. bright / dark green on Figure 6 in DAWE [2022b]).	**moderate**
	The Site is within an area that >6 species distribution models predict will be climatically suitable for Koalas in 2070 under a high global emissions scenario (i.e. light / dark blue on Figure 6 in DAWE [2022b]).	**low**
Clearing of Koala habitat	Habitat clearing is occurring or has recently occurred within the AU polygon and/or adjacent landscape, or is not constrained by State/Local legislation and is reasonably likely to occur within the AU polygon for development or other/existing land uses	**high - very high**
	Habitat clearing is not occurring or has not recently occurred within the AU polygon or adjacent landscape, **and** Habitat clearing is not constrained by State/Local legislation, but is reasonably unlikely to occur within the AU polygon for development or other/existing land uses; **or** Habitat clearing within the AU polygon and/or adjacent landscape is constrained by State/Local legislation, but is not prohibited by State/Local legislation or protected via legally binding mechanisms for an offset and/or formalised protected area	**moderate**
	Habitat clearing is not occurring or has not recently occurred within the AU polygon or adjacent landscape, **and** Habitat within the AU polygon is protected via legally binding mechanisms for an offset and/or formalised protected area, or is otherwise heavily constrained or prohibited, such that habitat clearing is highly unlikely	**low**
Koala disease	There is evidence of mortality or poor health from disease on the Site **and/or** There are records of regular mortality from disease within the local area (i.e. within 5-10km of the Site), as determined through interrogation of the Queensland Government's Koala hospital data (https://www.data.qld.gov.au/dataset/koala-hospital-data), **and** The prevalence of disease is likely to have been exacerbated by recent changes in local landscape conditions (i.e. drought, habitat loss and fragmentation).	**high - very high**
	There are records of regular mortality from disease within the local area (i.e. within 5-10km), **and** The prevalence of disease is unlikely to have been exacerbated by recent changes in local landscape conditions (i.e. drought, habitat loss and fragmentation).	**moderate**
	None of the above	**low**

Key Threat	Risk Rating Criteria	Risk Rating
Mortality from vehicles and/or dogs	There is evidence of mortality from dog attack or vehicle strike on the Site; **and/or** There are records of regular mortality from dog attack or vehicle strike within surrounding properties/roads; **and/or** Known presence of unrestrained dogs on the Site / adjacent properties and no formal control/preventative measures are in place; **and/or** High speed (>50km/hr) and high volume roads occur within / adjacent to the Site and lack fauna sensitive design measures.	**moderate**
	None of the above.	**low**

Table 4.16. Absence of threats scoring for Koala

Description	Score
At least two* "high – very high" risks from **Table 4.15**	**1**
At least one "high – very high" risk or at least two "moderate" risks from **Table 4.15**	**7**
No "high – very high" or "moderate" risks from **Table 4.15**	**15**

*DCCEEW have advised that only sites subject to multiple and cumulative threats to Koala warrant a score of 1.

Grey-headed Flying-fox Site Context: Absence of threats

The key threat to GHFF is loss of habitat (DAWE 2021). The loss of habitat, particularly important habitat such as reliable winter resources along the east coast, has continued to lead to population decline.

Sites not mapped PMAV category X are scored as low threat (15). All other sites are scored as high threat (1), taking into account existing land uses (grazing and associated clearing).

Koala Site Context: Species mobility capacity

This attribute is measured in consideration of the presence and severity of factors that would contribute to a reduction in the mobility of the species. For example, when a barrier or obstacle to movement is created within or between habitats that is likely to result in a long-term reduction in genetic fitness or access to important resources. Mobility capacity for Koalas been determined for according to the scoring shown in **Table 4.17.**

Table 4.17. Species mobility capacity

Score	Description
1 Severely restricted (>90% reduction)	The AU polygon is functionally isolated from other appropriate habitat for the species, with much of the landscape considered a barrier to species mobility.
4 Highly restricted (>70-90% reduction)	The AU polygon is likely isolated to regular movement of the species into or out of habitat contiguous to the AU polygon.
7 Moderately restricted (>25-70% reduction)	The AU polygon is representative of a temporary refuge or stepping stone in the landscape between other patches of habitat, with potential regular movement into or out of habitat contiguous to the AU polygon.
10 Minor restriction (0-25% reduction)	Movement by the species into and out of the AU polygon is relatively unrestricted and unhampered by barriers/obstacles.

Grey-headed Flying-fox Site Context: Species mobility capacity

DAWE (2021) cites studies that indicate (a) Grey-headed Flying-foxes have been known to fly as far as 40 km to feed, before returning to their roost the same night, and (b) the mean distance of a Grey-headed Flying-fox foraging site from the camp in which the animal had roosted and to which it returned was 10.9 km (quartile range from 6.2 - 27.9 km).

Table 4.18. Species mobility capacity scoring

Score	Description
1 - Severely restricted	GHFF camp (including inactive camps) >40 km
4 - Highly restricted	GHFF camp (including inactive camps) within 40 km
7 - Moderately restricted	GHFF camp (including inactive camps) within 28 km
10 - Minor restriction	GHFF camp (including inactive camps) within 11 km

Stocking Rate

The assessment of species stocking rate has been undertaken for each AU in accordance with the modified Habitat Quality Spreadsheet for Queensland, as shown in **Table 4.19**.

Table 4.19. Species stocking rate scoring

Species Stocking Rate (SSR)					
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	Score	0	5	10	
		No	Yes - adjacent	Yes - on site	
Species usage of the site (habitat type & evidenced usage)	Score	0	5	10	15
		Not habitat	Dispersal	Foraging	Breeding
Approximate density (per ha)	Score	0	10	20	30
		Not habitat	1-50%	51-85%	86-100%
Role/importance of species population on site*	Score (Total from supplementary table below)	0	5	10	15
			5 - 15	20 - 35	40 - 45
Total SRR score (/ 70) **SRR Score (out of 4)**					

***SSR Supplementary Table**			
*Key source population for breeding	Score	0	10
		No	Yes/ Possibly
*Key source population for dispersal	Score	0	5
		No	Yes/ Possibly
*Necessary for maintaining genetic diversity	Score	0	15
		No	Yes/ Possibly
*Near the limit of the species range	Score	0	15
		No	Yes

Koala presence

All AUs scored the maximum possible 10 points as numerous Koala records have been made throughout the project area, in habitats within and/or adjacent to all AUs.

Grey-headed Flying-fox presence

Targeted surveys for GHFF were not undertaken, although it is assumed this species would visit the project area during flowering events of important winter/spring feed trees; therefore, this parameter scored 10 for all sites where food trees are present.

Koala usage

AUs within which Koalas or Koala evidence has been recorded, and within which breeding/foraging habitat is present, were scored 15 points. AUs where no Koalas or Koala evidence was recorded, but breeding/foraging habitat is present, scored 10 points. AUs that do not support breeding/foraging habitat but could be traversed by Koala were scored 5 points.

Grey-headed Flying-fox usage

The project area does not support a roost (breeding) site, but it is assumed Grey-headed Flying-fox would forage within the project area during flowering events of important winter/spring feed trees; therefore, this parameter scored 10 for all sites where recognised food trees are present.

Koala density

There is scant information relating to Koala densities in the habitats of the Scenic Rim Regional Council LGA. A relevant reference is a study by Dissanayake *et al.* (2021) where Koala densities for south-east Queensland were estimated using a predictive model based on Koala sightings from 1997 to 2013. The area in which the project area is located was modelled as supporting 0.0005-0.01 Koalas/km^2 (0.000005-0.0001 Koalas/ha). However, it is likely that, in the local area, which has a sparse human population, Koalas are sighted less often than in more populated regions and, therefore, the predicted Koala density range for this location was not well-informed.

The spatial model of Rhodes *et al.* (2015) in the eastern LGAs of the Koala Coast (excluding the Scenic Rim LGA within which the project area is located) predicted the highest Koala densities occurring along the coastal regions of south-east Queensland, but particularly in the central and southern coastal regions, with average densities across the region estimated as being relatively low at 0.04 koalas/ha and ranging from 0 to 6.54 Koalas/ha. Rhodes *et al.* (2015) noted an unexpected prediction for higher Koala densities in some of the western portions of the study area (see **Image 4.1**), although these were areas where surveys were not conducted and there was high uncertainly in the density estimates in these areas.

The Rhodes *et al*. (2015) modelling was based on covariates that were chosen based on hypothesised links with Koala density that had an ability to be mapped across the entire study region. Notably, moist to dry eucalypt open-forests to woodlands on basalt areas categorised as BVG11a (including REs 12.8.16 and 12.8.17) and woodlands and open woodlands on alluvial areas categorised as BVG16c (including RE 12.3.3), were designated as 'high suitability' for Koalas, while woodlands on granitic and metamorphic ranges categorised as BVG16c (including RE12.9-10.7) were designated as 'suitable' for Koalas. These constitute the REs of the project area.

In the absence of data more specific to the local area, Koala density estimates for the project area are based on the results of the thermal Koala surveys undertaken to inform an offset strategy for Stage 1 of the Queensland Government's 'Coomera Connector' project in 2022 (BAAM, 2022). The survey covered approximately 107 ha of a property within the Scenic Rim LGA at Tabooba, approximately 50km south-east of the project area (and comprising similar habitats to those within the project area, including RE 12.8.16). With a detection probability of 90%, a density of approximately 0.08 Koalas/ha was recorded in the surveyed area. Koala density was highest within the remnant vegetation areas (0.23-0.25/ha), followed by advanced regrowth (0.04-0.07/ha). No Koalas were recorded within young regrowth or in the predominantly cleared.

These results support the logical assumption that, where there are not otherwise factors that are expected to significantly influence the presence and abundance of Koalas (i.e. such as access difficulties, threats from dog attack or vehicle strike, etc), sites comprising denser, more mature habitat are likely to support a higher density of Koalas. Accordingly, the scoring applied in relation to Koala density is based on the observed and expected relative densities, while making the conservative assumption that the highest relative densities would be typical of those in the broader area (thereby achieving the maximum score):

- Remnant vegetation with evidence of Koala use = 30.
- Remnant vegetation with no evidence of Koala use = 20.
- Regrowth with evidence of Koala use = 10.
- Regrowth with no evidence of Koala use, or cleared areas = 0.

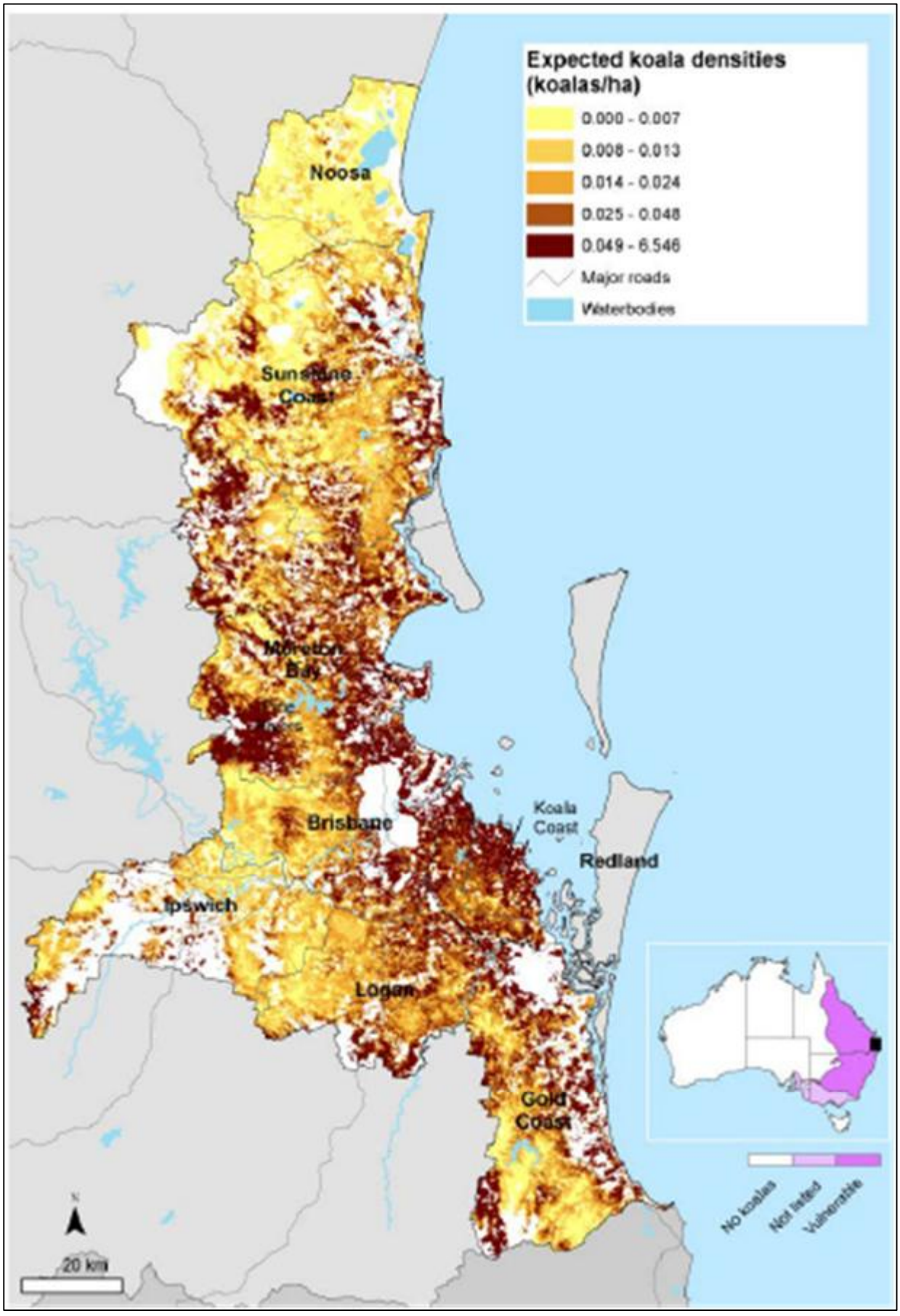


Image 4.1. Koala density modelling results of Rhodes et al. (2015)

Grey-headed Flying-fox density

Given the impracticality of measuring actual density of Grey-headed Flying-foxes at a given site, density was scored on the basis of the number of recognised Grey-headed Flying-fox roost camps (including inactive camps) occurring within a 20km radius of AUs with recognised food trees (based on a typical foraging distance of 6-28 km (DAWE 2021), using data obtained from the DCCEEW National Flying-fox monitoring viewer (https://www.environment.gov.au/webgis-framework/apps/ffc-wide/ffc-wide.jsf), as outlined in **Table 4.20**.

Table 4.20. Grey-headed Flying-fox Density

Description	Score
>5 Grey-headed Flying-fox habitat camps (including inactive camps) within a 20km radius of the AU	30
3 – 5 camps (including inactive camps) within a 20km radius of the AU	20
1 – 2 camps (including inactive camps) within a 20km radius of the AU	10
No camps (including inactive camps) within a 20km radius of the AU	0

Role/importance of site to Koala

In terms of the role/importance of the Koala population on site, the site is not known to support a key source population for breeding or a key source population for dispersal, or be necessary for maintaining genetic diversity, nor is the site near the limit of the species range. Even so, a score of 5 has been applied to areas where Koalas/Koala evidence has been observed, in accordance with the precautionary principle.

Role/importance of site to Grey-headed Flying-fox

As there are no barriers to dispersal from outside of the project area, and the project area does not support a flying-fox roost (breeding) site, it is considered GHFF within the project area are unlikely to be part of a source population for breeding, dispersal or for maintaining genetic diversity. Nor is the project area at the limit of the species' range. Therefore, all AUs scored 0 for this parameter.

Total Habitat Quality Scores for the Site

Appendix 9 provides the results for each habitat quality attribute for Koala and Grey-headed Flying-fox, respectively, based on the habitat scoring method outlined above. A summary of the total, weighted habitat quality scores for Koala and Grey-headed Flying-fox are provided in **Tables 4.21 and 4.22**, respectively.

An overall score of 6 (out of 10) for Koala and 5 (out of 10) for Grey-headed Flying-fox indicates the project area represents moderate quality habitat for these species.

Tables 4.21 and 4.22 also confirm the percentage of the offset obligation associated with each impact stage that is to be covered by the corresponding offset stage for each species.

Table 4.21. Total Current Koala habitat score for the Project Area.

Component	AU1a		AU1b		AU2		AU3		AU4		AU5		AU6		AU7		Average/Final
	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2	
Site Condition score (out of 3)	0.86	0.86	2.13	2.13	1.53	1.53	0.57	0.57	0.65	0.65	2.18	2.18	1.91	1.91	0.68	0.68	1.31
Site Context Score (out of 3)	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41
Species Stocking Rate Score (out of 4)	2.29	2.29	2.29	2.29	2.29	2.29	0.86	0.86	0.86	0.86	2.29	2.29	2.29	2.29	0.86	0.86	1.75
Habitat Quality score (out of 10)	*5.55*	*5.55*	*6.83*	*6.83*	*6.23*	*6.23*	*3.84*	*3.84*	*3.91*	*3.91*	*6.88*	*6.88*	*6.60*	*6.60*	*3.94*	*3.94*	5.47
Assessment Unit area (ha)	0.00	4.58	0.00	4.58	5.93	107.66	24.69	16.81	12.71	0.00	5.91	0.40	50.54	20.41	5.48	0.00	259.71
Total impact area (ha) for this MNES	259.71	259.71	259.71	259.71	259.71	259.71	259.71	259.71	259.71	259.71	259.71	259.71	259.71	259.71	259.71	259.71	259.71
Size Weighting	0.00	0.02	0.00	0.02	0.02	0.41	0.10	0.06	0.05	0.00	0.02	0.00	0.19	0.08	0.02	0.00	1.00
Weighted Habitat Quality Score	***0.00***	***0.10***	***0.00***	***0.12***	***0.14***	***2.58***	***0.36***	***0.25***	***0.19***	***0.00***	***0.16***	***0.01***	***1.28***	***0.52***	***0.08***	***0.00***	***5.80***

		% Offset
Stage 1 Weighted Quality Habitat Score	2.22	38.32
Stage 2 Weighted Quality Habitat Score	3.58	61.68
Weighted Quality Habitat Score	***5.80***	

Table 4.22 Total Current Grey-headed Flying-fox habitat score for the Project Area.

Component	AU1a		AU1b		AU2		AU3		AU4		Average/Final
	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2	
Site Condition score (out of 3)	1.25	1.25	2.13	2.13	1.82	1.82	2.30	2.30	2.00	2.00	1.90
Site Context Score (out of 3)	2.09	2.09	2.09	2.09	1.18	1.18	1.23	1.23	1.18	1.18	1.55
Species Stocking Rate Score (out of 4)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
Habitat Quality score (out of 10)	*5.05*	*5.05*	*5.93*	*5.93*	*4.72*	*4.72*	*5.25*	*5.25*	*4.89*	*4.89*	5.17
Assessment Unit area (ha)	0.00	4.58	0.00	4.58	5.93	107.66	5.91	0.40	50.54	20.41	200.02
Total impact area (ha) for this MNES	200.02	200.02	200.02	200.02	200.02	200.02	200.02	200.02	200.02	200.02	200.02
Size Weighting	0.00	0.02	0.00	0.02	0.03	0.54	0.03	0.00	0.25	0.10	1.00
Weighted Habitat Quality Score	***0.00***	***0.12***	***0.00***	***0.14***	***0.14***	***2.54***	***0.16***	***0.01***	***1.24***	***0.50***	***4.83***

		% Offset
Stage 1 Weighted Quality Habitat Score	1.53	31.68
Stage 2 Weighted Quality Habitat Score	3.30	68.32
Weighted Quality Habitat Score	***4.83***	

4.5 ASSESSMENT OF DIRECT, INDIRECT, CONSEQUENTIAL AND CUMULATIVE IMPACTS

4.5.1 Direct Impacts

Loss of Habitat

The proposed action will result in the permanent loss of 258 ha of known and potential habitat for Koala and 199 ha of potential habitat for Grey-headed Flying-fox.

Fragmentation and Barriers to Movement

The proposed action could lead to further fragmentation of Koala habitat and create barriers to fauna movements across the project area and into suitable habitats in adjacent lands. In particular, the proposed access road and associated creek crossing could cause significant impacts to the local Koala population by reducing or preventing dispersal of juveniles or preventing gene flow between neighbouring populations and restricting access to suitable foraging or shelter habitat.

The risk of impact from fragmentation and barriers to movement is low for highly-mobile species, such as Grey-headed Flying-fox.

Death or Injury to Fauna

The clearing of vegetation can result in injury or death to Koala if present within the clearing area at the time of clearing.

Koalas being struck by vehicles on roads is recognised as a major source of Koala mortality (Gonzalez-Astudillo *et al*. 2017; McAlpine *et al*. 2006; Niehaus and Wilson, 2018; Tisdell *et al*. 2017). No data relating to the frequency of Koala crossings of the road reserve is available; therefore, it is difficult to predict how regularly Koala cross the area of the proposed access road. Regardless, the construction of the access road through, or adjacent to, habitats that are known to support Koala, will increase the risk of vehicle/Koala interactions, especially between dusk and dawn. The operation of heavy and light vehicles within the quarry site could also result in animal/vehicle collisions; data obtained from the recent surveys indicates such risks are likely to be greater in the eastern and northern parts of the site, which demonstrate relatively high levels of Koala activity (**Figure 3.3**).

4.5.2 Indirect Impacts

The removal of vegetation may result in secondary impacts to adjacent vegetation to be retained, through “edge effects” such as increased desiccation, light penetration, wind-throw, herbivory and weed invasion (Murcia 1995). In particular, introduced weeds can change vegetation community composition and in some cases increase the intensity of fire, leading to further community degradation.

Soil disturbance/exposure and altered water flow patterns, and subsequent erosion and sedimentation, can expose tree roots, smother vegetation, and potentially alter the physical form, chemical processes and ecological health of downstream aquatic and riparian habitats.

Vegetation removal, earthworks, exposed stockpiles and vehicle movements also create dust, which can impact on nearby vegetation; excessive dust has been known to reduce photosynthesis rates and inhibit plant growth (Thompson *et al.* 1984, Sharifi, *et al.* 1997), and pollutants in dust can impede plant growth (Farmer 1993).

Any night work activities will require artificial lighting, which may affect feeding, dispersal and breeding behaviour of Koala, and feeding behaviour of Grey-headed Flying-fox.

General waste and land disturbance has the potential to attract highly competitive and/or predatory exotic fauna species, such as dogs (a known threat to Koala).

Without appropriate mitigation measures, the operation of the quarry also has the potential to disrupt natural ecological processes within the local area through:

- altering the local surface water environment due to large-scale landform modification, and subsequent potential impacts on downstream habitats, particularly those in low-lying areas. This includes alterations to base flows, as well as to the frequency and extent of flooding;
- creating long-term edge effects along the borders of the active area and adjacent habitat.

Measures proposed to address these indirect impacts are discussed in **Section 5.0**.

4.5.3 Cumulative Impacts

Warrill View and neighbouring suburbs have already experienced significant levels of rural development, such that the amount of remaining forested Koala habitat in the landscape is already below the recognised threshold of 40-60% (Biolink, 2007) in most areas surrounding the Site (i.e. remaining forested habitat within 20km is currently 21%). The direct loss of habitat on the Site will not represent a significant contribution to the total extent of loss of foraging habitat for Koala and Grey-headed Flying-fox that has already occurred in the local area (i.e. 0.2% within 20km); however, the development will contribute to ongoing loss of foraging habitat in the region, and associated, cumulative impacts on local and regional populations, that have led to ongoing population decline for these species.

4.5.4 Impact Significance

Koala

Under the former EPBC Act referral guidelines for the vulnerable Koala (Commonwealth of Australia 2014), an assessment of the significance of impacts to Koala was based on whether the project is likely to adversely affect habitat critical to the survival of the Koala, and/or whether the proposed development will interfere substantially with the recovery of the Koala through the introduction or exacerbation of key threats in areas of habitat critical to the survival of the Koala.

Although the former EPBC Act referral guidelines for the vulnerable Koala are no longer considered suitable for use since the species was uplisted to endangered on 12 February 2022, they are still considered as providing the most relevant criteria for assessing the significance of impacts to Koala for this project, given the Koala was listed as vulnerable at the time of the referral, and these criteria are more specific to Koala than the Commonwealth's more general Significant Impact Guidelines for MNES (DotE 2013). Consequently, an assessment of whether the project is likely to adversely affect habitat critical to the survival of the Koala, and/or whether the proposed development will interfere substantially with the recovery of the species, has been undertaken, as outlined in **Tables 4.23** and **4.24**. This takes into account proposed measures to avoid or mitigate impacts, as discussed in **Section 5.0**.

Overall, there is a moderate-high residual risk that the proposed action will lead to a significant impact on Koala, by adversely affecting critical habitat and interfering with the recovery of this species.

Grey-headed Flying-fox

Table 4.25 provides the results of assessments of impact significance for Grey-headed Flying-fox based on the Significant Impact Guidelines 1.1 (DotE 2013). This takes into account proposed measures to avoid or mitigate impacts, as discussed in **Section 5.0**.

Overall, there is a moderate-high residual risk that the proposed action will lead to a significant impact on Grey-headed Flying-fox, by adversely affecting critical habitat and interfering with the recovery of this species.

Table 4.23. Assessment of the significance of removing habitat critical to the survival of Koala (refer Sections 6, 7, 8 of Commonwealth of Australia 2014).

Characteristics that could adversely affect habitat critical to the survival of Koala	Assessment of Proposed Actions (refer to Section 5 for further detail on proposed avoidance and mitigation measures)
The score calculated for the impact area (higher score = greater risk)	The assessment of habitat quality outlined in **Section 4.4 suggests** the habitat quality within the Site rates 6 (out of 10). **Moderate risk of significant impact.**
Amount of Koala habitat being cleared (more habitat cleared = greater risk)	A total of 260 ha of potential habitat will be removed. **High risk of significant impact.**
Method of clearing	All vegetation clearing would be conducted in a sequential manner over a number of years, under the supervision of an experienced fauna spotter in accordance with the Queensland government *Nature Conservation (Koala) Conservation Plan 2017* (State of Queensland 2023b). **Low risk of significant impact expected.**
The density or abundance of Koalas	Due to the paucity of Koala evidence through the majority of the project area, and the low proportion of mature vegetation (i.e. that would otherwise support a higher density of Koalas), it is considered the density of Koalas across the project area is relatively low. **Low risk of significant impact expected.**
Level of fragmentation caused by the clearing	The project area occurs within a landscape that has historically been cleared and fragmented for agricultural purposes. The proposed action will retain connected vegetation to mitigate impacts from fragmentation. Underpasses suitable for Koala movement underneath the access road and creek crossing, exclusion fencing and smart signs will be installed to minimise the risk of Koala/vehicle interactions. **Low-moderate risk of significant impact expected.**

Table 4.24. Assessment of the significance of Project impacts interfering with the recovery of Koala.

Impacts which are likely to substantially interfere with the recovery of the Koala	Assessment of Proposed Actions (refer to Section 5 for further detail on proposed avoidance and mitigation measures)
Increasing Koala fatalities to dog attacks	Camera surveys (**Appendix 7**) recorded wild and free-roaming domestic dogs within the project area. A dog control program will be formulated as part of the proposed action, which is expected to reduce the risk of dog attack compared to the current situation. **Low risk of significant impact expected.**
Increasing Koala fatalities to vehicle-strikes	Vehicle movements along the access road and within the quarry site could lead to an increase in Koala fatalities. Underpasses suitable for Koala movement, exclusion fencing and smart signs will be installed to reduce the risk of Koala/vehicle interactions. Within the site, the speed environment will be reduced to 20 km/hr to reduce the likelihood of vehicle strike. **Low-moderate risk of significant impact expected.**
Facilitating the introduction or spread of disease of pathogens, that are likely to significantly reduce the reproductive output of Koalas,	The clearing of Koala habitats can induce stress on individual animals, which then predisposes the animals to diseases/pathogens such as Chlamydia. During clearing, no Koala would be placed in a stressful situation by forcing it to move from a tree targeted for clearing. A qualified fauna spotter/catcher would be present during all vegetation clearing to ensure any Koalas present are not disturbed and are left to move of their own volition, and to report the presence of any sick or injured Koala observed within the clearing area. **Low risk of significant impact expected.**
Creating a barrier to movement to, between or within habitat critical to the survival of the Koala that is likely to result in the long-term reduction of genetic fitness.	The proposed action includes retention of approximately 199 ha of connected habitat, and the installation of underpasses designed to allow safe movement of Koala underneath the access road and creek crossing, to ensure safe Koala movements between and within habitats critical to the survival of Koala (refer **Section 5.5**). The location of the proposed action will not prevent Koala accessing important habitats within the retained area or potential habitats outside of the project area. **Low risk of significant impact expected.**
Changing hydrology which degrades habitat critical to the survival of the Koala to the extent the carrying capacity of the habitat is reduced in the long-term.	Within the site Environmental Management Plan (EMP), consideration has been given to the engineering of drainage design to minimise any changes to existing hydrological process in retained habitats. **Low risk of significant impact expected.**

Table 4.25 Assessment of significance of impacts to Grey-headed Flying-Fox.

Impact Criteria (Vulnerable Species)	Grey-headed Flying-fox (GHFF)
lead to a long-term decrease in the size of an important population of a species	The proposed action will result in the loss of 199 ha of important winter foraging habitat expected to be used by the species. **High risk of significant impact.**
reduce the area of occupancy of an important population	Grey-headed Flying-fox have an extensive area of occupancy; which will not be significantly reduced through the proposed action. **Low risk of significant impact.**
fragment an existing important population into two or more populations	The project area is located within an already highly fragmented landscape. **Low risk of significant impact.**
adversely affect habitat critical to the survival of a species	The proposed action will result in the loss of 199 ha of important winter foraging habitat expected to be used by the species. **High risk of significant impact.**
disrupt the breeding cycle of an important population	The project area does not support a roost/breeding site. **Low risk of significant impact.**
modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	There are extensive areas of suitable GHFF habitat between the closest known roost site and the project area; therefore, there is a **low risk** that the loss of 199 ha of potential habitat of moderate quality will lead to decline of the population.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Invasive species are not listed as a threat to Grey-headed Flying-fox (DAWE 2021).
introduce disease that may cause the species to decline	Disease is not recognised as a threat to Grey-headed Flying-fox (DAWE 2021).
interfere substantially with the recovery of the species.	The Recovery Plan for Grey-headed Flying-fox (DAWE 2021) aims to identify, protect and increase key foraging and roosting habitat. The project area does not support roosting habitat, but does support critical foraging habitat. Overall, there is a **moderate risk** that the proposed action will impact the recovery of this species.

5.0 AVOIDANCE AND MITIGATION

5.1 DEVELOPMENT LOCATION/CONTEXT

Quarry resources are the result of fortuitous geological events and, consequently, their location is fixed. The project area has been confirmed as containing a high quality and quantity of resource. In March 2023, the project area and haulage route was recognised as a Key Resource Area ('KRA') (State Significance) and designated KRA 172 Warrill View Silverdale. The designation of the project area as KRA 172 will ensure existing and future demand for quarry materials continues to be met, from a site which is proximate to the south-east Queensland market.

In contrast to mining resources, quarry products are high volume, low margin products resulting in transport being a major cost of production, a cost which is ultimately passed to the consumer. Quarry resources, therefore, have to be located close to where they are needed to ensure the efficient and affordable supply of construction materials.

As urban encroachment continues, and existing operations become exhausted, greenfield sites that are proximate to the market, such as the project area, become increasingly difficult to find. The Ipswich, Beaudesert, Brisbane and Logan markets (amongst others) are all within a 1 hour drive from the site.

The other important distinction with quarries, as compared with, for example, the establishment of residential estates, is quarries are gradually developed over time and lateral extension to the quarry footprint is also gradual, with the function primarily to assist with horizontal development of benches, in order to access quarry material at depth. As such, the total extent of impact described for the ultimate quarry footprint will not occur for several decades. The known resource estimates for the project area will facilitate a lifespan in excess of 100 years. This does not include the likely further resource availability, which will result from further exploratory work to be undertaken on the site.

5.2 PROJECT ALTERNATIVES

As provided above, quarries are an essential component of development for infrastructure and urban development. It is estimated that approximately 10 tonne of quarry material is consumed per person per annum for development of communities. Scenic Rim is a major supplier of quarry material to the broader south-east Queensland region due to its proximity and relatively low population density. The cost of quarry materials for urban development in the Scenic Rim area is relatively low due to the proximity of the quarries to urban development.

The proposed action is for a new quarry that will provide essential construction material for the Scenic Rim and broader south-east Queensland region, assisting to deliver the South East Queensland Regional Plan 2023 (ShapingSEQ), which seeks to deliver 34,500 new homes each year to provide for additional 2.2 million people anticipated by 2046.

Other options were considered by the proponent and determined not to be feasible. These alternatives are described below:

1. Increasing Sales Rates at other locations – The proponent operates quarries located in Bromelton North and Cryna, both in the Scenic Rim region, and Brendale Quarry in the Moreton Bay region. These quarries service a different market and are in excess of 30km east of the project area. The extractive resource produced by each of the Bromelton and Cryna quarries is basalt, typically used as concrete and asphalt aggregate, while the Brendale Quarry produces sand and gravel, used in road base and premix concrete. The main rock found in the project area is trachyte, used predominantly in building and paving stones.

   As provided above, transport of material is a major cost of production. The project area will be able to supply material to the local market with reduced transportations costs, and fewer potential impacts associated with material transportation. In addition, the Bromelton North Quarry is nearing completion as the construction material will be extinguished by the mid 2030's. The upcoming closure of the Bromelton North Quarry will create a gap of an estimated 500,000 tonnes per annum

in quarry material supply for the Beaudesert area. Separately to this proposed action, Neilsens are investing in the Cryna Quarry to enable the current 500,000 tonnes per annum supplied from Bromelton North Quarry to be supplied from the Cryna Quarry.

The new Warrill View Quarry will be a major supplier to the Scenic Rim and Ipswich areas, due to its location and resource. Given the site's location, it will not be a major supplier for the Beaudesert area, which the proponent already supplies from the Bromelton North and Cryna Quarries.

2. Purchase and/or Co-location with Nearby Operations – Due to the increasing demand for construction materials, there is little opportunity to purchase or co-locate sales volume at an existing operations in the Warrill View area. Several KRAs are in relative proximity to the site, the nearest being KRA 141 located 4 km to the south and KRA 158 located 10 km to the north. KRA 141 is capitalised by an established quarry (Kalbar Quarry) operated by Hy-Tec Industries (Queensland) Pty Ltd. Scenic Rim Council granted approval to Wagners for a quarry in KRA 141in 2020. Mt Walker Quarries hold an approval for a quarry in KRA 158; however, it does not appear that the activity has commenced.
3. Abandon Proposed Action – As provided above, the proposed action will provide essential construction material for the Scenic Rim and broader SEQ region, assisting to deliver the affordable development in line with the South East Queensland Regional Plan 2023 (ShapingSEQ). This alternative does not provide a desirable commercial outcome, nor would it benefit the community.
4. Reduce Footprint – The quarry has already balanced the potential impacts to matters of State and National significance, as outlined in the following section. The site will be developed progressively, in line with operational needs and will be progressively rehabilitated as terminal benches are reached.

5.3 AVOIDING/MINIMISING HABITAT LOSS

5.3.1 Disturbance Footprint

Based on the findings of ecological assessments, significant concessions were made in relation to the proposed extent of disturbance areas for the quarrying activities. Areas in proximity to Warroolaba Creek, the northern section of the west pit and the eastern-most boundary of the east pit have all been modified / reduced in order to balance the environmental values present with a viable and workable quarry design. An estimated 120 hectares of land with known quarry resources has been removed from the extent of proposed disturbance areas and extraction footprints, so as to retain larger portions of identified higher value fauna habitat within the project area.

Following the results of field surveys in 2018, where Koala evidence and numerous *Eucalyptus tereticornis* were recorded in an area that was originally planned as a stockpile area, the proposed footprint for the east pit was reduced to allow higher value habitats to be retained (refer **Figure 3.3**). The retention of this area will enhance connectivity to a large patch (~80 ha) of Koala habitat located immediately adjacent to the north-eastern boundary of the project area.

The 2019 field surveys identified an area of relatively high Koala usage located in the proposed west pit ancillary/operations area. To minimise impacts to threatened species, the size of the proposed ancillary/operations area was reduced by 7 ha; thereby retaining an additional 7 ha of known Koala habitats near the north-east boundary of the west pit.

These surface-level concessions significantly reduce the volume of essential construction material able to be extracted, not only due to the associated benching requirements but also because the reduced footprint limits the ability to maintain optimal pit geometry, setback buffers, and safe working areas. The smaller disturbance area restricts internal configuration such as the placement of haul roads and access ramps, reduces opportunities to follow the full extent of the resource, and requires additional areas of in-situ material to be left in place for geotechnical stability along the perimeter. Collectively, these factors sterilise otherwise accessible resource and materially diminish the long-term yield of the quarry.

5.3.2 Highest Value Koala Habitat

Of the 260 ha identified as Koala habitat (refer **Section 4.4.1**), only 6 ha within the highest valued Koala habitat (floodplain) will be lost, whilst 20 ha will be retained. This floodplain habitat is shown on **Figure 3.1**, and intersects primarily with the following components of the proposed action:

- Internal access road, connecting the operation from the unnamed road reserve to the stockpiling area.
- East pit stormwater basin, and necessary stormwater management infrastructure to cater for the upstream catchment.
- East pit ancillary operations area (part).
- Creek crossing providing connection to the west pit.
- West pit ancillary operations area (part).

It is not feasible for the components listed above to be relocated elsewhere within the site due to the topography and configuration of the land, which becomes constrained at the north-western section of Lot 18 RP50377 and north-eastern section of Lot 1 RP51909.

The internal road, connecting the operation to the unnamed road reserve, follows the most direct path.

As illustrated by the contours on **Figure 3.1**, the location of the creek crossing is the most efficient location, given the natural ground levels and efficiencies of haulage between the two pits. An alternative location for the crossing may require longer haul roads, intersecting steeper terrain and increasing disturbance to the creek bed and banks. The ancillary operations areas will be created through extraction of essential construction material, to create a flat and suitable pad for ongoing processing and stockpiling of material.

Stormwater infrastructure must be located in low points of the catchment to function effectively. The basin location is required to capture runoff from the upstream catchment before discharge to the creek. Relocating the basin upslope could reduce storage efficiency, and possibly require larger earthworks or additional disturbance/clearing areas. The SLR Stormwater Management Plan (SMP) provides hydrology calculation results in Table 6 – Downstream Impact Assessment of **Appendix 2**, and confirm that, given the extremely large upstream catchment, there will be a negligible change on surface water hydrology (average reduction in runoff of approximately 7 to 8 percent). This infrastructure is provided in the lower portions of the site, as is standard practice, and the stormwater retention basin has been limited to a size practicable to achieve the requirements in the EA.

Together, these components affect approximately 22.5% of the floodplain habitat present within the project area. Relocation of these components is constrained by site topography, drainage requirements, haulage efficiency between the pits, and the need to minimise the overall disturbance footprint. Alternative layouts would require longer haul roads, additional creek crossings, or relocation of stormwater infrastructure outside natural drainage lines, resulting in greater environmental disturbance and reduced operational safety.

The loss of 6 ha of highest-value Koala habitat is balanced by the retention of a large contiguous patch (~80 ha) of Koala habitat immediately adjacent to the north-eastern boundary of the project area, as well as 7 ha of known Koala habitat near the north-east boundary of the west pit, which was previously identified and excluded from disturbance following the 2018 and 2019 surveys.

5.4 AVOIDING/MINIMISING IMPACTS TO RETAINED HABITAT

Table 5.5 summarises the proposed measures that will be implemented to avoid/minimise impacts to the retained areas and enhance their value for Koala and Grey-headed Flying-fox, and describes their predicted effectiveness, the responsible party(ies), associated milestones / performance / completion criteria, and proposed monitoring and evaluation program.

The following sections provide a description of the proposed measures. All measures and associated monitoring will be committed to for the life of the proposed action, until the onset of conditioned site closure actions.

Protection of Retained Vegetation

All onsite vegetation and habitats to be retained within 100m of the proposed project footprint will be protected from potential adverse impacts associated with adjacent clearing and construction activities through designated and demarcated "exclusion/management zones" (totalling approximately 87 ha - refer **Figure 5.1**), and regular monitoring of the health of retained vegetation/habitat therein.

The intended purpose for retained areas outside the exclusion/management zones is the continuation of existing uses.

To manage unauthorised access to the exclusion/management zones by people and/or livestock, a minimum of 3 strand rural fencing will be constructed along the perimeter, with signage every 50m state "Do not enter – Quarry Operations". This will generally be as identified on **Figure 5.1**, unless existing fencing is adopted. The same will apply to external boundary fencing around the site.

To ensure no works occur outside the approved limits of extraction, posts or star pickets will be erected and maintained at regular intervals of no more than 50m around the final approved limits of extraction; the posts will be approximate 1m in height and painted a contrasting colour.

Access within the exclusion/management zones will be restricted to that necessary for monitoring and habitat enhancement works described below, fire control, pest animal management, fence replacement/repair, and general land care practices. Quarry staff and contractors will be advised during site inductions that there is to be no dumping or stockpiling of cleared vegetation, soil or other material within the exclusion/management zones.

The bounds of each Exclusion/Management Zone will be provided to the clearing contractor and the regeneration contractor in electronic format, and clearly demarcated on-ground by physical means (i.e. fencing along external boundaries as described above, and flagging tape tags at 20 metre increments between Exclusion/Management Zones).

Exclusion/Management Zone 2b occurs within a State-approved offset area alongside Warroolaba Creek to the south of the proposed west pit (refer **Figure 5.1**). This area will be specifically managed to achieve remnant vegetation status in accordance with the State-approved management plan for this area and, where there are any inconsistencies between the measures described in this section and those prescribed in the State-approved management plan, the latter takes precedent.

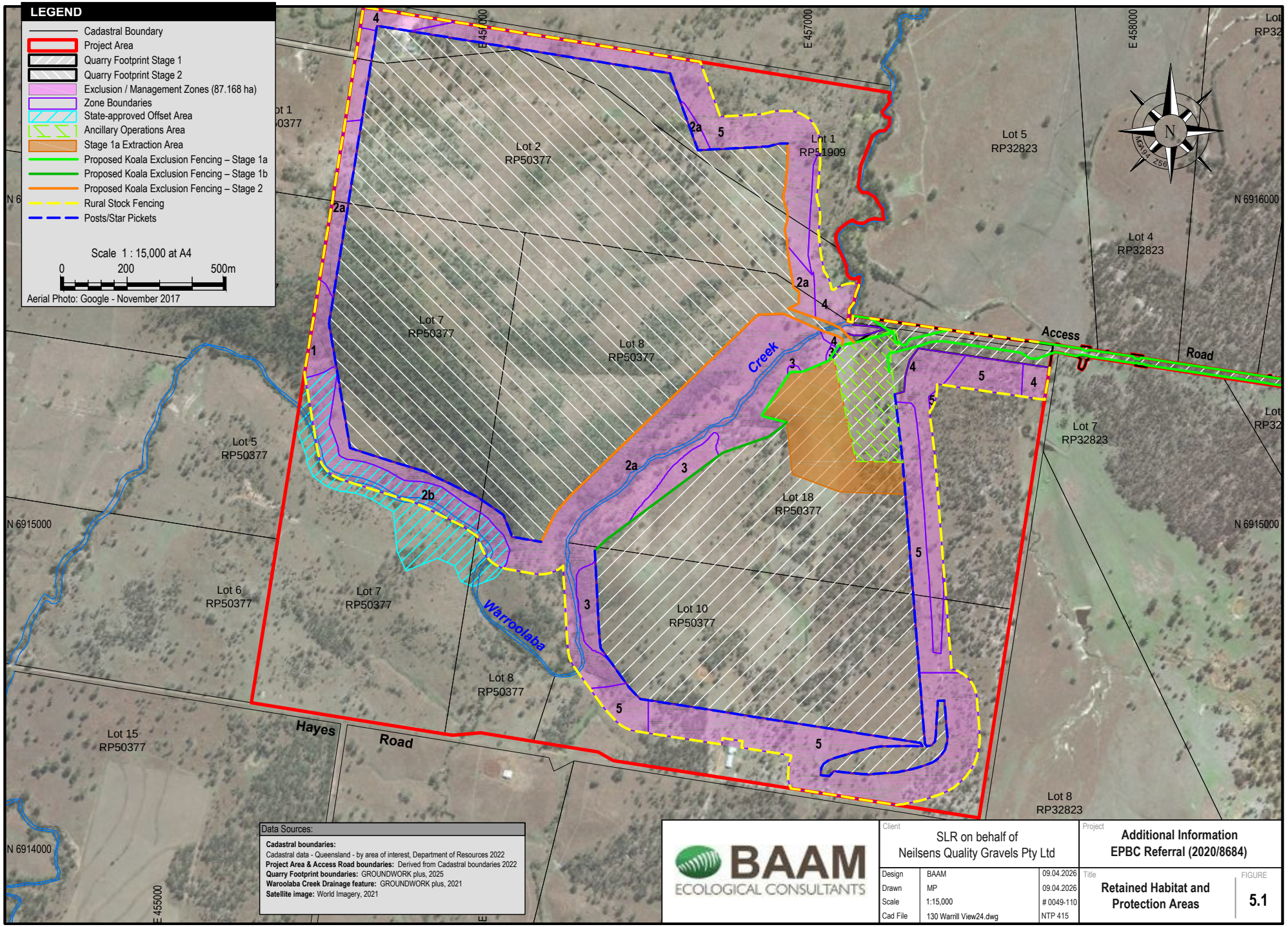
Onsite effluent will be collected and managed by a suitably licensed contractor for transport and disposal at an approved offsite facility, unless sufficient information is provided to DCCEEW demonstrating that an onsite treatment and irrigation system will not adversely impact MNES. This will include:

- confirmation of system capacity and irrigation area extent;
- identification and mapping of the irrigation area, including buffers and exclusion zones relative to MNES habitat and sensitive areas;
- assessment of potential impacts to vegetation condition, hydrology and habitat function, and how these will be avoided or minimised;
- description of irrigation method and any operational risks to MNES; and
- outline of maintenance requirements and associated impacts to habitat values.

Weed Management

Weed management will be undertaken in all exclusion/management zones to enhance and maintain habitat quality and movement opportunities for Koala, Grey-headed Flying-fox and other native fauna . A suitably qualified ecologist/rehabilitation contractor will be engaged to identify and map weed occurrences and treat declared and environmental weeds throughout the life of the quarry. The contractor must be appropriately licenced to undertake herbicide application.

Weed mapping for each exclusion/management zone (indicating key areas of each dominant weed species for targeted management) adjacent to Stage 1 of the impact will occur within two (2) years of commencement of Stage 1 and be repeated in conjunction with ongoing BioCondition monitoring.



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Weed mapping for each exclusion/management zone adjacent to Stage 2 of the impact will commence within one (1) year of commencement of Stage 2, and be repeated in conjunction with ongoing BioCondition monitoring.

Weed management activities will target areas of least disturbance and weed invasion and work towards the more weed infested areas. Soil disturbance will be minimised to reduce the potential for fresh weed invasion, while native plant regeneration will dictate the rate of ongoing weed removal.

Before the commencement of weed removal in Exclusion/Management Zones 2a and 2b, a sediment fence will be installed between the works area and creek bank. The fence will be fully erected and functional before weed removal commences, and will be inspected and repaired after all rainfall events. The sediment fencing will be maintained for 12 months post weed removal works and any supplementary plantings. In general, manual removal of herbaceous weeds, regrowth and seedlings is preferred to minimise disturbance to soil stability and existing native species, while chemical removal can be utilised for larger weeds and areas of large infestation containing few natives. The use of herbicides will be restricted to the control of weeds declared under the *Biosecurity Act 2014* (such as Lantana and Prickly Pear *Opuntia tomentosa*), as well as recognised environmental weeds (such as Red Natal Grass *Melinis repens*) that threaten the success of habitat enhancement or impede fauna movement, and will be in strict compliance with Queensland Department of Primary Industries (DPI) guidelines.

A particular focus of weed management will be the removal of patches of Lantana, which was particularly prevalent onsite. Dependent on the level of infestation, this weed can be hand-pulled, cut-stumped, splatter-gunned and/or foliar sprayed.

The extent and impact of exotic grasses will also be recorded and, dependent on the level of impacts (e.g. cover, density and height of exotic grasses has reached a stage that it precludes natural regeneration), adaptive management measures will be initiated; this could include slashing of grasses or pulse grazing, controlled burns or herbicide treatment.

Prior to entering the exclusion/management zones, all equipment will be cleaned to remove seeds and sediment.

Habitat Enhancement

Current vegetation/habitat condition within the exclusion/management zones will be maintained and enhanced through promoting ‘assisted natural regeneration’, which applies to native vegetation communities that are largely healthy and functional, and displaying intact topsoil and a viable native seedbank, but are impacted by weeds and other disturbances. This applies to Exclusion/Management Zone 1, and portions of Exclusion/Management Zones 2-5 that already comprise an intact, native tree canopy. Minor intervention in the form of weed control (as described above) and removal of other disturbances (e.g. removal of livestock, implementation of appropriate fire regimes) will typically allow the community to recover.

In portions of Exclusion/Management Zones 2-5 that are largely cleared or display a more open canopy (and in which natural recruitment would take longer to restore the original community), supplementary plantings of recognised food tree species for Koala and Grey-headed Flying-fox that naturally occur within each exclusion/management zone will be undertaken,. Recognised food tree species for Koala and Grey-headed Flying-fox that naturally occur within each exclusion/ management zone and typical canopy stem densities (based on the technical description for the associated regional ecosystem) are provided in **Table 5.1**.

Supplementary planting works will also ensure:

- Plants are sourced from local provenance (i.e. within 50 km), where available, to enhance survival rates. Alternatively, seeds will be collected from mature trees within the Site and used to direct seed the planting areas, or used to propagate seedlings for later planting.
- Plants are 50mm “tube-stock” size, provided in forestry tubes with a minimum plant height of 20cm and a well-developed root system; this size is cost effective and has higher survival rates and faster growth rates than advanced stock.

Table 5.1. Recognised food tree species for Koala and Grey-headed Flying-fox that naturally occur within each exclusion/management zone and typical canopy stem densities

Exclusion/ Management Zone (associated RE)	Recognised food tree species for Koala and Grey-headed Flying-fox	Typical Canopy Stem Density
Exclusion/Management Zones 2a, 2b, 3 (RE 12.8.17)	*Corymbia clarksoniana, Corymbia intermedia, Corymbia tessellaris, Eucalyptus crebra, Eucalyptus melanophloia, Eucalyptus melliodora, Eucalyptus tereticornis*	1/17m^2 (at least 580/ha)
Exclusion/Management Zone 4 (RE 12.3.3)	*Corymbia clarksoniana, Corymbia intermedia Eucalyptus crebra, Eucalyptus moluccana, Eucalyptus tereticornis*	1/27m^2 (at least 365/ha)
Exclusion/Management Zone 5 (RE 12.9-10.7)	*Corymbia tessellaris, Eucalyptus crebra, Eucalyptus tereticornis*	1/20m^2 (at least 480/ha)

- Seedlings are healthy and displaying signs of active growth – any plants displaying yellowing, disease, root curling or are root bound will not be planted, nor will any plants with weeds growing in the pot.
- Seedlings are moist at time of planting and if necessary, watered prior to planting.
- A weed-free mulch will be laid over the planting rows to a depth of 100mm prior to planting. Care will be taken during the planting process to ensure mulch does not touch the plant stems to avoid stem rot.
- Tree guards are installed around each planted tree to protect against grazing by native and exotic fauna.
- Seedlings are watered with a minimum of 5 – 10 litres of water each at the time of planting, then water weekly (approximately 8-10 litres depending on weather conditions) for four weeks and then monthly or as necessary until seedlings are established (approximately 3 – 6 months).

In areas that have experienced recent cattle grazing, soil ripping/tilling will also be undertaken prior to planting, if the ground appears compacted.

In terms of timing, rehabilitation of the State-approved offset area (including exclusion management zone 2b) must be completed prior to any clearing of remnant RE 12.8.17 occurring in the proposed west pit. Otherwise, habitat enhancement will be undertaken in stages, with habitat enhancement adjacent to Stage 1 of the impact commencing within two (2) years of commencement of Stage 1, and habitat enhancement adjacent to Stage 2 of the impact commencing within one (1) year of commencement of Stage 2.

Exact timings for supplementary plantings will depend on appropriate climatic conditions, although all plantings will commence within two (2) years of commencing each stage(s) of the impact.

The establishment and maintenance period will be 36 months following each planting event. Maintenance will be undertaken by a rehabilitation contractor or other suitably qualified contractor, and will consist of weed control around plantings and replacement of dead or damaged plants and depleted mulch according to the watering regime described above for the first 3 months, then every 3 months up until the first 12 months after planting, and then every 6 months up until 36 months after planting. Protection and maintenance of planted areas will then be undertaken as described for the overall exclusion/management zone.

A Bushfire Management Plan is also being prepared for the proposed development, which recommends implementation of appropriate fire regimes for land surrounding the proposed quarry footprint, including in accordance with relevant RE fire management guidelines for areas identified for conservation outcomes (i.e. the exclusion/management zones) (refer **Table 5.5**).

Rehabilitation Targets

The rehabilitation targets for each Exclusion/Management Zone are outlined in **Table 5.2**. As the aim is to maintain/enhance current condition, overall Biocondition and non-native plant cover targets are based on current scores outlined in **Tables 3.4-3.8**.

Table 5.2. Rehabilitation targets for each exclusion/management zone

Exclusion/ Management Zone	Specific Targets (from year 5 until site closure)		General Targets (all zones)
	Overall Biocondition Score Target (rounded out of 10)	Non-native Plant Cover Score Target (out of 10)	
Exclusion Management Zone 1 (remnant RE 12.8.17)	≥8	>0	• Declared weed species cover within each exclusion/management zone is reduced to, and maintained at, <5% within 5 years of commencing weed management works. • Natural recruitment by native species and establishment of supplementary plantings is not suppressed by weeds. • Natural regeneration of native species, including species known to support Koala and important winter food trees for Grey-headed Flying-fox, is evident within each exclusion/management zone within 2 years of commencing rehabilitation works. • All supplementary plantings achieve at least 90% survival rate by the end of the 36 month establishment and maintenance period. • Vegetation structure within each exclusion/management zone reflects the relevant Regional Ecosystem, and includes recognised food tree species for Koala and Grey-headed Flying-fox as dominant canopy species (and representatives of key species in all other strata), within 5 years of commencing rehabilitation works.
Exclusion Management Zone 2a (non-remnant RE 12.8.17 with regrowth/scattered trees)	≥6	≥5	
Exclusion Management Zone 2b (non-remnant RE 12.8.17 with regrowth/scattered trees – part of State-approved offset area)	≥6	≥5	
Exclusion Management Zone 3 (non-remnant RE 12.8.17 – cleared pasture)	≥2	≥5	
Exclusion Management Zone 4 (non-remnant RE 12.3.3 with regrowth/scattered trees)	≥6	≥5	
Exclusion Management Zone 5 (non-remnant RE12.9-10.7 with regrowth/scattered trees)	≥7	≥7.5	

Minimising General Environmental Harm

An EMP has been prepared by SLR to manage potential impacts to surrounding areas caused by dust, noise, chemical spills and changes in hydrology (refer **Appendix 8**). Measures relevant to minimising impacts on adjacent vegetation/habitat to be retained include:

- Ensuring all quarry staff and contractors, are inducted on the environmental management requirements for the Site and informed of the environmental management objectives and specifics of the EMP.
- Implementation of the site Stormwater Management Plan (**Appendix 2**) to ensure contaminants are not released from the Site to any waters (other than those specified in the EA).
- Implementation of measures for the management of surface water runoff and erosion and sediment transport from the Site in accordance with the Stormwater Management Plan and State approval conditions.
- Ensuring minimum buffers (5.0m) are maintained at all times from the Site boundary to all stockpiled material.
- Implementation of measures for the management of hydrocarbons and chemicals at the Site in accordance with State approval conditions.
- Installing appropriate bunding on all bulk chemical and fuel storage areas.
- Preparation of an Air Quality Management Plan to control potential air quality impacts occurring as a result of land disturbance necessary for the extractive industry operation, including implementation of measures for the management of dust emissions from the Site in accordance with State approval conditions.
- Restricting blasting to 9:00am to 3:00pm Monday to Friday and 9:00am to 1:00pm on Saturdays, and restricting rock drill operation to 7:00am to 6:00pm on all days, with no extraction and processing from 10:00pm to 6:00am.

The EMP is subject to periodic review to ensure continuous improvement of the Site environmental performance through adaption of management strategies, to meet the changing needs of the Site.

Monitoring

To monitor the progress of vegetation protection, weed management and habitat enhancement within all exclusion/management zones, monitoring sites will be established in accordance with *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual. Version 2.2* (Eyre, et al. 2015), ensuring adequate coverage and representation of each exclusion/management zone shown on **Figure 5.1**. Monitoring sites for exclusion/management zone 2b will be co-located with those established in the State-approved offset area to improve the efficiency of the overall monitoring regime.

Within all exclusion/management zones, monitoring will occur over the life of the operation (in order of 100 years). This will consist of annual monitoring for the first five (5) years after commencing the management of each stage, which will focus on the level of recruitment and flora species composition achieved through natural regeneration, the health, growth and survival of plants, and any new or recurring weed infestations. Monitoring will then be undertaken for each stage every 5 years from year 5 following Eyre, et al. (2011), to determine progress and inform adaptive management actions to ensure rehabilitation targets are achieved and maintained.

Monitoring of threatening processes from adjacent quarrying activities will also be undertaken, as detailed in the site EMP (**Appendix 8**) and summarised in **Table 5.5**.

The details and results of each monitoring event will be documented in a monitoring report, which will include:

- monitoring aims and methods;
- recorded data (including photos);
- activities undertaken since the previous monitoring event;
- overall progress towards the achievement of intended outcomes;
- any issues identified; and
- necessary corrective actions.

5.5 AVOIDING/MINIMISING IMPACTS TO HABITAT CONNECTIVITY AND KOALA MOVEMENT

Figure 5.2 shows the expected current Koala dispersal pathways through the project area, based on records of Koala activity shown on **Figure 3.3**, and the expectation that Koalas would utilise relatively low-lying, vegetated areas for dispersal rather than sparsely vegetated and/or steep areas. In particular, the Warroolaba Creek corridor is expected to be a primary thoroughfare for Koalas negotiating the otherwise fragmented and topographically challenging landscape.

Impacts to these expected current Koala dispersal pathways during each phase of the project include:

1. Removal of vegetation (representing shelter/refuge during dispersal) from the Access Road corridor, and construction of the access road during the initial project setup phase.
2. Removal of vegetation from expected current Koala dispersal pathways within the northern portion of the Stage 1 impact area, to enable construction of the ancillary operations area and initial extraction area (identified as "Stage 1a Extraction Area" on **Figure 5.1**).
3. Access road operation during Stage 1a.
4. Removal of vegetation from expected current Koala dispersal pathways within the southern portion of the Stage 1 impact area, to enable progression of the east pit.
5. Access road operation during the progression of Stage 1.
6. Removal of vegetation from the proposed location of the Warroolaba Creek crossing, and construction of the crossing during the initial setup phase for Stage 2.
7. Removal of vegetation from expected current Koala dispersal pathways within the Stage 2 impact area.
8. Access road and creek crossing operation during the progression of Stage 2.

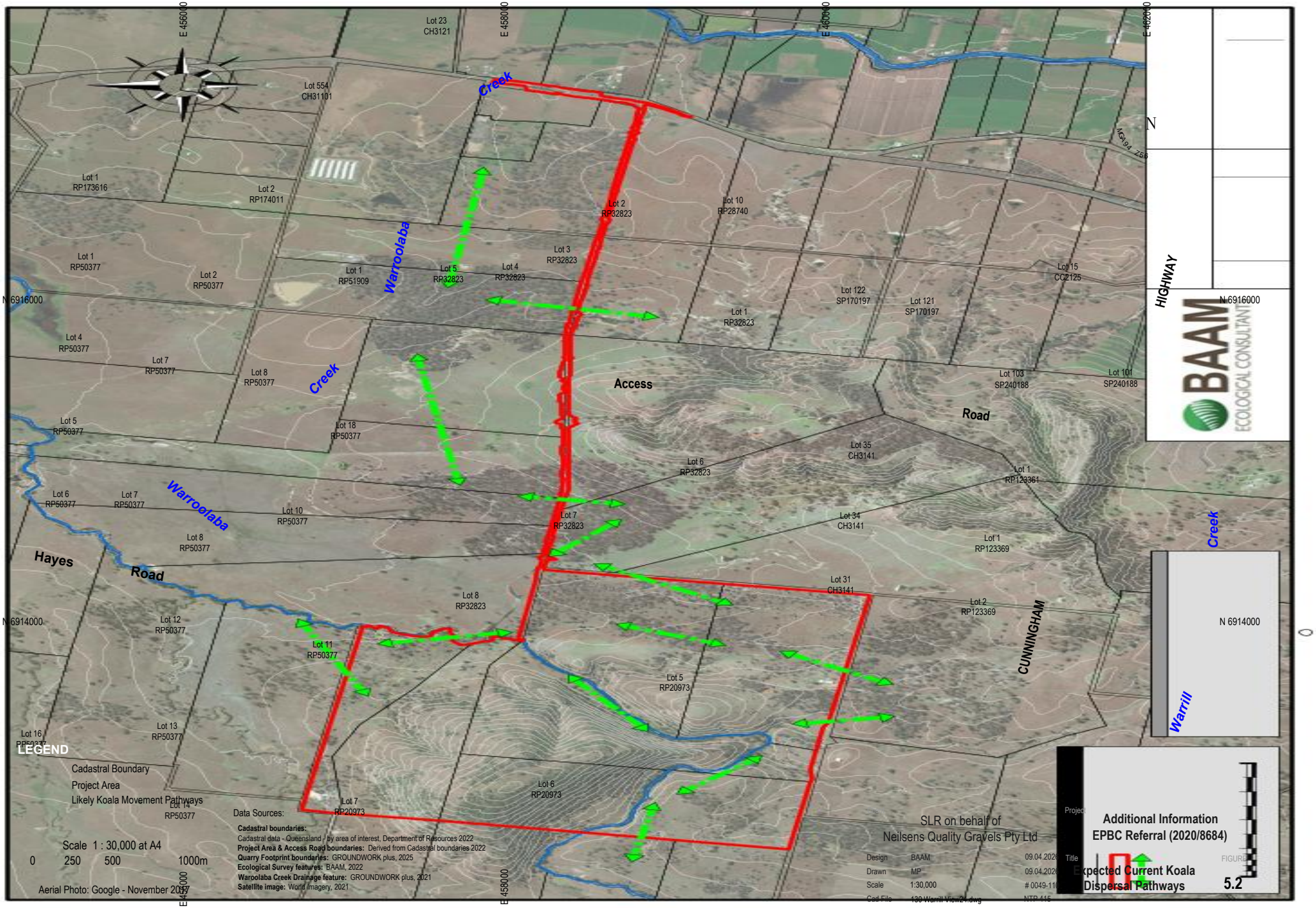
If left unmanaged, the gradual deterioration of retained habitat surrounding the operational areas could also impact Koala movement due to physical impediments (e.g. Lantana thickets) or avoidance of these areas by Koala.

The construction and operation of the new access road will have the most influence on the current dispersal pathways of the local Koala population. However, the construction of this new road, to appropriately connect the site to the Cunningham Highway, is unavoidable. To mitigate impacts to Koala movement and functional habitat connectivity associated with the construction and operation of the access road, the Queensland Department of Transport and Main Roads' *Fauna Sensitive Transport Infrastructure Delivery manual* [DTMR 2024]) was consulted to determine and inform the type, number and location of fauna movement measures to be incorporated into road design, while accounting for engineering constraints.

From this assessment, it was determined that underpasses would be the best option, given signage alone would be inadequate, and "overpass" alternatives were either not financially or spatially feasible (i.e. vegetated land bridges), or not yet proven to facilitate Koala movement (e.g. canopy bridges, steel gantries). In accordance with DTMR (2024), and accounting for engineering constraints, the design of the access road incorporates three drainage culverts that are positioned at expected current Koala dispersal pathways (i.e. adjacent to existing patches of habitat), and will allow for Koala movement based on their dimensions and inundation frequency. Koala exclusion fencing will also be installed in association with each underpass on both sides of the road to choreograph Koala movement towards the underpasses; each section of Koala exclusion fencing will be at least 500m long and continuous where it passes through large areas of habitat, in accordance with DTMR (2024).

Table 5.3 provides an assessment of how these Koala-sensitive road design features addresses the relevant recommendations of DTMR (2024). In particular, the specified road culverts:

- have been placed at likely movement pathways for the target species (i.e. Koala).
- are of a size known to be used by Koalas.
- will be free-draining, avoiding ponding and ensuring rapid clearance of water, and will be dry the vast majority of the time (i.e. with a maximum inundation duration of 8hrs following a 1 in 100 year flood event).



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Table 5.3. Assessment of proposed Koala-sensitive road design features against DTMR guidelines (DTMR 2024)

Guideline Recommendation	Assessment of Proposed Koala-sensitive Road Design Features
Access Road	
Culvert Positioning • Place culverts at known or likely movement pathways for the target species.	Culverts 8A, 10B and 11B are adjacent to large patches of vegetation adjacent to the access road, where Koalas are more likely to cross the road.
Culvert Shapes and Sizes • There are many reports of Koalas using culverts, including round concrete pipes and square and rectangular concrete box culverts, to pass under roads and railways. • For Koalas, box culverts are generally preferred over pipes because they have a flat floor and larger surface area. • For 2 lane roads, the optimal culvert height x width for Koala movement is 1.2 m x 1.2 m without a timber rail included. • In most cases, a slightly smaller crossing structure compared to those given in this manual is unlikely to result in a 'failed' structure – it typically results in lower rates of use. Therefore, in situations where an optimally sized structure is unable to be installed due to project constraints, it may be compensated for by installing more slightly smaller crossing structures over a larger area. • The dimensions of culverts used by Koalas to pass under roads vary considerably, including occasional use of culverts down to 900 millimetres high.	Culvert 8A comprises an array of 5 x 1200mm diameter pipes. Culvert 10B comprises an array of two 2100mm wide x 1200mm high outer culverts separated by a 3600mm spanning slab. Culvert 11B comprises an array of two 2700mm wide x 900mm high outer culverts separated by a 3300mm spanning slab. As culvert 11B is below the optimal height of 1.2m, refuge poles and rails will be installed at the entrance/exit of the culvert to assist Koalas escape any predators lurking within or near the culvert.
Culvert Inundation Frequency • The culvert should remain dry year-round, ideally set above the 1:10 year flood level. The culvert should be free draining to prevent ponding of water. If the culvert cannot be set above the 1:10 year flood level or is likely to be inundated during flood events, an alternative dry passage option for terrestrial fauna should be provided − can be a ledge, shelf, or alternative structure that provides equivalent dry passage, installed on both outer walls of the culvert or culvert array. • If the culvert is likely to be inundated more frequently than during flood events (e.g. during base or high flow), install a multi-use culvert. The two outer cells must be set higher than the middle cell which is the focus for water flow. The outer cells must meet terrestrial culvert requirements described in this section.	The culverts will be free-draining, avoiding ponding and ensuring rapid clearance of water, to maintain road safety and infrastructure reliability. Given the topographical constraints, it is not feasible to set the culverts above the 1:10 yr flood level. Even so, flood modelling indicates culverts 8A, 10B and 11B will be dry the vast majority of the time, with a maximum inundation duration of 8hrs following a 1 in 100 year flood event. Culverts 10B and 11B will incorporate a central, "low-flow" culvert to further ensure the outer culverts remain suitable for Koala movement the vast majority of the time.
Koala Exclusion Fencing • Fauna fences should typically be installed on both sides of transport infrastructure. • For preliminary planning purposes, assume 500 m of fencing at each crossing structure and continuous fencing where it passes through large areas of habitat. • Fauna fencing should typically include a 'return' – an angled section of fence (the last 10-20 m of fencing) to encourage fauna to turn back towards their habitat rather than move around the fence end and onto the transport infrastructure.	Fencing associated with each underpass will be on both sides of the road, will be at least 500m long and will be continuous where it passes through large areas of habitat. A 10m return will be included at either end of each section of Koala exclusion fencing.
Main Creek Crossing	
Size and Shape • For 2 lane roads, the optimal minimum size (height x width) of the "terrestrial wildlife zone" in bridge underpasses for Koala movement is 1.2 m x 1.2 m without a timber rail included, or 2.4 m x 1.5 m with a timber rail included. • A terrestrial wildlife zone is provided on both banks of the waterway and is as flat as possible.	The proposed creek crossing incorporates timber rails and the terrestrial wildlife zone exceeds the optimal minimum size for this scenario. Terrestrial wildlife zones will be provided on both banks and will incorporate timber rails to facilitate Koala movement.
Fauna Furniture	The proposed creek crossing incorporates timber rails.

Guideline Recommendation	Assessment of Proposed Koala-sensitive Road Design Features
• Koalas can move along the ground, however, are at increased risk of predator attack. Where possible, timber rails should be installed to minimise this risk.	
Inundation Frequency • Terrestrial wildlife zones are set outside of the high bank to remain dry year-round except during flood events (i.e. set above the 1:10 year flood level if practicable).	Terrestrial wildlife zones will be set above the Q10 flood level.
Koala Exclusion Fencing • Install fencing to funnel the target species to the bridge wherever there is a risk that the target species may access the road. • Fencing must consider the risk of flood and being damaged during floods and/or debris becoming lodged in the fencing and obstructing the flow of water. • Fauna fences should typically be installed on both sides of transport infrastructure. • Where possible, fence ends should be integrated with other infrastructure, such as boundary fencing, natural barriers e.g. cliffs, cuttings, rocky areas, or other geographical features that limit movement of the target species.	Fencing will be installed on both sides of the road to funnel Koalas to the terrestrial wildlife zones of the bridge crossing. Fencing will be set above the Q100 flood level. Fence ends will be integrated with other Koala exclusion fencing around quarry operational areas.

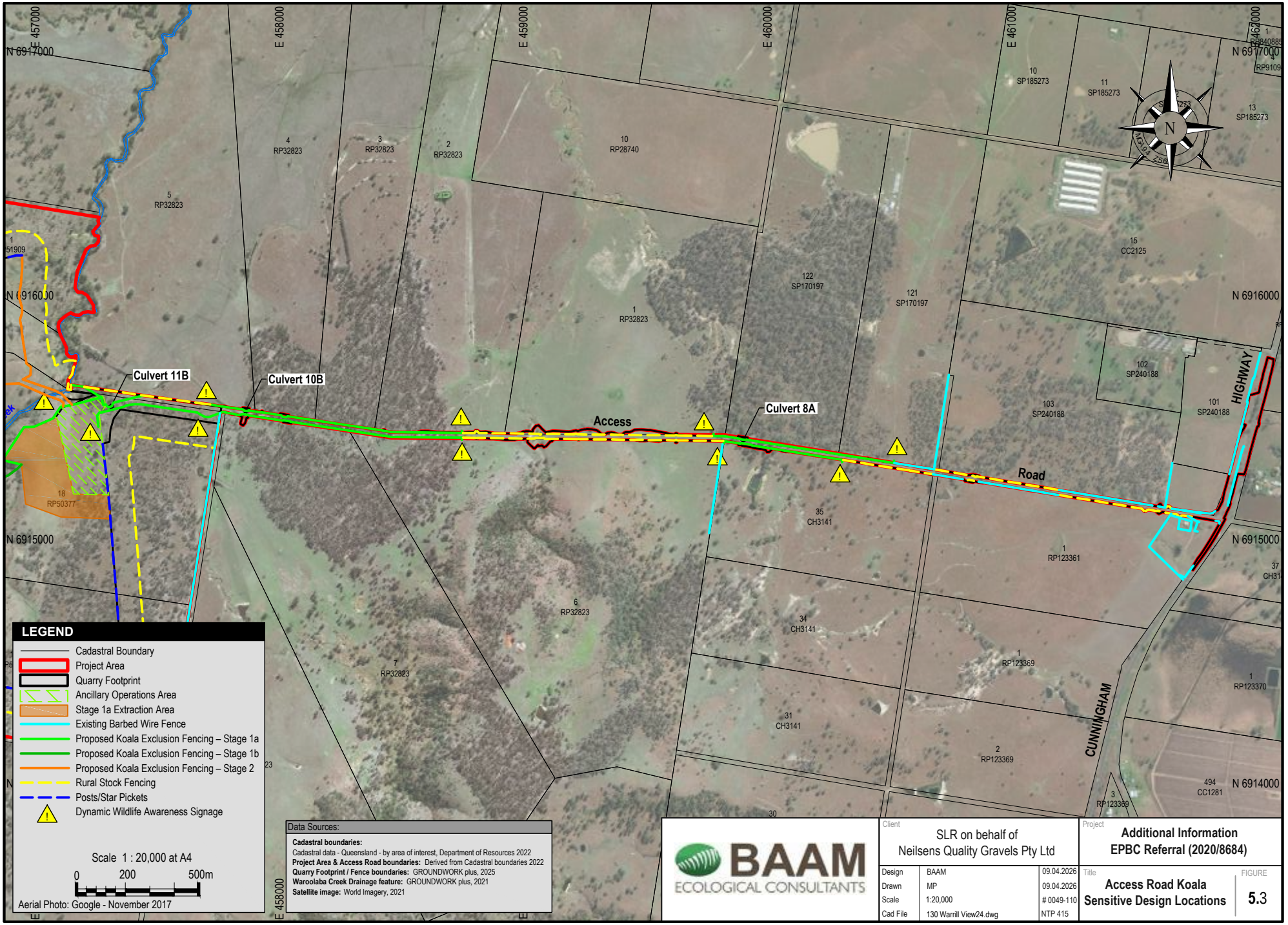
Dynamic wildlife awareness signage will also be installed at the commencement and termination of Koala exclusion fencing along the access road, which coincides with the edges of vegetation patches abutting the road corridor. Wildlife signage is one of the most widely employed attempts at mitigating strikes, and new signage technology has the potential to increase the effectiveness of such signs, by allowing for real-time messaging to drivers that can be tailored and dynamic, providing useful feedback to drivers about their driving behaviour, particularly in relation to speed. Such dynamic signage has been consistently demonstrated to reduce driver speed, and collisions, and can do so cost-effectively (Griffith University 2019a,b; Wu et al. 2020).

The proposed locations for the access road underpasses and associated fencing and signage are indicated on **Figure 5.3**.

The access road traverses rolling terrain with multiple undulations, shallow curves, and embankment transitions. Scenic Rim Regional Council has agreed to adopt a reduced speed environment for this new road, reducing the rural road speed from 100km/hr to 60km/hr. A posted speed of 60 km/h allows the design to more naturally conform to existing terrain, reducing the need for significant earthworks, achieving smaller, safer batters and more sustainable drainage patters, and reducing vegetation clearance and sedimentation risks during construction that would otherwise be necessary to support a 100 km/h posted speed. It also assists improving driver reaction time. The dynamic wildlife signage will indicate a reduced speed limit of 40km/hr from dusk to dawn, which is the peak time for Koala movement.

Sections of the access road where Koala exclusion fencing is not provided will be fenced using standard, 4-strand rural fencing, which is a common feature that dispersing Koalas already navigate in the local landscape, and is positioned where Koalas are unlikely to cross the road (i.e. based on lack of adjacent vegetation - refer **Figure 5.3**). Where new sections of this fencing is proposed, the bottom strand will be at least 30cm off the ground to facilitate the movement of any Koalas that happen to cross this section of the road. Consequently, no significant risk of entanglement, or entrapment of Koalas within the road corridor is expected.

The proposed construction of a bridge over Warroolaba Creek will provide access to the western side of the waterway, once the sufficient market demand has been established for the commencement of the west pit. This bridge crossing will require earthworks on both sides of the upper bank of the creek. On the eastern side of the creek, works will primarily involve cut to align the bridge approach with the floor level of the east pit and associated operational areas. On the western side of the creek, fill will be required, with the finished level remaining above the upper bank of the creek.



BAAM ECOLOGICAL CONSULTANTS

Client	SLR on behalf of Neilsens Quality Gravels Pty Ltd	
Design	BAAM	09.04.2026
Drawn	MP	09.04.2026
Scale	1:20,000	# 0049-110
Cad File	130 Warrill View24.dwg	NTP 415

Project: **Additional Information EPBC Referral (2020/8684)**

Title: **Access Road Koala Sensitive Design Locations**

FIGURE **5.3**

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A concept design for the creek crossing is provided in **Appendix 10.** The Queensland *Fauna Sensitive Transport Infrastructure Delivery manual* (DTMR 2024) was consulted to inform the design of the crossing, to ensure impacts on Koala movement through this section of the Warroolaba Creek corridor were minimised. Accordingly, the bridge structure will incorporate an underpass on either side of the waterway channel so Koalas can easily and safely access retained habitat on either side of the crossing; this will be facilitated by installing Koala exclusion fencing on either side of the bridge (refer **Figure 5.1**) to choreograph the movement of Koalas towards the underpasses, thereby encouraging safe passage beneath the structure. The underpasses will also incorporate raised hardwood log rails to minimise risk of predator attack, which will retain their natural bark surface to provide adequate grip for climbing fauna, and securely anchored to the bridge substructure or supported by concrete footings.

Table 5.3 provides an assessment of how the creek crossing design addresses the relevant recommendations of DTMR (2024).

Periodic inspection and maintenance of the bridge and road underpasses and associated fencing will be undertaken by the Quarry manager in accordance with DTMR (2024), as detailed in **Table 5.4**. Responsible parties and corrective actions are provided in **Table 5.5**.

In terms of maintaining the functional connectivity of retained habitat, research has determined strategic revegetation of Koala food trees along watercourses where Koala are present should inform conservation planning at local levels (Adams-Hosking et al. 2014), to ensure long-term persistence of Koala. The management strategies set out in **Section 5.4** will maintain and facilitate Koala movement along the Warroolaba Creek corridor (which would represent the main thoroughfare through the central portion of the Site) and elsewhere around the boundaries of the proposed east and west pits, through the treatment of Lantana and supplementary plantings of preferred canopy species for Koala. Although some dispersal pathways will no longer be available, these measures will ensure alternative, adjacent pathways remain available and suitable for Koala movement throughout all phases and stages of the project, as depicted on **Figure 5.4**.

Table 5.4. Maintenance requirements for proposed Koala-sensitive road design features in accordance with DTMR guidelines (DTMR 2024)

Feature / Component	Maintenance Checks
Access Road Culverts – Inspect annually and within 4 weeks after high rainfall and flooding events for the duration of the proposed action	
Approaches and entrances	• Dry passage is available, small temporary puddles are OK. • Vegetation type, coverage, and connectivity is appropriate for the target species. • No rubbish or debris is blocking the entrance. • Signs of use by Koalas, as well as signs of use by non-target species (i.e. foxes) which could negatively impact the intended functionality of the culvert.
Structure	• There is no visible damage to the structure (e.g. cracks or leaks).
Creek Crossing - Inspect annually and within 4 weeks after high rainfall and flooding events for the duration of the proposed action	
Approaches and entrances	• Dry passage is available, small temporary puddles are OK. • Vegetation coverage and connectivity is appropriate for the target species. • A Koala movement pathway is present (not washed away). • Large erosion control rocks are not obstructing fauna movement.
Fauna furniture	• Koala rails are functional and not obviously damaged.
Fencing – Inspect annually and within 4 weeks after high rainfall and flooding events for the duration of the proposed action	
Vegetation	• No trees are leaning on or extending over the fence.
Structure	• No holes are present in the fence. • No significant gaps are evident under the fence. • The fence is not leaning or falling over. • Gates or other designed openings are operational. Locks are functional and there are no gaps between or under gates. • Any escape mechanisms are not damaged or impeded. • Secondary features are still in place and functional (e.g. perspex or metal panel on Koala fence).

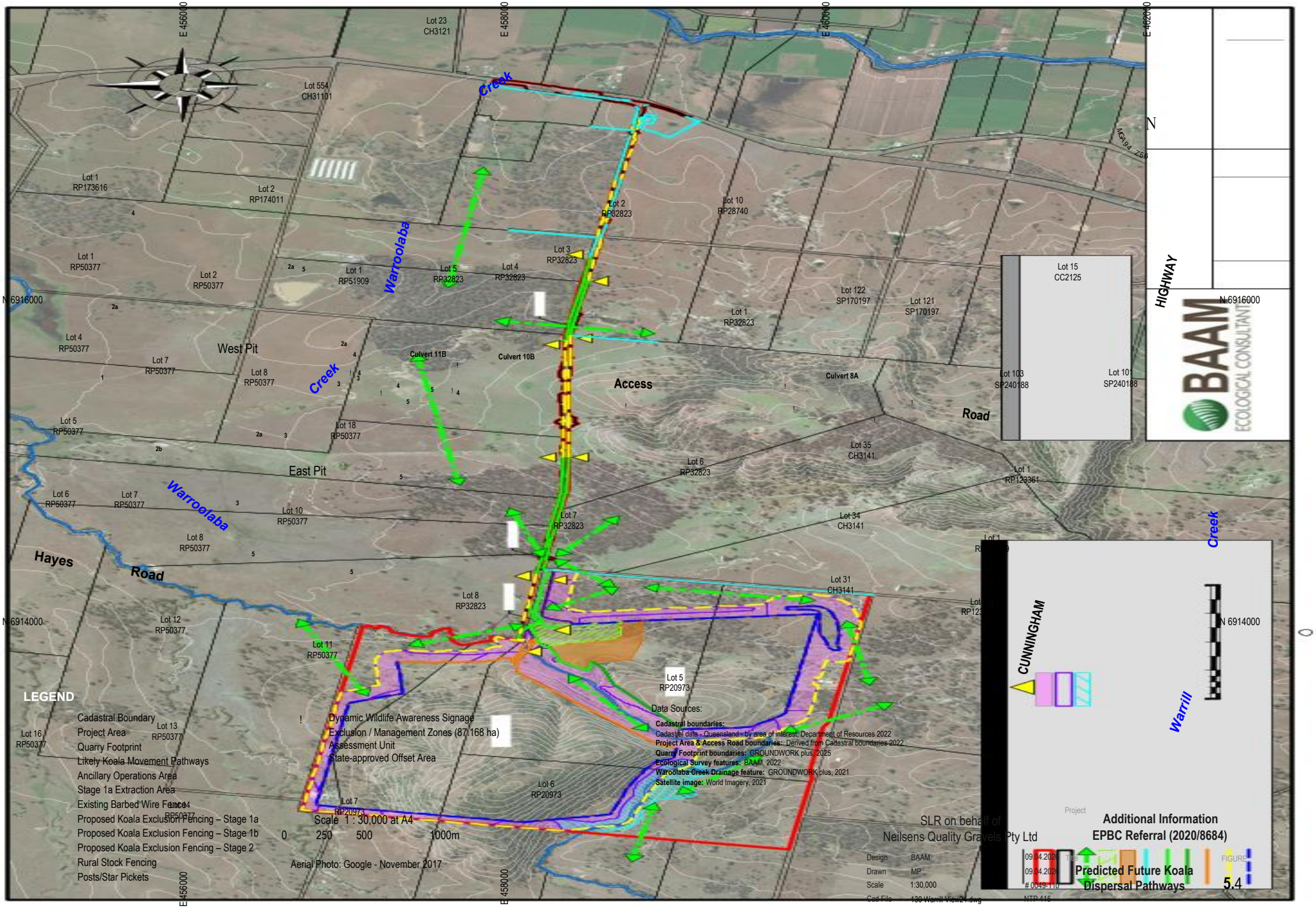
5.6 AVOIDING/MINIMISING DEATH OR INJURY TO KOALA DURING CLEARING AND QUARRY OPERATION

Table 5.5 outlines the proposed measures aimed at avoiding death or injury to Koalas during clearing activities and operation of the quarry, their predicted effectiveness, the responsible party, associated milestones / performance / completion criteria, and proposed monitoring and evaluation program. These measures are also outlined in the site EMP (**Appendix 8**). In particular:

- All vegetation clearing will be undertaken in accordance with the Queensland *Nature Conservation (Koala) Conservation Plan 2017,* which requires that clearing is undertaken under the guidance and supervision of an appropriate number of suitably qualified and experienced fauna spotter-catchers (FSCs), and prohibits the disturbance of trees containing Koalas and any trees with adjoining canopies, until the Koala has left the tree of its own volition.
- Koala exclusion fencing will be installed along the boundary of the operations area on either side of the Warroolaba Creek corridor to prevent dispersing Koalas entering the operations area (refer **Figures 5.1 and 5.4**).
- Management actions, performance outcomes and corrective actions have been developed to minimise the risk of dog attack, including the development and implementation of a wild dog control program for the site, and prohibiting all persons entering the quarry from bringing dogs onto the site;
- Management actions, performance outcomes and corrective actions have been developed to minimise the risk of vehicle strike, including
    - Installation of underpasses that allow Koala movement and associated Koala exclusion fencing and dynamic wildlife awareness signage at the proposed crossing of Warroolaba Creek and at strategic locations along the quarry access road (refer **Section 5.5**).
    - Reducing the vehicle speed environment within the quarry site to 20 km/hr and installing advisory signage at strategic locations within the quarry operations area advising drivers of the potential for Koalas to be sited within the operational areas as the disturbance area evolves.
    - Communicating and explaining speed limits within the quarry suite and along the access road to all staff and contractors as part of the general site induction, as well as penalties for non-compliance. All Neilsens employees must also comply with a drivers code of conduct, including adherence to specified speed limits.

All of the above measures will be committed to for the life of the proposed action, until the onset of conditioned site closure actions.

As shown on **Figures 5.1 and 5.4**, Koala exclusion fencing installed during the initial phase of the project will be restricted to that associated with the access road underpasses, and along the boundary of the ancillary operations area and initial phase of the east pit (identified as “Stage 1a Extraction Area”) where it abuts the Warroolaba Creek corridor, thereby avoiding disruptions to existing movement pathways across other, undeveloped parts of the site during this time. Exclusion fencing will then be installed along the remaining boundary between the east pit and Warroolaba Creek corridor prior to the commencement of subsequent phases of extraction within the east pit, whereas the installation of exclusion fencing associated with the creek crossing and boundary between the Stage 2 (west pit) operational area and Warroolaba Creek corridor will be delayed until the commencement of Stage 2.



c Biodiversity Assessment and Management Pty Ltd. While every care is taken to ensure the accuracy of this data, Biodiversity Assessment and Management makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation liability in negligence) for all expenses, losses, damages (including indirect consequential damage) and costs which might be incurred as a result of the data being inaccurate or incomplete in any way and for any reason.

Table 5.5. Summary of avoidance and mitigation measures and associated monitoring and corrective actions (committed to for the life of the proposed action, until the onset of conditioned site closure actions)

Key objective	Management objective	Success criteria	Management actions	Responsible parties	Predicted effectiveness	Monitoring	Trigger for corrective action/s	Corrective action/s
Avoid/Minimise Death or Injury to Koala during Clearing	Provide appropriate guidance and supervision during clearing	Personnel responsible for ensuring Koala wellbeing are on site during all clearing activities	All vegetation clearing will be undertaken under the guidance and supervision of suitably qualified and experienced fauna spotter-catchers	Site Manager Clearing contractors FSCs	The presence of suitably qualified and experienced fauna spotter-catchers is expected to eliminate the risk of any trees containing Koalas being felled, and minimise risks to Koala from other onsite activities during clearing.	Suitably qualified and experienced fauna spotter-catchers will be present for initial pre-clear inspections and pre-start meeting prior to clearing each day, and remain on site during clearing.	Fauna spotter/catchers not present prior to/during clearing	Immediately cease all clearing works until suitably qualified and experienced fauna spotter-catchers are present.
	Undertake clearing progressively, in line with operational needs	Koalas disperse from the site of their own volition without becoming trapped or otherwise requiring direct human intervention	A maximum daily clearing rate of three hectares per day will apply at all times. There will be at least one period of 12 hours that starts at 6p.m. on a day and ends at 6a.m. on the following day, during which no trees are cleared on the Site.	Site Manager Clearing contractors FSCs	Koalas are expected to move away from areas of disturbance where vegetation is being removed, provided there is sufficient time and breaks in site activity to do so	Areas to be cleared will be carefully inspected each day for Koalas immediately prior to and during clearing activities. Previously cleared areas will be continually monitored for Koalas during adjacent clearing activities.	Koala detected in area to be cleared. Koala detected in previously cleared area.	Immediately cease all clearing works and implement measures to avoid impacts to Koalas present during clearing (as outlined in this table). Immediately cease all clearing works and remove potential impediments to the Koala vacating the previously cleared area and returning to suitable vegetation. Immediately contact DETSI to organise Koala removal/relocation from the previously cleared area, if necessary to avoid death or injury to the Koala or site personnel. If there is more than 1 occurrence of a Koala being detected in a previously cleared area, immediately reduce the extent of habitat cleared each day and/or periods of no clearing. If there is more than 2 occurrences of a Koala being detected in a previously cleared area, install fencing within 24 hours to exclude Koalas from previously cleared areas prior to the continuation of clearing.
	Facilitate Koala movement towards retained habitat during clearing	Koalas disperse from the site of their own volition without becoming trapped or otherwise requiring direct human intervention	The FSC will confirm the direction of clearing; general directions of clearing are to be towards areas of retained bushland habitat. Any existing fences which, in the opinion of the FSC, represent a risk to fauna dispersal, will be either demolished, have a suitable number of panels removed or be laid flat on the ground for the clearing phase. Appropriate habitat links will be maintained within the clearing site, and between the site and its adjacent areas, to allow Koalas to move out of the site. The site contractor/foreman will be clearly shown the identification of all trees and exclusions zones which are not permitted for any day's clearing prior to starting the first piece of construction equipment on that day of clearing.	Site Manager Clearing contractors FSCs	Koalas are expected to move away from areas of disturbance where vegetation is being removed, provided there are no impediments to doing so.	Areas to be cleared will be carefully inspected each day for potential movement barriers/impediments. The presence of appropriate habitat links between the site and its adjacent areas will be confirmed at the start of each day during clearing activities.	Potential movement barriers/impediments detected in area to be cleared. Unplanned clearing of habitat links occurs.	Immediately cease all clearing works and remove potential movement barriers/impediments, prior to the continuation of clearing. Immediately cease and reprioritise clearing to ensure remaining habitat links are protected, and discuss/rectify cause of unplanned clearing at subsequent pre-start meetings.

Key objective	Management objective	Success criteria	Management actions	Responsible parties	Predicted effectiveness	Monitoring	Trigger for corrective action/s	Corrective action/s
	Avoid impacts to Koalas present during clearing	Koalas present during clearing are not harmed and move out of the clearing area without human intervention	No tree in which a Koala is present (as identified by the attending FSC), and no tree with a crown overlapping a tree in which a Koala is present, will be cleared. Any such trees will be tagged and excluded from clearing until the Koala has safely dispersed during the 12 hour no clearing period. When located, clearing works in the vicinity of the tree will be ceased until clearing exclusion zones (25m minimum) around the active Koala tree are set out where no activity can occur for the day's duration to confirm animal safety and allow dispersal. All personnel on site will be advised of the presence of the Koala and any adjoining trees will be clearly flagged. The tree containing the Koala will not be isolated, so as to ensure a safe passage for the Koala from the work site. Koala response to peripheral human activity will be monitored by the FSC at hourly intervals to confirm acceptable disturbance. The site contractor/foreman will be clearly shown the identification of all trees and exclusions zones which are not permitted for any day's clearing prior to starting the first piece of equipment on that day of clearing. No dogs will be permitted on the site during clearing/construction. Employees, contractors, subcontractors, agents or any other person engaged or employed to carry out the clearing of vegetation, will be inducted to ensure they are aware of, understand, and comply with these requirements.	Site Manager Clearing contractors FSCs	Koalas are expected to move away from areas of disturbance where vegetation is being removed, provided they are allowed safe opportunities to do so of their own volition	Areas to be cleared will be carefully inspected each day for Koalas immediately prior to and during clearing activities.	Tree containing a Koala is felled. Clearing activity occurs within the 25m exclusion zone. Koala response to peripheral human activity indicates the animal is stressed. Koala refuses to move from the clearance area on its own accord after two days. Dog presence recorded on site.	All clearing is to cease immediately until the FSC has determined the severity of the incident and organised appropriate treatment of the animal. Where it is deemed the animal is OK for release, clearing is not to recommence until post release monitoring confirms successful dispersal out of the clearing zone. Discuss/rectify cause of incident at subsequent pre-start meetings. Immediately cease and reprioritise clearing to ensure remaining habitat links are protected, and discuss/rectify cause of unplanned clearing at subsequent pre-start meetings. Immediately direct clearing away from the proximity and monitor the Koala's until reaction is deemed acceptable. FSC will notify DETSI prior to the recommencement of clearing and negotiate appropriate methods for removal and relocation. Under no circumstances must the tree and the Koala be disturbed. Immediately cease all clearing works until the animal is removed or appropriately restrained. Reiterate site rules at subsequent pre-start meetings.
Avoid/Minimise Impacts to Retained Habitat	Protect retained vegetation/habitat within 100m of the proposed project footprint from potential adverse impacts associated with adjacent clearing and operational activities	Retained vegetation/habitat is not directly or indirectly impacted by adjacent clearing and operational activities	Vegetation/habitat within 100m of the proposed project footprint will be designated and demarcated as exclusion/management zones. External fencing will be a minimum of 3 strand rural fencing, with signage every 50m stating the site contains "Do not enter - Quarry operations". To ensure no works occur outside the approved limits of extraction, posts or star pickets (approximate 1m in height and painted a contrasting colour) will be erected at regular intervals of no more than 50m around the final approved limits of extraction (i.e. internal boundaries of each exclusion/management zone). Signage will be installed at strategic locations that indicates prohibitions on the following activities within retained vegetation/habitat: • Access beyond the boundaries of the active quarry and ancillary areas, except that necessary for monitoring and habitat enhancement works described below, fire control, pest animal	Site Manager Clearing/construction contractors Rehabilitation contractors Project ecologist	Fencing, signage and the induction of site contractors is expected to provide clear and sufficient direction relating to the protection of retained vegetation/habitat	Baseline information/photographs on the general health of retained vegetation will be collected prior to the start of adjacent clearing and operational activities, and daily inspections will be undertaken during the clearing phase and monthly inspections will be undertaken during the operational phase to monitor the compliance of contractors with regard to management/exclusion zone restrictions, the state of the fencing and health of the vegetation.	Prohibited activities detected within exclusion zone. Boundary fencing/signage	Materials dumped or stored or any other prohibited activity identified within exclusion zones must be removed/ceased immediately and the relevant contractor provided with a copy of conditions applying to exclusion zones and required to pay for rehabilitation (if required within the contract). Repeat offenders must be provided with a written warning within 24 hours of the second offence. If further incidents occur, the contractor will be banned from the site. Any areas disturbed are rehabilitated within 6 months to achieve relevant rehabilitation targets. Repair damaged/dysfunctional boundary fences/signage within 24 hours of detection.

Key objective	Management objective	Success criteria	Management actions	Responsible parties	Predicted effectiveness	Monitoring	Trigger for corrective action/s	Corrective action/s
			management, fence replacement/repair, and general land care practices; • Storage, dumping or stockpiling of cleared vegetation, soil or other material, equipment or waste; Documentation will be prepared advising all contractors of restrictions applying to exclusion/management zones and ensuring all staff are informed of such restrictions during site inductions and at pre-start meetings. The bounds of each Exclusion/Management Zone will be provided to the clearing contractor and the regeneration contractor in electronic format, and clearly demarcated on-ground by physical means (i.e. fencing along external boundaries as described above, and flagging tape tags at 20 metre increments between Exclusion/Management Zones). Onsite effluent will be collected and managed by a suitably licensed contractor for transport and disposal at an approved offsite facility, unless sufficient information is provided to DCCEEW demonstrating that an onsite treatment and irrigation system will not adversely impact MNES. This will include: • confirmation of system capacity and irrigation area extent; • identification and mapping of the irrigation area, including buffers and exclusion zones relative to MNES habitat and sensitive areas; • assessment of potential impacts to vegetation condition, hydrology and habitat function, and how these will be avoided or minimised; • description of irrigation method and any operational risks to MNES; and • outline of maintenance requirements and associated impacts to habitat values.				damaged or dysfunctional.	
	Enhance habitat condition and value for Koala and Grey-headed Flying-fox through weed management	The contractor undertaking weed management works is a suitably qualified professional. Declared weed species cover within each exclusion/management zone is reduced to, and maintained at, <5% within 5 years of commencing weed management works, and overall non-native plant cover scores are maintained at or exceed those recorded for each exclusion/management zone in **Table 5.2** from year 5.	A suitably qualified ecologist/rehabilitation contractor will be engaged to identify and map weed occurrences and treat declared and environmental weeds throughout the life of the quarry. The contractor will be appropriately licenced to undertake herbicide application. Weed mapping for each exclusion/management zone (indicating key areas of each dominant weed species for targeted management) adjacent to Stage 1 of the impact will occur within two (2) years of commencement of Stage 1. Weed mapping for each exclusion/management zone adjacent to Stage 2 of the impact will commence within one (1) year of commencement of Stage 2. Weed management activities will target areas of least disturbance and weed invasion and work towards the more weed infested areas. Soil disturbance will be minimised to reduce the potential for fresh weed invasion, while native plant regeneration will dictate the rate of ongoing weed removal.	Site Manager Rehabilitation contractors Project ecologist	The proposed weed management measures are based on recognised guidelines/advice, which should ensure the successful enhancement of habitat condition and value for the target species.	Rehabilitation contractors will supply to the Land Manager daily records of weed control works undertaken including details of the area and weed species treated, methods used, herbicides applied and photos of the treatment area. During the establishment of supplementary plantings, weeds will be monitored and treated as necessary in association with watering (i.e. weekly for four weeks and then monthly until seedlings are established [approximately 3 – 6 months]), then every 3 months up until the first 12 months after planting, and then every 6 months up until 36 months after planting. 6-monthly inspections of the exclusion/management zones will otherwise be undertaken to document any occurrence of new weed species and/or notable	Performance criteria are not achieved. The cover, density and/or height of exotic grasses has reached a stage that it precludes natural regeneration or impacts the establishment of supplementary plantings.	Additional removal/management works are to be instigated (e.g. slashing of grasses, pulse grazing, controlled burns or herbicide treatment) within 6 months of the monitoring period and receive follow-up maintenance to ensure the non-native plant cover targets are achieved.

Key objective	Management objective	Success criteria	Management actions	Responsible parties	Predicted effectiveness	Monitoring	Trigger for corrective action/s	Corrective action/s
		Natural recruitment by native species and establishment or supplementary plantings is not suppressed by weeds.	Before the commencement of weed removal in Exclusion/Management Zones 2a and 2b, a sediment fence will be installed between the works area and creek bank. The fence will be fully erected and functional before weed removal commences, and will be inspected and repaired after all rainfall events. The sediment fencing will be maintained for 12 months post weed removal works and any supplementary plantings. Weed control will follow Queensland Department of Agriculture and Fisheries' (DAF) guidelines. In general, manual removal of herbaceous weeds, regrowth and seedlings will be prioritised to minimise disturbance to soil stability and existing native species, while chemical removal will be utilised for larger weeds and areas of large infestation containing few natives. The use of herbicides will be restricted to the control of weeds declared under the *Biosecurity Act 2014*, as well as recognised environmental weeds that threaten the success of habitat enhancement or impede fauna movement, and will be in strict compliance with Queensland Department of Primary Industries (DPI) guidelines. Prior to entering the exclusion/management zones, all equipment will be cleaned to remove seeds and sediment.			increase in weed cover, as well as weed control undertaken since the previous inspection, including before and after photos of the weed treatment area. Weed mapping/monitoring for each exclusion/management zone (indicating key areas of each dominant weed species for targeted management) will then be undertaken at permanent rehabilitation monitoring sites, as described below.		
	Enhance habitat condition and value for Koala and Grey-headed Flying-fox through assisted natural regeneration, including incorporation of recognised food tree species through supplementary plantings, as necessary	Contractors undertaking rehabilitation works and prescribed ecological burns are suitably qualified professionals. Natural regeneration of native species, including species known to support Koala and important winter food trees for Grey-headed Flying-fox, is evident within each exclusion/management zone within 2 years of commencing rehabilitation works. All supplementary plantings achieve at least 90% survival rate by the end of the 36 month establishment and maintenance period. Vegetation structure within each exclusion/management zone reflects the relevant Regional Ecosystem, and	Rehabilitation works within each exclusion/management zone adjacent to Stage 1 of the impact will occur within two (2) years of commencement of Stage 1. Rehabilitation works within each exclusion/management zone adjacent to Stage 2 of the impact will occur within one (1) year of commencement of Stage 2. Permanent or occasional removal of livestock will be undertaken within each exclusion/management zone, as considered necessary to promote natural regeneration and facilitate the achievement of success criteria. Implementation of appropriate fire regimes will be undertaken within each exclusion/management zone in accordance with relevant RE fire management guidelines, as considered necessary to promote natural regeneration and facilitate the achievement of success criteria. In portions of Exclusion/Management Zones 2-5 that are largely cleared or display a more open canopy (and in which natural recruitment would take longer to restore the original community), supplementary plantings of recognised food tree species for Koala and Grey-headed Flying-fox that naturally occur within each exclusion/management zone will be undertaken, using the species and densities provided for each exclusion/management zone in **Table 5.1**. A suitably qualified ecologist or rehabilitation contractor will be engaged to delineate and map specific supplementary planting areas and prepare a revegetation plan within six months of commencing	Site Manager Rehabilitation contractors Project ecologist	The proposed rehabilitation methodologies are based on recognised guidelines/advice, which should ensure the successful enhancement of habitat condition and value for the target species.	Rehabilitation contractors will supply to the Land Manager daily records of supplementary planting works undertaken, including details of the area and species used, and photos of the planting area. Fire management contractors will supply to the Land Manager daily records of prescribed ecological burns undertaken, including details and photos of the fire management area. 6-monthly inspections of the exclusion/management zones will document any evidence of wildfire, assess fuel loads and identify any areas of concern. Permanent rehabilitation monitoring sites will be established in accordance with the *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual. Version 2.2* (Eyre, et al. 2015), ensuring adequate coverage and representation of each exclusion/management zones shown on **Figure 5.1**. Monitoring sites for exclusion/management zone 2b will be co-located with those established in the State-approved offset area to improve the	Annual monitoring determines that natural regeneration is not evident. Annual monitoring determines that natural regeneration is being suppressed by livestock access. Annual monitoring determines that natural regeneration is being suppressed by a lack of appropriate fire management. Monitoring from year 5 onwards determines that success criteria are not being achieved.	Commence supplementary plantings within areas showing no signs of natural regeneration within 6 months of annual monitoring. Within 3 months, implement permanent or occasional removal of livestock within areas where livestock is suppressing natural regeneration, in accordance with advice from a qualified ecologist. Within 6 months, implement a modified fire regime within areas where fire is suppressing natural regeneration, in accordance with advice from a qualified fire consultant. Within 6 months of the monitoring indicating failure to achieve success criteria, an investigation will be undertaken to determine cause of failure including an assessment of weed control, livestock exclusion and fire management practices undertaken to date, and the need for supplementary plantings. Where necessary, and as advised through consultation with an ecologist and other relevant

Key objective	Management objective	Success criteria	Management actions	Responsible parties	Predicted effectiveness	Monitoring	Trigger for corrective action/s	Corrective action/s
		includes recognised food tree species for Koala and Grey-headed Flying-fox as dominant canopy species (and representatives of key species in all other strata), within 5 years of commencing rehabilitation works, and overall BioCondition scores are maintained at or exceed those recorded for each exclusion/management zone in **Table 5.2** from year 5 until site closure.	weed management works within each exclusion/management zone. Initial supplementary planting works will commence within 2 years of commencing weed management works within each exclusion/management zone. Revegetation works including ground preparation, planting and follow-up maintenance will be undertaken by a suitably qualified rehabilitation contractor in accordance with the prepared revegetation plan, ensuring: • Plants are sourced from local provenance (i.e. within 50 km), where available,. Alternatively, seeds will be collected from mature trees within the Site and used to direct seed the planting areas, or used to propagate seedlings for later planting. • Plants are 50mm "tube-stock" size, provided in forestry tubes with a minimum plant height of 20cm and a well-developed root system. • Seedlings are healthy and displaying signs of active growth. • Seedlings are moist at time of planting and if necessary, watered prior to planting. • A weed-free mulch will be laid over the planting rows to a depth of 100mm prior to planting. • Tree guards are installed around each planted tree to protect against grazing by native and exotic fauna. Plantings will be maintained by a suitably qualified rehabilitation contractor in accordance with the prepared revegetation plan, ensuring: • Seedlings are watered with a minimum of 5 – 10 litres of water each at the time of planting, then water weekly (approximately 8-10 litres depending on weather conditions) for four weeks and then monthly or as necessary until seedlings are established (approximately 3 – 6 months). • Replacement of dead or damaged plants and depleted mulch is undertaken according to the watering regime described above for the first 3 months, then every 3 months up until the first 12 months after planting, and then every 6 months up until 36 months after planting. Livestock will be excluded from supplementary planting areas during the 36 month establishment and maintenance period.			efficiency of the overall monitoring regime. Annual monitoring will be undertaken for the first five (5) years after commencing the management of each area, which will focus on the level of recruitment, native vegetation cover and flora species composition/richness achieved through natural regeneration, and the health, growth and survival of supplementary plantings. Monitoring will then be undertaken every 3 years from year 5 to 20, and then every 5 years for the duration of the proposed action, and will follow Eyre, et al. (2015), to determine progress and inform adaptive management actions to ensure rehabilitation targets are achieved and maintained. The details and results of each monitoring event will be documented in a monitoring report, which will include: • monitoring aims and methods; • recorded data (including photos); • activities undertaken since the previous monitoring event; • overall progress towards the achievement of intended outcomes; • any issues identified; and • necessary corrective actions.		specialists (i.e. fire specialist, rehabilitation contractor), amendments to existing practices will be implemented.
	Minimise General Environmental Harm	Quarry operations comply with State environmental authority and EMP. Condition of retained habitat does not deteriorate as a result of general environmental harm regulated by the State	All Site personnel, including contractors, will be inducted on the environmental management requirements for the Site and informed of the environmental management objectives and specifics of the EMP. A Stormwater Management Plan has been prepared (refer **Appendix 2**) to ensure contaminants including turbid waters, chemicals, lubricants and fuels are not released from the Site to any waters (other than those specified in relevant release limits).	Site Manager Environmental management and monitoring contractors Quarry operational staff and contractors	Management measures must be development and implemented in accordance with State approval conditions, which are designed to minimise environmental harm on the surrounding environment.	6-monthly inspections of the exclusion/management zones will document any signs of localised flooding, erosion, damp or dry conditions relative to surrounding environment, or obvious signs of contaminated water supply.	Signs of localised flooding, erosion, damp or dry conditions relative to surrounding environment, or contaminated water supply.	Within 1 month, reinspect the exclusion/management zones to ensure measures to prevent a significant increase or decrease in water availability to retained vegetation/habitat are fit for purpose. Within 3 months, modify site drainage as necessary to avoid further impacts.

Key objective	Management objective	Success criteria	Management actions	Responsible parties	Predicted effectiveness	Monitoring	Trigger for corrective action/s	Corrective action/s
		environmental authority and EMP.	Implementation of measures for the management of surface water runoff and erosion and sediment transport from the Site will be undertaken in accordance with the Stormwater Management Plan and State approval conditions. This includes the use of regularly maintained sediment basin structures and clean water diversion drains, and maintaining minimum buffers (5.0m) at all times from the Site boundary to all stockpiled material. Stockpiles of material will be: • Adequately protected from wind, rain, concentrated surface flow and excessive upslope stormwater surface flows. • Placated to direct drainage water to sediment basin systems in event of surface water runoff. • Maintained in a moist state including by use of sprinklers to minimise the risk of movement by wind. Implementation of measures for the management of hydrocarbons and chemicals at the Site will be undertaken in accordance with State approval conditions. Appropriate bunding will be installed on all bulk chemical and fuel storage areas at all times. An Air Quality Management Plan will be prepared to control potential air quality impacts occurring as a result of land disturbance necessary for the extractive industry operation. Implementation of measures for the management of dust emissions from the Site will be undertaken in accordance with State approval conditions. This includes: • Dampen down cleared areas, extraction working areas, processing plant working areas, haul roads, stockpiles and other hardstand areas by water spraying when visual surveillance indicates excessive dust generation and propagation from point or mobile sources. • Limiting clearing, topsoil and overburden removal at any one time to that necessary whilst providing for effective production of the resource. • Monitoring meteorological conditions to time potential dust generating activities with favourable weather conditions. • Engaging a water truck/cart to dampen access roads. • Using shielding and/or windbreaks at processing plants. • Stabilising and revegetating topsoil and overburden stockpiles. • Maintain road surfaces in good • Ensuring loads are appropriately contained and covered prior to leaving the Site. • Progressively rehabilitating the Site as areas become available.			6-monthly inspections of the exclusion/management zones will document any signs of incursion of stockpiled or other quarried material. 6-monthly inspections of the exclusion/management zones will document any signs of smothering of vegetation by dust. Otherwise, as per Stormwater Management Plan (**Appendix 2**) and EMP (**Appendix 8**).	Incursion of stockpiled or other quarried material. Signs of smothering of vegetation by dust. Otherwise, as per Stormwater Management Plan (**Appendix 2**) and EMP (**Appendix 8**).	Within 1 month, reinspect the exclusion/management zones to ensure measures to prevent a significant decrease in the quality of water available to retained vegetation/habitat are fit for purpose. Within 1 month, reinspect the exclusion/management zones to ensure measures to prevent incursion of stockpiled or other quarried material are fit for purpose and all staff are informed and educated on the location and importance of retained vegetation/habitat. Within 3 months, remove stockpiled or other quarried material, repair or replace measures to prevent incursion of stockpiled or other quarried material and rehabilitate vegetation. Consider relocation, reshaping or improved stabilisation of stockpiled material to avoid re-incursion or structural failure. Within 1 month, reinspect the exclusion/management zones to ensure measures to prevent dust incursion are fit for purpose, particularly for dust generating activities in close proximity to retained vegetation/habitat. Otherwise, as per Stormwater Management Plan (**Appendix 2**) and EMP (**Appendix 8**).

Key objective	Management objective	Success criteria	Management actions	Responsible parties	Predicted effectiveness	Monitoring	Trigger for corrective action/s	Corrective action/s
			Blasting will be restricted to 9:00am to 3:00pm Monday to Friday and 9:00am to 1:00pm on Saturdays, and rock drill operation will be restricted to 7:00am to 6:00pm on all days, with no extraction and processing from 10:00pm to 6:00am. The EMP will be subject to periodic review to ensure continuous improvement of the Site environmental performance through adaption of management strategies, to meet the changing needs of the Site.					
Avoid/Minimise Death or Injury to Koala during Quarry Operation	Minimise Koala mortality or injury from dog attack	No Koala deaths or injuries have occurred as a result of dog attack during quarry operation. No domestic dogs enter the site.	A wild dog control program will be developed for the site, in liaison with Scenic Rim Regional Council and local landholders, as well as the Queensland Department of Agriculture and Fisheries (DAF). A 'Standard Operation Procedure' (SOP) will be developed and implemented for minimising the risk of death or injury to Koala from dog attack as a result of quarry operation, ensuring: • site inductions for all staff, contractors and visitors include education regarding presence of Koala in the area and the potential impacts from dog attack.; • all persons entering the quarry (staff, contractors, visitors) are prohibited from bringing dogs onto the site; • all persons within the quarry are prohibited from leaving food scraps in areas that may entice dogs. • food waste disposal bins will be installed in convenient locations; • food waste disposable bins will be mounted at least 50 cm from the ground to minimise the risk that a dog could tip over a bin; • food waste disposable bins will include lids that cannot be easily opened by a dog. The SOP for dog attack will be established before construction commences and will be maintained over the life of the quarry.	Site Manager Pest animal contractors Quarry operational staff and contractors	Development of a wild dog control program in consultation with relevant authorities and local landholders is expected to minimise the threat of Koalas being attacked by wild dogs on site. This will be facilitated by preventing pet/domestic dogs onto the site.	6-monthly inspections of the exclusion/management zones will document any evidence of dog activity. GPS locations and photos of key areas (e.g. tracks, scats, remains of predated animals) will be recorded for utilisation in pest animal control actions and follow-up monitoring.	Evidence of dog activity has increased from the previous 6-monthly inspection. Koala deaths or injuries have occurred as a result of dog attack. Domestic dogs recorded on the site.	Within two months of monitoring recording an increase in dog activity since the previous inspection, the Site Manager is to implement additional control measures aimed at reducing numbers, in coordination with neighbouring land holders, SRRC and QPWS. All Koala deaths or injuries will be investigated within 24 hours of notification and reported to the relevant Regulatory Authorities within 7 days and, as required, actions will be developed to prevent future Koala deaths or injuries within 7 days. If wild dog attack on Koala has been confirmed, liaise with DAF and local government within 1 month to devise a trapping/baiting program. All failures of the SOP for dog attack will be investigated within 24 hours and, as required, actions will be developed within 7 days to prevent future failures.
	Minimise Koala road mortality and assist dispersal	No Koala deaths or injuries due to vehicle strike occur during quarry operation.	A 'Standard Operation Procedure' (SOP) will be developed and implemented for minimising the risk of vehicle strike as a result of quarry operation, ensuring: • site inductions for all staff, contractors and visitors include education regarding presence of Koala in the area and the potential impacts from vehicle strike, and the location of retained habitats and reduced speed zones; • all vehicle strikes or 'near misses' must be reported immediately to the Quarry Manager; • underpasses that allow Koala movement and associated exclusion fencing will be installed at the proposed crossing of Warroolaba Creek and at strategic locations along the quarry access road (designed and constructed in accordance with the principles of the Queensland Department of Transport and Main Roads' Fauna Sensitive Transport Infrastructure Delivery manual [DTMR	Site Manager Quarry operational staff and contractors Project ecologist	The design and installation of road underpasses and associated exclusion fencing and signage is based on the current *Fauna Sensitive Transport Infrastructure Delivery Manual* prepared by the Queensland Department of Transport and Main Roads, which is expected to minimise the risk of vehicle strike (refer **Table 5.3**).	The structural integrity and functioning of the underpasses, exclusion fencing and signage will be periodically inspected, as per the recommendations of the current *Fauna Sensitive Transport Infrastructure Delivery Manual* prepared by the Queensland Department of Transport and Main Roads (refer **Table 5.4**).	Near miss reported. Koala deaths or injuries due to vehicle strike recorded/reported.	The location of the reported near miss will be inspected within 24 hours of receiving the report to determine if corrective actions need to be implemented. If deaths or injuries are recorded, immediately investigate the cause and liaise with Project Ecologist to determine best mitigation strategy. All failures of the SOP for vehicle strike will be investigated within 24 hours, and necessary actions will be developed within 7 days to prevent future failures. The Quarry Manager will liaise with the Project Ecologist within 1 month to identify if or where additional fauna infrastructure is required, or where reduced speed limits need to be introduced in

Key objective	Management objective	Success criteria	Management actions	Responsible parties	Predicted effectiveness	Monitoring	Trigger for corrective action/s	Corrective action/s
			2024]) (refer **Figure 5.3, Table 5.3 and Appendix 10**); • sections of the access road where Koala exclusion fencing is not provided will be fenced using standard, 4-strand rural fencing. Where new sections of this fencing is proposed (refer **Figure 5.4**), the bottom strand will be at least 30cm off the ground to facilitate the movement of any Koalas that happen to cross this section of the road. • dynamic wildlife signage will be installed at strategic locations along the access road into the quarry, advising drivers of the potential for Koalas to cross the access road, and recommending a maximum speed of 40km/hr from dawn to dusk (compared to the official 60km/hr speed limit) (refer **Figure 5.3**); • a speed limit of 20 km/h will apply within the quarry site, which will assist vehicle operators to detect and avoid Koalas on haulage routes; • advisory signage will be installed at strategic locations within the quarry operations area advising drivers of the potential for Koalas to be sited within the operational areas as the disturbance area evolves; • Koala exclusion fencing will be installed along the boundary of the operations area on either side of the Warroolaba Creek corridor to prevent dispersing Koalas entering the operations area (refer **Figures 5.1 and 5.4**). The SOP for vehicle strike will be established before construction commences and will be maintained over the life of the quarry. It will form part of the general site induction for all staff and contractors, with penalties for non-compliance. All Neilsens employees must also comply with a drivers code of conduct, including adherence to specified speed limits. All of the above measures will be committed to for the life of the proposed action, until the onset of conditioned site closure actions.				Failures of the structural integrity and/or functioning of the underpasses, exclusion fencing and signage detected.	locations where a single hit on Koala, or repeated near misses, have been reported. All failures of the structural integrity and/or functioning of the underpasses, exclusion fencing and signage will be repaired within 1 month and will be investigated, and actions will be developed to prevent future breaches within 7 days of notification of failure. Staff, contractors or visitors who disobey the speed limit will be issued with a disciplinary warning within 24 hours.

6.0 PROPOSED OFFSETTING OF IMPACTS

An offset is proposed to compensate for the significant residual impacts on Koala and Grey-headed Flying-fox arising from the proposed action. The proposed offset takes into consideration:

- the Commonwealth legislative offsets framework;
- results of the ecological investigations undertaken at the proposed offset site;
- advice of the Department of Climate Changes, Energy, Environment and Water (DCCEEW);
- results of the application of the EPBC Act Offsets Assessment Guide; and
- conservation and ecological outcomes.

Offset opportunities were sought throughout 2023 until early 2024, as close as possible to the impact area; however, at this time, there were no suitable, sufficiently large properties for sale within the Scenic Rim local government area (LGA), and available options were relatively small and scattered across the landscape. Opportunities were subsequently sought in other south-east Queensland LGAs.

A number of potential properties with appropriate attributes for Koala and Grey-headed Flying-fox were subject to desktop analysis and, in some cases, preliminary field investigation were conducted to test their suitability. The proponent was finally successful in purchasing a proposed offset property at Louisadale Road, Monsildale ('Colorado'), located north-west of the township of Kilcoy in the Somerset LGA (**Figure 6.1**).

6.1 PROPOSED OFFSET PROPERTY

6.1.1 Offset Property Description

"Colorado" is located on Louisadale Road, in the locality of Monsildale, approximately 25km north-west of the town of Kilcoy in the Somerset Regional Council LGA, and approximately 120km north of the project area (**Figure 6.1**). The 1,564 ha property is comprised of five lots:

- Lot 9 on SP169632.
- Lot 69 on C311668.
- Lot 116 on RP809269.
- Lot 115 on CG48.
- Lot 8 on RP851331.

As shown on **Figure 6.2**, the proposed offset area[5] will comprise the majority of the property, with other uses proposed for portions of Lots 9, 8 and 116. The portions of Lot 69 that do not form part of the proposed offset area are already required to undergo restoration of vegetation under State legislation, as described in the Offset Area Management Plan (OAMP) in **Appendix 11**.

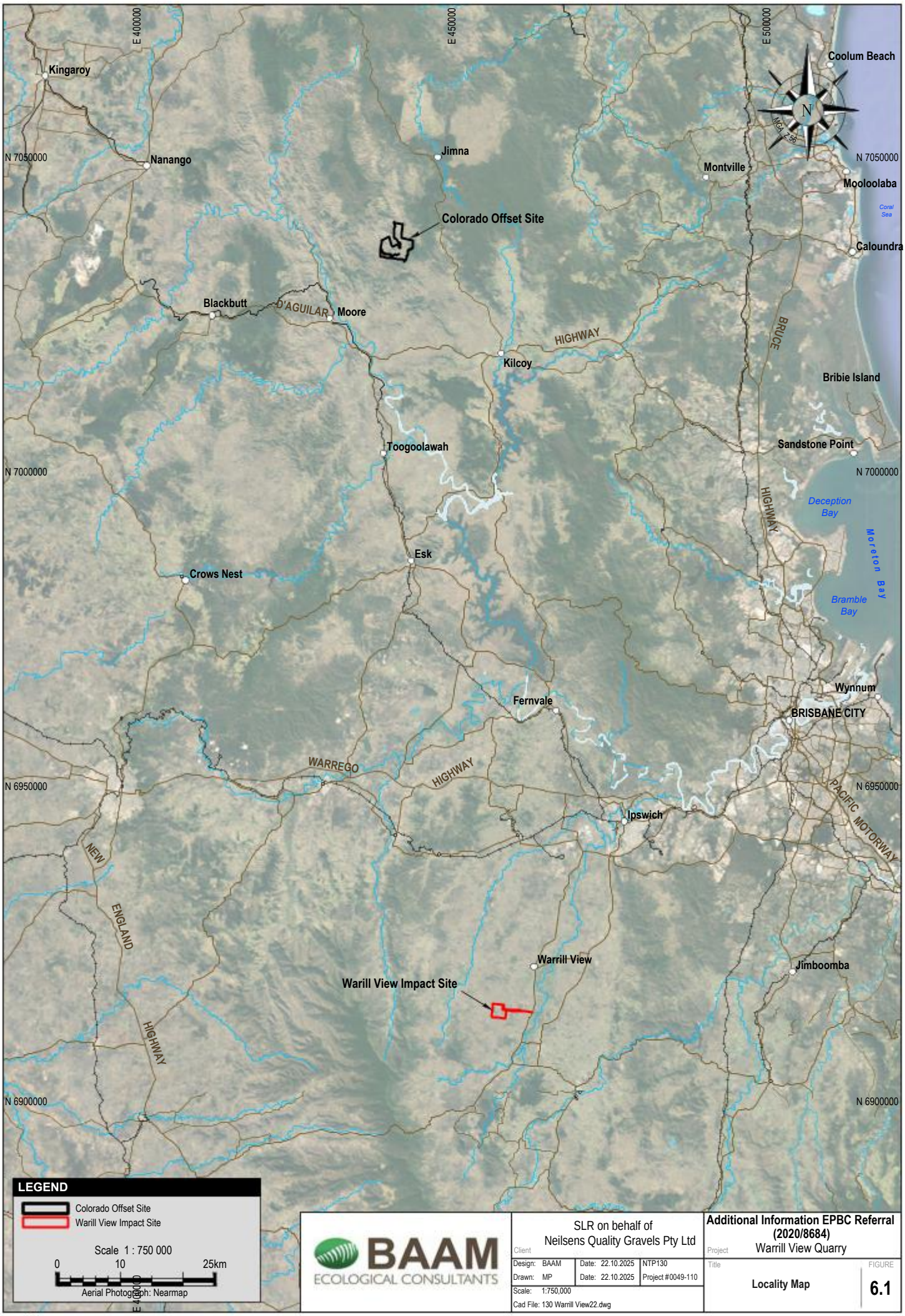
A detailed description of the offset property, including its landscape context, management history, existing vegetation/habitat and suitability for the impacted MNEs species is provided in the Offset rea Management Plan provided at **Appendix 11**. In summary:

- The northern and eastern portions of the property form part of a State corridor that is recognised within the Somerset Regional Council Planning Scheme.
- The majority of the property (1,036 ha) is mapped by the Queensland Government as 'non-remnant' (i.e. neither 'remnant'[6] or 'high value regrowth'[7] [HVR]) (**Figure 6.3**) and, therefore, is generally exempt from clearing regulations under the Queensland *Vegetation Management Act 1999* (VM Act). The remainder of the property comprises remnant (427 ha) and HVR (101 ha) vegetation.

[5] The boundaries of the proposed offset area are indicative only at this stage, until suitable fencing locations/alignments are determined. Any adjustments are expected to be very minor in terms of the total area of the proposed offset area (i.e. + or - <10ha).

[6] Vegetation that has or has not been cleared but where the dominant canopy has greater than 70% of the height and greater than 50% of the cover relative to the undisturbed height and cover of that stratum and is dominated by species characteristic of the vegetation's undisturbed canopy.

[7] Vegetation (not otherwise classified as remnant) in an area that has not been cleared for at least 15 years.



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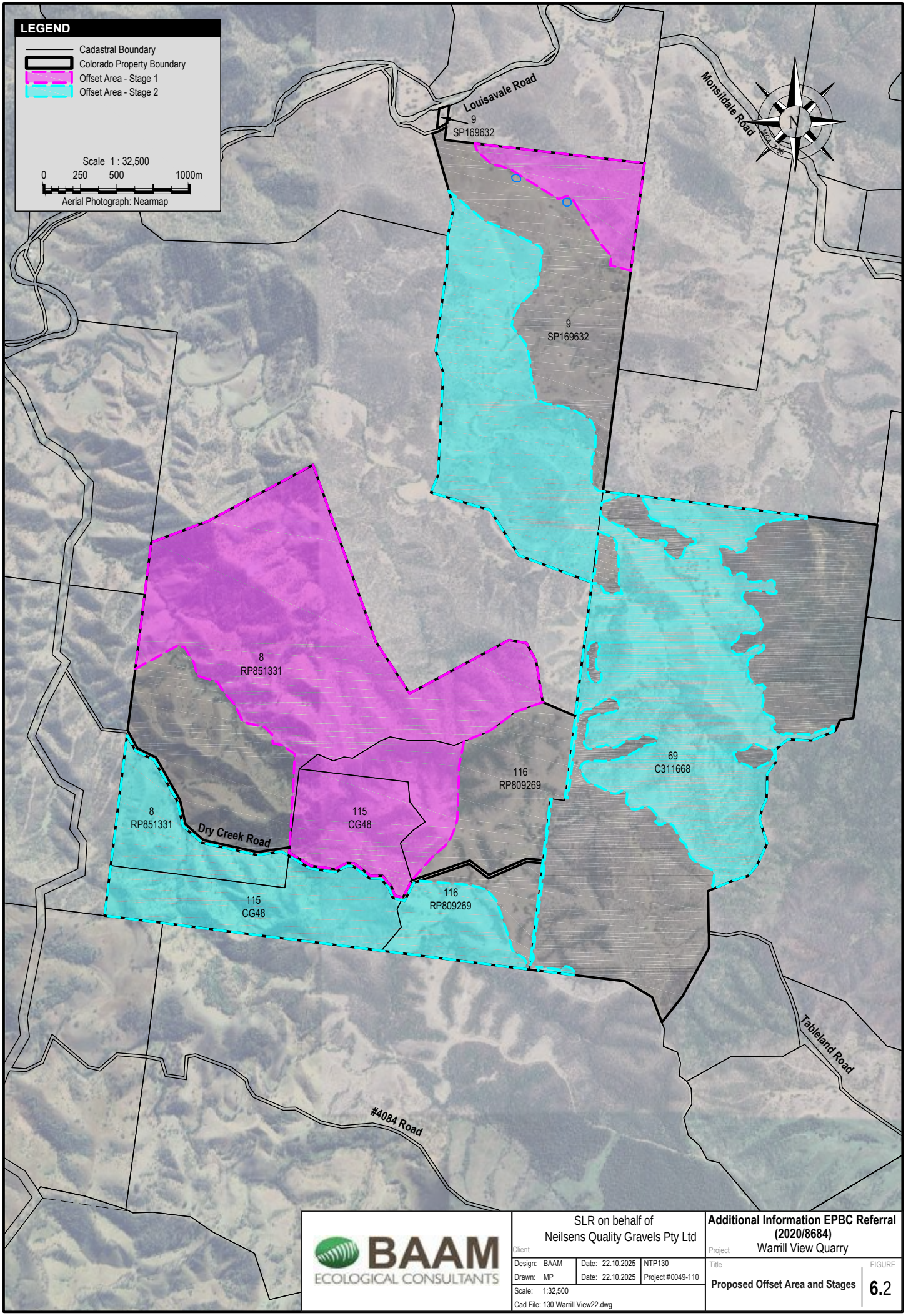
Client	SLR on behalf of Neilsens Quality Gravels Pty Ltd		
Design: BAAM	Date: 22.10.2025	NTP130	
Drawn: MP	Date: 22.10.2025	Project #0049-110	
Scale: 1:750,000			
Cad File: 130 Warrill View22.dwg			

Project: **Additional Information EPBC Referral (2020/8684)** Warrill View Quarry

Title: **Locality Map**

FIGURE **6.1**

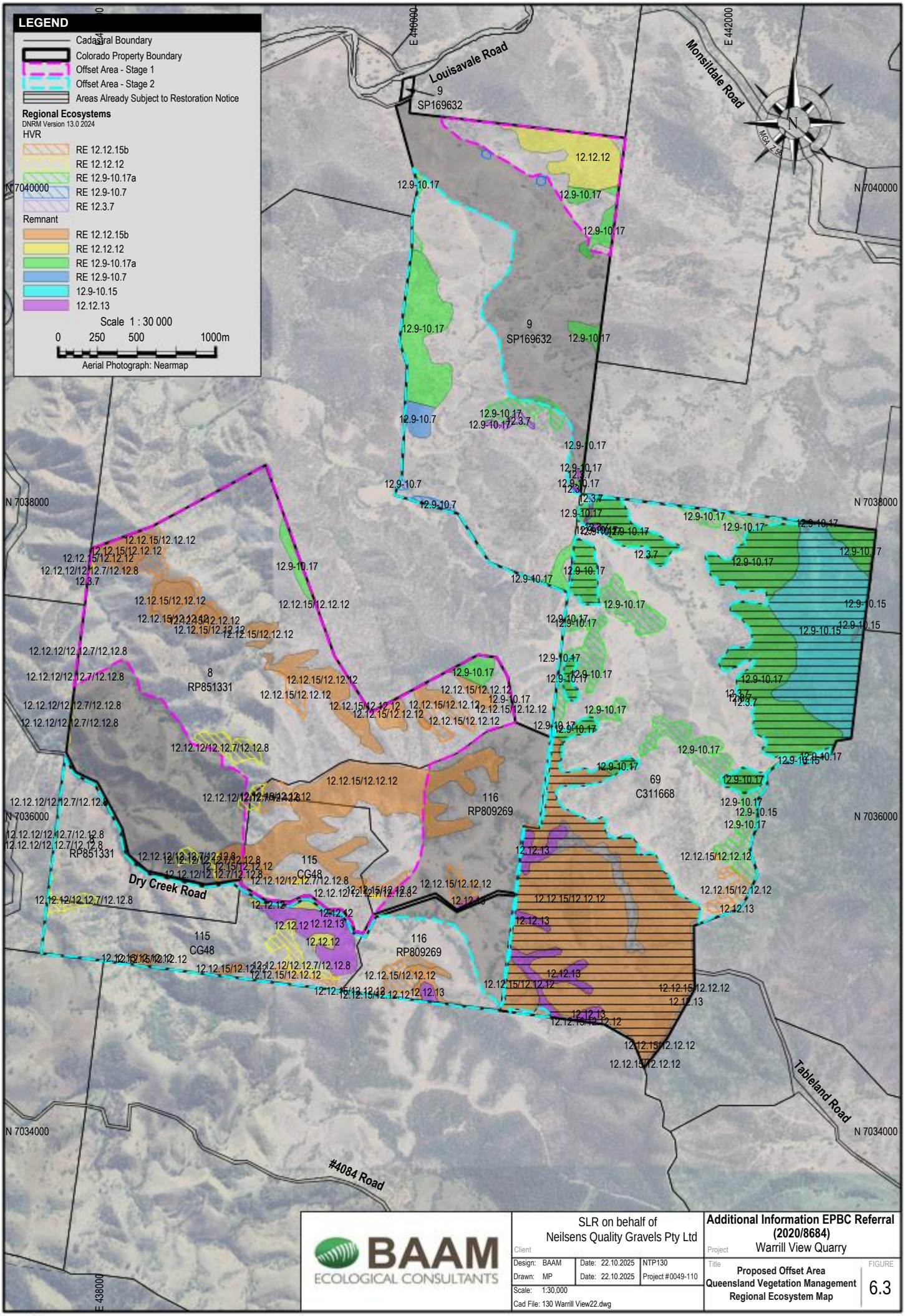
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Project	Additional Information EPBC Referral (2020/8684) Warrill View Quarry		
Design: BAAM	Date: 22.10.2025	NTP130	
Drawn: MP	Date: 22.10.2025	Project #0049-110	
Scale: 1:32,500			
Cad File: 130 Warrill View22.dwg			
Title	Proposed Offset Area and Stages	FIGURE	6.2

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Client	SLR on behalf of Neilsens Quality Gravels Pty Ltd		
Project	Additional Information EPBC Referral (2020/8684) Warrill View Quarry		
Design: BAAM	Date: 22.10.2025	NTP130	
Drawn: MP	Date: 22.10.2025	Project #0049-110	
Scale: 1:30,000			
Cad File: 130 Warrill View22.dwg			
Title	Proposed Offset Area Queensland Vegetation Management Regional Ecosystem Map	FIGURE	6.3

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- Colorado has been historically used for cattle grazing. Cattle have not been fenced from watercourses, and evidence of overgrazing, bank/gully erosion and weed proliferation is apparent along watercourses and steep gorge/gully areas. This has resulted in greatly reduced species diversity along riparian areas, and there are no native grasses and very limited native forbs found along adjacent flood plains. Native grasses and forbs are in abundance on slopes, while the extent of pasture grasses is greatly reduced, except along the top of ridgelines where there is no canopy vegetation. Lantana is present in wetter gullies, but occurs in relatively low amounts on the slopes. Several additional Weeds of National Significance (WoNS), State-restricted weeds and other environmental weeds also occur.
- Fire has been used as a tool on the site and neighbouring properties to reduce fuel loads and decrease risk of wildfire. Most neighbours burn heavily each year to avoid a repeat of the intense fires that ravaged the area in late 2019.
- The portions of the property within which the offset is proposed to be delivered (hereafter referred to as the "proposed offset area"), totalling 978 ha, have been selected to allow similar land uses as those described above to continue within the balance of the property. These balance lands (totalling 586 ha) will be managed to ensure there are no adverse impacts on the value of the proposed offset for the relevant species (e.g. appropriate management of fire, weeds, pests, etc).

6.2 SUITABILITY AND HABITAT QUALITY FOR RELEVANT MNES

The majority of vegetation communities currently or historically present within and adjacent to Colorado are known to provide suitable habitat with moderate-high foraging value for Koalas. The property is well-located to provide valuable Koala habitat on the tablelands, ridges, slopes and wetter, more fertile lower slopes and flood zones of the drainage lines, which are currently cleared and are similarly cleared in much of the surrounding landscape where beef cattle production dominates land use. Restoring and maintaining Koala habitat connectivity between the riparian and ridgeline habitats would have significant benefits by enabling Koalas to safely inhabit and move between the range of altitudinal habitats for feeding and breeding purposes and to seek refuge during periods of climatic extremes. Revegetation of most of the property would also consolidate larger patches of Koala habitat to the north-west and south-east, and enhance connections between the adjacent Conondale National Park and other protected areas to the north.

The majority of REs on Colorado and in the surrounding landscape are also dominated by vegetation species that are important habitat for Grey-headed Flying-fox, such as *Eucalyptus tereticornis* and *E. crebra* and *E. siderophloia*.

There are multiple Koala records from the surrounding area, and recent surveys confirmed the presence of Koala on the property (**Photo 1**), albeit at low densities. The presence of Dingo/wild dog and foxes was also confirmed (**Photo 2**).



Photo 6.1. Koala sighted on Colorado property



Photo 6.2. Dingo recorded on Colorado property

There are Grey-headed Flying-fox records from the surrounding area, with one flying-fox camp within 20km in which Grey-headed Flying-fox has been recorded (at Linville), and another at Kilcoy (21km to the south-east). Camps at Woodford and Maleny (40-45km to the east) are identified as 'nationally important flying-fox camps', which are camps that have contained ≥10,000 Grey-headed Flying-foxes in more than one year in the last 10 years, or have been occupied by more than 2,500 Grey-headed Flying-foxes permanently or seasonally every year for the last 10 years.

Habitat quality was assessed using the same scoring approach as that used for the impact site, as described in **Section 4.4.2**. Further details on particular aspects are provided in the OAMP (**Appendix 11**).

A summary of the total, weighted habitat quality scores for Koala and Grey-headed Flying-fox are provided in **Tables 6.1 and 6.2**, respectively. An overall score of 5 (out of 10) for Koala and 4 (out of 10) for Grey-headed Flying-fox indicates habitats within the proposed offset property are currently of low-moderate quality for both species. Proposed Stages 1 and 2 of the offset (refer **Section 6.3.3**) also both scored 5 (out of 10) for Koala and 4 (out of 10) for Grey-headed Flying-fox.

6.3 OFFSET MANAGEMENT MEASURES

The identified management actions for the proposed offset area have been determined to achieve the following key objectives:

- Protect against the loss or degradation of Koala and Grey-headed Flying-fox habitat;
- Increase extent and quality of habitat available to Koala and Grey-headed Flying-fox; and
- Mitigate identified threats to Koala and Grey-headed Flying-fox.

Based on the proposed land uses, current condition and offset goals, as well as identified risks, the following offset management measures are considered most appropriate for the proposed offset area:

- Restoration of habitat resources for Koala and Grey-headed Flying-fox through assisted natural regeneration and revegetation;
- Limiting vegetation clearing to only those areas required for maintaining fences, fire breaks, road/track access and/or thinning of invasive native species that are impacting Koala or Grey-headed Flying-fox habitat targets;
- Monitoring and controlling feral animals that are likely to be detrimental to threatened fauna or the restoration of threatened fauna habitat (e.g. dogs, pigs, deer);
- Monitoring and controlling weeds, particularly those that inhibit fauna usage, dispersal or habitat restoration;
- Prohibiting alternate land use and activities (e.g. timber harvesting, cropping, etc.);
- Monitoring and managing livestock densities to ensure no degradation to present, naturally recruiting or revegetated threatened fauna habitat; and
- Monitoring and managing fuel loads and fire risk.

The Offset Area Management Plan in OAMP (**Appendix 11**) details the management, monitoring and reporting that will be undertaken for the proposed offset area.

6.4 OFFSET ESTIMATED COST

The proponent purchased the offset site in 2024 for a value of circa $6 million. Since this time, approximately $500,000 has been spent towards onsite works, including initial weed management (Lanta removal), fencing and site management assessments, including bushfire management planning.

The total cost of implementing the offset will include ongoing management, monitoring and reporting requirements in accordance with the Offset Area Management Plan. At this stage, it is expected that the initial 5 years of offset delivery will cost in the order of $5,500,000. While final costs will be informed by contractor quotations obtained during implementation, the proponent has committed sufficient funding to deliver the offset in full, including long-term management and monitoring requirements. The proponent acknowledges its obligations under the approval conditions and confirms that adequate financial resources are available to implement the project and associated offset commitments.

Table 6.1a. Total Current Koala habitat score for the proposed offset area.

Component	AU1	AU2	AU3	AU4	AU5	AU6	AU7	AU8	AU9	AU10	AU11	AU12	AU13	AU14	Average/Final
Site Condition score (out of 3)	1.32	1.15	0.89	1.31	1.28	1.64	1.42	1.64	1.61	1.07	1.84	1.43	1.38	2.52	1.46
Site Context Score (out of 3)	2.20	2.12	2.42	2.36	2.36	2.17	2.22	2.36	2.36	2.46	2.20	2.14	2.41	2.36	2.29
Species Stocking Rate Score (out of 4)	1.14	1.14	1.14	1.14	1.14	2.29	2.29	1.14	1.14	1.14	3.43	2.29	3.43	2.29	1.80
Habitat Quality score (out of 10)	*4.66*	*4.41*	*4.46*	*4.81*	*4.78*	*6.10*	*5.93*	*5.14*	*5.11*	*4.67*	*7.46*	*5.85*	*7.22*	*7.16*	5.55
Assessment Unit area (ha)	221.95	177.86	275.45	50.08	16.95	33.20	29.38	45.87	1.56	1.31	75.54	3.41	35.96	3.29	**971.83**
Total impact area (ha) for this MNES	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83
Size Weighting	0.23	0.18	0.28	0.05	0.02	0.03	0.03	0.05	0.00	0.00	0.08	0.00	0.04	0.00	**1.00**
Weighted Habitat Quality Score	***1.06***	***0.81***	***1.26***	***0.25***	***0.08***	***0.21***	***0.18***	***0.24***	***0.01***	***0.01***	***0.58***	***0.02***	***0.27***	***0.02***	***5.00***

Table 6.1b. Total Current Koala habitat score for Stage 1 of the proposed offset area.

Component	AU1	AU2	AU3	AU4	AU5	AU6	AU7	AU8	AU9	AU10	AU11	AU12	AU13	AU14	Average/Final
Site Condition score (out of 3)	1.32	1.15	0.89	1.31	1.28	1.64	1.42	1.64	1.61	1.07	1.84	1.43	1.38	2.52	1.46
Site Context Score (out of 3)	2.20	2.12	2.42	2.36	2.36	2.17	2.22	2.36	2.36	2.46	2.20	2.14	2.41	2.36	2.29
Species Stocking Rate Score (out of 4)	1.14	1.14	1.14	1.14	1.14	2.29	2.29	1.14	1.14	1.14	3.43	2.29	3.43	2.29	1.80
Habitat Quality score (out of 10)	4.66	4.41	4.46	4.81	4.78	6.10	5.93	5.14	5.11	4.67	7.46	5.85	7.22	7.16	5.55
Assessment Unit area (ha)	143.32	90.24	37.71	0.00	1.74	22.80	22.97	0.00	0.00	0.00	70.78	0.33	11.30	0.00	**401.19**
Total impact area (ha) for this MNES	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19
Size Weighting	0.36	0.22	0.09	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.18	0.00	0.03	0.00	**1.00**
Weighted Habitat Quality Score	***1.66***	***0.99***	***0.42***	***0.00***	***0.02***	***0.35***	***0.34***	***0.00***	***0.00***	***0.00***	***1.32***	***0.00***	***0.20***	***0.00***	***5.30***

Table 6.1c. Total Current Koala habitat score for Stage 2 of the proposed offset area.

Component	AU1	AU2	AU3	AU4	AU5	AU6	AU7	AU8	AU9	AU10	AU11	AU12	AU13	AU14	Average/Final
Site Condition score (out of 3)	1.32	1.15	0.89	1.31	1.28	1.64	1.42	1.64	1.61	1.07	1.84	1.43	1.38	2.52	1.46
Site Context Score (out of 3)	2.20	2.12	2.42	2.36	2.36	2.17	2.22	2.36	2.36	2.46	2.20	2.14	2.41	2.36	2.29
Species Stocking Rate Score (out of 4)	1.14	1.14	1.14	1.14	1.14	2.29	2.29	1.14	1.14	1.14	3.43	2.29	3.43	2.29	1.80
Habitat Quality score (out of 10)	4.66	4.41	4.46	4.81	4.78	6.10	5.93	5.14	5.11	4.67	7.46	5.85	7.22	7.16	5.55
Assessment Unit area (ha)	78.64	87.62	237.74	50.08	15.20	10.40	6.42	45.86	1.56	1.30	4.76	3.09	24.66	3.29	**570.63**
Total impact area (ha) for this MNES	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63
Size Weighting	0.14	0.15	0.42	0.09	0.03	0.02	0.01	0.08	0.00	0.00	0.01	0.01	0.04	0.01	**1.00**
Weighted Habitat Quality Score	***0.64***	***0.68***	***1.86***	***0.42***	***0.13***	***0.11***	***0.07***	***0.41***	***0.01***	***0.01***	***0.06***	***0.03***	***0.31***	***0.04***	***4.79***

Table 6.2a. Total Current Grey-headed Flying-fox habitat score for the proposed offset area.

Component	AU1	AU2	AU3	AU4	AU5	AU6	AU7	AU8	AU9	AU10	AU11	AU12	AU13	AU14	Average/Final
Site Condition score (out of 3)	1.32	1.18	0.89	1.31	1.28	1.64	1.55	1.64	1.61	1.07	1.78	1.55	1.38	2.52	1.48
Site Context Score (out of 3)	1.04	1.08	1.29	1.29	1.37	1.82	2.12	2.14	2.04	2.14	2.14	1.98	2.44	2.63	1.82
Species Stocking Rate Score (out of 4)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
Habitat Quality score (out of 10)	*4.08*	*3.98*	*3.89*	*4.31*	*4.36*	*5.18*	*5.38*	*5.49*	*5.36*	*4.92*	*5.63*	*5.24*	*5.53*	*6.86*	5.01
Assessment Unit area (ha)	221.95	177.86	275.45	50.08	16.95	33.20	29.38	45.87	1.56	1.31	75.54	3.41	35.96	3.29	**971.83**
Total impact area (ha) for this MNES	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83
Size Weighting	0.23	0.18	0.28	0.05	0.02	0.03	0.03	0.05	0.00	0.00	0.08	0.00	0.04	0.00	**1.00**
Weighted Habitat Quality Score	***0.93***	***0.73***	***1.10***	***0.22***	***0.08***	***0.18***	***0.16***	***0.26***	***0.01***	***0.01***	***0.44***	***0.02***	***0.20***	***0.02***	***4.36***

Table 6.2b. Total Current Grey-headed Flying-fox habitat score for Stage 1 of the proposed offset area.

Component	AU1	AU2	AU3	AU4	AU5	AU6	AU7	AU8	AU9	AU10	AU11	AU12	AU13	AU14	Average/Final
Site Condition score (out of 3)	1.32	1.18	0.89	1.31	1.28	1.64	1.55	1.64	1.61	1.07	1.78	1.55	1.38	2.52	1.48
Site Context Score (out of 3)	1.04	1.08	1.29	1.29	1.37	1.82	2.12	2.14	2.04	2.14	2.14	1.98	2.44	2.63	1.82
Species Stocking Rate Score (out of 4)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
Habitat Quality score (out of 10)	4.08	3.98	3.89	4.31	4.36	5.18	5.38	5.49	5.36	4.92	5.63	5.24	5.53	6.86	5.01
Assessment Unit area (ha)	143.32	90.24	37.71	0.00	1.74	22.80	22.97	0.00	0.00	0.00	70.78	0.33	11.30	0.00	**401.19**
Total impact area (ha) for this MNES	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19
Size Weighting	0.36	0.22	0.09	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.18	0.00	0.03	0.00	**1.00**
Weighted Habitat Quality Score	***1.46***	***0.89***	***0.37***	***0.00***	***0.02***	***0.29***	***0.31***	***0.00***	***0.00***	***0.00***	***0.99***	***0.00***	***0.16***	***0.00***	***4.49***

Table 6.2c. Total Current Grey-headed Flying-fox habitat score for Stage 2 of the proposed offset area.

Component	AU1	AU2	AU3	AU4	AU5	AU6	AU7	AU8	AU9	AU10	AU11	AU12	AU13	AU14	Average/Final
Site Condition score (out of 3)	1.32	1.18	0.89	1.31	1.28	1.64	1.55	1.64	1.61	1.07	1.78	1.55	1.38	2.52	1.48
Site Context Score (out of 3)	1.04	1.08	1.29	1.29	1.37	1.82	2.12	2.14	2.04	2.14	2.14	1.98	2.44	2.63	1.82
Species Stocking Rate Score (out of 4)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
Habitat Quality score (out of 10)	4.08	3.98	3.89	4.31	4.36	5.18	5.38	5.49	5.36	4.92	5.63	5.24	5.53	6.86	5.01
Assessment Unit area (ha)	78.64	87.62	237.74	50.08	15.20	10.40	6.42	45.86	1.56	1.30	4.76	3.09	24.66	3.29	**570.63**
Total impact area (ha) for this MNES	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63
Size Weighting	0.14	0.15	0.42	0.09	0.03	0.02	0.01	0.08	0.00	0.00	0.01	0.01	0.04	0.01	**1.00**
Weighted Habitat Quality Score	***0.56***	***0.61***	***1.62***	***0.38***	***0.12***	***0.09***	***0.06***	***0.44***	***0.01***	***0.01***	***0.05***	***0.03***	***0.24***	***0.04***	***4.26***

6.5 EXPECTED IMPROVEMENT

Expected improvements in habitat quality resulting from the proposed management actions over 20 years are described in the OAMP (**Appendix 11**). Scores for a number of site condition attributes are expected to improve towards or achieve benchmark values through the cessation of clearing and cessation/control of grazing activities, removal and control of weeds, implementation of appropriate fire regimes (which will promote natural regeneration), and revegetation using species appropriate for pre-clear REs, thereby increasing overall habitat patch size and connectivity. The expected increase in the cover of regrowth and remnant vegetation across the offset area, and associated increase in foraging habitat quality, are also expected to facilitate an increase in Koala utilisation in current non-remnant areas, and accommodate an increase in Koala density.

In recognition of the of the challenges of rehabilitating an offset area of this size and topography, and the planned/expected requirement to manage fuel loads and grass/weed cover through controlled burns and crash grazing, scores for the remaining habitat quality attributes are predicted to be maintained at current levels as a result of the proposed management measures, rather than improved. This includes the scoring of threats to Koala; given the low likelihood of eliminating the risk of dingo/wild dog and fox attack on Koala within an offset area of this size, and the reliance on surrounding properties to be equally committed to pest animal control, the current threat score is predicted to be maintained (but not improved) through the continuation of the current pest animal management regime.

A summary of the predicted total, weighted habitat quality scores for Koala and Grey-headed Flying-fox are provided in **Tables 6.3 and 6.4**, respectively. An overall score of 7 (out of 10) for Koala and 6 (out of 10) for Grey-headed Flying-fox indicates habitats within the proposed offset property are expected to be of moderate-high quality after 20 years of dedicated habitat management. Proposed Stages 1 and 2 of the offset are also both expected to score 7 (out of 10) for Koala and 6 (out of 10) for Grey-headed Flying-fox after 20 years of targeted management.

6.6 OFFSET ASSESSMENT

6.6.1 Offset Assessment Guide Results

The habitat scores derived for the impact site and proposed offset property have been used to assess whether the proposed offset property could be viewed as suitable in respect to meeting the offset obligation for the proposed action, using the Commonwealth's Offset Assessment Guide calculators. Values for the other parameters used in the calculators are summarised in the OAMP (**Appendix 11**).

Using these values, protection and management of the entire offset area accounts for 103% of the offset requirement for Koala and 160% of the offset requirement for Grey-headed Flying-fox in accordance with the Offset Assessment Guide (refer **Appendix 11**).

As shown in **Tables 4.22 and 4.24**, based on weighted quality habitat scores associated with each impact stage, Stage 1 of the offset must achieve at least 38.3% of the total offset obligation for Koala and at least 31.7% of the total offset obligation for Grey-headed Flying-fox. As shown in **Appendix 11**, protection and management of Stage 1 of the proposed offset accounts for 42.3% of the offset obligation for Koala and 65.5% of the offset obligation for Grey-headed Flying-fox in accordance with the Offset Assessment Guide, thereby meeting the respective requirements.

6.6.2 Offset Suitability

Aside from meeting the offset obligations for the proposed action, an assessment of the suitability of the offset against the principles specified in the Commonwealth's Environmental Offsets Policy (Commonwealth of Australia [2012]) is provided in the OAMP (**Appendix 11**), along with a description of how the proposed offset addresses each of the relevant Conservation Advices, Recovery Plans and Threat Abatement Plans for the protected matters (as at April 2026).

The OAMP (**Appendix 11**) also assesses the risks that may inhibit achieving the management objectives and completion criteria for the proposed offset area, including risks that may be wholly outside the proponent's control.

6.7 SECURITY MECHANISM

The offset area will be legally secured to provide enduring conservation protection on the title of land under relevant Queensland legislation, in relation to an offset site, or another enduring protection mechanism agreed to in writing by the department, to provide protection for the site against development incompatible with conservation.

Further details on the proposed offset area security mechanism are provided in the OAMP (**Appendix 11**).

Reporting to the Commonwealth will be in accordance with any and all requirements given in the EPBC Act approval.

Table 6.3a. Total Predicted Koala habitat score for the proposed offset area.

Component	AU1	AU2	AU3	AU4	AU5	AU6	AU7	AU8	AU9	AU10	AU11	AU12	AU13	AU14	Average/Final
Site Condition score (out of 3)	1.74	1.51	1.45	1.64	1.81	2.06	1.67	2.01	1.89	1.49	2.21	1.67	1.98	2.67	1.84
Site Context Score (out of 3)	2.30	2.30	2.57	2.57	2.57	2.25	2.41	2.57	2.57	2.57	2.41	2.25	2.57	2.57	2.46
Species Stocking Rate Score (out of 4)	2.29	2.29	2.29	2.29	2.29	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.02
Habitat Quality score (out of 10)	*6.33*	*6.10*	*6.30*	*6.50*	*6.66*	*7.74*	*7.51*	*8.01*	*7.89*	*7.49*	*8.05*	*7.34*	*7.98*	*8.67*	7.33
Assessment Unit area (ha)	221.95	177.86	275.45	50.08	16.95	33.20	29.38	45.87	1.56	1.31	75.54	3.41	35.96	3.29	**971.83**
Total impact area (ha) for this MNES	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83
Size Weighting	0.23	0.18	0.28	0.05	0.02	0.03	0.03	0.05	0.00	0.00	0.08	0.00	0.04	0.00	**1.00**
Weighted Habitat Quality Score	***1.44***	***1.12***	***1.79***	***0.33***	***0.12***	***0.26***	***0.23***	***0.38***	***0.01***	***0.01***	***0.63***	***0.03***	***0.30***	***0.03***	***6.67***

Table 6.3b. Total Predicted Koala habitat score for Stage 1 of the proposed offset area.

Component	AU1	AU2	AU3	AU4	AU5	AU6	AU7	AU8	AU9	AU10	AU11	AU12	AU13	AU14	Average/Final
Site Condition score (out of 3)	1.74	1.51	1.45	1.64	1.81	2.06	1.67	2.01	1.89	1.49	2.21	1.67	1.98	2.67	1.84
Site Context Score (out of 3)	2.30	2.30	2.57	2.57	2.57	2.25	2.41	2.57	2.57	2.57	2.41	2.25	2.57	2.57	2.46
Species Stocking Rate Score (out of 4)	2.29	2.29	2.29	2.29	2.29	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.02
Habitat Quality score (out of 10)	6.33	6.10	6.30	6.50	6.66	7.74	7.51	8.01	7.89	7.49	8.05	7.34	7.98	8.67	7.33
Assessment Unit area (ha)	143.32	90.24	37.71	0.00	1.74	22.80	22.97	0.00	0.00	0.00	70.78	0.33	11.30	0.00	**401.19**
Total impact area (ha) for this MNES	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19
Size Weighting	0.36	0.22	0.09	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.18	0.00	0.03	0.00	**1.00**
Weighted Habitat Quality Score	***2.26***	***1.37***	***0.59***	***0.00***	***0.03***	***0.44***	***0.43***	***0.00***	***0.00***	***0.00***	***1.42***	***0.01***	***0.22***	***0.00***	***6.77***

Table 6.3c. Total Predicted Koala habitat score for Stage 2 of the proposed offset area.

Component	AU1	AU2	AU3	AU4	AU5	AU6	AU7	AU8	AU9	AU10	AU11	AU12	AU13	AU14	Average/Final
Site Condition score (out of 3)	1.74	1.51	1.45	1.64	1.81	2.06	1.67	2.01	1.89	1.49	2.21	1.67	1.98	2.67	1.84
Site Context Score (out of 3)	2.30	2.30	2.57	2.57	2.57	2.25	2.41	2.57	2.57	2.57	2.41	2.25	2.57	2.57	2.46
Species Stocking Rate Score (out of 4)	2.29	2.29	2.29	2.29	2.29	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.02
Habitat Quality score (out of 10)	6.33	6.10	6.30	6.50	6.66	7.74	7.51	8.01	7.89	7.49	8.05	7.34	7.98	8.67	7.33
Assessment Unit area (ha)	78.64	87.62	237.74	50.08	15.20	10.40	6.42	45.86	1.56	1.30	4.76	3.09	24.66	3.29	**570.63**
Total impact area (ha) for this MNES	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63
Size Weighting	0.14	0.15	0.42	0.09	0.03	0.02	0.01	0.08	0.00	0.00	0.01	0.01	0.04	0.01	**1.00**
Weighted Habitat Quality Score	***0.87***	***0.94***	***2.63***	***0.57***	***0.18***	***0.14***	***0.08***	***0.64***	***0.02***	***0.02***	***0.07***	***0.04***	***0.34***	***0.05***	***6.59***

Table 6.4a. Total Predicted Grey-headed Flying-fox habitat score for the proposed offset area.

Component	AU1	AU2	AU3	AU4	AU5	AU6	AU7	AU8	AU9	AU10	AU11	AU12	AU13	AU14	Average/Final
Site Condition score (out of 3)	1.74	1.55	1.45	1.64	1.94	2.12	1.75	2.16	1.89	1.76	2.08	1.67	1.81	2.67	1.87
Site Context Score (out of 3)	2.33	2.38	2.57	2.57	2.76	2.25	2.52	2.57	2.57	2.73	2.41	2.46	2.57	2.79	2.54
Species Stocking Rate Score (out of 4)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
Habitat Quality score (out of 10)	*5.78*	*5.65*	*5.73*	*5.93*	*6.42*	*6.09*	*5.98*	*6.45*	*6.18*	*6.20*	*6.20*	*5.84*	*6.10*	*7.17*	6.12
Assessment Unit area (ha)	221.95	177.86	275.45	50.08	16.95	33.20	29.38	45.87	1.56	1.31	75.54	3.41	35.96	3.29	**971.83**
Total impact area (ha) for this MNES	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83
Size Weighting	0.23	0.18	0.28	0.05	0.02	0.03	0.03	0.05	0.00	0.00	0.08	0.00	0.04	0.00	**1.00**
Weighted Habitat Quality Score	***1.32***	***1.03***	***1.62***	***0.31***	***0.11***	***0.21***	***0.18***	***0.30***	***0.01***	***0.01***	***0.48***	***0.02***	***0.23***	***0.02***	***5.86***

Table 6.4b. Total Predicted Grey-headed Flying-fox habitat score for Stage 1 of the proposed offset area.

Component	AU1	AU2	AU3	AU4	AU5	AU6	AU7	AU8	AU9	AU10	AU11	AU12	AU13	AU14	Average/Final
Site Condition score (out of 3)	1.74	1.55	1.45	1.64	1.94	2.12	1.75	2.16	1.89	1.76	2.08	1.67	1.81	2.67	1.87
Site Context Score (out of 3)	2.33	2.38	2.57	2.57	2.76	2.25	2.52	2.57	2.57	2.73	2.41	2.46	2.57	2.79	2.54
Species Stocking Rate Score (out of 4)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
Habitat Quality score (out of 10)	5.78	5.65	5.73	5.93	6.42	6.09	5.98	6.45	6.18	6.20	6.20	5.84	6.10	7.17	6.12
Assessment Unit area (ha)	143.32	90.24	37.71	0.00	1.74	22.80	22.97	0.00	0.00	0.00	70.78	0.33	11.30	0.00	**401.19**
Total impact area (ha) for this MNES	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19
Size Weighting	0.36	0.22	0.09	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.18	0.00	0.03	0.00	**1.00**
Weighted Habitat Quality Score	***2.07***	***1.27***	***0.54***	***0.00***	***0.03***	***0.35***	***0.34***	***0.00***	***0.00***	***0.00***	***1.09***	***0.00***	***0.17***	***0.00***	***5.86***

Table 6.4c. Total Predicted Grey-headed Flying-fox habitat score for Stage 2 of the proposed offset area.

Component	AU1	AU2	AU3	AU4	AU5	AU6	AU7	AU8	AU9	AU10	AU11	AU12	AU13	AU14	Average/Final
Site Condition score (out of 3)	1.74	1.55	1.45	1.64	1.94	2.12	1.75	2.16	1.89	1.76	2.08	1.67	1.81	2.67	1.87
Site Context Score (out of 3)	2.33	2.38	2.57	2.57	2.76	2.25	2.52	2.57	2.57	2.73	2.41	2.46	2.57	2.79	2.54
Species Stocking Rate Score (out of 4)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
Habitat Quality score (out of 10)	5.78	5.65	5.73	5.93	6.42	6.09	5.98	6.45	6.18	6.20	6.20	5.84	6.10	7.17	6.12
Assessment Unit area (ha)	78.64	87.62	237.74	50.08	15.20	10.40	6.42	45.86	1.56	1.30	4.76	3.09	24.66	3.29	**570.63**
Total impact area (ha) for this MNES	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63
Size Weighting	0.14	0.15	0.42	0.09	0.03	0.02	0.01	0.08	0.00	0.00	0.01	0.01	0.04	0.01	**1.00**
Weighted Habitat Quality Score	***0.80***	***0.87***	***2.39***	***0.52***	***0.17***	***0.11***	***0.07***	***0.52***	***0.02***	***0.01***	***0.05***	***0.03***	***0.26***	***0.04***	***5.86***

7.0 ECONCOMIC AND SOCIAL MATTERS

7.1 ECONOMIC BENEFITS AND EMPLOYMENT OPPORTUNITIES

The proposed quarry operation will secure long-term access to quarry materials to continue servicing an ongoing and increasing demand, primarily for the infrastructure building and construction industry. These two areas have been highlighted by all levels of government as critical areas of growth to assist with the economy, post COVID.

In relation to the economic benefits of the project, the proposed quarry will ensure that both existing and projected demand continues to be met, further reducing (or at least delaying) the need for more remotely located greenfield quarries to be secured and developed. Ideally, quarry resources need to be located close to where they are required, to enable the efficient and affordable supply of construction materials.

The economic benefits associated with the proposed quarry apply to the wider community where the ability to purchase locally produced construction materials is assured, contributing towards housing affordability and the cost-effective delivery of proximate infrastructure projects.

The indirect economic benefits include assisting with migration, facilitating a competitive national and international market for businesses to locate, as well as supporting a local Queensland based business, which will in turn bolster other areas of the local economy.

It is emphasised that the described direct and indirect economic benefits, as well as the employment opportunities associated with the proposed action, are substantial and considered to be in addition to those benefits, if the action were not to take place. Quarry resources are the result of fortuitous geological events and hence their locations are fixed. The quarry operations proposed within the project area, in particular its size, volume of high quality resource and its proximity to market are all relatively unique attributes that reinforce the additionality of the economic benefits and associated employment opportunities.

The proponent (The Neilsen Group) is an independent and family-owned company, which primarily delivers a vertically integrated supply of pre-mixed concrete and quarry products. This vertically integrated supply chain results in an in-house and ongoing need for a significant proportion of the construction materials being produced. The Neilsen Group plans to develop the Warrill View Quarry to replace its Bromelton North Quarry, which is due to be exhausted in 3 to 5 years. The Bromelton North Quarry has been the company's primary producer for concrete aggregates to supply its network of concrete batching plants and major infrastructure projects, with recent major project examples including the Airport Link, Legacy Way Tunnel and Brisbane Airport (second runway). Hence, the Warrill View Quarry will become an integral part of the company's future supply chain.

In this regard, a major part of the economic need for the quarry material that will be produced by the proposed operations is already existing and the ongoing in-house supply will be transferred over to this site upon commencement.

It is estimated that the project will require the Proponent to invest approximately $40 million of capital over a period of two (2) years for site establishment works. This value includes civil construction of the access road, cost of purchasing site equipment and infrastructure, and onsite establishment works. The site establishment works will allow for engagement of trades and services from the south-east Queensland region, including:

- Road Civil Works ($20mil budget) – based on a 52 month construction process an average of 50-80 jobs per day over this period is expected across direct employees, subcontractors and cartage companies.
- Onsite commencement works ($20mil budget) – based on an 8 month construction process an average of 10-20 jobs per day over this period is expected by subcontractors to establish the site and connect the processing equipment.
- Site employment – the Proponent has five staff directly employed for site commencement activities.

Once operational, the quarry will provide direct employment for approximately 80 staff (likely to be two separately run operations and working on the site in shifts), as well as indirect employment for about the same number (includes drivers, sub-contractors, maintenance and site servicing as well as ongoing site monitoring, quarry design and data collection services). The proposed operation has capacity to increase its outputs to respond to large tenders or projects as they arise and this will also likely convert to additional employment requirements. Following commencement of quarry operations, the project is expected to generate ongoing economic activity within the local and regional economy through the procurement of goods and services required for quarry operations. This includes equipment maintenance, fuel supply, transport and logistics services, equipment hire, and other operational support services. The project will also support continued demand for local contractors and service providers associated with site management, environmental monitoring and maintenance activities.

Additional indirect economic benefits may occur through increased use of local accommodation, hospitality and retail services by employees and contractors associated with the operation of the quarry. These estimates are based on anticipated operational workforce requirements and typical supply chain expenditure associated with comparable quarry operations in Queensland.

7.2 PUBLIC STAKEHOLDER CONSULTATION

In Queensland, formal periods of public consultation are determined based on the type of land use being proposed. The development approval process for the new quarry comprised an Impact Assessable application, assessed by Scenic Rim Regional Council. The Impact assessment process requires an application to be publicly notified for a period of fifteen (15) business days. This process involves notifying adjacent landowners in writing, publishing a notice in a locally circulated newspaper and placing a notice in the prescribed location on the land. During the process a total of six (6) submissions were submitted to Council between 15 August 2018 to 5 September 2018. These submissions raised concerns about the proposed development as well as suggested conditions of approval. The matters raised covered topics which are a normal and ordinary consequence of the activity, including traffic generation, water usage, hours of operation, potential environmental impacts, and visual amenity. Ultimately these concerns were deemed to be satisfied with reasonable and relevant conditions imposed by Council on the development approval.

In addition to the statutory notification period, the proponent met with the majority of adjoining property owners, to clarify the scope of the project and to enable the local landowners to provide their input prior to and following lodgement of the development application.

The Scenic Rim Regional Councillor for the area and the Mayor were informed about the project prior to the commencement of consultation and were kept apprised of progress through the program.

Over the last two (2) years, the proponent has met with the property owners of land adjacent to the unnamed road reserve. As a result of these discussions, the road design has evolved in response to landowner interests accommodating the provision of acoustic fencing and/or site access from the unnamed road reserve to each landholding. At the time of writing this report, it is understood that all but one (1) of the landowners have provided written consent for the works in the unnamed road reserve. The proponent will continue to engage with the remaining landowner to ensure the works achieve a mutually beneficial outcome particularly in relation to easement terms and conditions.

7.3 INDIGENOUS STAKEHOLDER CONSULTATION

A Cultural Heritage Assessment was prepared for the project area by Converge Heritage consultants in October 2018 (refer **Appendix 12**), which confirmed that the Yuggera Ugarapul People were the registered party for consultation. The assessment also confirmed that there were no registered sites within the project area and, due to the high level of site disturbance (long-term grazing), that it is generally unlikely that the project will have any impact on Aboriginal cultural heritage.

The Cultural Heritage assessment recommended that further consultation occur with the Yuggera Ugarapul People and that a cultural heritage agreement may also be required to manage and enable the appropriate land clearances, while also ensuring that cultural heritage obligations are met for the project.

On 23 October 2023, a Cultural Heritage Management Plan was approved pursuant to section 107 of the *Aboriginal Cultural Heritage Act 2003* by the (then) Department of Treaty, Aboriginal and Torres Strait Islander Partnerships, Communities and the Arts (refer **Appendix 12**).

The proponent has engaged with the Yuggera Ugarapul People in the way set out in the Cultural Heritage Management Plan in anticipation of site establishment works commencing in 2026.

8.0 ECOLOGICALLY SUSTAINABLE DEVELOPMENT

Ecologically Sustainable Development (ESD) is an objective that requires environmental protection to be taken into consideration effectively when making development decisions. Four recognized principles are identified in Section 3A of the EPBC Act, which inform this objective, comprising the precautionary principle, the principle of inter-generational equity, the principle of conservation of biological diversity and ecological integrity; and the principle of improved valuation, pricing and incentive mechanisms.

A response to each of these listed principles is provided as follows:

3A(a) decision making processes should effectively integrate both long term and short term economic, environmental, social and equitable considerations.

Sustainable development requires the consideration, in an integrated way, of the wider economic, social and environmental implications of decisions.

From an economic perspective, the proposed quarry will service the Southeast Queensland market for at least the next 100 years. The site is proposed to be included as a Key Resource Area (KRA) in the Queensland State Planning Policy, which sets out the State's interests in land-use planning and development across Queensland. The purpose of KRAs is to protect the identified resources from incompatible land uses and to prevent sterilization of the resource, either now, or into the future.

The proposed quarry and its proximate distances to known markets will ensure that projected demand continues to be met. Unlike many mining resources that produce high value commodities which are able to support the transport of product over large distances, quarry products are high volume, low margin materials, resulting in transport being a major component in the cost of production and a cost which is inevitably passed to the consumer. Quarry resources therefore need to be located close to where they are required, to ensure the efficient and affordable supply of construction materials for housing, road construction and other essential infrastructure.

The economic benefits associated with the proposed quarry will benefit the wider community where the ability to purchase locally produced construction materials is assured, contributing towards housing affordability and the cost-effective delivery of proximate infrastructure projects.

As urban encroachment continues and existing South-east Queensland quarry operations become depleted over the short, medium and longer term, greenfield quarry sites will inevitably need to be located at further distances from their market, which will result in higher costs per tonne, increased travel time, as well as adding to congestion and greenhouse gas emissions.

The location of quarry resources are the result of fortuitous geological events and hence their locations are fixed. The full utilisation of these identified resources is imperative, given the State policy objectives to maximize efficiencies and to prevent any premature sterilization. The proposed quarry, in particular its size, volume of high quality resource and proximity to market enables it to achieve the ESD principles, as the ongoing supply of construction materials to the South-east Queensland region is able to be achieved efficiently and cost effectively.

The disturbance area has sought to avoid disturbance of Warroolaba Creek, including 50 to 100 metre buffers on either side of the creek. The assessments carried out to date have confirmed that the proposed disturbance areas have been modified to avoid confirmed areas of MNES. In addition to the constraints applied, the ancillary operations area (approved in the development application to Council) has been further reduced, so as to further minimise potential impacts on known koala food trees.

The decision to allow the proposed extraction footprint and ancillary operations areas will essentially forego the clearing and extraction of the identified surrounding buffer areas, in order to achieve (and preserve) a better longer term environmental outcome. The limited number of uses that are able to locate within a quarry separation area, also locks in the environmental values and corridors around the site for the long-term.

Extensive ecological studies associated with the proposed development have been carried out, to ensure that relevant environmental matters are appropriately managed through avoidance and mitigation.

From a social perspective, the proposed operation will provide direct employment for approximately eighty (80) staff (likely to be two separately run operations and working on the site in shifts), as well as indirect employment for about the same number (includes drivers, sub-contractors, maintenance and site servicing as well as ongoing site monitoring, quarry design and data collection services). The proposed operation has capacity to increase its outputs to respond to large tenders or projects as they arise and this will also likely convert to additional employment requirements.

The proposed operation will also be guided by an Environmental Authority (EA) and associated conditions for the operation, which is regulated by the Queensland Department of Environment, Tourism, Science and Innovation (DETSI). The EA seeks to ensure that potential for environmental nuisance from the proposed operation is managed and/or prevented. In addition, the proposed operation will be guided by the site's Environmental Management Plan, which sets out the objectives, control measures and actions, to ensure that activities are managed, so as to suitably manage potential impacts to the surrounding community and environment.

Consistent with industry standard, the proposed operation will maintain a site complaints register. All complaints will be followed up and notification provided to DETSI, where required.

The proposed quarry development has been assessed by DETSI and EA conditions issued, in accordance with the Queensland *Environmental Protection Act 1994* (EP Act). The objective of the EP Act is to protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends (ecologically sustainable development). A number of decisions under the EP Act require the decision maker to comply with the regulatory requirements and consider a set of standard criteria.

The standard criteria are a list of considerations and are specified in Schedule 4 - Dictionary of the EP Act and include (in part):

(a) the following principles of environmental policy as set out in the Intergovernmental Agreement on the Environment—

(i) the precautionary principle;

(ii) intergenerational equity;

(iii) conservation of biological diversity and ecological integrity;

Whilst the granting of the EA by DETSI illustrates consideration of the principles of ESD, additional information has been provided below.

3A(b) if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

As discussed, the proposed quarry operation will be regulated by EA conditions and guided by the site's Environmental Management Plan.

Potential impacts to MNES include the removal of foraging and dispersal habitat for Koala and the removal of foraging habitat for Grey-headed Flying-fox, as well as indirect impacts on habitat retained adjacent to the proposed quarry operation. The proposed management of impacts includes:

- Measures to avoid/minimise death or injury to Koalas during clearing of vegetation (i.e. appropriate guidance and supervision during clearing, progressive clearing methods that allow for Koala movement towards retained habitat).
- Measures to avoid/minimise impacts to retained habitat (i.e. protect and enhance the condition of adjacent, retained vegetation/habitat, minimise general environmental harm through compliance with State approval conditions)
- Measures to avoid/minimise death or injury to Koalas during quarry operation (i.e. minimise risk of dog attack and vehicle strike).
- Compensating for significant, residual impacts through the delivery of a suitable offset (i.e. the rehabilitation and legal protection of replacement habitat).

3A(c) the principle of inter-generational equity—that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.

The majority of the project area (aside from the non-navigable steep sections and a band of vegetation associated with Warroolaba Creek) have been historically cleared and used for cattle grazing. The flatter sections of the site remain heavily disturbed and contain evidence of long periods of grazing activities. Outside the proposed exclusion/management zone areas, cattle grazing will continue across the balance of the site, concurrently with the proposed action.

The disturbance area for the proposed action considered the environmental values of the site, seeking to avoid disturbance of Warroolaba Creek, including 50 to 100 metre buffers on either side of the creek, and further modifying / reducing extraction areas in the northern section of the west pit and the eastern-most boundary of the east pit in order to balance the environmental values present with a viable and workable quarry design.

The proposed quarry development will ensure the continued supply of resources, primarily to the building and construction industry. The provision of construction materials is not only important to the current generation, but the considered and efficient utilisation of quarry resources must be planned for, in order to ensure the prevention of premature sterilisation of essential construction materials for longer term use, as well as enabling continued availability of construction materials for future generations.

It is likely that an activity which would result in widespread and/or irreversible environmental harm, would not meet the principle of inter-generational equity. However, the proposed quarry activities are subject to EA conditions, requiring progressive rehabilitation and the return of the land post quarrying to a stable, self-sustaining and non-polluting landform.

Following the completion of quarrying activities, the site will be rehabilitated to a landform suitable for alternative land uses compatible with the surrounding landscape. As discussed in **Section 4.1**, the nominated post-quarrying land use for the disturbance areas will align with the definition of rural uses and activities, with the exclusion/management zones adjacent to the disturbance areas maintained as an ecological corridor.

The intended post-quarry land use will include rehabilitated areas that support native vegetation and habitat values, contributing to local biodiversity and ecological connectivity. These areas will be designed to be stable and self-sustaining, ensuring that the environmental health, diversity and productivity of the site are maintained or enhanced over the long term.

Through the progressive rehabilitation of disturbed areas and the establishment of a stable post-quarry land use that supports ecological function and landscape integration, the proposed action is consistent with the principle of inter-generational equity. The site will ultimately provide environmental values and land capability that can benefit future generations while enabling the responsible use of a finite construction material for current community needs.

Rehabilitation will be undertaken in accordance with established quarry rehabilitation practices to ensure that the final landform is stable, safe and capable of supporting the nominated post-quarry land uses. This includes the re-establishment of vegetation, management of surface water drainage, and the stabilisation of disturbed areas to prevent erosion and sediment transport. These measures will support the recovery of ecological values and ensure that the long-term land capability of the site is maintained or improved relative to its current highly modified condition.

3A(d) the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making.

As discussed, extensive ecological assessments associated with the proposed quarry have been carried out to guide decision-making, in particular the location of the quarry footprint and to ensure that avoidance of impacts are prioritised, wherever practicable.

Actions associated with quarrying such as vegetation clearing occur progressively and are staged, in line with extraction. Unlike housing developments, for example, where clearing generally occurs over the whole of a development area (and often rapidly to facilitate the development), clearing associated with quarrying is a slow and gradual practice. Actions such as vegetation clearing are capital intensive and it is normal practice for quarries to clear only what is needed ahead of extraction, while rehabilitation is progressively commenced in areas that have reached

terminal benches and are suitably removed from any active working areas of the quarry operation. The progression of the footprint of disturbance associated with quarries also occurs both vertically and horizontally, hence the gradual disturbance of the 2D land surface over time.

Based on the findings of ecological assessments, significant concessions were made in relation to the proposed extent of disturbance areas for the quarrying activities. Areas in proximity to Warroolaba Creek, the northern section of the west pit and the eastern-most boundary of the east pit have all been modified / reduced in order to balance the environmental values present with a viable and workable quarry design. An estimated 120 hectares of land with known quarry resources has been removed from the extent of proposed disturbance areas and extraction footprints, so as to retain larger portions of identified higher value fauna habitat within the project area.

Following the results of field surveys in 2018, where Koala evidence and numerous *Eucalyptus tereticornis* were recorded in an area that was originally planned as a stockpile area, the proposed footprint for the east pit was reduced to allow higher value habitats to be retained. The retention of this area will enhance connectivity to a large patch (~80 ha) of Koala habitat located immediately adjacent to the north-eastern boundary of the project area.

The 2019 field surveys identified an area of relatively high Koala usage located in the proposed west pit ancillary/operations area. To minimise impacts to threatened species, the size of the proposed ancillary/operations area was reduced by 7 ha; thereby retaining an additional 7 ha of known Koala habitats near the north-east boundary of the west pit.

These surface-level concessions significantly reduce the volume of essential construction material able to be extracted, not only due to the associated benching requirements but also because the reduced footprint limits the ability to maintain optimal pit geometry, setback buffers, and safe working areas. The smaller disturbance area restricts internal configuration such as the placement of haul roads and access ramps, reduces opportunities to follow the full extent of the resource, and requires additional areas of in-situ material to be left in place for geotechnical stability along the perimeter. Collectively, these factors sterilise otherwise accessible resource and materially diminish the long-term yield of the quarry.

3A(e) improved valuation, pricing and incentive mechanisms should be promoted.

The principle of improved pricing and incentive mechanisms emphasises the internalisation of environmental costs. Namely, that environmental factors should be included in the valuation of assets and services such as the 'polluter pays' concept relating to pollution generators bearing the cost of pollution containment or avoidance and the concept of 'lifecycle cost' associated with the provision of goods as services where it is considered that the users of products and services should pay prices which account for the full lifecycle cost incurred.

Unlike mining operations where large portions of overburden can be stockpiled as waste, quarry operations generate a range of products on site utilising the full extent of extracted materials and therefore generate very little waste. Topsoil is generally stockpiled for later use in rehabilitation works and the remainder of material is sold as product. Water usage at the proposed quarry will be self-sufficient, with no reliance on reticulated water or bore water.

Potential contaminants are principally limited to turbidity associated with stormwater runoff which is managed on site through sediment and erosion control devices to ensure that conditions of the EA are achieved so as not to result in impact to downstream environments.

The cost of site's environmental management will be borne by the proposed quarry. In accordance with the site's Environmental Management Plan, the proponent is committed to and bears accountability for the quality of its service provision and compliance to all applicable legislation.

As quarries are temporary activities with a high potential for development into alternative uses once quarrying has ceased, the future asset value of the land will ultimately be dependent on overall environmental performance and planning. There is therefore an incentive to ensure that environmental goals are achieved in a cost effective and pro-active manner.

The proponent is cognisant of their obligations regarding pollution generation. Quarry operations need to be environmentally focused and managed pro-actively to prevent unforeseen environmental costs being incurred. Due to the high volume, low margin nature of the materials produced, any increase in costs associated with product production will inevitably be passed to the consumer.

The quarry industry operates in a highly competitive market and in order to maintain their market position, operators must keep their costs as low as possible, to remain competitive. In addition, consumer expectation and the social licence to operate are also key factors in consumer choice for company brand and product which also ensures that environmental responsibility is maintained as a key focus.

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APPENDIX 1

Conceptual Overall Development Plan

Notes:
1. Fixed processing plant to be located generally as shown. Mobile processing plant will also be utilised subject to operational need and their location will be subject to change, generally aligning with progressive site workings.
2. Stockpiles and overburden within the Ancillary Operations Area and the quarry floor (Proposed Extraction Footprint) will be subject to change, based on operational requirements.
3. Within the Ancillary Operations Area additional internal haul roads may be utilised based on operational requirements.
4. Ancillary Operations Area includes a range of activities including crushing, screening, stockpiling, overburden storage, pre-coat, pugmill, quarry services and infrastructure, including weighbridge, office, amenities and crib.
5. A 50m buffer to the creek corridor is required by Condition 43 of the Development Approval.
6. The configuration of the West Pit (stockpile pad) adopts that proposed under the EPBC Determination in 2021.

Legend:
- Site Boundary
- Cadastral Boundary
- Mapped Stream Order
- Actual Gully Line
- Clean Water Diversion
- Council Road
- Haul Road
- Creek Crossing
- Q100 Flood Outline
- Proposed Extraction Footprint
- Ancillary Operations Area
- Likely Longer Term Location of Overburden
- Direction of Quarrying

Development Summary

Lot Areas	
Lot 2 RP50377	62.322 ha
Lot 7 RP50377	93.389 ha
Lot 8 RP50377	77.381 ha
Lot 10 RP50377	86.198 ha
Lot 18 RP50377	83.466 ha
Lot 1 RP51909	36.151 ha
TOTAL Lot Area	438.907 ha
West Pit Ancillary Operations Area	9.665 ha
West Pit	144.261 ha
TOTAL	153.926 ha
East Pit Ancillary Operations Area	6.314 ha
East Pit	77.974 ha
TOTAL	84.288 ha

West Pit
East Pit
West Pit Ancillary Operations Area
Ancillary Operations Area
New Haul Road
New Council Road
Indicative Creek Crossing
Diversion Channel
Initial Location of Fixed Plant
Caretaker's Dwelling
WARROOLABA CREEK
HAYES ROAD
Lot 1 RP173616
Lot 2 RP174011
Lot 1 RP50377
Lot 2 RP50377
Lot 1 RP51909
Lot 5 RP32823
Lot 4 RP50377
Lot 4 RP32823
Lot 7 RP50377
Lot 8 RP50377
Lot 18 RP50377
Lot 6 RP50377
Lot 10 RP50377
Lot 15 RP50377

E 454500m E 455000m E 455500m E 456000m E 456500m E 457000m E 457500m E 458000m
N 6916500 m N 6916000 m N 6915500 m N 6915000 m N 6914500 m

REV	DESCRIPTION	DATE	BY
7	East Pit 50m buffer as required by Council. West Pit revised to May 2021 configuration	09-10-2024	MR
8	New road and diversion channel added	10-09-2025	GL
9	Indicative creek crossing added	10-10-2025	GL

Data Sources:
Photography: Google Earth. Captured 2016-08-27
Topography: LiDAR Survey. Captured 2016-12-16.
Cadastra:
Ecosystem:
Other:

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PROJECT: Warrill View Quarry
CLIENT: Neilsens Quality Gravels Pty Ltd

TITLE: Conceptual Overall Development Plan

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APPENDIX 2

Stormwater Management Plan and Associated Technical Memorandum

GROUNDWORK plus

WARRILL VIEW QUARRY
STORMWATER MANAGEMENT PLAN

Prepared for:
Neilsens Quality Gravels Pty Ltd
Date: November 2018

Reference:
1361.610.002

Document Control

Project/ Report Details

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Principal Author:	Tom Manning
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Issue	*Description*	*Date*	*Author*	*Reviewer*
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1	Revised for SARA Information Request	6 February 2018	M. Folker	C. Hill
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ATTACHMENTS

Attachment 1	Proposal Plans
Attachment 2	Clean Water Diversion Drain Calculations
Attachment 3	Sediment Basin Calculations (Proposed)
Attachment 4	HEC-RAS Modelling Results

1. Introduction

1.1 Project Overview

This Stormwater Management Plan (SMP) has been prepared for Neilsens Quality Gravel Pty Ltd (Neilsens) to support the proposed new extractive industry operation at 299 Hayes Road, Silverdale (the Site). The Site is located approximately 45 kilometres west of Beaudesert and 60 kilometres south-west of Brisbane, with access to be provided from the Cunningham Highway (refer Figure 1 - Site Access Plan).

The Environmentally Relevant Authorities (ERAs) sought will be carried out under a Development Approval (DA) for the activity, issued by the Scenic Rim Regional Council (Council), as well as an Environmental Authority (EA) issued by the Department of Environment and Science (DES).

1.2 Site Details

Location:	299 Hayes Road, Silverdale, QLD, 4307
Access:	Cunningham Highway
Real Property Description:	Lot 2 on RP50377, Lot 7 on RP50377, Lot 8 on RP50377, Lot 10 on RP50377, Lot 18 on RP50377 and Lot 1 on RP51909
Local Authority:	Scenic Rim Regional Council
Assessing Authority:	Department of Environment and Science
Area:	438.907 Hectares
Tenure:	Freehold

1.3 Scope of Works

The scope of this SMP includes the following work items undertaken by Groundwork Plus:

- Conduct a catchment delineation and hydrologic assessment
- 1D hydraulic modelling of Warroolaba Creek
- Undertake engineering designs for stormwater quality treatment system
- Undertake a site based water balance modelling to ensure the proposed measures are in accordance with DES and Council guidelines
- Develop an operational plan for implementation and maintenance of stormwater quality treatment system.

This SMP outlines the engineering design details and operational management procedures that the operator will be required to adopt, in order to integrate stormwater management and EA licence compliance into daily operations and site activity.

1.4 Site Survey and Topography

The Site occupies land that Warroolaba Creek traverses south-west to north-east, and is situated on ground with elevations between RL75.0 metres – RL250.0 metres AHD. A detailed Unmanned Aerial Vehicle (UAV) survey was conducted in December 2016, to ensure that accurate levels are known for the Site. Refer to Figure 2 – Orthophoto December 2016 for details on existing site surface topography and features.

2. Stormwater Quality Treatment System Design

2.1 Design Criteria

The International Erosion Control Association (IECA): *Best Practice Erosion and Sediment Control* (2008) design guidelines and the Department of Environment and Heritage Protection: *Stormwater Guideline – Environmentally Relevant Activities* (2014) (EHP Stormwater Guideline) were used to design an engineering solution, to meet stormwater quality treatment appropriate for the Site operations.

2.2 Erosion and Soil Management Controls

The proposed quarry footprint is shown in Attachment 1 – Proposal Plans. A model has been undertaken to assess the required stormwater management measures based on the proposed Site layout against the design criteria set out in the *Environment Protection Act 1994* (EP Act).

2.2.1 Clean Water Diversion Design Calculations

IECA stipulates that all clean water diversions be designed to adequately convey flow from the peak 20 year Average Recurrence Interval (ARI) rainfall event. Refer to Attachment 1 – Proposal Plans for the location and extent of the proposed clean water diversion drains.

As per IECA 2008, the average velocity and water depth for the existing clean water diversion drains are calculated based on the following modified Mannings equation:

$Q = (1/n) \times A \times R^{2/3} \times S^{1/2}$, where:

Q = Channel flow rate (m^3/s)
n = Mannings roughness coefficient
A = Cross sectional area of the flow (m^2)
R = Hydraulic Radius (m)
S = Channel bed slope (m/m)

Table 1 – Clean Water Diversion Drain Sizing below details the required drain size to convey upstream flows around the overburden stockpile.

Table 1 – Clean Water Diversion Drain Sizing

Drain ID	Catchment Area (ha)	Q_{20} Peak Discharge (m^3/s)	Base Width (m)	Batters (1v:Xh)	Minimum Depth (m)	Velocity (m/s)	Proposed Lining
CW1	170.30	23.90	8.0	6.0	2.00	0.85	Grass

The design criteria is for velocities to remain below 2.0m/s and depth x velocity product below $0.6m^2/s$, in order to ensure minimal erosion to the channel bed. As shown in Table 1 – Clean Water Diversion Drain Sizing, the upstream clean water diversion drain will experience acceptable velocities and will not require additional scour protection. It is proposed to provide turf over a 0.5 metre layer of well compacted material. Refer to Attachment 2 – Clean Water Diversion Drain Calculations for calculations.

2.2.2 Sediment Basin Design Calculations

In order to meet the requirements of the EHP Stormwater Guideline, a sediment basin must be designed, constructed and operated to retain the runoff at the site for events up to and including a 24 hour storm event, with an ARI of 1 in 5 years.

As outlined in the EHP Stormwater Guideline, the total upper settling storage requirements for sediment basins are calculated based on the following formula:

$V_s = A * C_v * R_{(1 \text{ in } 5;\ 24hr)}$, where:
A = Catchment Area (m^2)
C_v = Coefficient of Discharge
R = Rainfall depth (m) from 24 hour storm, and ARI of 1 in 5 years

In addition to the upper settling volume, a sediment storage zone is required to be accommodated based on 0.5 times the upper settling volume: $V_{SED} = 0.5 * V_s$

Table 2 – Site Sediment Storage Requirements details the sediment basin storage requirements for the site, based on a Coefficient of Discharge (C_v) of 0.75, and a Rainfall Depth (R) of 0.129m for an adopted average intensity of 5.40mm/h (Source: Bureau of Meteorology).

Table 2 – Site Sediment Storage Requirements

Basin ID	Catchment area (ha)	Upper Settling Volume, V_s (m^3)	Sediment Storage Volume, V_{sed} (m^3)	Total Required Storage Volume, V_{tot} (m^3)
Quarry Sump QS1	78.492	81.38	40.69	122.07
Quarry Sump QS2	144.206	149.51	74.76	224.27
Sediment Basin SB1	11.120	11.53	5.76	17.29
Sediment Basin SB2	6.592	6.83	3.42	10.25
Sediment Basin SB3	16.246	16.84	8.42	25.27

The details of the proposed layout for the sediment basins is included in Attachment 1 – Proposal Plans and Figure 3 – Stormwater Management Plan. The site is to be generally maintained in accordance with Figure 3 – Stormwater Management Plan to ensure that adequate stormwater quality treatment measures are implemented onsite to prevent the release of contaminants from the site. Refer to Attachment 3 – Sediment Basin Calculations (Proposed) for details of the sediment basin sizing calculations.

2.2.3 Sediment Basin Spillway Sizing Calculations

The proposed discharge locations from the quarry are shown in Figure 3 - Stormwater Management Plan, comprising spillways SW2 and SW3, from Sediment Basins SB2 and SB3 respectively. Hydrologic modelling was undertaken using DRAINS (Watercom) to design the spillway for each sediment basin. A 50 year ARI event was selected (1 hour duration) to determine that each spillway can adequately convey overtopping in accordance with the EHP Stormwater Guideline. All basins were simulated as full before the commencement of the design rainfall event.

The proposed spillway design specifications are outlined in Table 3 – Sediment Basin Spillway Design. The design criteria included ensuring velocities remain below 2.0m/s and depth x velocity product below $0.6m^2/s$, in order to minimise scour. A rock lined spillway has been assumed (Mannings 'n' value of 0.045), with appropriate downstream conveyance.

Table 3 – Sediment Basin Spillway Design

Spillway ID	Base Width (m)	Batters (1 in x)	Spillway RL (m AHD)	Chute Slope (%)	Flow Depth, d (m)	Discharge Capacity (Q, m^3/s)	Flow Velocity V (m/s)	Depth x Velocity (m^2/s)
SW2	12	3.0	75.50	1.0	0.327	3.818	0.90	0.29
SW3	12	3.0	79.50	1.0	0.491	7.637	1.15	0.57

2.2.4 Surface Water Discharge Estimations

The volume of water estimated to discharge from the nominated release points are shown below in Table 4 – Surface Water Runoff Volume Estimations. The estimations include a range of events and the conditions for the model assume that the required freeboard for each basin is maintained in accordance with Table 2 – Site Sediment Storage Requirements.

Table 4 – Surface Water Runoff Volume Estimations

SPILLWAY ID	Estimated Runoff Volume (m^3) for Average Recurrence Interval (1:n years) (24 hour duration)						
	1	2	5	10	20	50	100
SW2	0.00	0.00	0.00	838.9	2,348.1	4,364.7	6,032.5
SW3	0.00	0.00	0.00	477.5	4,003.8	8,716.9	12,613.8

2.2.5 Sediment Basin Freeboard Details

In accordance with the EHP Stormwater Guideline, it is required that water is treated and pumped from each basin following a storm event, to restore the upper settling volume V_s, shown in Table 2 – Site Sediment Storage Requirements.

Freeboard markers should be installed in each basin to ensure adequate capacity is achieved prior to a design rainfall event. Recommended freeboard marker levels for each basin are included in Table 5 – Sediment Basin Freeboard Marker Levels.

Table 5 – Sediment Basin Freeboard Marker Levels

Basin ID	Freeboard Marker Level (m AHD)^	Spillway Level (m AHD)^
SB2	75.00	79.50
SB3	72.50	75.50

^ Levels are subject to detailed design.

2.2.6 Downstream Impact Assessment

The hydrology of the broader catchment was examined to identify if there are any impacts associated with the proposed quarry footprint. The downstream reference for the assessment including the contributing catchments are shown on Figure 4 – Stormwater Impact Assessment Downstream.

Results are shown below in Table 6 – Downstream Impact Assessment and indicate a negligible change on surface water hydrology (average reduction in runoff of approximately 7 to 8%). It is noted that the assessment is based on 100% capture for the entire proposed quarry footprint area, which is considered as highly conservative, as this scenario is not likely occur within the next 100 years. The assessment also ignores the treatment and dewatering of the quarry pits following a rainfall event.

Table 6 – Estimated Total Runoff Comparison

Downstream	Estimated Runoff Volume (m^3) for Average Recurrence Interval (1:n years) (24 hour duration)					
	2	5	10	20	50	100
Existing	184,303	552,004	849,356	1,278,275	1,819,948	2,434,370
Future	169,952	509,023	783,224	1,178,745	1,678,239	2,244,825
Difference	14,351	42,981	66,132	99,530	141,709	189,545

3. Flooding

3.1 Objective

The Council Flood Code indicates that in non-urban areas, where a development is located in an area affected by a Defined Flood Event indicated by Council flood mapping, all infrastructure and buildings require a 50 metre setback from the 1 in 100 year ARI event flood outline in order to maintain the natural function of riparian corridors. The proposed development will consist of an open quarry pit, earthworks pads, roads and associated infrastructure located both on the eastern and western side of Warroolaba Creek. The following flood model was utilised to determine the applicable development envelope for the Site.

3.2 Catchment Characteristics

The Warroolaba Creek contributing catchment was estimated utilising LiDAR data, UAV data compiled by Groundwork Plus and Queensland Globe online mapping contour data. The catchment characteristics adopted for this study are shown in Table 7 – Catchment Characteristics. Fraction impervious values were estimated using aerial imagery.

Table 7 – Catchment Characteristics

Item	Value
Area (Ha)	2,003
Flow Path Length (m)	10,750
Average Slope (%)	1.60
Fraction Impervious (%)	0.09

3.3 Peak Flow Estimate

In order to estimate the peak flows for a range of storm events for the contributing catchment, hydrologic modelling was undertaken using DRAINS (a computer simulation program by Watercom). Site-based rainfall polynomial coefficients were obtained using the Intensity-Frequency-Duration (IFD) generation tool, available on the Bureau of Meteorology's website. Multiple design storms were set up in DRAINS ranging from the 1 in 5 year ARI event up to the 1 in 100 year ARI event. Table 8 – Peak Flow Estimates below outlines the adopted peak flows utilised in the hydraulic modelling of Warroolaba Creek.

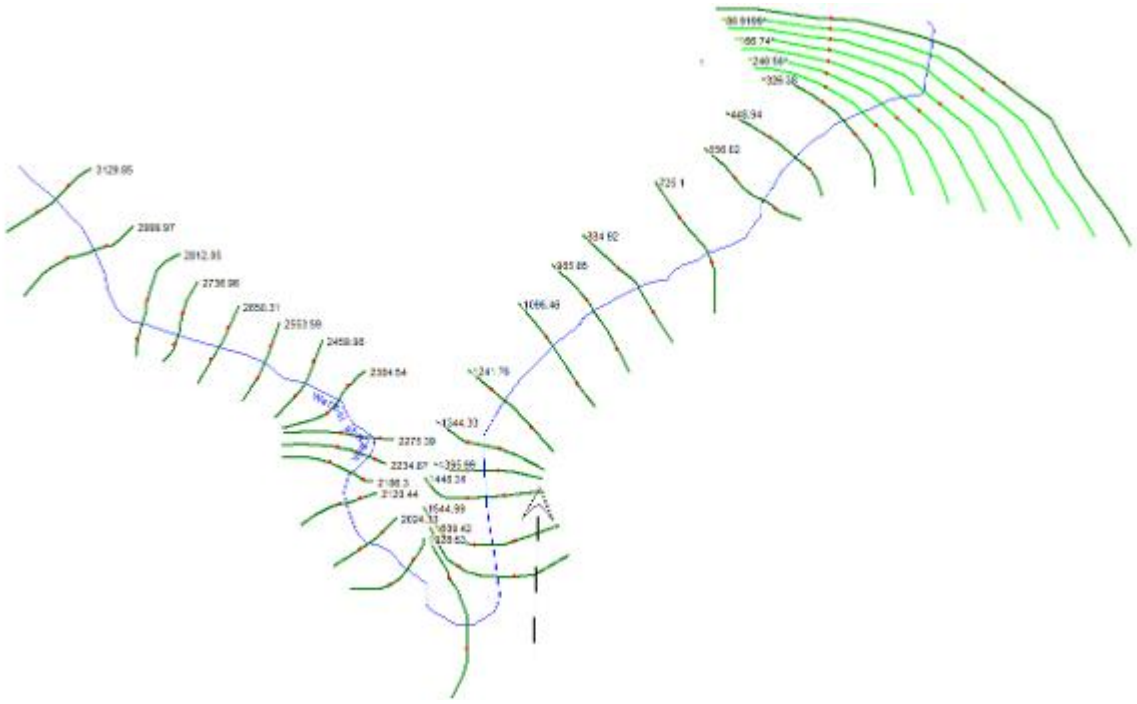
Table 8 – Peak Flow Estimates

Average Recurrence Interval (ARI) (years)	Peak Discharge (m^3/s)
5	42.80
10	56.10
20	75.30
50	104.0
100	128.0

3.4 Hydraulic Modelling

Hydraulic modelling was undertaken using HEC-RAS (one-dimensional steady flow river hydraulics modelling software developed by the U.S. Army Corps of Engineers) to obtain the 1 in 100 year ARI flood extents of Warroolaba Creek with a peak discharge of $128m^3/s$. Site inspection and aerial photography has identified the main stream bed is heavily vegetated with trees and shrubs, whilst the overbanks are predominately long grass for the full length of the reach. A manning's 'n' of 0.12 and 0.06 were used in the model respectively. Diagram 2 – HEC-RAS Schematic below is a schematic of the HEC-RAS model utilised. Refer Attachment 4 – HEC-RAS Modelling Results for details.

Diagram 2 – HEC-RAS Schematic



3.5 Results

The existing case modelling results has indicated an approximate average depth of 3.0 metres throughout the water course for a 1 in 100 year ARI event. The proposed quarry footprint has been established with an average 50 metre (minimum 25 metre) offset from the flood outline, equating to approximately 10.0 metres in height difference, due to the steep topography either side of Warroolaba Creek.

Refer to Figure 3 – Stormwater Management Plan for the extent of the 1 in 100 year ARI event flood outline and proposed extent of the quarry footprint. Refer Attachment 4 – HEC-RAS Modelling Results for HEC-RAS sections and calculations.

4. Operational Management Procedures

This section outlines the stormwater management procedures to be adopted by the operator, in order to comply with EA licence conditions.

Stormwater Management Procedures

Purpose

This Stormwater Management Plan has been prepared to manage potential environmental impacts that may result from the operation in relation to stormwater and surface water quality.

Risk Sources and Potential Impacts

Site operations that have the potential to impact on stormwater quality include:

- Material Stockpiles.
- Vegetation clearing (including grass).
- Sediment Basins (if not maintained).
- Topsoil stripping.
- Construction and maintenance of carpark, roads and hardstands.
- Spillage during handling of materials.
- Use and storage of oils, greases, fuels and other chemicals.

Performance Targets

Water quality discharged from a controlled release point on the Site is to comply with Environmental Protection (Water) Policy 2009: Bremer River environmental values and water quality objectives:

Table 9 - Water Quality Parameters

Parameter	100 percentile concentration limit
pH	6.5 – 8.5
Total Suspended Soils (TSS)	<6 mg/L
Turbidity	<17 NTU
Dissolved Oxygen	85 – 110% saturation

It is noted that the above targets are more stringent than industry best practice targets set in the Department of Environment and Science (DES) Guideline: *Stormwater and Environmentally Relevant Activities (2014)*. The nominated water quality objectives, in particular TSS are also bordering on levels which are undetectable through normal certified laboratory procedures.

Therefore, background water quality data is proposed to be monitored upstream and downstream of the proposed operations, to derive local water quality objectives and supersede the limits based on the broader Bremer River catchment environmental values shown in Table 9 – Water Quality Parameters, should this data and procedure be mutually acceptable by authorities and stakeholders.

Responsibilities

The Quarry Manager will be primarily responsible for the implementation of this SMP.

Stormwater Management Procedures

Strategies/ mitigation measures:

Strategies/mitigation measures for the management of surface water runoff and erosion and sediment transport from the Site will be implemented in accordance the relevant approval conditions.

Operational Procedures for mitigating identified risks are provided in the following measures.

4.1 Stockpiling of Materials

Ensure minimum buffer (5.0m) is maintained at all times from the Site boundary to all stockpiled material

The buffer distance is defined between the toe of the stockpile embankment and the surveyed Site boundary and must be minimum of 5.0m.

Stockpiles of material must be:

- Adequately protected from wind, rain, concentrated surface flow and excessive upslope stormwater surface flows.
- Placated to direct drainage water to sediment basin systems in event of surface water runoff.
- Maintained in a moist state including by use of sprinklers to minimise the risk of movement by wind.

4.2 Bunding of Fuels and Chemicals

Install a secondary bund on all bulk chemical and fuel storage areas at all times.

Clearly designate storage areas and do not deviate from assigned bunded areas for storage of chemicals and fuels unless a suitable secondary bund is provided.

4.3 Clean Water Diversion Drains/Bunds

Clean water diversion drains/bunds are to have greater than 80% vegetation coverage.

This coverage is required to be in-place at all times. Seeding of the exposed areas using approved native grass species. The grass species will be required to have the following characteristics (as per IECA 2008).

- Plants with a fibrous root system.
- Plants that primarily grow horizontal rather than upright clumping plants.
- Leguminous plants.
- Non-invasive plants.
- Avoid clumping or tussock forming grasses.

Stormwater Management Procedures

4.4 Sediment Basin Structures

Design, construct and maintain sediment basin system in accordance with Figure 3 Stormwater Management Plan.

- Details of sediment basin and engineering design are also included in Section 2 – Stormwater Quality Treatment System Design.
- Ensure sediment retention capacity is available at all times, or within five (5) days from receiving design rainfall event.
- Implement the inspection and maintenance program as detailed below in Table 10 - Monitoring and Maintenance of Stormwater Control Devices

4.5 Site Access

Site exit points must be appropriately managed to minimise the risk of sediment being tracked onto sealed, public roadways.

Monitoring and Maintenance

A summary schedule of the various inspections, performance criteria and responses that shall be performed on Site is shown below.

Table 10 - Monitoring and Maintenance of Stormwater Control Devices

Inspection	Minimum Frequency	Performance Criteria	Response
Sediment Basins	Weekly, and prior to and following rainfall events	• 10% storage capacity available at all times to maintain adequate freeboard	• Basins are to be de-silted to ensure capacity is maintained at all times.
Inspect drainage lines including catch drains, contour drains and diversions	Weekly, and prior to and following rainfall events	• erosion in areas adjacent to water conveyancing structures	• eroded areas shall be rip rapped as soon as practicable
		• overtopping of water conveyancing structures (i.e. clean water diversion drains) (identified by the scouring of the drain batters perpendicular to the direction of flow)	• eroded areas shall be repaired and stabilised.
Waste containers	Weekly	• waste is stored in appropriate containers • waste receptacles labelled	• ensure waste material is stored and disposed of properly and in accordance with conditions of the EA and legislative requirements.

Stormwater Management Procedures

	Spill response stations	Weekly and following use	• equipment is properly maintained	• maintain equipment • replace used equipment
	Maintenance / refuelling area	Weekly	• fuel, oil spills	• clean up fuel spills and investigate source
			• equipment maintenance	• maintain equipment maintenance records
			• fuel storage integrity maintained	• investigate and repair potential leaks
Auditing	Stormwater quality testing results, practices and management reviews are required to be carried out annually to assess the implementation of the management strategies.			
Identification of Incident or Failure	Non-compliance with the performance criteria herein will be identified by: • Build-up of sediment within sediment basins. • Excessive sediment build-up on the Site. • Excessive erosion on the Site. • Release of contaminants from the Site. • Poor vegetation establishment. • Poorly maintained, damaged or failed Erosion and Sediment Control (ESC) devices. • Uncontrolled release from site for events less than the design event. • Non-compliant water quality being released from Site.			
Corrective Action	The Quarry Manager shall be responsible for identification of incident or failure and completion of corrective actions. Following identification of incident or failure, the source/cause is to be immediately located and the following measures implemented: • Build-up of sediment in sediment basins – the material must be collected and disposed of in a manner that will not cause ongoing environmental nuisance or harm; then on-site ESC measures amended, where appropriate, to reduce the risk of further sedimentation. • Excessive sediment build-up on the Site – collect and dispose of material, then amend up-slope drainage and/or erosion control measures as appropriate to reduce further occurrence. • Severe or excessive rill erosion – investigate cause, control up-slope water movement, re-profile surface, cover dispersive soils with a minimum 100mm layer of non-dispersive soil, and stabilise with erosion control measures and vegetation as necessary. • Release of construction material from the Site – collected and disposed of in a manner that will not cause ongoing environmental nuisance or harm; then inspect litter and waste receptors. • Poor vegetation growth or soil coverage – plant new vegetation and/or mulch as required. • Sediment control failure – replace and monitor more frequently. Regular failures may mean that the sediment control location, alignment or installation may need to be amended. • Scour / erosion of sediment basin bunds will be required to be stabilised.			

Stormwater Management Procedures	
Internal Reporting	A copy of all incidents and complaints will be stored at the Site within the incident and complaint register. All complaints and incidents are recorded internally.
External Reporting	Reporting of non-compliance events including discharge of contaminants from the site are to be reported to the Administering Authority, in accordance with conditions of the EA.

5. Stormwater Management Plan Implementation

This SMP will be reviewed as required and will be updated as necessary to include revised operational activities and changes to disturbed areas.

5.1 Monitoring Management Measures

The following management measures will be implemented during facility operation:

- The Quarry Manager or authorised representative is to regularly inspect the stormwater management devices, particularly prior to forecasted wet weather and following major rainfall events to ensure that these devices are in good working order. All inspections are to be documented (including photos) and available on site at all times.
- The Quarry Manager or authorised representative is to ensure that drains and paved surfaces are kept free of wastes or other material, especially materials which may impact on runoff water quality.
- The Quarry Manager shall carry out general surveillance to qualitatively assess stormwater releases from Site during discharge events.
- A surface water quality monitoring program may be implemented to assess performance from time to time. Any sampling conducted shall be undertaken in accordance with the Department of Environment and Heritage Protection's Monitoring and Sampling Manual (2009) or more recent editions or supplements to that document by a suitability qualified person.

5.2 Auditing and Review

The effectiveness of the SMP will be reviewed as necessary (e.g. following a change in Site operations) and at least once every year. The review shall take into account changes to Site activities, available surface water monitoring results, any complaints, pollution incidents and any corrective actions taken.

5.3 Reporting and Responsibility

- The Quarry Manager will be responsible for ensuring that sediment basins and other stormwater devices constructed on the Site have adequate free water storage capacity.
- All complaints pertaining to water quality received will be recorded in the complaints register/log maintained on-site.
- The Quarry Manager or a suitably qualified consultant will prepare water monitoring records if and when required by the regulatory authority.
- Records, including results of any monitoring program undertaken on-site, complaints or incidents will be kept on-site for a minimum of five (5) years.

5.4 Identification of Incident or Failure

An incident or failure may include, but not be limited to:

- deterioration in surface water quality within waters discharged from Site
- receipt of a stormwater quality release complaint
- not maintaining on-site stormwater controls or treatment devices.

5.5 Corrective Action

If a discharge of contaminants occurs as a result of on-site operations, DES will require notification and an investigation will be conducted to identify appropriate action to resolve the issue to the fullest practicable extent.

6. Conclusion

This SMP outlines the appropriate treatment measures and operational procedures required to integrate stormwater management and administering authority compliance into daily operations and site activity. Specifically:

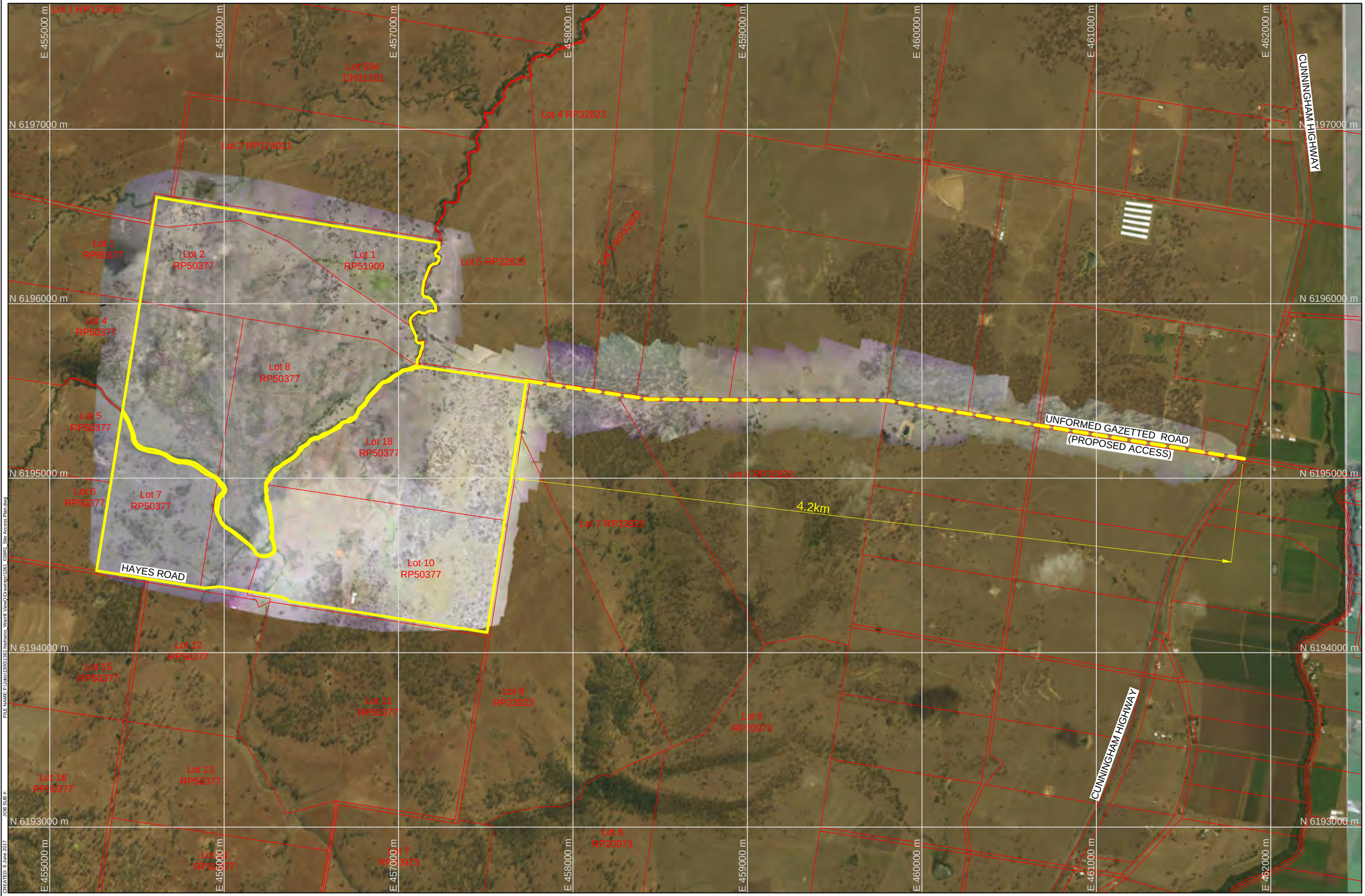
- Stormwater and ESC measures have been developed for the management and treatment of stormwater runoff from disturbed areas caused by proposed Site activities.
- Controls have been designed to treat contaminated stormwater runoff to ensure compliance with all DES and Council guidelines.
- Appropriate setbacks have been set based on the 1 in 100 year flood outline in accordance with the Scenic Rim Regional Council flood code.

Operational procedures outlined in this SMP will assist to ensure ongoing compliance with DES conditions as a minimum standard as well as seek further opportunities to exceed these standards.

7. Reference List

1. *Department of Environment and Heritage Protection, Queensland Urban Drainage Manual, 2008*
2. *International Erosion Control Association, Best Practice Erosion and Sediment Control: Book 2 and Book 4, 2008.*
3. *Department of Environment and Heritage Protection, Stormwater Guideline: Environmentally Relevant Activities, 2014.*

figures



FILE NAME: P:\Jobs\1300\1361 Neilsens Warrill View\QDrawings\1361 038R1 Site Access Plan.dwg
JOB SUB #:
CREATED: 6 June 2017

REV	DESCRIPTION	DATE	BY
1	Revised Site Boundary To Include Lot 1 RP51909	22-02-17	GR

Data Sources:
Photography: Google Imagery. Captured 2016-08-16.
Topography:
Cadastre:
Ecosystem:
Other:

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Legend:
- Proposed Site Boundary
- Proposed Site Access
- Cadastral Boundary

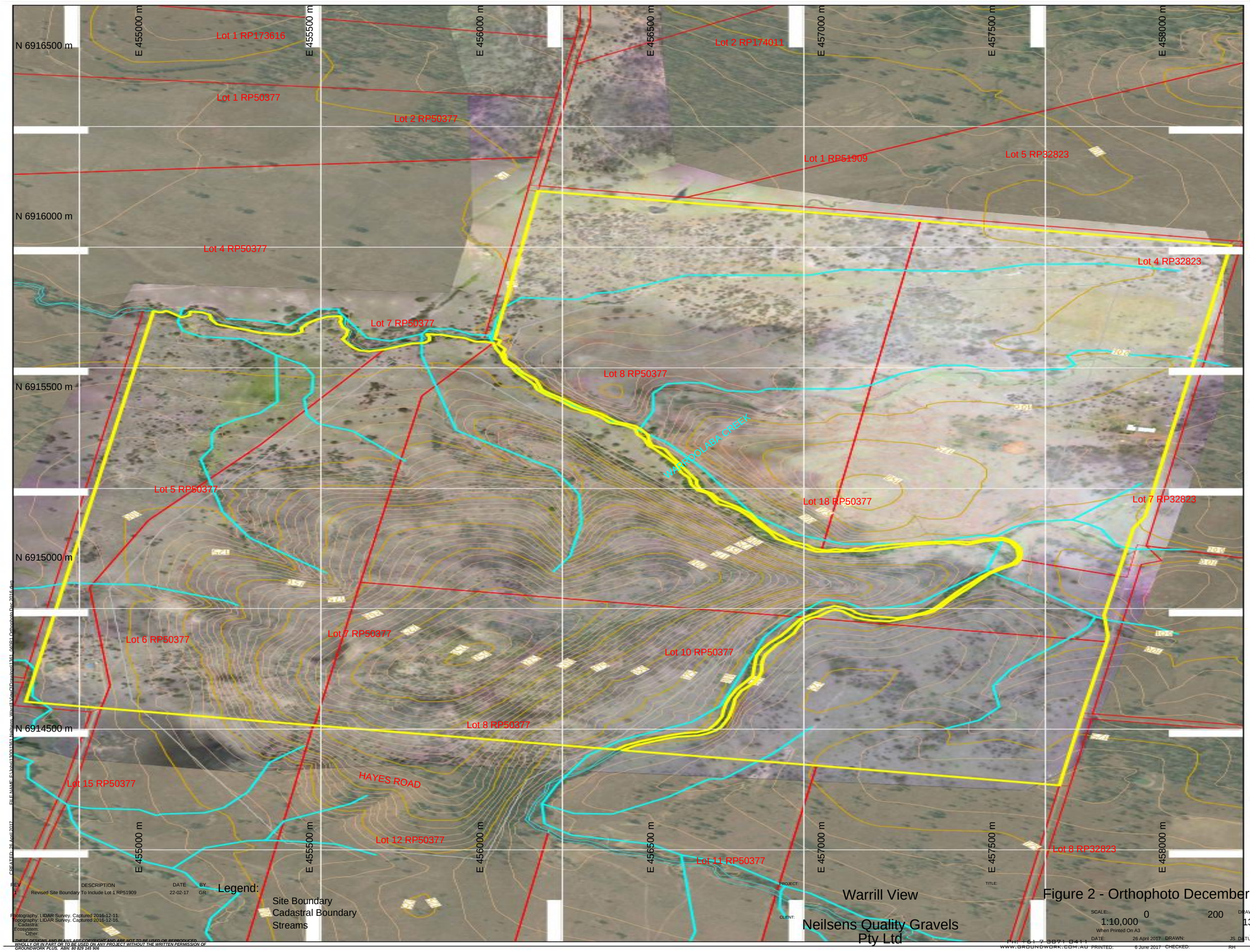
PROJECT: Warrill View Quarry

CLIENT: Neilsens Quality Gravels Pty Ltd

TITLE: Figure 1 - Proposed Access Road Location

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SCALE: 1:20,000 When Printed On A3 (0 – 400)
DRAWING NUMBER: 1361.DRG.038B
REVISION: 1
DATE: 6 June 2017 DRAWN: JS
PRINTED: 6 June 2017 CHECKED: JT
DATUM: HORIZONTAL / VERTICAL / ZONE
MGA / AHD / 56



FILE NAME: P:\Jobs\1300\1361\Mapping Work\ArcView\Drawings\1361.DRG.040 Orthophoto Dec 2016.dwg

CREATED: 26 April 2017

REV	DESCRIPTION	DATE	BY
1	Revised Site Boundary To Include Lot 1 RP51909	22-02-17	GR

Legend:

Site Boundary
Cadastral Boundary
Streams

Photography: LIDAR Survey. Captured 2016-12-11.
Topography: LIDAR Survey. Captured 2016-12-16.
Cadastra:
Ecosystem:
Other:

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PROJECT: Warrill View

CLIENT: Neilsens Quality Gravels Pty Ltd

TITLE: Figure 2 - Orthophoto December 2016

SCALE: 1:10,000 When Printed On A3 — 0 — 200

DRAWING NUMBER: 1361.DRG.040

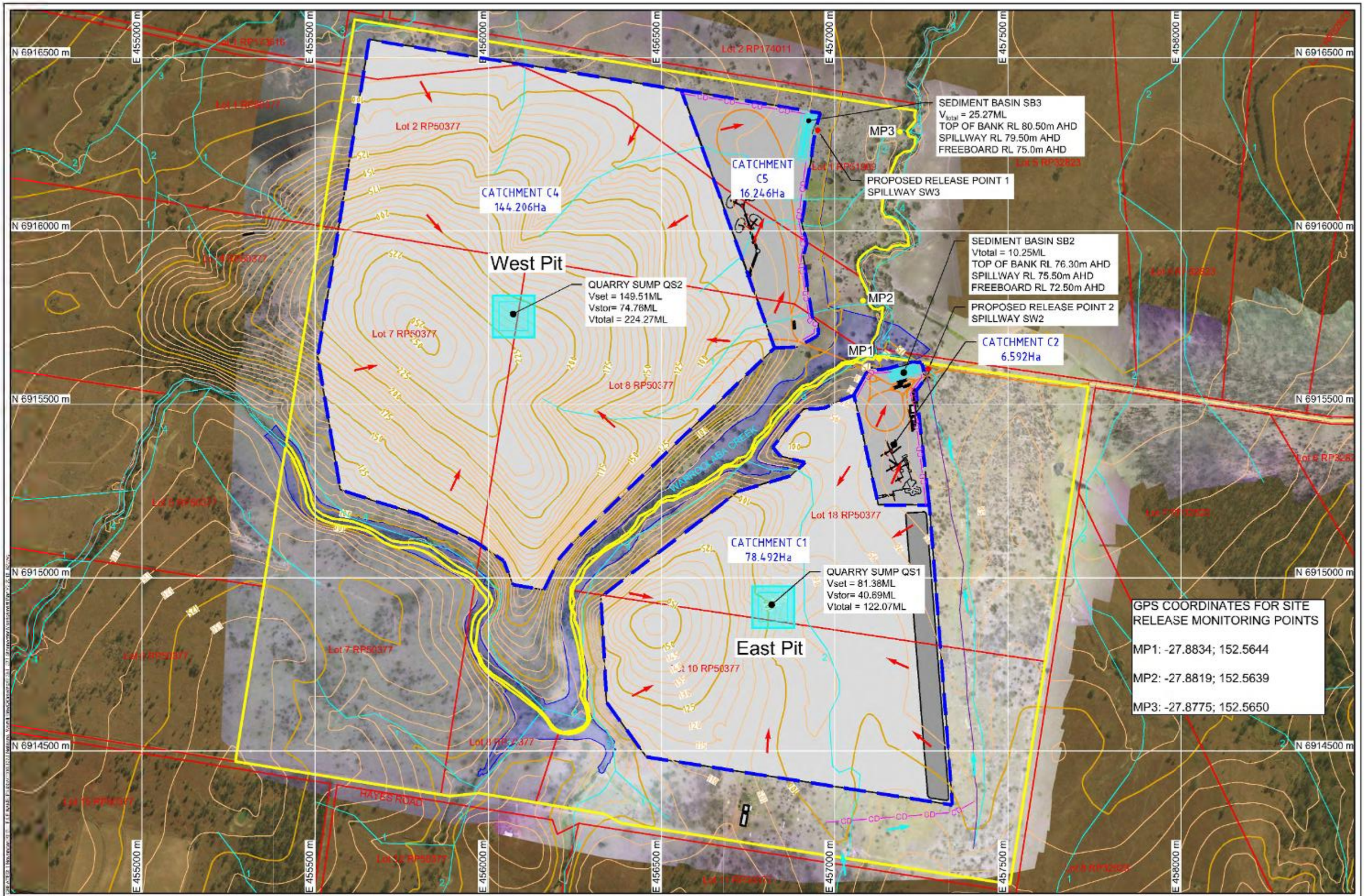
REVISION: 1

DATE: 26 April 2017 DRAWN: JS

DATUM: HORIZONTAL / VERTICAL / ZONE: MGA 7 / AHD 7 56

PRINTED: 6 June 2017 CHECKED: RH

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REV	DESCRIPTION	DATE	BY

Data Sources:
Photogrammetry: Google Earth - Captured 2018-08-27
Topography & DEM Survey - Captured 2018-12-15
Data Misc
Environment
Other

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Legend:

- CADASTRAL BOUNDARY
- CATCHMENT BOUNDARY
- CLEAN SURFACE WATER FLOW
- DIRTY SURFACE WATER FLOW
- CD — CUT OFF DRAIN
- DB — DIVERSION BUND

PROJECT: Warrill View Quarry

CLIENT: Neilsens Quality Gravels Pty Ltd

TITLE: Figure 3 - Stormwater Management Plan

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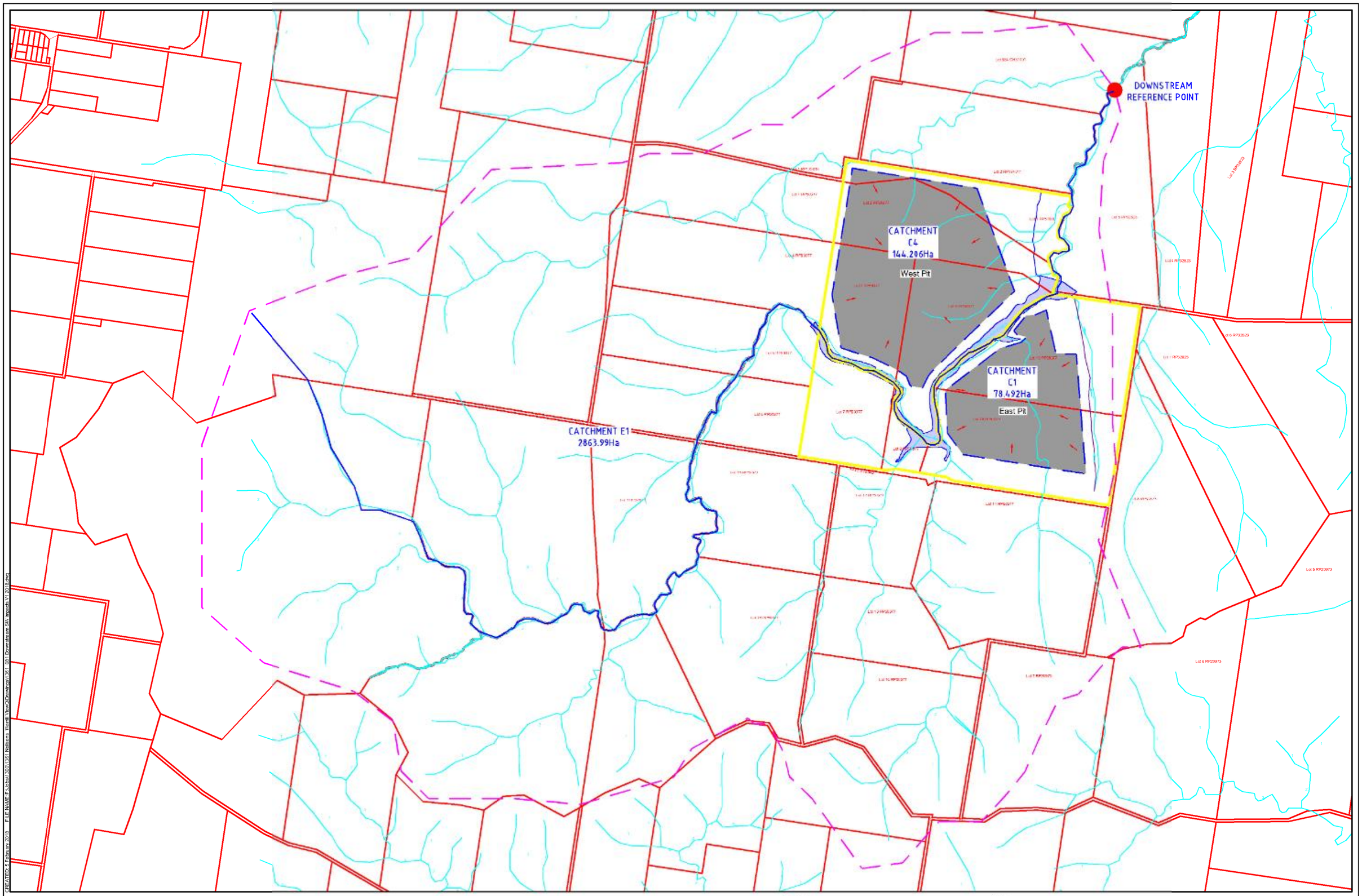
SCALE: 1:10,000 (0 — 200) When Printed On A3

DRAWING NUMBER: 1361.DRG.071

REVISION: 2

DATE: 1 November 2018 | DRAWN: TM | DATUM: HORIZONTAL / VERT CAL / ZONE: MGA 1 AHD / 56

PRINTED: 1 November 2018 | CHECKED:



CREATED: 5 February 2018 FILE NAME: P:\Jobs\1300s\1361 Neilsens Warrill View\Civil\Drawings\1361 081 Downstream SW impacts V1 2018.dwg

REV	DESCRIPTION	DATE	BY

Data Sources:
Photography: Google Earth. Captured 2016-08-27.
Topography: LIDAR Survey. Captured 2016-12-16.
Cadastre:
Ecosystems:
Other:

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Legend:

- CADASTRAL BOUNDARY
- CATCHMENT BOUNDARY
- CLEAN SURFACE WATER FLOW
- DIRTY SURFACE WATER FLOW
- CD — CUT OFF DRAIN
- DB — DIVERSION BUND

PROJECT: Warrill View Quarry

CLIENT: Neilsens Quality Gravels Pty Ltd

TITLE: Figure 4 - STORMWATER IMPACT ASSESSMENT DOWNSTREAM

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SCALE: 1:10,000 (When Printed On A3) 0 200
DRAWING NUMBER: 1361.DRG.081
REVISION: 1
DATE: 5 February 2018
DRAWN: TM
PRINTED: 6 February 2018
CHECKED:
DATUM: HORIZONTAL / VERTICAL / ZONE: MGA / AHD / 56

attachments

Attachment 1

Proposal Plans

Notes:
1. Fixed processing plant to be located generally as shown. Mobile processing plant will also be utilised subject to operational need and their location will be subject to change, generally aligning with progressive site workings.
2. Stockpiles and overburden within the Ancillary Operations Area and the quarry floor (Proposed Extraction Footprint) will be subject to change, based on operational requirements.
3. Within the Ancillary Operations Area additional internal haul roads may be utilised based on operational requirements.
4. Ancillary Operations Area includes a range of activities including crushing, screening, stockpiling, overburden storage, pre-coat, pugmill, quarry services and infrastructure, including weighbridge, office, amenities and crib.

Legend:
- Site Boundary
- Cadastral Boundary
- Mapped Stream Order
- Actual Gully Line
- Clean Water Diversion
- Council Road
- Haul Road
- Light Vehicle Access Road
- Q100 Flood Outline
- Proposed Extraction Footprint
- Ancillary Operations Area
- Likely Longer Term Location of Overburden
- Direction of Quarrying

Development Summary

N 6915500 m Lot Areas	
Lot 2 RP50377	62.322 ha
Lot 7 RP50377	93.389 ha
Lot 8 RP50377	77.381 ha
Lot 10 RP50377	86.198 ha
Lot 18 RP50377	83.466 ha
Lot 1 RP51909	36.151 ha
TOTAL Lot Area	438.907 ha
Ancillary Operations Area	6.600 ha
West Pit Ancillary Operations Area	16.500 ha
TOTAL	23.100 ha

West Pit
East Pit
West Pit Ancillary Operations Area
Ancillary Operations Area
Caretakers Dwelling
New Haul Road
New Council Road
HAYES ROAD
WARRIBOLABA CREEK

Lot 2 RP174011
Lot 2 RP50377
Lot 1 RP51909
Lot 5 RP32823
Lot 4 RP50377
Lot 4 RP32823
Lot 7 RP50377
Lot 8 RP50377
Lot 5 RP50377
Lot 18 RP50377
Lot 7 RP32823
Lot 6 RP50377
Lot 7 RP50377
Lot 10 RP50377
Lot 8 RP50377
Lot 15 RP50377
Lot 12 RP50377
Lot 11 RP50377
Lot 6 RP32823

E 455000 m E 455500 m E 456000 m E 456500 m E 457000 m E 457500 m E 458000 m
N 6916500 m N 6916000 m N 6915500 m N 6915000 m N 6914500 m

REV	DESCRIPTION	DATE	BY
1	Drawing revised	06-04-17	GR
2	Notes revised	18-05-17	GR
3	Stockpile Area Removed, Stormwater Pit Revised, Notes Amended	01-08-18	JHV

Photography: Google Earth. Captured 2016-08-27
Topography: LIDAR Survey. Captured 2016-12-16.
Cadastra:
Ecosystem:
Other:

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FILE NAME: F:\1361\1300\1361_Warrill_View\CAD\drawings\1361_DRG058_Conceptual Long Term.dwg
CREATED: 1 August 2018

PROJECT: Warrill View Quarry
CLIENT: Neilsens Quality Gravels Pty Ltd
TITLE: Conceptual Overall Development Plan
SCALE: 1:10,000 When Printed On A3 (0 – 200)
DRAWING NUMBER: 1361.DRG.058
REVISION: 3
DATE: 1 August 2018 DRAWN: GR
DATUM: HORIZONTAL / VERTICAL / ZONE: MGA / AHD / 56
PRINTED: 1 August 2018 CHECKED:

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Notes:

1. Fixed processing plant to be located generally as shown. Mobile processing plant will also be utilised subject to operational need and their location will be subject to change, generally aligning with progressive site workings.
2. Stockpiles and overburden within the Ancillary Operations Area and the quarry floor (Proposed Extraction Footprint) will be subject to change, based on operational requirements.
3. Within the Ancillary Operations Area additional internal haul roads may be utilised based on operational requirements.
4. Ancillary Operations Area includes a range of activities including crushing, screening, stockpiling, overburden storage, pre-coat, pugmill, quarry services and infrastructure, including weighbridge, office, amenities and crib.

Legend:

- Site Boundary
- Cadastral Boundary
- Mapped Stream Order
- Actual Gully Line
- Haul Road
- Light Vehicle Access Road
- Q100 Flood Outline
- Proposed Extraction Footprint
- Ancillary Operations Area
- Direction of Quarrying

Development Summary

Lot Areas	
Lot 2 RP50377	62.322 ha
Lot 7 RP50377	93.389 ha
Lot 8 RP50377	77.381 ha
Lot 10 RP50377	86.198 ha
Lot 18 RP50377	83.466 ha
Lot 1 RP51909	36.151 ha
TOTAL Lot Area	438.907 ha
Operations Area (East Pit)	6.600 ha
Gross Floor Area (approx.)	318 m²
Site Cover	0.005%
Car Parking	16 Spaces

E 457000 m
E 457200 m
E 457400 m
N 6915700 m
N 6915500 m
N 6915300 m
E 456800 m
E 457000 m
E 457200 m
E 457400 m

Lot 8 RP50377
Lot 5 RP32823
Lot 18 RP50377
WARROO ABA CREEK

Road Reserve (to remain unconstructed)
Culvert Crossing
Sediment Basin SB2
Weighbridge Office and Site Office (20m x 6m)
Weighbridge
Light Vehicle Spaces: 16 spaces @ typical 6.0m by 2.6m (reverse in only)
Interim Office, Amenities and Crib (198m²)
Workshop (Igloo)
Diesel Transtank (6.0m x 3.0m)
Stockpiles
Fixed Processing Plant

60
20
20

CREATED: 1 August 2018 FILE NAME: P:\Jobs\13501\1361 Neilsens_Warrill View\QID\drawings\1361_059R4 Operations Area-initial.dwg

REV	DESCRIPTION	DATE	BY
2	Drawing revised	03-05-17	GR
3	Notes revised	18-05-17	GR
4	Stockpile Area Removed, Stormwater Pit Revised, Notes Amended	01-08-18	JHV

Data Sources:
Photography: UAV Flyover. Captured 2016-12-11.
Topography: UAV Flyover. Captured 2016-12-11.
Cadastra:
Ecosystem:
Other:

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PROJECT: Warrill View Quarry

CLIENT: Neilsens Quality Gravels Pty Ltd

TITLE: Operations Area and Initial Quarry Development Plan

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SCALE: 1:2,000 (0 – 40) When Printed On A3
DRAWING NUMBER: 1361.DRG.059
REVISION: 4
DATE: 1 August 2018
DRAWN: GR
PRINTED: 1 August 2018
CHECKED:
DATUM: HORIZONTAL / VERTICAL / ZONE
MGA / AHD / 56

E 456500 m
E 456600 m
E 456700 m
E 456800 m
E 456900 m
E 457000 m
N 6916400 m
N 6916300 m
N 6916200 m
N 6916100 m
N 6916000 m
N 6915900 m
N 6915800 m
N 6915700 m
N 6915600 m

Sediment Basin

Stockpiles

Fixed Processing Plant

Foremans Office (20.0m x 6.0m)

Creek Crossing

Refer 1361.DRG.060A for East Pit

Development Summary

Lot Areas	
Lot 2 RP50377	62.322 ha
Lot 7 RP50377	93.389 ha
Lot 8 RP50377	77.381 ha
Lot 10 RP50377	86.198 ha
Lot 18 RP50377	83.466 ha
Lot 1 RP51909	36.151 ha
TOTAL Lot Area	438.907 ha
Ancillary Operations Area	6.600 ha
Additional Stockpile/Overburden Area	11.200 ha
West Pit Ancillary Operations Area	16.500 ha
TOTAL	34.300 ha
Gross Floor Area (approx.)	774 m²
Site Cover	0.04%
Car Parking	16 Spaces

Legend:
- Site Boundary
- Cadastral Boundary
- Mapped Stream Order
- Haul Road
- Q100 Flood Outline
- Proposed Extraction Footprint
- Ancillary Operations Area
- Direction of Quarrying

Notes:
1. Fixed processing plant to be located generally as shown. Mobile processing plant will also be utilised subject to operational need and their location will be subject to change, generally aligning with progressive site workings.
2. Stockpiles and overburden within the Ancillary Operations Area and the quarry floor (Proposed Extraction Footprint) will be subject to change, based on operational requirements.
3. Within the Ancillary Operations Area additional internal haul roads may be utilised based on operational requirements.
4. Ancillary Operations Area includes a range of activities including crushing, screening, stockpiling, overburden storage, pre-coat, pugmill, quarry services and infrastructure, including weighbridge, office, amenities and crib.

REV	DESCRIPTION	DATE	BY
1	Drawing revised	04-04-17	GR
2	Notes revised	15-05-17	GR

Data Sources:
Photography: UAV Flyover, Captured 2016-12-11.
Topography: UAV Flyover, Captured 2016-12-11.
Cadastre:
Ecosystems:
Other:

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PROJECT: Warrill View Quarry

CLIENT: Nielsens Quality Gravels Pty Ltd

TITLE: West Pit Operations Area Plan - Long Term Layout

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SCALE: 1:2,500 When Printed On A3 (0 – 50)
DATE: 18 May 2017 DRAWN: GR
PRINTED: 18 May 2017 CHECKED:
DRAWING NUMBER: 1361.DRG.060B
REVISION: 2
DATUM: HORIZONTAL / VERTICAL / ZONE
MGA / AHD /

Attachment 2

Clean Water Diversion Drain Calculations

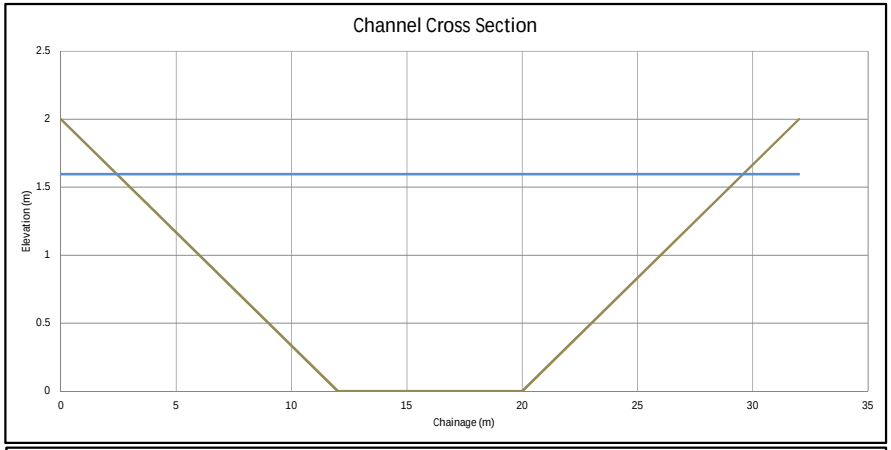
CLEAN WATER DIVERSION CHANNEL CW1

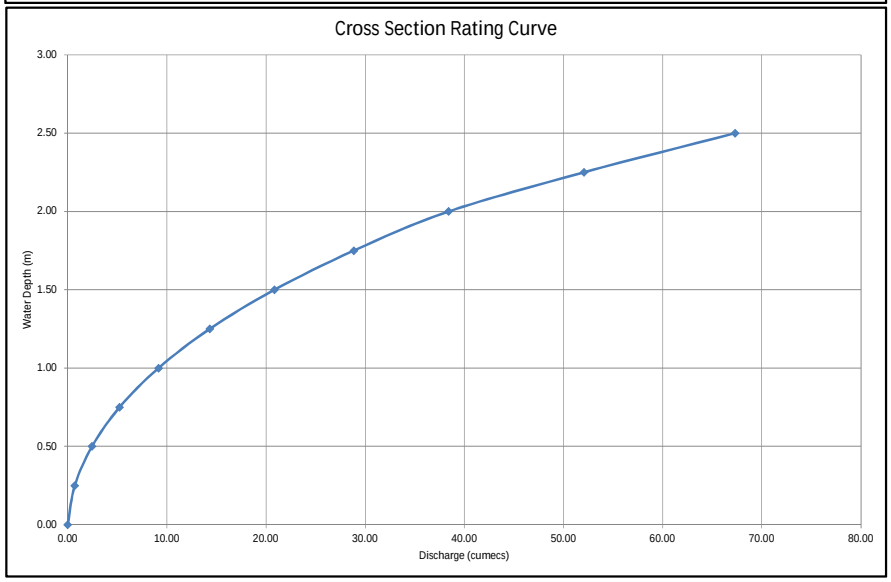
User inputs		
Channel Slope	0.01	m/m
Mannings' n	0.12	
Maximum Water surface level	2.5	m

Item	Chainage (m)	Elevation (m)
1	0	2
2	12	0
3	20	0
4	32	2
5		
6		
7		
8		
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54		

Rating Curve	
Depth (m)	Discharge (m^3/s)
0.00	0.00
0.25	0.71
0.50	2.45
0.75	5.23
1.00	9.15
1.25	14.32
1.50	20.84
1.75	28.84
2.00	38.42
2.25	52.06
2.50	67.31

Design flow	23.9	m^3/s
Water depth	1.60	m
Velocity	0.85	m/s





Attachment 3

Sediment Basin Calculations (Proposed)

Sediment Basin Storage Volume Estimation
(Stormwater Guideline - Environmentally Relevant Activities - DEHP)

Project Name: Warrill View Quarry
Sediment Basin: QS1

$V_s = A * C_v * R_{(1 \text{ in } 5;\ 24hr)}$

A = 784,925 m^2

$$C_{V(composite)} = \frac{C_{V(pervious)} \cdot (A - A_{(imp.)}) + A_{(imp.)}}{A}$$ Equation 4.12 (QUDM)

$C_{v\ (pervious)}$ = 0.75 Refer Table 4.9.2 (QUDM)
$F_{(imp)}$ = 0.20 Adopted effective fraction impervious
$A_{(imp)}$ = 156985
$C_{v\ (composite)}$ = 0.8

$R_{(1 \text{ in } 5;\ 24hr)}$ = 129.6 mm Source: (BoM IFD)
$R_{(1 \text{ in } 5;\ 24hr)}$ = 0.1296 m

V_s = 81,381 m^3
V_s = 81.38 ML

$V_{SED} = 0.5 * V_s$
V_{SED} = 40.69 ML

Sediment Basin Requires a Upper Settling Volume of 81.38 ML
Sediment Basin Requires a Sediment Storage Volume of 40.69 ML
Total Sediment Basin Storage Volume is 122.07 ML

Sediment Basin Storage Volume Estimation
(Stormwater Guideline - Environmentally Relevant Activities - DEHP)

Project Name: Warrill View Quarry
Sediment Basin: QS2

$V_s = A * C_v * R_{(1 \text{ in } 5;\ 24hr)}$

A = 1,442,060 m^2

$$C_{V(composite)} = \frac{C_{V(pervious)} \cdot (A - A_{(imp.)}) + A_{(imp.)}}{A}$$ Equation 4.12 (QUDM)

$C_{v\ (pervious)}$ =	0.75	Refer Table 4.9.2 (QUDM)
$F_{(imp)}$ =	0.20	Adopted effective fraction impervious
$A_{(imp)}$ =	288412	
$C_{v\ (composite)}$ =	0.8	

$R_{(1 \text{ in } 5;\ 24hr)}$ =	129.6	mm	Source: (BoM IFD)
$R_{(1 \text{ in } 5;\ 24hr)}$ =	0.1296	m	

V_s =	149,513	m^3
V_s =	149.51	ML

$V_{SED} = 0.5 * V_s$

V_{SED} = 74.76 ML

Sediment Basin Requires a Upper Settling Volume of 149.51 ML
Sediment Basin Requires a Sediment Storage Volume of 74.76 ML
Total Sediment Basin Storage Volume is 224.27 ML

Sediment Basin Storage Volume Estimation
(Stormwater Guideline - Environmentally Relevant Activities - DEHP)

Project Name: Warrill View Quarry
Sediment Basin: SB1

$V_s = A * C_v * R_{(1 \text{ in } 5;\ 24hr)}$

A = 111,200 m^2

$$C_{V(composite)} = \frac{C_{V(pervious)} \cdot (A - A_{(imp.)}) + A_{(imp.)}}{A}$$ Equation 4.12 (QUDM)

$C_{v\ (pervious)}$ =	0.75	Refer Table 4.9.2 (QUDM)
$F_{(imp)}$ =	0.20	Adopted effective fraction impervious
$A_{(imp)}$ =	22240	
$C_{v\ (composite)}$ =	0.8	

$R_{(1 \text{ in } 5;\ 24hr)}$ =	129.6	mm	Source: (BoM IFD)
$R_{(1 \text{ in } 5;\ 24hr)}$ =	0.1296	m	

V_s =	11,529	m^3
V_s =	11.53	ML

$V_{SED} = 0.5 * V_s$

V_{SED} = 5.76 ML

Sediment Basin Requires a Upper Settling Volume of	11.53	ML
Sediment Basin Requires a Sediment Storage Volume of	5.76	ML
Total Sediment Basin Storage Volume is	17.29	ML

Sediment Basin Storage Volume Estimation
(Stormwater Guideline - Environmentally Relevant Activities - DEHP)

Project Name: Warrill View Quarry
Sediment Basin: SB2

$V_s = A * C_v * R_{(1 \text{ in } 5;\ 24hr)}$

A = 65,920 m^2

$$C_{V(composite)} = \frac{C_{V(pervious)} \cdot (A - A_{(imp.)}) + A_{(imp.)}}{A}$$ Equation 4.12 (QUDM)

$C_{v\ (pervious)}$ = 0.75 Refer Table 4.9.2 (QUDM)
$F_{(imp)}$ = 0.20 Adopted effective fraction impervious
$A_{(imp)}$ = 13184
$C_{v\ (composite)}$ = 0.8

$R_{(1 \text{ in } 5;\ 24hr)}$ = 129.6 mm Source: (BoM IFD)
$R_{(1 \text{ in } 5;\ 24hr)}$ = 0.1296 m

V_s = 6,835 m^3
V_s = 6.83 ML

$V_{SED} = 0.5 * V_s$
V_{SED} = 3.42 ML

Sediment Basin Requires a Upper Settling Volume of 6.83 ML
Sediment Basin Requires a Sediment Storage Volume of 3.42 ML
Total Sediment Basin Storage Volume is 10.25 ML

Sediment Basin Storage Volume Estimation
(Stormwater Guideline - Environmentally Relevant Activities - DEHP)

Project Name: Warrill View Quarry
Sediment Basin: SB3

$V_s = A * C_v * R_{(1 \text{ in } 5;\ 24hr)}$

A = 162,460 m^2

$$C_{V(composite)} = \frac{C_{V(pervious)} \cdot (A - A_{(imp.)}) + A_{(imp.)}}{A}$$ Equation 4.12 (QUDM)

$C_{v\ (pervious)}$ = 0.75 Refer Table 4.9.2 (QUDM)
$F_{(imp)}$ = 0.20 Adopted effective fraction impervious
$A_{(imp)}$ = 32492
$C_{v\ (composite)}$ = 0.8

$R_{(1 \text{ in } 5;\ 24hr)}$ = 129.6 mm Source: (BoM IFD)
$R_{(1 \text{ in } 5;\ 24hr)}$ = 0.1296 m

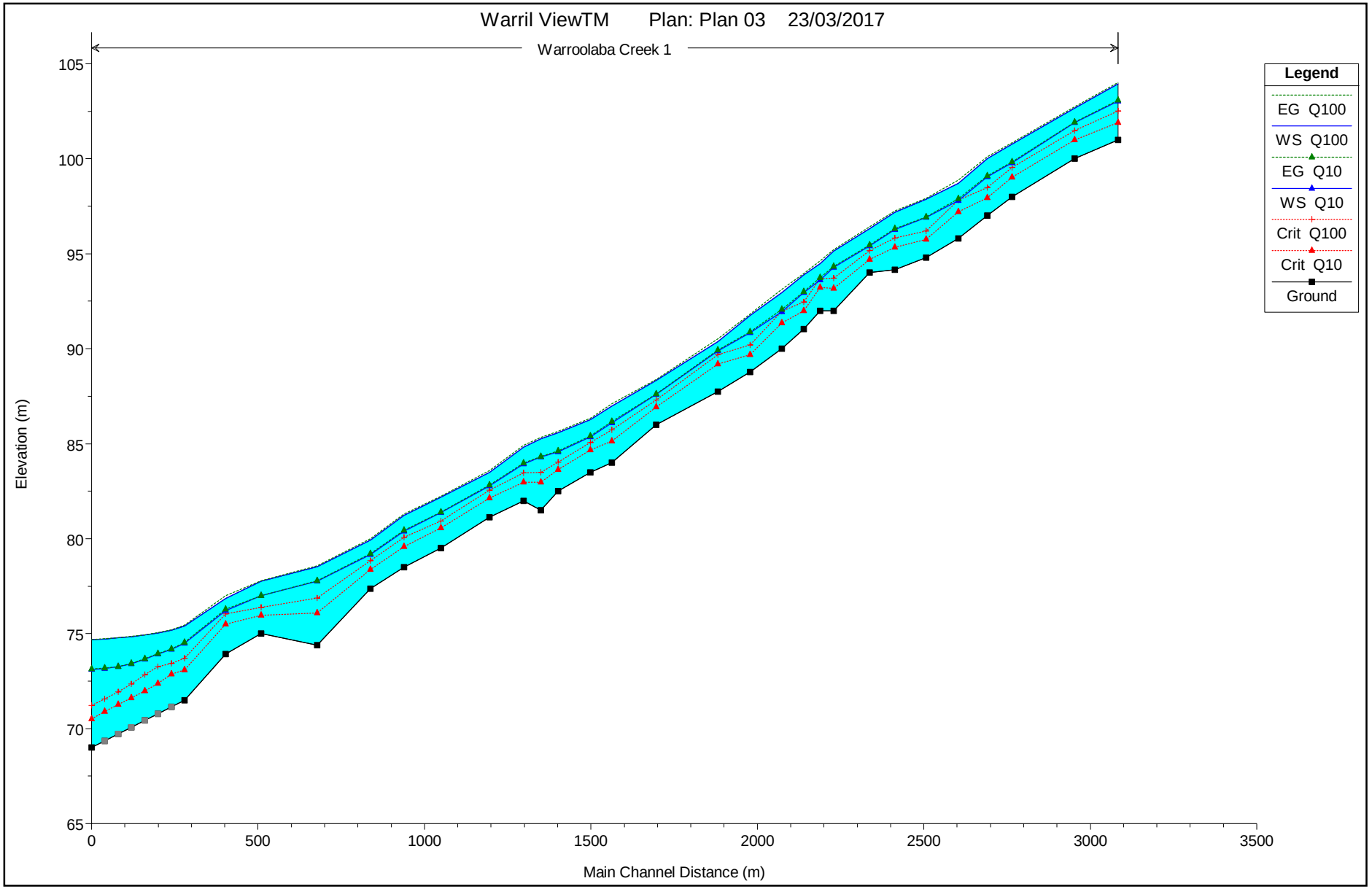
V_s = 16,844 m^3
V_s = 16.84 ML

$V_{SED} = 0.5 * V_s$
V_{SED} = 8.42 ML

Sediment Basin Requires a Upper Settling Volume of 16.84 ML
Sediment Basin Requires a Sediment Storage Volume of 8.42 ML
Total Sediment Basin Storage Volume is 25.27 ML

Attachment 4

HEC-RAS Modelling Results


Warril ViewTM Plan: Plan 03 23/03/2017
Warroolaba Creek 1
Legend
EG Q100
WS Q100
EG Q10
WS Q10
Crit Q100
Crit Q10
Ground
Elevation (m)
105
100
95
90
85
80
75
70
65
0
500
1000
1500
2000
2500
3000
3500
Main Channel Distance (m)

HEC-RAS Plan: Plan 02 River: Warroolaba Creek Reach: 1 Profile: Q100

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
1	3129.85	Q100	128.00	101.00	103.94	102.50	104.02	0.009375	1.30	98.33	47.26	0.29
1	2999.97	Q100	128.00	100.00	102.66	101.50	102.74	0.010448	1.24	103.63	58.76	0.30
1	2812.05	Q100	128.00	98.00	100.76	99.53	100.84	0.009738	1.25	102.68	53.91	0.29
1	2736.96	Q100	128.00	97.00	100.02	98.49	100.11	0.009605	1.34	95.65	44.61	0.29
1	2650.31	Q100	128.00	95.82	98.72	97.83	98.87	0.023139	1.76	72.86	44.12	0.44
1	2553.59	Q100	128.00	94.80	97.87	96.19	97.92	0.005188	1.02	126.04	56.52	0.22
1	2459.98	Q100	128.00	94.15	97.18	95.83	97.26	0.009890	1.28	99.95	51.34	0.29
1	2384.54	Q100	128.00	94.00	96.32	95.16	96.43	0.012470	1.42	89.89	46.51	0.33
1	2275.39	Q100	128.00	92.00	95.13	93.73	95.21	0.009912	1.24	103.53	55.53	0.29
1	2234.87	Q100	128.00	92.00	94.48	93.70	94.62	0.022672	1.64	77.99	51.26	0.42
1	2186.3	Q100	128.00	91.04	93.90	92.47	93.97	0.008400	1.21	105.73	52.10	0.27
1	2120.44	Q100	128.00	90.00	92.95	91.98	93.12	0.021533	1.84	69.47	36.64	0.43
1	2024.33	Q100	128.00	88.78	91.74	90.21	91.83	0.008888	1.34	95.25	41.52	0.28
1	1928.53	Q100	128.00	87.75	90.38	89.69	90.52	0.023581	1.65	77.64	52.52	0.43
1	1742.76	Q100	128.00	86.00	88.34	87.29	88.38	0.006680	0.85	150.96	108.31	0.23
1	1609.42	Q100	128.00	84.00	86.99	85.73	87.09	0.014816	1.43	89.52	52.47	0.35
1	1544.99	Q100	128.00	83.50	86.27	85.07	86.35	0.009176	1.22	104.95	54.63	0.28
1	1448.31	Q100	128.00	82.50	85.58	84.03	85.64	0.005807	1.09	117.33	50.51	0.23
1	1395.99	Q100	128.00	81.50	85.26	83.49	85.33	0.006337	1.16	110.10	45.80	0.24
1	1344.33	Q100	128.00	82.00	84.81	83.47	84.91	0.010531	1.41	90.65	41.57	0.31
1	1241.76	Q100	128.00	81.13	83.49	82.56	83.60	0.015749	1.48	86.77	51.27	0.36
1	1096.46	Q100	128.00	79.50	82.19	80.93	82.24	0.006053	0.97	131.84	71.07	0.23
1	985.85	Q100	128.00	78.50	81.23	80.07	81.31	0.012296	1.29	99.10	59.42	0.32
1	884.92	Q100	128.00	77.37	79.91	78.85	79.99	0.013850	1.27	100.66	67.83	0.33
1	725.1	Q100	128.00	74.39	78.52	76.88	78.56	0.006179	0.92	139.78	83.32	0.23
1	556.02	Q100	128.00	75.00	77.77	76.38	77.80	0.003441	0.74	172.70	91.45	0.17
1	448.94	Q100	128.00	73.93	76.85	76.04	76.99	0.025619	1.66	77.13	55.00	0.45
1	326.38	Q100	128.00	71.50	75.39	73.72	75.44	0.007309	0.99	129.36	78.09	0.25
1	286.47*	Q100	128.00	71.14	75.18	73.43	75.21	0.004560	0.75	170.07	109.23	0.19
1	246.56*	Q100	128.00	70.79	75.03	73.26	75.05	0.003259	0.62	207.87	140.38	0.16
1	206.65*	Q100	128.00	70.43	74.92	72.83	74.94	0.002458	0.52	244.30	170.12	0.14
1	166.74*	Q100	128.00	70.07	74.84	72.35	74.85	0.001908	0.46	280.80	199.17	0.12
1	126.83*	Q100	128.00	69.71	74.78	71.93	74.78	0.001484	0.40	318.71	226.28	0.11
1	86.9199*	Q100	128.00	69.36	74.72	71.57	74.73	0.001227	0.36	358.75	263.75	0.10
1	47.01	Q100	128.00	69.00	74.68	71.21	74.68	0.001002	0.31	416.47	375.91	0.09

Technical Memorandum

To:	Neilsens Quality Gravel Pty Ltd	**From:**	Laura Meatheringham
Cc:	BAAM Ecology	**SLR Consulting Australia Pty Ltd**	
		Date:	7 August 2025
		Project No.	625.V01818.00009

RE: Proposed upstream monitoring location Warrill View Quarry Operation Neilsens Quality Gravel Pty Ltd – EPBC Referral 2020 – 8684.

Confidentiality
This document is confidential and may contain legally privileged information. If you are not a named or authorised recipient, you must not read, copy, distribute or act in reliance on it. If you have received this document in error, please notify us immediately and return the document by mail.

This technical memorandum has been prepared for Neilsens Quality Gravel Pty Ltd ('Neilsens') to nominate upstream monitoring locations in support of their EPBC Referral (Reference: 2020 – 8684). The purpose of nominating an appropriate upstream location is to establish baseline water quality and quantity characteristics to facilitate the assessment of potential changes and the effectiveness of proposed mitigation measures associated with the Warrill View Quarry extractive industry project, located at 299 Hayes Road, Silverdale QLD 4307 ('the site').

Objective

A Stormwater Management Plan ('SMP') has been developed to address potential environmental impacts related to stormwater and surface water quality arising from the proposed quarry operations. However, the SMP does not currently nominate an upstream monitoring location for comparative analysis of water quality parameters. The objective is to identify an appropriate upstream monitoring site that will enable the determination of changes in water quality and quantity, and evaluate the success of proposed mitigation measures, as required under EPBC Referral 2020 – 8684.

Relevant Environmental Values and Water Quality Objectives

The site is located within an area identified as Lowland Freshwaters within the Lower Warrill Creek Catchment and is recognised under the Bremer River Environmental Values and Water quality Objectives Basin No 1436 (part) *Environmental Protection (Water) Policy 2019* ('EPP (Water)'). The Environmental Values ('EVs') identified for these waters include: Aquatic Ecosystem, Irrigation, Farm Supply and Stock Water, Human Consumption, Primary and Secondary Recreation, Visual Recreation, Drinking Water, and Cultural and Spiritual Values.

As detailed in the SMP, the majority of activities associated with the proposed quarry relate to ground disturbance. Quarrying activities are considered relatively inert compared to other industrial operations, with the primary risk to water quality arising from erosion and sedimentation, which can impact turbidity levels. All fuels and chemicals used on site will be securely bunded and appropriately located away from stormwater infrastructure to minimise the risk of contamination.

The Water Quality Objectives ('WQOs') applicable to the site, as required under the Environmental Authority ('EA') conditions, are presented in **Table 1 – Water Quality Objectives** below.

Table 1 – EA Water Quality Objectives

Parameter	100 percentile concentration limit
pH	6.5 – 8.5
Turbidity	<5NTU
Total Suspended Soils (TSS)	<6 mg/L
Electrical Conductivity (EC)	500 µS/cm
Dissolved Oxygen	85 – 110%

*release from SW2 and SW3

It is important to emphasise that the regulatory preference in establishing WQOs is to derive a set of site – specific criteria, referred to as Locally Derived Water Quality Objectives. These are typically established after collecting sufficient baseline data to derive statistically robust alternatives to those detailed in the catchment wide WQOs.

To this end, whilst the limits in the EA remain relevant, background water quality data is proposed to be monitored upstream of the proposed operations to derive WQOs specific to the local environment. Once these site – specific WQO's are established, the limits prescribed in the EA may be varied to reflect the confirmed parameters.

Flow Path to Warroolaba Creek

Warroolaba Creek is recognised as a waterway for the purposes of the *Water Act 2000.* The sites release points, identified as SW2 and SW3, are engineered stormwater controls designed to capture the 1 in 5-year ARI 24-hour rainfall event for the locality. Water flows in a northerly direction through the site discharging north through SW2 and SW3 into drainage features connecting to the Warroolaba Creek.

The two (2) release locations are located in near proximity to each other, and are a function of the quarry layout, stormwater control and topographic constraints. There will be no incidental releases from elsewhere on site to the receiving environment given the nature of the development.

Monitoring Locations

The following has been prepared with reference to the ANZECC Monitoring and Sampling Manual, and *AS/NZS5667 Water Quality Sampling Part 1: Guidance of the design of Sampling Programs, Sampling techniques and the Preservation and Handling of Samples*.

The monitoring locations nominated in the SMP (Groundwork Plus, November 2018), are described in **Table 2 – Monitoring Locations SMP**.

Table 2 – Monitoring Locations SMP

Location	Purpose
Site Release Waters	Releases may occur from two locations at the site (SW2 and SW3) monitoring of release waters is to occur at three locations (MP1, MP2 and MP3). All release locations discharge to the northern portion of the site. (Release locations are shown in **Attachment 1 – Surface Water Monitoring Locations**).
Representative Downstream Location	The Downstream reference point is located approximately 1.4km downstream of the release points (Downstream

Location	Purpose
	locations are shown in **Attachment 1 – Surface Water Monitoring Locations**).

The SMP has not nominated an upstream monitoring location. An upstream monitoring location is to be established to ensure there is no influence from the site operations (i.e. not within areas subject to release waters), and is reflective of the downstream receiving environment with regard to stream type, environmental values and condition. To this end, a suitable upstream montitoring location has been nominated, and is described in **Table 3** below and displayed in **Figure** 1 below.

Table 3 – Proposed Upstream Location

Location	Purpose
Representative Upstream Location	The upstream reference point is located approximately 1.4km upstream of the disturbance areas. This location has been selected due to its distance from the proposed disturbance area and accessibility of the sample location. (Proposed upstream location is also included in **Attachment 1 – Surface Water Monitoring Locations**). The location is within the same waterway (Warroolaba Creek), with the same adjoining land uses, stream characteristics (bed and banks), aligned environmental values and similar in nature to the downstream receiving environment.

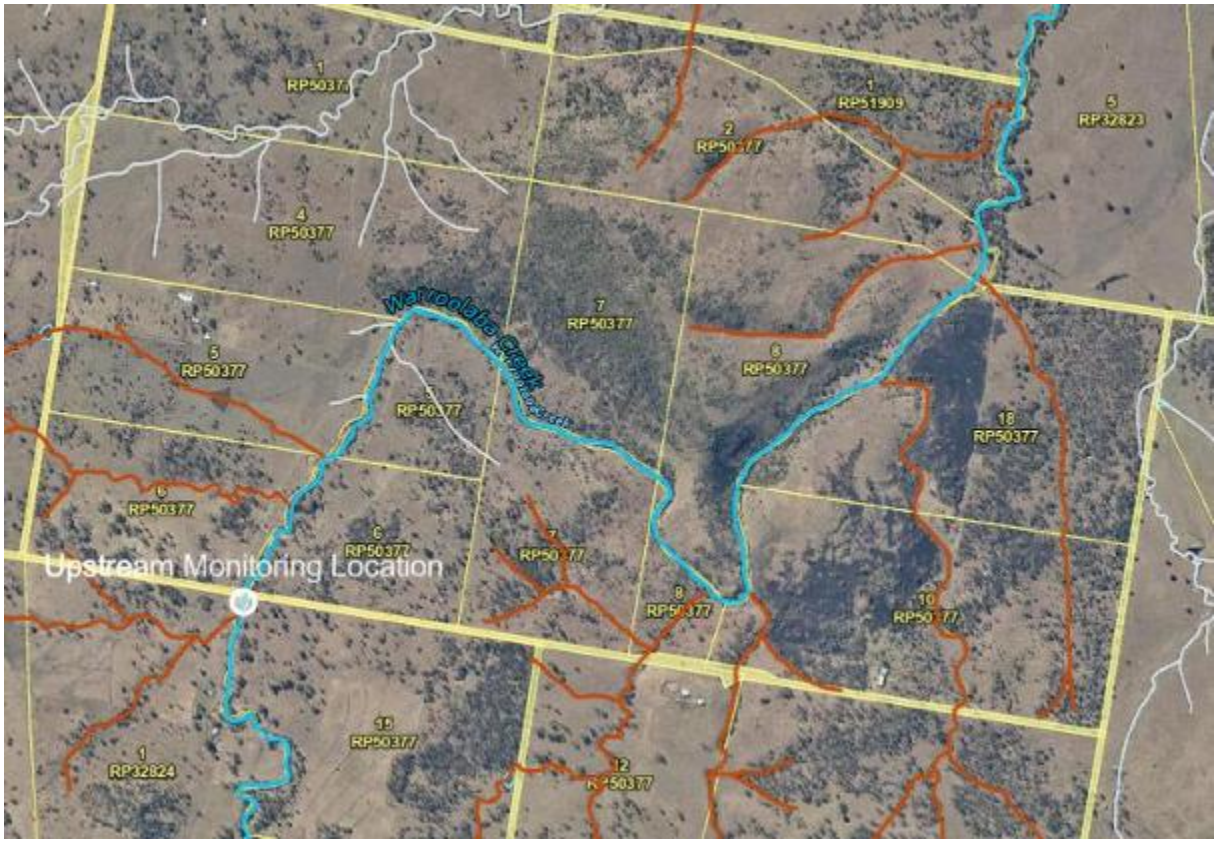


Figure 1 – Nominated Upstream Monitoring Location

The proposed upstream monitoring location is situated approximately 1.4 kilometres upstream of the proposed quarry footprint. This location has been selected to ensure that water quality data reflects conditions unaffected by quarry related activities, which provides a reliable baseline for comparison with downstream monitoring results. Positioned beyond the influence of quarry operations, the site offers a representative location of pre-disturbance conditions. Importantly, the surrounding land use at this location closely mirrors that of the downstream environment, enhancing its suitability as a reference point.

Although suitable monitoring locations may be identified further downstream where water quality from the unnamed drainage features upstream of the quarry could be captured, these areas are not situated on quarry owned land and may present challenges in terms of access and safety. In contrast, the selected upstream monitoring location offers consistent and safe access for field personnel, supporting regular and reliable sampling throughout the monitoring program. Overall, the Upstream Monitoring Location provides a robust and practical foundation for assessing the potential environmental impacts of the proposed quarry development.

Analysis Requirements

The following summarises the analysis requirements for the samples of water collected.

In – situ

The following parameters are to be monitored in – situ i.e. in the field, using a suitably calibrated meter:

- pH

- EC
- DO
- Turbidity

Laboratory

With the exception of the parameters that can be monitored in – situ, all other analyses must be carried out by a laboratory that has National Association of Testing Authorities ('NATA') certification, or an equivalent certification, for such analyses. The parameters requiring laboratory analysis are as follows:

- Total suspended solids

Observations

Observations are to be made during each sampling event, and must include the following:

- General comment on water clarity
- Visual oil and grease, or hydrocarbon sheen
- Any indication of environmental harm
- Flow characteristics.

Whilst not compulsory, photographs of each of the sampling locations is desirable to maintain a visual record of the monitoring.

Quality Control Samples

As the analysis will be undertaken sporadically and only during a release event, no quality control sampling (field blanks, duplicates, inter lab analysis) is proposed.

Quality Assurance

All instruments used to measure or monitor parameters required under the relevant conditions of development and operational requirements are to be calibrated, maintained and operated appropriately. All sampling is to be undertaken by an appropriately qualified person.

Conclusion

The identification of an upstream monitoring location is a critical component of the water quality monitoring for the Warrill View Quarry project. The selected site, located approximately 1.4 kilometres upstream of the proposed disturbance area, provides a reliable baseline for assessing potential changes in water quality and quantity resulting from quarry operations. Its location outside the influence of site activities, combined with comparable land use and safe accessibility, ensures that monitoring data will be representative and robust. The proposed monitoring program, including in – situ and laboratory analysis, observational records. The proposed upstream monitoring location is believed to be suitable in providing a reference location which is unaffected by quarry activities as well consistently accessible.

Regards,

SLR Consulting Australia Pty Ltd



Laura Meatheringham
Senior Project Consultant

Attachments

Attachment 1 –Surface Water Monitoring Locations

Attachment 1 –Surface Water Monitoring Locations

Setout Points
Surface Water Monitoring Locations

ID	Easting	Northing
Downstream Reference Point	457,549.68	6917116.47
MP 01	457,127.69	6915632.19
MP 02	457,081.37	6915799.31
MP 03	457,187.94	6916286.71
SW2	457,269.19	6915602.29
SW3	456,950.87	6916291.42
Upstream Reference Point	454,527.95	6914565.81

Downstream Reference Point
Upstream Reference Point
RELEASE POINT 1
SPILLWAY SW3
RELEASE POINT 2
SPILLWAY SW2
SW3
MP 03
MP 02
MP 01
SW2

2RP32834 1RP173616 554CH31101 8RP28740 2RP174011 10RP28740 4RP32823 3RP32823 1RP50377 1RP51909 5RP32823 2RP32823 52CH31953 2RP50377 4RP50377 1RP32823 7RP50377 8RP50377 5RP50377 18RP50377 6RP50377 7RP50377 6RP50377 6RP32823 8RP50377 10RP50377 7RP32823 15RP50377 8RP32823 1RP32824 12RP50377 11RP50377 16RP50377

N 6917000m
N 6916000m
N 6915000m
N 6914000m
E 454000m
E 455000m
E 456000m
E 457000m
E 458000m
E 459000m

FILE NAME: Z:\Shared\Data\Jobs\1301-1400\1361 Neilsens Warrill View\Drawings\1361.DRG.100 -Surface Water Monitoring Locations .dwg
JOB SUB #:
CREATED: 8 August 2025

REV	DESCRIPTION	DATE	BY

Data Sources:
Photography: Digital Globe
Topography: LIDAR Survey. Captured 2016-12-16.
Cadastre:
Ecosystem:
Other:

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Legend:
- Site Boundary
- Cadastral Boundary
- Easement Boundary
- Cadastral - Watercourse
- Catchment Area

PROJECT: Warrill View Quarry

CLIENT: Neilsens Quality Gravels Pty Ltd

TITLE: Surface Monitoring Locations

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APPENDIX 3

Database Search Results: EPBC Protected Matters Search and Wildlife Online

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 08-May-2025

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	42
Listed Migratory Species:	10

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	20
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	3
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity
Moreton bay	50 - 100km upstream from Ramsar site

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
Grey box-grey gum wet forest of subtropical eastern Australia	Endangered	Community likely to occur within area
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community may occur within area
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community may occur within area
Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions	Endangered	Community likely to occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour may occur within area

Scientific Name	Threatened Category	Presence Text
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat likely to occur within area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area
Cyclopsitta diophthalma coxeni Coxen's Fig-Parrot [59714]	Critically Endangered	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat likely to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat likely to occur within area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat likely to occur within area
MAMMAL		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Endangered	Species or species habitat may occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat may occur within area
Petauroides volans Greater Glider (southern and central) [254]	Endangered	Species or species habitat likely to occur within area
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Petrogale penicillata		
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
PLANT		
Arthraxon hispidus		
Hairy-joint Grass [9338]	Vulnerable	Species or species habitat likely to occur within area
Bosistoa transversa		
Three-leaved Bosistoa, Yellow Satinheart [16091]	Vulnerable	Species or species habitat may occur within area
Bulbophyllum globuliforme		
Miniature Moss-orchid, Hoop Pine Orchid [6649]	Vulnerable	Species or species habitat may occur within area
Cupaniopsis shirleyana		
Wedge-leaf Tuckeroo [3205]	Vulnerable	Species or species habitat may occur within area
Cupaniopsis tomentella		
Boonah Tuckeroo [3322]	Vulnerable	Species or species habitat may occur within area
Dichanthium setosum		
bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area
Fontainea venosa		
[24040]	Vulnerable	Species or species habitat may occur within area
Leuzea australis listed as Rhaponticum australe		
Austral Cornflower, Native Thistle [9363]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Notelaea lloydii Lloyd's Olive [15002]	Vulnerable	Species or species habitat likely to occur within area
Picris evae Hawkweed [10839]	Vulnerable	Species or species habitat may occur within area
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat may occur within area
Rhodomyrtus psidioides Native Guava [19162]	Critically Endangered	Species or species habitat may occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
REPTILE		
Delma torquata Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area
Furina dunmalli Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area
Hemiaspis damelii Grey Snake [1179]	Endangered	Species or species habitat likely to occur within area

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area overfly marine area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat likely to occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat likely to occur within area overfly marine area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area overfly marine area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area overfly marine area
Pterodroma cervicalis White-necked Petrel [59642]		Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat may occur within area overfly marine area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area overfly marine area

Extra Information

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status
Warrill View Hard Rock Quarry	2020/8684		Assessment
Not controlled action			
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
Upgraded sewerage infrastructure in the Helensvale/Coombabah catchment	2004/1427	Not Controlled Action	Completed

Bioregional Assessments [Resource Information]

SubRegion	BioRegion	Website
Clarence-Moreton	Clarence-Moreton	BA website

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data is available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on the contents of this report.

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions when time permits.

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

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

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded breeding sites; and
- seals which have only been mapped for breeding sites near the Australian continent

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

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

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

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

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

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

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Queensland Government

WildNet species list

Search Criteria: Species List for a Specified Point
Species: All
Type: Native
Queensland status: All
Records: All
Date: Since 1980
Latitude: -27.8849
Longitude: 152.5537
Distance: 10
Email: jedd@baamecology.com
Date submitted: Thursday 08 May 2025 14:04:03
Date extracted: Thursday 08 May 2025 14:10:10

The number of records retrieved = 295

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Information about your Species lists request is logged for quality assurance, user support and product enhancement purposes only.
The information provided should be appropriately acknowledged as being derived from WildNet database when it is used. As the WildNet Program is still in a process of collating and vetting data, it is possible the information given is not complete. Go to the WildNet database webpage (https://www.qld.gov.au/environment/plants-animals/species-information/wildnet) to find out more about WildNet and where to access other WildNet information products approved for publication. Feedback about WildNet species lists should be emailed to wildlife.online@des.qld.gov.au.

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Hylidae	*Litoria caerulea*	common green treefrog		C		4
animals	amphibians	Hylidae	*Litoria fallax*	eastern sedgefrog		C		6
animals	amphibians	Hylidae	*Litoria gracilenta*	graceful treefrog		C		1
animals	amphibians	Hylidae	*Litoria latopalmata*	broad palmed rocketfrog		C		4/2
animals	amphibians	Hylidae	*Litoria nasuta*	striped rocketfrog		C		5/3
animals	amphibians	Hylidae	*Litoria rubella*	ruddy treefrog		C		7/1
animals	amphibians	Limnodynastidae	*Limnodynastes peronii*	striped marshfrog		C		13/9
animals	amphibians	Limnodynastidae	*Limnodynastes tasmaniensis*	spotted grassfrog		C		16/9
animals	amphibians	Limnodynastidae	*Platyplectrum ornatum*	ornate burrowing frog		C		1
animals	birds	Acanthizidae	*Acanthiza chrysorrhoa*	yellow-rumped thornbill		C		10
animals	birds	Acanthizidae	*Acanthiza nana*	yellow thornbill		C		1
animals	birds	Acanthizidae	*Acanthiza reguloides*	buff-rumped thornbill		C		2
animals	birds	Acanthizidae	*Gerygone levigaster*	mangrove gerygone		C		1
animals	birds	Acanthizidae	*Gerygone olivacea*	white-throated gerygone		C		18
animals	birds	Acanthizidae	*Pyrrholaemus sagittatus*	speckled warbler		C		2
animals	birds	Acanthizidae	*Sericornis frontalis*	white-browed scrubwren		C		3
animals	birds	Acanthizidae	*Smicrornis brevirostris*	weebill		C		2
animals	birds	Accipitridae	*Accipiter fasciatus*	brown goshawk		C		1
animals	birds	Accipitridae	*Aquila audax*	wedge-tailed eagle		C		7
animals	birds	Accipitridae	*Circus approximans*	swamp harrier		C		3
animals	birds	Accipitridae	*Circus assimilis*	spotted harrier		C		2
animals	birds	Accipitridae	*Elanus axillaris*	black-shouldered kite		C		7
animals	birds	Accipitridae	*Haliaeetus leucogaster*	white-bellied sea-eagle		C		4
animals	birds	Accipitridae	*Haliastur indus*	brahminy kite		C		1
animals	birds	Accipitridae	*Haliastur sphenurus*	whistling kite		C		6
animals	birds	Accipitridae	*Milvus migrans*	black kite		C		4
animals	birds	Acrocephalidae	*Acrocephalus australis*	Australian reed-warbler		C		5
animals	birds	Alaudidae	*Mirafra javanica*	Horsfield's bushlark		C		3
animals	birds	Alcedinidae	*Ceyx azureus*	azure kingfisher		C		1
animals	birds	Alcedinidae	*Dacelo leachii*	blue-winged kookaburra		C		3
animals	birds	Alcedinidae	*Dacelo novaeguineae*	laughing kookaburra		C		18
animals	birds	Alcedinidae	*Todiramphus macleayii*	forest kingfisher		C		1
animals	birds	Alcedinidae	*Todiramphus pyrrhopygius*	red-backed kingfisher		C		1
animals	birds	Alcedinidae	*Todiramphus sanctus*	sacred kingfisher		C		12/1
animals	birds	Alcedinidae	*Todiramphus sordidus*	Torresian kingfisher		C		3
animals	birds	Anatidae	*Anas gracilis*	grey teal		C		19
animals	birds	Anatidae	*Anas superciliosa*	Pacific black duck		C		31
animals	birds	Anatidae	*Aythya australis*	hardhead		C		12
animals	birds	Anatidae	*Chenonetta jubata*	Australian wood duck		C		18
animals	birds	Anatidae	*Cygnus atratus*	black swan		C		15
animals	birds	Anatidae	*Dendrocygna eytoni*	plumed whistling-duck		C		12
animals	birds	Anatidae	*Malacorhynchus membranaceus*	pink-eared duck		C		2
animals	birds	Anatidae	*Spatula rhynchotis*	Australasian shoveler		C		7
animals	birds	Anhingidae	*Anhinga novaehollandiae*	Australasian darter		C		10
animals	birds	Anseranatidae	*Anseranas semipalmata*	magpie goose		C		5
animals	birds	Apodidae	*Apus pacificus*	fork-tailed swift		SL		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Apodidae	*Hirundapus caudacutus*	white-throated needletail		V	V	3
animals	birds	Ardeidae	*Ardea alba modesta*	eastern great egret		C		9
animals	birds	Ardeidae	*Ardea intermedia*	intermediate egret		C		5
animals	birds	Ardeidae	*Ardea pacifica*	white-necked heron		C		7
animals	birds	Ardeidae	*Bubulcus ibis*	cattle egret		C		14
animals	birds	Ardeidae	*Egretta garzetta*	little egret		C		4
animals	birds	Ardeidae	*Egretta novaehollandiae*	white-faced heron		C		23
animals	birds	Ardeidae	*Nycticorax caledonicus*	nankeen night-heron		C		1
animals	birds	Artamidae	*Artamus cyanopterus*	dusky woodswallow		C		2
animals	birds	Artamidae	*Cracticus nigrogularis*	pied butcherbird		C		20
animals	birds	Artamidae	*Cracticus torquatus*	grey butcherbird		C		12
animals	birds	Artamidae	*Gymnorhina tibicen*	Australian magpie		C		46
animals	birds	Artamidae	*Strepera graculina*	pied currawong		C		8
animals	birds	Cacatuidae	*Cacatua galerita*	sulphur-crested cockatoo		C		4
animals	birds	Cacatuidae	*Cacatua sanguinea*	little corella		C		4
animals	birds	Cacatuidae	*Eolophus roseicapilla*	galah		C		23
animals	birds	Cacatuidae	*Nymphicus hollandicus*	cockatiel		C		5
animals	birds	Campephagidae	*Coracina maxima*	ground cuckoo-shrike		C		1
animals	birds	Campephagidae	*Coracina novaehollandiae*	black-faced cuckoo-shrike		C		26
animals	birds	Campephagidae	*Coracina papuensis*	white-bellied cuckoo-shrike		C		1
animals	birds	Campephagidae	*Edolisoma tenuirostre*	common cicadabird		C		1
animals	birds	Campephagidae	*Lalage leucomela*	varied triller		C		2
animals	birds	Campephagidae	*Lalage tricolor*	white-winged triller		C		1
animals	birds	Charadriidae	*Elseyornis melanops*	black-fronted dotterel		C		3
animals	birds	Charadriidae	*Erythrogonys cinctus*	red-kneed dotterel		C		3
animals	birds	Charadriidae	*Vanellus miles*	masked lapwing		C		12
animals	birds	Charadriidae	*Vanellus miles novaehollandiae*	masked lapwing (southern subspecies)		C		14
animals	birds	Ciconiidae	*Ephippiorhynchus asiaticus*	black-necked stork		C		10
animals	birds	Cisticolidae	*Cisticola exilis*	golden-headed cisticola		C		20
animals	birds	Climacteridae	*Cormobates leucophaea metastasis*	white-throated treecreeper (southern)		C		2
animals	birds	Columbidae	*Geopelia humeralis*	bar-shouldered dove		C		15
animals	birds	Columbidae	*Geopelia placida*	peaceful dove		C		7
animals	birds	Columbidae	*Leucosarcia melanoleuca*	wonga pigeon		C		1
animals	birds	Columbidae	*Ocyphaps lophotes*	crested pigeon		C		20
animals	birds	Coraciidae	*Eurystomus orientalis*	dollarbird		C		7
animals	birds	Corvidae	*Corvus orru*	Torresian crow		C		50
animals	birds	Cuculidae	*Cacomantis flabelliformis*	fan-tailed cuckoo		C		1
animals	birds	Cuculidae	*Centropus phasianinus*	pheasant coucal		C		17
animals	birds	Cuculidae	*Chalcites basalis*	Horsfield's bronze-cuckoo		C		2
animals	birds	Cuculidae	*Chalcites lucidus*	shining bronze-cuckoo		C		1
animals	birds	Cuculidae	*Eudynamys orientalis*	eastern koel		C		4/1
animals	birds	Cuculidae	*Scythrops novaehollandiae*	channel-billed cuckoo		C		1
animals	birds	Dicaeidae	*Dicaeum hirundinaceum*	mistletoebird		C		11
animals	birds	Dicruridae	*Dicrurus bracteatus*	spangled drongo		C		4
animals	birds	Estrildidae	*Lonchura castaneothorax*	chestnut-breasted mannikin		C		9
animals	birds	Estrildidae	*Neochmia modesta*	plum-headed finch		C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Estrildidae	*Neochmia temporalis*	red-browed finch		C		6
animals	birds	Estrildidae	*Taeniopygia bichenovii*	double-barred finch		C		11
animals	birds	Estrildidae	*Taeniopygia guttata*	zebra finch		C		7
animals	birds	Falconidae	*Falco berigora*	brown falcon		C		10
animals	birds	Falconidae	*Falco cenchroides*	nankeen kestrel		C		17
animals	birds	Falconidae	*Falco longipennis*	Australian hobby		C		2
animals	birds	Falconidae	*Falco peregrinus macropus*	Australian peregrine falcon		C		2
animals	birds	Falconidae	*Falco subniger*	black falcon		C		1
animals	birds	Hirundinidae	*Cheramoeca leucosterna*	white-backed swallow		C		1
animals	birds	Hirundinidae	*Hirundo neoxena*	welcome swallow		C		24
animals	birds	Hirundinidae	*Petrochelidon ariel*	fairy martin		C		17
animals	birds	Hirundinidae	*Petrochelidon nigricans*	tree martin		C		4
animals	birds	Jacanidae	*Irediparra gallinacea*	comb-crested jacana		C		6
animals	birds	Laridae	*Chlidonias hybrida*	whiskered tern		C		1
animals	birds	Laridae	*Chroicocephalus novaehollandiae*	silver gull		C		6
animals	birds	Laridae	*Thalasseus bergii*	crested tern		SL		1
animals	birds	Locustellidae	*Cincloramphus cruralis*	brown songlark		C		1
animals	birds	Locustellidae	*Cincloramphus mathewsi*	rufous songlark		C		1
animals	birds	Locustellidae	*Cincloramphus timoriensis*	tawny grassbird		C		7
animals	birds	Maluridae	*Malurus cyaneus*	superb fairy-wren		C		17
animals	birds	Maluridae	*Malurus lamberti*	variegated fairy-wren		C		1
animals	birds	Maluridae	*Malurus melanocephalus*	red-backed fairy-wren		C		18
animals	birds	Megapodiidae	*Alectura lathami*	Australian brush-turkey		C		1
animals	birds	Meliphagidae	*Acanthorhynchus tenuirostris*	eastern spinebill		C		1
animals	birds	Meliphagidae	*Caligavis chrysops*	yellow-faced honeyeater		C		4
animals	birds	Meliphagidae	*Entomyzon cyanotis*	blue-faced honeyeater		C		6
animals	birds	Meliphagidae	*Lichmera indistincta*	brown honeyeater		C		8
animals	birds	Meliphagidae	*Manorina melanocephala*	noisy miner		C		24
animals	birds	Meliphagidae	*Meliphaga lewinii*	Lewin's honeyeater		C		8
animals	birds	Meliphagidae	*Melithreptus albogularis*	white-throated honeyeater		C		7
animals	birds	Meliphagidae	*Myzomela sanguinolenta*	scarlet honeyeater		C		7
animals	birds	Meliphagidae	*Philemon citreogularis*	little friarbird		C		4
animals	birds	Meliphagidae	*Philemon corniculatus*	noisy friarbird		C		7
animals	birds	Meliphagidae	*Plectorhyncha lanceolata*	striped honeyeater		C		9
animals	birds	Meropidae	*Merops ornatus*	rainbow bee-eater		C		6
animals	birds	Monarchidae	*Grallina cyanoleuca*	magpie-lark		C		34
animals	birds	Monarchidae	*Myiagra inquieta*	restless flycatcher		C		2
animals	birds	Monarchidae	*Myiagra rubecula*	leaden flycatcher		C		2
animals	birds	Motacillidae	*Anthus novaeseelandiae*	Australasian pipit		C		7
animals	birds	Neosittidae	*Daphoenositta chrysoptera*	varied sittella		C		3
animals	birds	Oriolidae	*Oriolus sagittatus*	olive-backed oriole		C		9
animals	birds	Oriolidae	*Sphecotheres vieilloti*	Australasian figbird		C		12
animals	birds	Pachycephalidae	*Colluricincla harmonica*	grey shrike-thrush		C		9
animals	birds	Pachycephalidae	*Colluricincla megarhyncha*	little shrike-thrush		C		1
animals	birds	Pachycephalidae	*Pachycephala pectoralis*	golden whistler		C		7
animals	birds	Pachycephalidae	*Pachycephala rufiventris*	rufous whistler		C		15

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Pandionidae	*Pandion haliaetus cristatus*	eastern osprey		SL		1
animals	birds	Pardalotidae	*Pardalotus punctatus*	spotted pardalote		C		3
animals	birds	Pardalotidae	*Pardalotus striatus*	striated pardalote		C		23
animals	birds	Pelecanidae	*Pelecanus conspicillatus*	Australian pelican		C		13
animals	birds	Petroicidae	*Eopsaltria australis*	eastern yellow robin		C		5
animals	birds	Petroicidae	*Microeca fascinans*	jacky winter		C		1
animals	birds	Petroicidae	*Petroica rosea*	rose robin		C		2
animals	birds	Phaethontidae	*Phaethon rubricauda*	red-tailed tropicbird		V		3/1
animals	birds	Phalacrocoracidae	*Microcarbo melanoleucos*	little pied cormorant		C		15
animals	birds	Phalacrocoracidae	*Phalacrocorax carbo*	great cormorant		C		2
animals	birds	Phalacrocoracidae	*Phalacrocorax sulcirostris*	little black cormorant		C		14
animals	birds	Phasianidae	*Coturnix pectoralis*	stubble quail		C		1
animals	birds	Phasianidae	*Synoicus ypsilophorus*	brown quail		C		5
animals	birds	Podicipedidae	*Tachybaptus novaehollandiae*	Australasian grebe		C		21
animals	birds	Pomatostomidae	*Pomatostomus temporalis*	grey-crowned babbler		C		1
animals	birds	Psittaculidae	*Parvipsitta pusilla*	little lorikeet		C		1
animals	birds	Psittaculidae	*Platycercus adscitus*	pale-headed rosella		C		16
animals	birds	Psittaculidae	*Platycercus elegans*	crimson rosella		C		1
animals	birds	Psittaculidae	*Trichoglossus chlorolepidotus*	scaly-breasted lorikeet		C		13
animals	birds	Psittaculidae	*Trichoglossus moluccanus*	rainbow lorikeet		C		13
animals	birds	Psophodidae	*Psophodes olivaceus*	eastern whipbird		C		3
animals	birds	Rallidae	*Fulica atra*	Eurasian coot		C		14
animals	birds	Rallidae	*Gallinula tenebrosa*	dusky moorhen		C		13
animals	birds	Rallidae	*Lewinia pectoralis*	Lewin's rail		C		1
animals	birds	Rallidae	*Porphyrio melanotus*	purple swamphen		C		12
animals	birds	Recurvirostridae	*Cladorhynchus leucocephalus*	banded stilt		C		1
animals	birds	Recurvirostridae	*Himantopus leucocephalus*	pied stilt		C		13
animals	birds	Recurvirostridae	*Recurvirostra novaehollandiae*	red-necked avocet		C		1
animals	birds	Rhipiduridae	*Rhipidura albiscapa*	grey fantail		C		16
animals	birds	Rhipiduridae	*Rhipidura leucophrys*	willie wagtail		C		35
animals	birds	Rhipiduridae	*Rhipidura rufifrons*	rufous fantail		C		1
animals	birds	Scolopacidae	*Calidris acuminata*	sharp-tailed sandpiper		V	V	2
animals	birds	Strigidae	*Ninox boobook*	southern boobook		C		1
animals	birds	Threskiornithidae	*Platalea flavipes*	yellow-billed spoonbill		C		4
animals	birds	Threskiornithidae	*Platalea regia*	royal spoonbill		C		11
animals	birds	Threskiornithidae	*Plegadis falcinellus*	glossy ibis		SL		6
animals	birds	Threskiornithidae	*Threskiornis molucca*	Australian white ibis		C		12
animals	birds	Threskiornithidae	*Threskiornis spinicollis*	straw-necked ibis		C		13
animals	birds	Turnicidae	*Turnix velox*	little button-quail		C		1
animals	birds	Tytonidae	*Tyto javanica*	eastern barn owl		C		5
animals	birds	Zosteropidae	*Zosterops lateralis*	silvereye		C		14
animals	mammals	Dasyuridae	*Dasyurus maculatus maculatus*	spotted-tailed quoll (southern subspecies)		E	E	1
animals	mammals	Dasyuridae	*Phascogale tapoatafa tapoatafa*	brush-tailed phascogale		C		3
animals	mammals	Macropodidae	*Macropus giganteus*	eastern grey kangaroo		C		3
animals	mammals	Macropodidae	*Notamacropus rufogriseus*	red-necked wallaby		C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	mammals	Molossidae	*Austronomus australis*	white-striped freetail bat		C		1
animals	mammals	Molossidae	*Mormopterus lumsdenae*	northern free-tailed bat		C		2
animals	mammals	Molossidae	*Mormopterus ridei*	eastern free-tailed bat		C		5
animals	mammals	Molossidae	*Mormopterus sp.*			C		2
animals	mammals	Muridae	*Pseudomys gracilicaudatus*	eastern chestnut mouse		C		4/2
animals	mammals	Peramelidae	*Isoodon macrourus*	northern brown bandicoot		C		1
animals	mammals	Phalangeridae	*Trichosurus vulpecula*	common brushtail possum		C		1
animals	mammals	Phascolarctidae	*Phascolarctos cinereus*	koala		E	E	96
animals	mammals	Pteropodidae	*Pteropus alecto*	black flying-fox		C		1
animals	mammals	Pteropodidae	*Pteropus poliocephalus*	grey-headed flying-fox		C	V	1
animals	mammals	Pteropodidae	*Pteropus scapulatus*	little red flying-fox		C		1
animals	mammals	Pteropodidae	*Pteropus sp.*	flying-fox		C		1
animals	ray-finned fishes	Ambassidae	*Ambassis agassizii*	Agassiz's glassfish				12
animals	ray-finned fishes	Anguillidae	*Anguilla australis*	southern shortfin eel				18
animals	ray-finned fishes	Anguillidae	*Anguilla reinhardtii*	longfin eel				35
animals	ray-finned fishes	Atherinidae	*Craterocephalus marjoriae*	silverstreak hardyhead				1
animals	ray-finned fishes	Atherinidae	*Craterocephalus stercusmuscarum*	flyspecked hardyhead				8
animals	ray-finned fishes	Clupeidae	*Nematalosa erebi*	bony bream				2
animals	ray-finned fishes	Eleotridae	*Gobiomorphus australis*	striped gudgeon				3
animals	ray-finned fishes	Eleotridae	*Gobiomorphus coxii*	Cox gudgeon				1
animals	ray-finned fishes	Eleotridae	*Hypseleotris compressa*	empire gudgeon				1
animals	ray-finned fishes	Eleotridae	*Hypseleotris galii*	firetail gudgeon				40
animals	ray-finned fishes	Eleotridae	*Hypseleotris klunzingeri*	western carp gudgeon				33
animals	ray-finned fishes	Eleotridae	*Philypnodon grandiceps*	flathead gudgeon				20
animals	ray-finned fishes	Melanotaeniidae	*Melanotaenia duboulayi*	crimsonspotted rainbowfish				31
animals	ray-finned fishes	Mugilidae	*Mugil cephalus*	sea mullet				1
animals	ray-finned fishes	Percichthyidae	*Macquaria novemaculeata*	Australian bass				4
animals	ray-finned fishes	Plotosidae	*Tandanus tandanus*	freshwater catfish				19
animals	ray-finned fishes	Retropinnidae	*Retropinna semoni*	Australian smelt				13
animals	ray-finned fishes	Scorpaenidae	*Notesthes robusta*	bullrout				1
animals	ray-finned fishes	Terapontidae	*Leiopotherapon unicolor*	spangled perch				24
animals	reptiles	Agamidae	*Diporiphora australis*	tommy roundhead		C		4/2
animals	reptiles	Agamidae	*Intellagama lesueurii*	eastern water dragon		C		1
animals	reptiles	Agamidae	*Pogona barbata*	bearded dragon		C		3
animals	reptiles	Boidae	*Morelia spilota*	carpet python		C		2
animals	reptiles	Colubridae	*Dendrelaphis punctulatus*	green tree snake		C		1
animals	reptiles	Colubridae	*Tropidonophis mairii*	freshwater snake		C		1
animals	reptiles	Elapidae	*Demansia psammophis*	yellow-faced whipsnake		C		1
animals	reptiles	Elapidae	*Demansia vestigiata*	lesser black whipsnake		C		3/2
animals	reptiles	Elapidae	*Furina diadema*	red-naped snake		C		1
animals	reptiles	Elapidae	*Pseudechis guttatus*	spotted black snake		C		1
animals	reptiles	Elapidae	*Pseudechis porphyriacus*	red-bellied black snake		C		2
animals	reptiles	Elapidae	*Pseudonaja textilis*	eastern brown snake		C		2
animals	reptiles	Elapidae	*Vermicella annulata*	bandy-bandy		C		1
animals	reptiles	Gekkonidae	*Gehyra dubia*	dubious dtella		C		1
animals	reptiles	Pygopodidae	*Delma plebeia*	common delma		C		3/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	reptiles	Scincidae	*Anomalopus verreauxii*	three-clawed worm-skink		C		3/1
animals	reptiles	Scincidae	*Carlia schmeltzii*	robust rainbow-skink		C		3/1
animals	reptiles	Scincidae	*Carlia vivax*	tussock rainbow-skink		C		6/4
animals	reptiles	Scincidae	*Ctenotus spaldingi*	straight-browed ctenotus		C		4/1
animals	reptiles	Scincidae	*Eulamprus quoyii*	eastern water skink		C		1
animals	reptiles	Scincidae	*Lampropholis delicata*	dark-flecked garden sunskink		C		1
animals	reptiles	Scincidae	*Lygisaurus foliorum*	tree-base litter-skink		C		5/3
animals	reptiles	Scincidae	*Morethia boulengeri*	south-eastern morethia skink		C		7/6
animals	reptiles	Scincidae	*Morethia taeniopleura*	fire-tailed skink		C		1
animals	reptiles	Typhlopidae	*Anilios insperatus*	Fassifern blind snake		CR	CE	1/1
animals	reptiles	Typhlopidae	*Anilios sp.*			C		1
fungi	Agaricomycetes	Agaricaceae	*Podaxis beringamensis*			C		2
fungi	lecanoromycetes	Caliciaceae	*Dirinaria aegialita*			C		1/1
fungi	lecanoromycetes	Cladoniaceae	*Cladia muelleri*			C		1/1
fungi	lecanoromycetes	Graphidaceae	*Diploschistes*					1/1
fungi	lecanoromycetes	Lecanoraceae	*Lecanora pseudistera*			C		1/1
fungi	lecanoromycetes	Lecanoraceae	*Lecidella stigmatea*			C		1/1
fungi	lecanoromycetes	Parmeliaceae	*Parmotrema cristiferum*			C		1/1
fungi	lecanoromycetes	Parmeliaceae	*Parmotrema maclayanum*			C		1/1
fungi	lecanoromycetes	Parmeliaceae	*Xanthoparmelia hypoconstictica*			C		1/1
plants	Charophyceae	Characeae	*Nitella cristata*			C		1/1
plants	land plants	Aizoaceae	*Tetragonia tetragonoides*	New Zealand spinach		C		1/1
plants	land plants	Apocynaceae	*Carissa ovata*	currantbush		C		1/1
plants	land plants	Apocynaceae	*Secamone elliptica*			C		1/1
plants	land plants	Apocynaceae	*Vincetoxicum ovatum*			C		1/1
plants	land plants	Araliaceae	*Hydrocotyle acutiloba*			C		1/1
plants	land plants	Cannabaceae	*Aphananthe philippinensis*			C		1/1
plants	land plants	Celastraceae	*Celastrus subspicata*	large-leaved staffvine		C		1/1
plants	land plants	Celastraceae	*Denhamia disperma*			C		1/1
plants	land plants	Celastraceae	*Elaeodendron australe var. australe*			C		1/1
plants	land plants	Cyperaceae	*Bolboschoenus caldwellii*			C		1/1
plants	land plants	Elaeocarpaceae	*Elaeocarpus obovatus subsp. obovatus*			C		1/1
plants	land plants	Euphorbiaceae	*Acalypha nemorum*	hairy acalypha		C		1/1
plants	land plants	Euphorbiaceae	*Mallotus claoxyloides*	green kamala		C		1/1
plants	land plants	Haloragaceae	*Myriophyllum verrucosum*	water milfoil		C		1/1
plants	land plants	Lamiaceae	*Coleus alloplectus*			C		1/1
plants	land plants	Leguminosae	*Acacia brunioides subsp. brunioides*			C		1/1
plants	land plants	Leguminosae	*Acacia maidenii*	Maiden's wattle		C		1/1
plants	land plants	Leguminosae	*Desmodium gangeticum*			C		1/1
plants	land plants	Leguminosae	*Senna coronilloides*			C		1/1
plants	land plants	Meliaceae	*Turraea pubescens*	native honeysuckle		C		1/1
plants	land plants	Menispermaceae	*Legnephora moorei*			C		1/1
plants	land plants	Myrtaceae	*Eucalyptus biturbinata*			C		1/1
plants	land plants	Myrtaceae	*Eucalyptus eugenioides*			C		2/2
plants	land plants	Phyllanthaceae	*Bridelia exaltata*			C		1/1
plants	land plants	Phyllanthaceae	*Bridelia leichhardtii*			C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Piperaceae	*Piper hederaceum var. hederaceum*			C		1/1
plants	land plants	Pittosporaceae	*Pittosporum viscidum*	black-fruited thornbush		C		1/1
plants	land plants	Poaceae	*Dichanthium sericeum subsp. humilius*			C		1/1
plants	land plants	Poaceae	*Eremochloa bimaculata*	poverty grass		C		1/1
plants	land plants	Poaceae	*Sorghum nitidum forma aristatum*			C		1/1
plants	land plants	Poaceae	*Sporobolus creber*			C		1/1
plants	land plants	Poaceae	*Sporobolus scabridus*			C		1/1
plants	land plants	Polygonaceae	*Persicaria decipiens*	slender knotweed		C		1/1
plants	land plants	Proteaceae	*Lomatia silaifolia*	crinkle bush		C		1/1
plants	land plants	Ranunculaceae	*Ranunculus lappaceus*	common buttercup		C		1/1
plants	land plants	Rhamnaceae	*Alphitonia excelsa*	soap tree		C		1/1
plants	land plants	Rutaceae	*Acronychia laevis*	glossy acronychia		C		1/1
plants	land plants	Rutaceae	*Dinosperma erythrococcum*			C		1/1
plants	land plants	Rutaceae	*Flindersia collina*	broad-leaved leopard tree		C		1/1
plants	land plants	Sapindaceae	*Alectryon diversifolius*	scrub boonaree		C		1/1
plants	land plants	Sapindaceae	*Atalaya salicifolia*			C		1/1
plants	land plants	Sapindaceae	*Cupaniopsis tomentella*	Boonah tuckeroo		V	V	2/2
plants	land plants	Simaroubaceae	*Ailanthus triphysa*	white siris		C		1/1
plants	land plants	Sterculiaceae	*Sterculia quadrifida*	peanut tree		C		1/1
plants	uncertain	Indet.	*Indet.*			C		1/1

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992.*
The codes are Extinct (EX), Extinct in the Wild (PE), Critically Endangered (CR), Endangered (E), Vulnerable (V), Near Threatened (NT), Special Least Concern (SL) and Least Concern (C).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999.*
The values of EPBC are Extinct (EX), Extinct in the Wild (XW), Critically Endangered (CE), Endangered (E), Vulnerable (V) and Conservation Dependent (CD).

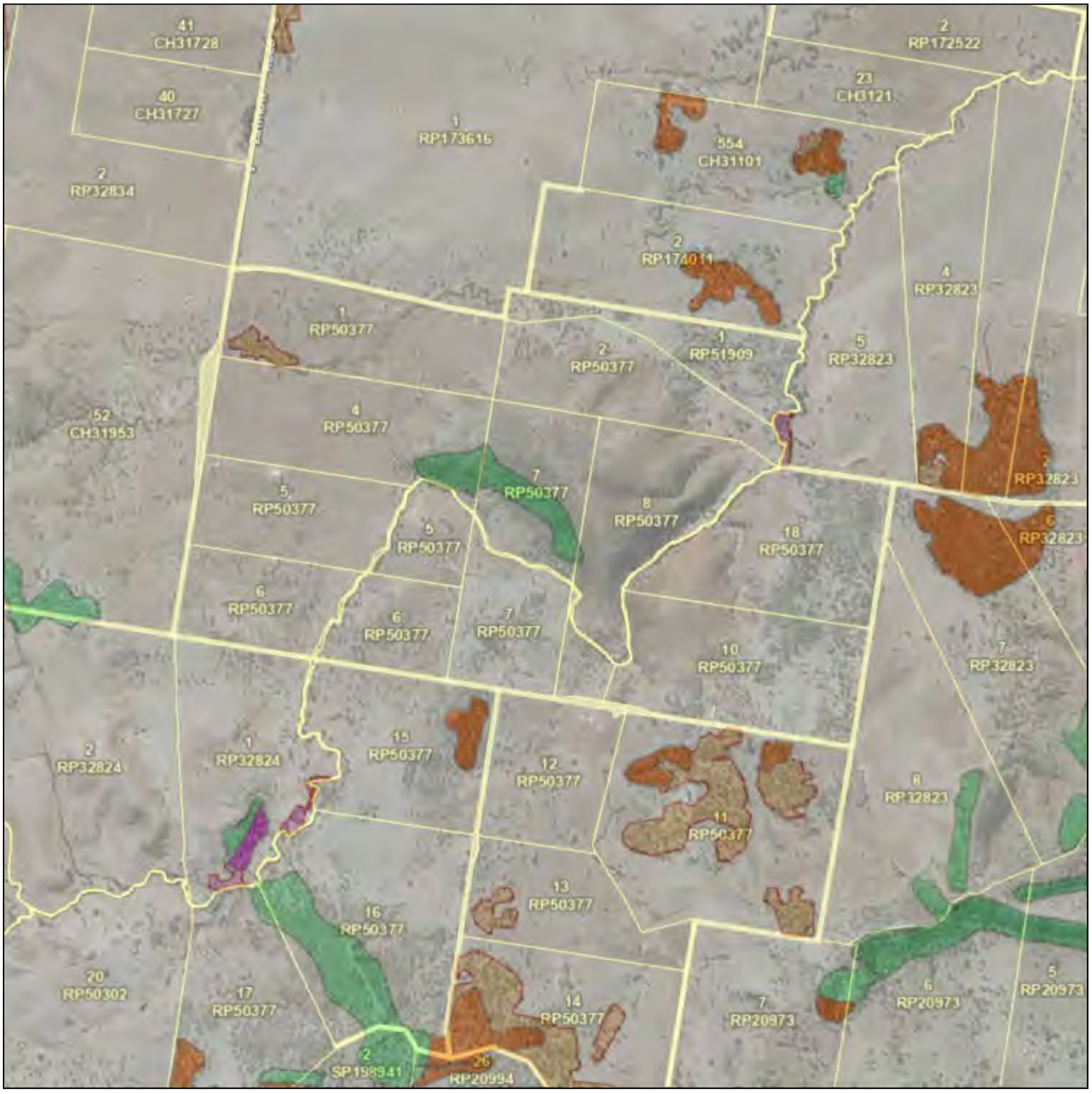
Records - The first number indicates the total number of records of the taxon (wildlife records and species listings for selected areas).
This number is output as 99999 if it equals or exceeds this value. A second number located after a / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.

APPENDIX 4

State Vegetation and Koala Habitat Mapping

27°51'37"S 152°31'14"E

27°51'37"S 152°34'53"E



27°54'51"S 152°31'14"E

27°54'51"S 152°34'53"E

A product of

Queensland Globe



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Legend located on next page

N

0 1 km

Scale: 1:34206

Printed at: A4

Print date: 20/4/2021

Datum: Geocentric Datum of Australia 1994
Projection: Web Mercator EPSG 102100

For more information, visit https://qldglobe.information.qld.gov.au/help-info/Contact-us.html

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Legend

Natural parcel boundary

Road parcel

Land parcel - gt 1 ha

Parcel

Easement parcel

Strata parcel

Volumetric parcel

Land parcel label - gt 1 ha

Category A or B area containing endangered

Category A or B area containing of concern

Category A or B area that is least concern

Category A or B area containing endangered and is S20AH

Category A or B area containing of concern and is S20AH

Category A or B area that is least concern and is S20AH

Category C or R area containing endangered

Category C or R area containing of concern

Category C or R area that is of least concern

Water

Non-remnant

Road

Highway

Main

Local

Private

Attribution

Maxar

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Legend

Vegetation management regional ecosystem - all

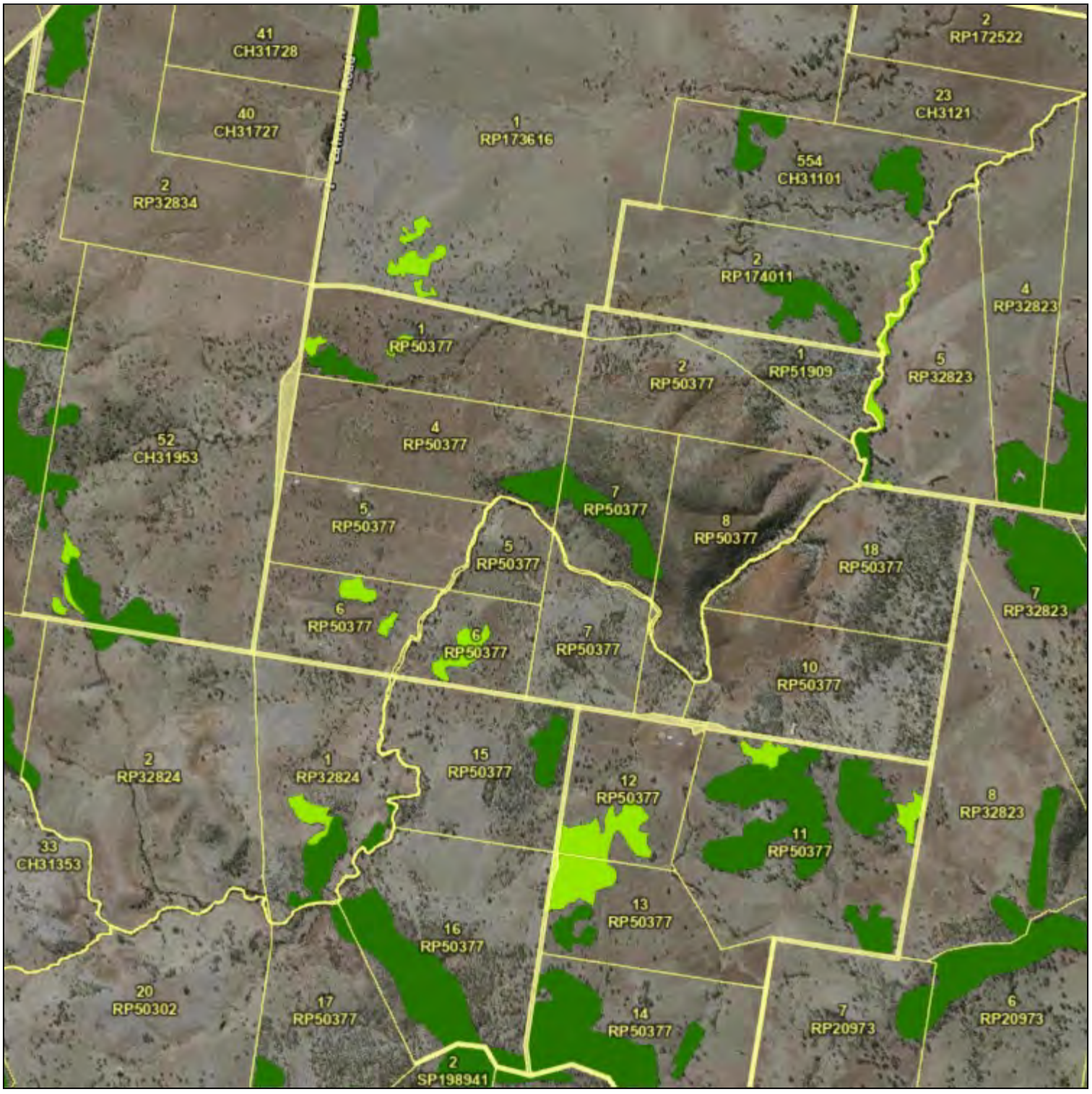
- Category A or B area containing endangered
- Category A or B area containing of concern
- Category A or B area that is least concern
- Category A or B area containing endangered and is S20AH
- Category A or B area containing of concern and is S20AH
- Category A or B area that is least concern and is S20AH
- Category C or R area containing endangered
- Category C or R area containing of concern
- Category C or R area that is of least concern
- Water
- Non-remnant

Railway

Cities and Towns

27°51'34"S 152°30'58"E

27°51'34"S 152°34'37"E



27°54'48"S 152°30'58"E

27°54'48"S 152°34'37"E

A product of Queensland Globe



Legend located on next page

N

0 1 km

Scale: 1:34206

Printed at: A4

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Legend

Core koala habitat area

Locally refined koala habitat area

Natural parcel boundary

Road parcel

Land parcel - gt 1 ha

Parcel

Easement parcel

Strata parcel

Volumetric parcel

Land parcel label - gt 1 ha

Railway

Road

Highway

Main

Local

Private

Cities and Towns

Attribution

Maxar

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APPENDIX 5

Quaternary Site Assessment Results

Descriptions and representative photographs of surveyed vegetation.

Site	Habitat description	Representative photo
Q1	**Brief description:** Non-remnant regrowth. **Canopy (T1):** Mid-dense. Height range 7-9m; median height 8m: *Eucalyptus crebra*. **Shrub (S1) Very s**parse. Height range 0.5-1m; median height 0.5m. *Lantana camara** **Groundcover:** Dense. Height range 0-0.3m; median height 0.2m: grazed grasses, *Chrysocephalum apiculatum, Verbena aristigera*.*	
Q2	**Brief description:** narrow belt of waterway vegetation with fringing eucalypts. . **Canopy (T1):** Dense. Height range 6-8m; median height 8m. Dominant species: *Melaleuca viminalis, Tristaniopsis laurina.* Associated species: *Acacia melanoxylon, Angophora subvelutina.* Adjacent upper banks*: E. tereticornis, C. tessellaris.* **Shrub (S1) Very s**parse. Height range 1-2m; median height 1.5m. Co-dominant species: *Acacia melanoxylon, Lantana camara*.* **Groundcover:** Mid-dense. Height range 0.1-0.5m; median height 0.4m. Dominant species*: Lomandra longifolia,* grazed grasses.	
Q3	**Brief description:** Non-remnant eucalypt open forest/woodland. **Canopy (T1):** Mid-dense. Height range 8-10m; median height 9m. Dominant species: *Eucalyptus melanophloia*. **Sub-canopy (T2**): Very sparse. Height range 4-6m; median height 5m. Dominant species: *Eucalyptus melanophloia, Alphitonia excelsa.* **Shrub (S1)** Mid-dense. Height range 1.5-2m; median height 1.5m. Dominant species: *Lantana camara*.* **Groundcover:** Dense. Height range 0.4-1m; median height 1m. Co-dominant species*: Heteropogon contortus, Themeda triandra, Aristida spp.*	

Site	Habitat description	Representative photo
Q4	**Brief description:** Eucalypt open forest. **Canopy (T1):** Mid-dense. Height range 13-16m; median height 16m: *Eucalyptus melanophloia, Eucalyptus crebra, Corymbia tessellaris.* **Sub-canopy (T2):** Mid-dense. Height range 7-10m; median height 8m. *Eucalyptus melanophloia Corymbia tessellaris, Alphitonia excelsa, Eucalyptus crebra.* **Shrub (S1)** patchy. Height range 1.5-2m; median height 1.5m: *Lantana camara*, Eucalyptus melanophloia, Grewia latifolia.* **Groundcover:** Dense. Height range 0.1-1m; median height 1m *Heteropogon contortus Themeda triandra.*	
Q5	**Brief description:** regrowth. **Canopy (T1):** Mid-dense. Height range 9-11m; median height 9m. Co-dominant species: *Eucalyptus melanophloia, Corymbia tessellaris* **Sub-canopy (T2):** Very sparse. Height range 4-7m; median height 6m. Co-dominant species: *Eucalyptus melanophloia, Corymbia tessellaris Alphitonia excelsa.* **Shrub (S1)** Very sparse. Height range 1.5-2m; median height 2m. Dominant species: *Lantana camara*.* **Groundcover: D**ense. Height range 0.1-1m; median height 1m. Co-dominant species*: Heteropogon contortus, Themeda triandra, Sida cordifolia*	
Q6	**Brief description:** non-remnant regrowth. **Canopy (T1):** Mid-dense. Height range 9-11m; median height 10m. Dominant species: *Eucalyptus melanophloia, Eucalyptus crebra.* **Sub-canopy (T2): Sparse. Height range 4-6m; median height 5m. Dominant species:** *Eucalyptus melanophloia, Eucalyptus crebra, Alphitonia excelsa, Acacia maidenii, Opuntia tomentose*, Erythrina vespertilio,* **Shrub (S1)** Very sparse. Height range 1.5-2m; median height 2m. Dominant species: Lantana camara*. **Groundcover:** Dense. Height range 0.1-1m; median height 1m. Co-dominant species: *Heteropogon contortus, Themeda triandra, Sida cordifolia.*	No photo available
Q7	**Brief description:** Eucalypt open forest. **Canopy (T1):** Mid-dense. Height range 13-15mm; median height 13m. Co-dominant species: *Eucalyptus crebra, Eucalyptus melanophloia.* **Sub-canopy (T2):** Mid-dense. Height range 5-9m; median height 8m. Dominant species: *Eucalyptus crebra, Eucalyptus melanophloia, Alphitonia excelsa, Acacia disparrima.* **Shrub (S1)** Mid-dense. Height range 1.5-2m; median height 2m. Dominant species: *Lantana camara*, Alphitonia excelsa.* **Groundcover:** Dense. Height range 0.1-1m; median height 1m. Co-dominant species: *Heteropogon contortus, Sida cordifolia.*	

Site	Habitat description	Representative photo
Q8	**Brief description:** Eucalypt open forest **Canopy (T1):** Mid-dense. Height range 16-18m; median height 17m. Dominant species: *Eucalyptus crebra, Corymbia intermedia, Angophora subvelutina, Eucalyptus melanophloia.* **Sub-canopy (T2):** Very sparse. Height range 7-10m; median height 8m. Dominant species:, *Alphitonia excelsa, Acacia maidenii, Erythrina vespertilio.* **Shrub (S1)** patchy. Height range 1.5-2m; median height 2m. Dominant species: *Lantana camara*, Alphitonia excelsa.* **Groundcover:** Dense. Height range 0.1-1m; median height 1m. Co-dominant species: *Heteropogon contortus, Themeda triandra, Sida cordifolia.*	
Q9	**Brief description:** Eucalypt open forest **Canopy (T1):** Mid-dense. Height range 16-21m; median height 19m. Dominant species: *Eucalyptus crebra, Corymbia intermedia, Angophora subvelutina, Eucalyptus tereticornis.* **Sub-canopy (T2):** Sparse. Height range 9-11m; median height 9m. Dominant species:, *Eucalyptus tereticornis, Eucalyptus crebra, Eucalyptus melanophloia, Corymbia tessellaris.* **Shrub (S1)** Very sparse. Height range 1-2m; median height 2m. Dominant species: *Lantana camara*, Alphitonia excelsa.* **Groundcover:** Dense. Height range 0.5-1m; median height 1m. Co-dominant species: *Heteropogon contortus, Themeda triandra.*	
Q10	**Brief description:** Eucalypt open forest **Canopy (T1):** Mid-dense. Height range 9-12m; median height 12m. Dominant species: *Eucalyptus crebra, Corymbia tessellaris, Eucalyptus tereticornis.* **Sub-canopy (T2):** Very sparse. Height range 4-5m; median height 4m. Dominant species: *Eucalyptus crebra, Acacia maidenii.* **Shrub (S1)** Very sparse. Height range 0.5-1m; median height 1m. Dominant species: *Lantana camara*.* **Groundcover:** Dense. Height range 0.1-0.5m; median height 0.5m. Co-dominant species: *Heteropogon contortus, Themeda triandra.*	
Q11	**Brief description:** non-remnant (small patch) eucalypt open forest. **Canopy (T1):** Mid-dense. Height range 14-16m; median height 16m. Dominant species: *Eucalyptus crebra.* **Sub-canopy (T2):** Very sparse. Height range 5-6m; median height 6m. Dominant species: *Alphitonia excelsa, Acacia disparrima.* **Shrub (S1)** Very sparse. Height range 1-2m; median height 1m. Dominant species: *Lantana camara*.* **Groundcover:** Mid-dense. Height range 0.1-0.5m; median height 0.3m. Co-dominant species: grazed grasses, *Chrysocephalum apiculatum, Verbena aristigera**	

Site	Habitat description	Representative photo
Q12	**Brief description:** regrowth. **Canopy (T1):** Sparse. Height range 10-15m; median height 14m. Co-dominant species: *Eucalyptus tereticornis, E. crebra.* Associated species: *Angophora subvelutina.* **Sub-canopy (T2):** Sparse. Height range 5-9m; median height 8m. Dominant species: *C. tessellaris Associated* species: *E. crebra.* **Shrub (S1)** Very sparse. Height range 0.5-1m; median height 0.5m. Dominant species: *C. tessellaris Associated* species: *Gomphocarpus physocarpus*.* **Groundcover:** Mid-dense. Height range 0.1-0.4m; median height 0.2m. Dominant species*: Themeda triandra, Chrysocephalum apiculatum, Verbena aristigera*, Dianella cerulea, Senecio madagascariensis*.* **Koala scats detected**	
Q13	**Brief description:** Eucalypt open woodland on floodplain. **Canopy (T1):** Very sparse. Height range 15-17m; median height 15m. Dominant species: *Eucalyptus tereticornis.* **Sub-canopy (T2):** Very sparse. Height range 4-8m; median height 7m. Dominant species: *Corymbia tessellaris, E. tereticornis, E. crebra. .* **Shrub (S1)** Very sparse. Height range 0.4-1m; median height 0.4m. Co-dominant species: eucalypt saplings. **Groundcover:** Dense. Height range 0.1-0.4m; median height 0.3m. Dominant species*: Themeda triandra, Chrysocephalum apiculatum, Verbena aristigera*, Dianella cerulea, Senecio madagascariensis*.* **Koala scats detected** **Hollows present in older trees**	
Q14	**Brief description:** Eucalypt open woodland on floodplain. **Canopy (T1):** Sparse. Height range 25-35m; median height 25m. Dominant species: *Eucalyptus tereticornis, E. crebra.* **Sub-canopy (T2):** Very sparse. Height range 6-11m; median height 7m. Dominant species: *E. tereticornis, Corymbia tessellaris, E. crebra.* **Shrub (S1)** absent **Groundcover:** Dense. Height range 0.1-0.4m; median height 0.3m. Dominant species*: Imperata cylindrica,* grazed grasses. **Koala scats detected** **Hollows present in older trees**	

Site	Habitat description	Representative photo
Q15	**Brief description:** non-remnant regrowth **Canopy (T1):** Mid-dense. Height range 12-16m; median height 15m. Co-dominant species: *Eucalyptus tereticornis, E. crebra.* **Sub-canopy (T2):** Very sparse. Height range 7-10m; median height 7m. Co-dominant species: *C. tessellaris, E. crebra.* **Shrub (S1)** absent **Groundcover:** Dense. Height range 0.1-0.4m; median height 0.3m. Dominant species*:*, grazed grasses, *Senecio madagascariensis*.*	
Q16	**Brief description:** non-remnant regrowth **Canopy (T1):** Sparse. Height range 15-17m; median height 16m. Co-dominant species: *Eucalyptus tereticornis, E. crebra.* **Sub-canopy (T2):** Sparse. Height range 7-13m; median height 10m. Co-dominant species: *C. tessellaris, E. crebra, E. melanophloia.* **Shrub (S1)** absent **Groundcover:** Dense. Height range 0.1-0.4m; median height 0.3m. Dominant species*:* grazed grasses, *Senecio madagascariensis*.* **Koala scats detected** **Hollows present in older trees**	
Q17	**Brief description:** non-remnant regrowth **Canopy (T1):** Mid-dense. Height range 10-13m; median height 10m. Co-dominant species: *Eucalyptus tereticornis, C. tessellaris, E. crebra.* **Sub-canopy (T2):** Very sparse. Height range 5-8m; median height 6m. Co-dominant species: *C. tessellaris, E. crebra.* **Shrub (S1)** absent **Groundcover:** Dense. Height range 0.1-0.4m; median height 0.3m. Dominant species*:*, grazed grasses, *Senecio madagascariensis*.* **Koala scats detected**	
Q18	**Brief description:** Narrow strip of riparian vegetation. **Canopy (T1):** Very sparse. Height range 15-30m; median height 20m. Dominant species: *Eucalyptus tereticornis.* Suppressed species: *Corymbia tessellaris.* **Sub-canopy (T2):** Dense. Height range 6-10m; median height 10m. Dominant species: *Tristaniopsis laurina, Casuarina cunninghamiana, Callistemon viminalis.* **Shrub (S1)** Very sparse. Height range 1-2m; median height 1.5m. Co-dominant species: *Lantana camara*, Tristaniopsis laurina, Maclura cochinchinensis.* **Groundcover:** Sparse. Height range 0.1-0.5m; median height 0.5m. Dominant species*:* heavily grazed grasses, *Lomandra longifolia* **Koala scats detected** **Hollows present in older trees**	

Site	Habitat description	Representative photo
Q19	**Brief description:** non-remnant copse of semi-mature eucalypts. **Canopy (T1):** Sparse. Height range 10-16m; median height 10m. Dominant species: *Eucalyptus tereticornis, Eucalyptus melanophloia.* Associated species: *Eucalyptus crebra.* **Sub-canopy (T2):** n/a **Shrub (S1)** Very sparse. Height range 1-3m; median height 3m. Dominant species: *Lantana camara** **Groundcover:** Very sparse. Height range 0.1-0.3m; median height 0.1m. Dominant species*:* heavily grazed grasses **Koala scats detected**	
Q20	**Brief description:** non-remnant copse of semi-mature eucalypts, with one large emergent. **Emergent (E):** Very sparse. Height 16m. Dominant species: *Eucalyptus crebra.* **Canopy (T1):** Dense. Height range 7-9m; median height 9m. Dominant species: *Eucalyptus crebra.* Associated species: *Corymbia tessellaris, Eucalyptus melanophloia* Suppressed species: *Eucalyptus tereticornis* **Sub-canopy (T2):** n/a **Shrub (S1)** n/a **Groundcover:** Very sparse. Height range 0.1-0.3m; median height 0.1m. Dominant species*:* heavily grazed grasses **Koala scats detected**	
Q21	**Brief description:** non-remnant copse of semi-mature eucalypts mid-slope on hillside. **Canopy (T1):** Mid-dense. Height range 6-11m; median height 9m. Dominant species: *Eucalyptus melanophloia.* Suppressed species: *Corymbia tessellaris* **Sub-canopy (T2):** n/a **Shrub (S1)** Very sparse. Height range 1-2m; median height 1m. Dominant species: *Lantana camara** **Groundcover:** Very sparse. Height range 0.1-0.4m; median height 0.3m. Dominant species*:* heavily grazed grasses, *Aristida spp. Sida cordifolia*.*	
Q22	**Brief description:** non-remnant copse of semi-mature eucalypts lower slope of hillside. **Canopy (T1):** Mid-dense/dense. Height range 9-16m; median height 14m. Dominant species: *Eucalyptus melanophloia.* Associated species: *Eucalyptus tereticornis* Suppressed species: *Corymbia tessellaris* **Sub-canopy (T2):** Very sparse. Height range 5-7m; median height 6m. Dominant species: *Corymbia tessellaris.* **Shrub (S1)** n/a **Groundcover:** Very sparse. Height range 0.1-0.2m; median height 0.1m. Dominant species*:* heavily grazed grasses, **Koala scats detected**	

Site	Habitat description	Representative photo
Q23	**Brief description:** Vegetated gully. **Canopy (T1):** Mid-dense/sparse. Height range 13-17m; median height 16m. Dominant species: *Eucalyptus tereticornis.* Associated species: *Corymbia tessellaris* Suppressed species: *Angophora subvelutina*, *Eucalyptus melanophloia* (edges only) **Sub-canopy (T2):** Very sparse. Height range 4-6m; median height 5m. Dominant species: *Corymbia tessellaris, Acacia disparrima.* **Shrub (S1)** Very sparse. Height range 1-2m; median height 1m. Dominant species: *Lantana camara*.* **Groundcover:** Mid-dense. Height range 0.1-0.5m; median height 0.2m. Dominant species*:* heavily grazed grasses Associated species: *Plectranthus parviflorus, Aristida spp., Senecio madagascariensis*.* **Koala scats detected**	
Q24	**Brief description:** non-remnant copse of mature and semi-mature eucalypts, lower slope of hillside. **Canopy (T1):** Mid-dense/sparse. Height range 20-30m; median height 20m. Dominant species: *Eucalyptus crebra.* Associated species: *Eucalyptus tereticornis* **Sub-canopy (T2):** Sparse. Height range 3-9m; median height 6m. Dominant species: *Corymbia tessellaris, E. crebra, Eucalyptus melanophloia.* **Shrub (S1)** Very sparse. Height range 0.5-1m; median height 1m. Dominant species: *Lantana camara*.* **Groundcover:** Very sparse. Height range 0.1-0.2m; median height 0.1m. Dominant species*:* heavily grazed grasses,	
Q25	**Brief description:** Copse of mature eucalypts, lower slope of hillside. **Canopy (T1):** Mid-dense. Height range 20-25m; median height 25m. Dominant species: *Eucalyptus tereticornis.* Associated species: *Corymbia tessellaris.* Suppressed species: *Eucalyptus crebra.* **Sub-canopy (T2):** Very sparse. Height range 6-10m; median height 8m. Dominant species: *E. tereticornis Corymbia tessellaris, E. crebra..* **Shrub (S1)** Very sparse. Height range 0.5-1m; median height 0.5m. Dominant species: *Lantana camara*.* **Groundcover:** Sparse. Height range 0.1-0.3m; median height 0.2m. Dominant species*:* heavily grazed grasses, *Aristida* spp. **Koala scats detected**	

Site	Habitat description	Representative photo
Q26	**Brief description:** Open, grazed valley dominated by very large, old Eucalypts. **Canopy (T1):** Very sparse. Height range 15-30m; median height 20m. Dominant species: *Eucalyptus tereticornis* (valley). Associated species: *Corymbia tessellaris, Eucalyptus crebra* (lower slopes of adjoining hillside) **Sub-canopy (T2):** Very sparse. Height range 6-11m; median height 8m. Dominant species: *E. tereticornis Corymbia tessellaris.* **Shrub (S1)** Very sparse. Height range 0.5-1m; median height 0.5m. Dominant species: *Lantana camara*.* **Groundcover:** Mid-dense. Height range 0.1-0.4m; median height 0.1m. Dominant species*:* heavily grazed grasses, *Imperata cylindrica*. **Koala scats detected** **Hollows present in older trees**	
Q27	**Brief description:** Eucalypt open forest on lower slopes of hillside. Upper slopes of adjoining hillside dominated by dense *Dodonaea triquetra.* **Canopy (T1):** Mid-dense/dense. Height range 15-20m; median height 18m. Dominant species: *Angophora subvelutina*. Suppressed species: *Eucalyptus tereticornis, Eucalyptus melanophloia.* **Sub-canopy (T2):** Very sparse. Height range 7-10m; median height 9m. Dominant species: *Angophora subvelutina.* **Shrub (S1)** Mid-dense. Height range 1-2m; median height 01m. Dominant species: *Lantana camara*, Xanthorrhoea johnsonii.* **Groundcover:** Mid-dense. Height range 0.1-0.5m; median height 0.2m. Dominant species*:* heavily grazed grasses.	
Q28	**Brief description:** non-remnant semi-mature eucalypts. **Canopy (T1):** Sparse. Height range 12-18m; median height 14m. Dominant species: *Eucalyptus crebra, Corymbia tessellaris.* Suppressed species: *Corymbia intermedia, Eucalyptus tereticornis.* **Sub-canopy (T2):** Sparse. Height range 6-10m; median height 6m. Dominant species: *Corymbia tessellaris, E. crebra.* **Shrub (S1)** Very sparse. Height range 1-2m; median height 1m. Dominant species: *E. crebra, C. tessellaris.* **Groundcover:** Very sparse. Height range 0.1-0.2m; median height 0.1m. Dominant species*:* heavily grazed grasses. **Koala scats detected**	

Site	Habitat description	Representative photo
Q29	**Brief description:** non-remnant copse of mature and semi-mature eucalypts, lower slope of hillside. **Canopy (T1):** Mid-dense/sparse. Height range 16-20m; median height 17m. Dominant species: *Eucalyptus crebra, Corymbia tessellaris.* Associated species: *Eucalyptus tereticornis* **Sub-canopy (T2):** Sparse. Height range 1-5m; median height 5m. Dominant species: *Eucalyptus crebra, Corymbia tessellaris.* Associated species: *Eucalyptus tereticornis* **Shrub (S1)** n/a **Groundcover:** Very sparse. Height range 0.1-0.2m; median height 0.1m. Dominant species*:* heavily grazed grasses, **Koala scats detected**	

Site	Habitat description	Representative photo
Access Road		
Q1	**Brief description:** RE12.8.16. **Canopy (T1):** Mid-dense/sparse. Height range 18-22m; median height 20m: *Eucalyptus crebra*. **Sub-canopy (T2**): Very sparse. Height range 8-12m; median height 10m. Dominant species: *Eucalyptus crebra, Corymbia tessellaris.* **Shrub (S1)** Very sparse. Height range 1-2m; median height 1m. *Eucalyptus crebra* **Groundcover:** Mid-dense. Height range 0-1m; median height 1m: grazed grasses.	
Q2	**Brief description:** RE12.9-10.7. **Canopy (T1):** Mid-dense/sparse. Height range 14-22m; median height 20m. Dominant species: *Eucalyptus crebra* Associated species: *Eucalyptus melanophloia.* **Sub-canopy (T2**): Very sparse. Height range 4-8m; median height 4m. Dominant species: *Petalostigma pubescens,* Associated species: *Eucalyptus crebra.* **Shrub (S1)** Very sparse. Height range 0.5-1m; median height 0.5m. Dominant species: *Lantana camara*.* **Groundcover:** Mid-dense. Height range 0.1-0.5m; median height 0.4m. Dominant species*: Heteropogon contortus,* grazed grasses.	
Q3	**Brief description:** RE12.9-10.7. **Canopy (T1):** Mid-dense/sparse. Height range 20-30m; median height 25m. Dominant species: *Eucalyptus crebra* Associated species: *Eucalyptus melanophloia, Eucalyptus tereticornis, Corymbia tessellaris.* **Sub-canopy (T2**): Very sparse. Height range 6-11m; median height 8m. Dominant species: *Eucalyptus melanophloia, Corymbia tessellaris.* **Shrub (S1)** Very sparse. Height range 0.5-1m; median height 0.5m. Dominant species: *Lantana camara*.* **Groundcover:** Dense. Height range 0.1-0.5m; median height 1m. Dominant species*: Heteropogon contortus.* **Koala scats detected**	

Site	Habitat description	Representative photo
Q4	**Brief description:** RE12.9-10.7. **Canopy (T1):** Mid-dense/sparse. Height range 25-30m; median height 25m. Dominant species: *Eucalyptus tereticornis, Eucalyptus crebra* **Sub-canopy (T2**): Mid-dense/sparse. Height range 7-15m; median height 12m. Dominant species: *Corymbia tessellaris.* Associated species: *Celtis sinensis** **Shrub (S1)** nil **Groundcover:** Dense. Height range 0.1-0.5m; median height 1m. Dominant species*: Heteropogon contortus.* **Koala scats detected**	
Q5	**Brief description:** non-remnant, ephemeral watercourse. **Canopy (T1):** Sparse. Height range 18-22m; median height 18m. Dominant species: *Eucalyptus tereticornis,* Associated species: *Eucalyptus crebra* **Sub-canopy (T2**): Very sparse. Height range 9-15m; median height 11m. Dominant species: *Corymbia tessellaris.* Associated species: *Eucalyptus crebra* **Shrub (S1)** nil **Groundcover:** Dense. Height range 0.1-0.5m; median height 1m. Dominant species*: Heteropogon contortus.* **Koala scats detected**	
Q6	**Brief description:** non-remnant, lower lying floodplain. **Canopy (T1):** Sparse. Height range 18-22m; median height 18m. Dominant species: *Eucalyptus tereticornis,* Associated species: *Eucalyptus melanophloia* **Sub-canopy (T2**): Sparse. Height range 9-14m; median height 11m. Dominant species: *Corymbia tessellaris.* Associated species: *Eucalyptus melanophloia* **Shrub (S1)** nil **Groundcover:** Mid-dense. Height range 0.1-0.5m; median height 1m. Dominant species*: Heteropogon contortus, grazed grasses.* **Koala scats detected**	

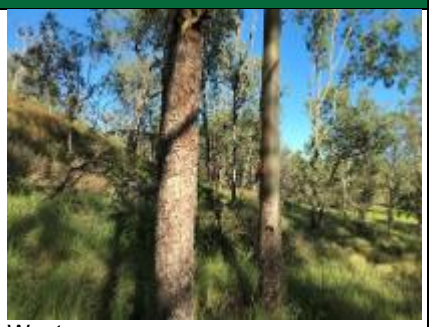
Site	Habitat description	Representative photo
Q7	**Brief description:** RE12.9-10.7. **Canopy (T1):** Mid-dense. Height range 20-25m; median height 25m. Dominant species: *Eucalyptus crebra* **Sub-canopy (T2**): Very sparse. Height range 8-12m; median height 9m. Dominant species: *Corymbia tessellaris.* **Shrub (S1)** nil **Groundcover:** Mid-dense. Height range 0.1-0.5m; median height 1m. Dominant species*: Heteropogon contortus,* grazed grasses.	
Quarry site		
Q8a	**Brief description:** Non-remnant watercourse fringing vegetation **Canopy (T1):** Mid-dense. Height range 20-25m; median height 25m. Dominant species: *Eucalyptus tereticornis.* **Sub-canopy (T2):** Mid-dense/dense. Height range 7-12m; median height 9m. *Tristaniopsis laurina, Casuarina cunninghamiana, Callistemon viminalis.* **Shrub (S1)** nil **Groundcover:** Sparse. Height range 0.1-0.5m; median height 0.5m. Dominant species*:* heavily grazed grasses, *Lomandra longifolia.*	
Quarry site 16 December additional points		
Q9a	**Brief description:** Non-remnant vegetation adjacent to watercourse **Canopy (T1):** Mid-dense/sparse. Height range 20-30m; median height 30m. Dominant species: *Eucalyptus tereticornis, Eucalyptus melanophloia.* **Sub-canopy (T2):** Mid-dense/sparse. Height range 10-16m; median height 15m. *Corymbia tessellaris, Angophora subvelutina.* **Shrub (S1)** Very sparse. Height range 1.5-2m; median height 1m. Dominant species: *Lantana camara*, Gomphocarpus physocarpus*, Eucalyptus melanophloia.* **Groundcover:** Dense. Height range 0.1-0.5m; median height 0.5m. Dominant species*: Heteropogon contortus,* grazed grasses. **Koala scats detected**	

Site	Habitat description	Representative photo
Q1a	**Brief description:** Eucalypt open forest – non-remnant **Canopy (T1):** Very sparse. Height range 16-25m; median height 25m. Dominant species: *Eucalyptus crebra.* **Sub-canopy (T2):** Mid-dense. Height range 8-12m; median height 10m. Dominant species: *Corymbia tessellaris, Eucalyptus crebra* **Shrub (S1)** nil **Groundcover:** Dense. Height range 0.1-1m; median height 1m. Dominant species: *Heteropogon contortus.*	

APPENDIX 6

BioCondition Site Assessment Results

Site/ AU	Representative Photograph	
BC1 AU1	 North	 East
	 South	 West
BC2 AU1	 North	 East
	 South	 West
BC3 AU2	 North	 East

Site/ AU	Representative Photograph	
BC3 AU2 cont.	 South	 West
BC4 AU2	 North	 East
	 South	 West
BC5 AU2	 North	 East
	 South	 West

Site/ AU	Representative Photograph	
BC6 AU2	 North	 East
	 South	 West
BC7 AU3	 North	 East
	 South	 West
BC7 AU4		

Site/ AU	Representative Photograph	
BC8 AU5	 North	 East
	 South	 West
BC9 AU5	 North	 East
	 South	 West
BC10 AU6	 North	 East

Site/ AU	Representative Photograph	
	 South	 West
BC11 AU6	 North	 East
	 South	 West
BC12 Au6	 North	 East
	 South	 West

Site/ AU	Representative Photograph	
BC13 AU6	 North	 East
BC13 AU6	 South	 West

BIOCONDITION SITE ASSESSMENT DATASHEET

Queensland Government

OFFICE USE ONLY
Entered:
Checked:
Corrected:

Site ID: BC1
DATE: 30 / 3 / 2021
BioCon survey number:
OBSERVERS: JC ST

50m transect due to lantana access issues

SITE INFORMATION

General habitat survey number:

LOCATION: (GPS reference) Bioregion:

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: Location derivation:

Road: zone: easting: northing: Plot Centre Direction: m at degrees

Plot Origin: zone: easting: northing: Accuracy:

Plot Centre zone: easting: northing: Accuracy:

Plot bearing: Plot alignment description:

Locality description (include tenure and reserve number):

REGIONAL ECOSYSTEM AND TREE HEIGHTS:

Habitat Description: CRE open forest over heavily infested lantana south facing slope. Huge canopy dieback due to drought in 2020. C=3 S=

Regional Ecosystem: 12-8-17 Tree Canopy (EDL*) height: 12 Tree subcanopy and/or emergent ht: S: 5 E:

SITE PHOTOS: (Photo Numbers) Plot centre: North ✓ South ✓ East ✓ West ✓

Landscape photo(s): Spot photo(s):

50 x 20m area: (NB: All logs >10cm, >0.5m within 50 x 20m area measured to the plot boundary)

Coarse woody debris:

Length: 44.23m (50m)

Site Total:
Per ha Total: 442

100 x 50m area: (NB: *Ecologically Dominant Layer. Tree defined as single stemmed over 2m. All tree species in the 100 x 50m (not just EDL species)

Total native tree spp richness:

Alph
Cre C ✓
Batwing loral C ✓
Dodonea
Mel C

Total: 5

Proportion of dominant canopy (EDL) species with evidence of recruitment: 50 %

50 x 10m area: Native Plant Spp Richness: (NB: List species if known or count if unknown. Shrub is defined as single stemmed below 2m or multi-stemmed from base or below 20cm)

		Total
Shrub spp. richness:	Alph, Batwing Coral, Sida sp.	3
Grass spp. richness:	Hetero, Panicum, Aristida, Cyperus, Entolasia, Red Barnyard.	6
Forbs and others spp. richness:	Brachyscome, Cheilanthes, Yellow Sida sp., Glycine 1, Glycine 2, Yellow fl, Herb 1, Bomandra, Oxalis, Chrysto. (Mistletoe ?)	10
Non-native plant cover (%):	80% (Lantana)	80 %

BCIE
N, E, S, W

BIOCONDITION SITE ASSESSMENT DATASHEET cont...

Five 1 x 1m plots: *attributes are essential to assess as used in scoring, however assessment of all attributes improves your ability to more accurately visualise proportions of each of the attributes.

Native other grass (if relevant)*							20
Native forbs and other species (non-grass)							
Native shrubs (<1m in height)							
Non-native grass			30				6
Non-native forbs and shrubs	100	20	30	90	20		5
Rock					20		4
Bare ground					60		12
Cryptograms							
Total	100%	100%	100%	100%	100%	100	

100 x 50m area: *from benchmark doc.
Eucalypt large tree DBH*: 38
Non-eucalypt large tree DBH*:
No. of large eucalypt trees: 5 - all dead
50 x 50 m area
No. of large non-eucalypt trees:
Total large trees: 0

100m transect:
Tree Canopy Cover: (Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present *If trees are in the same layer and continuous along the transect you can group them)

50m (double to extrapolate)

C	6-8	2	5	2	2						
				41-38	3						
				38-34	4						
				28-23	5						
				22-20	2						
				18-17	1						
				15-14	1						
									C =	0	
					18				S =	5	
										Total C:	4
										Total S:	36
										Total E:	

Shrub Canopy Cover: * denote as native or exotic. Only native shrub cover is used in the scoring.

E	50-46	4													
	45-34	11													
	29-28	1													
	23-19	4													
	13-12	1													
	8-0	8													
		29												Total native:	0
														Total exotic:	58

BIOCONDITION SITE ASSESSMENT DATASHEET

Queensland Government

OFFICE USE ONLY
Entered:
Checked:
Corrected:

Site ID: BC2 N, E, S, W
DATE: 30/3/2021 BioCon survey number:
OBSERVERS: ST, JC

SITE INFORMATION

General habitat survey number:

LOCATION: (GPS reference) Bioregion:

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: Location derivation:

Road: zone: easting: northing: Plot Centre Direction: m at degrees

Plot Origin: zone: easting: northing: Accuracy:

Plot Centre zone: easting: northing: Accuracy:

Plot bearing: Plot alignment description:

Locality description (include tenure and reserve number):

REGIONAL ECOSYSTEM AND TREE HEIGHTS:

Habitat Description: Eucalypt open forest on south facing slope
Exotics dominate U/S grass + shrub layer
C= S=

Regional Ecosystem: 12.8.17 Tree Canopy (EDL*) height: 20 Tree subcanopy and/or emergent ht: S: 10 E:

SITE PHOTOS: (Photo Numbers) Plot centre: North ☐ South ✓ East ✓ West ✓

Landscape photo(s): Spot photo(s):

50 x 20m area: (NB: All logs >10cm, >0.5m within 50 x 20m area measured to the plot boundary)

Coarse woody debris:

Length:
27.05
(270.5)
Site Total:
Per ha Total: 271

100 x 50m area: (NB: *Ecologically Dominant Layer. Tree defined as single stemmed over 2m. All tree species in the 100 x 50m (not just EDL species)

Total native tree spp richness:

CLE c ✓ Petalostig
Alph Coral Bean
Acacia 1 Mel ✓
Acacia 2
Stringy c ✓
Dodonaea Total: 9

Proportion of dominant canopy (EDL) species with evidence of recruitment: 100 %

50 x 10m area: Native Plant Spp Richness: (NB: List species if known or count if unknown. Shrub is defined as single stemmed below 2m or multi-stemmed from base or below 20cm)

		Total
Shrub spp. richness:	Acacia, Breynia, Grevia, Dodonaea, Sida sbs, Sida cord	6
Grass spp. richness:	Hetero, ~~Brachyseme~~ Panicum, Cyperus, Aristida, Cyperus 2, Red Barnyard	6
Forbs and others spp. richness:	Dodonea, Merthes, Glycine l, Breynia, ~~Yellow Sida~~ Small yellow, Eustephus, Oxalis, Hardenbergia, Lobmandra, Chrysanthem, ~~Brachyseme~~ Brachyotum Purple Portlaca, Blue Flower, Fabaceae yell, Onosto.	16
Non-native plant cover (%):	30 Lantana, forbs	30 %

BC2.

BIOCONDITION SITE ASSESSMENT DATASHEET cont...

Five 1 x 1m plots: *attributes are essential to assess as used in scoring, however assessment of all attributes improves your ability to more accurately visualise proportions of each of the attributes.

[illegible] cover	50	50	40	40			3
Native other grass (if relevant)*							
Native forbs and other species (non-grass)	20		30	10	40		2
Native shrubs (<1m in height)							
Non-native grass							
Non-native forbs and shrubs	20	50	30	50	50		4
Rock							
Bare ground							
Cryptograms					10		2
Total	100%	100%	100%	100%	100%	100	

100 x 50m area: *from benchmark doc.

Eucalypt large tree DBH*: 38

Non-eucalypt large tree DBH*: .....

No. of large eucalypt trees: 15

No. of large non-eucalypt trees: .....

Total large trees: 30

100m transect:

Tree Canopy Cover: (Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present *If trees are in the same layer and continuous along the transect you can group them)

S	88-84	4	C	99-94	5							
	30-27	3		79-70	9							
	4	4		64-54	10							
				48-39	9							
				37-31	6							
				22-11	11							
										C=5		
										S=		
											Total C:	50
											Total S:	11
											Total E:	

Shrub Canopy Cover: * denote as native or exotic. Only native shrub cover is used in the scoring.

N	2		E	98-94	4									
				3	3									
				76-73	3									
				71-67	4									
				3	3									
				48-46	2									
				49-51	2									
													Total native:	2
													Total exotic:	21

BIOCONDITION SITE ASSESSMENT DATASHEET

Queensland Government

OFFICE USE ONLY
Entered:
Checked:
Corrected:

Site ID: BC3
DATE: 31 / 3 / 2021 BioCon survey number:
OBSERVERS: JC ST.

SITE INFORMATION

General habitat survey number:

LOCATION: (GPS reference) Bioregion: 12

Datum: ☐ AGD84 ☑ GDA94 (WGS84) OTHER: Location derivation:

Road: zone: easting: northing: Plot Centre Direction: m at degrees

Plot Origin: zone: easting: northing: Accuracy:

Plot Centre zone: easting: northing: Accuracy:

Plot bearing: Plot alignment description:

Locality description (include tenure and reserve number):

REGIONAL ECOSYSTEM AND TREE HEIGHTS:

Habitat Description: Mel, Cle, Tess open forest on north facing rocky slope with grassy understorey

Regional Ecosystem: 12.8.17 Tree Canopy (EDL*) height: 17 Tree subcanopy and/or emergent ht: S: 9 E:

SITE PHOTOS: (Photo Numbers) Plot centre: North ✓ South ✓ East ✓ West ✓

Landscape photo(s): Spot photo(s):

50 x 20m area:

Coarse woody debris: (NB: All logs >10cm, >0.5m within 50 x 20m area measured to the plot boundary)

Length: 26.5

Site Total: 265
Per ha Total:

100 x 50m area:

Total native tree spp richness: (NB: *Ecologically Dominant Layer. Tree defined as single stemmed over 2m. All tree species in the 100 x 50m (not just EDL species)

PBW FRG
Tess cv
Cre cv
Mel cv
Acacia
Alphitonia

Total: 7

Proportion of dominant canopy (EDL) species with evidence of recruitment: 100 %

50 x 10m area: Native Plant Spp Richness: (NB: List species if known or count if unknown. Shrub is defined as single stemmed below 2m or multi-stemmed from base or below 20cm)

		Total
Shrub spp. richness:	Sida substicata, Grewia, Sida 2, Alph. Tess	5
Grass spp. richness:	Aristida, Cypens, ~~H.A.~~, Heteropogon, Cypens2, Barnyard, Cypens 3, O. Panicum,	7
Forbs and others spp. richness:	Glycine, Glycine 2, Native lobbers, Emilia, WApple, YButtons, Desmodium, Flemingea, Cheilanthes, Lomandra, Sida woody, Herb 1, Christo.	13
Non-native plant cover (%):	5% (forbs + shrubs)	

BC3
NESW

BIOCONDITION SITE ASSESSMENT DATASHEET cont...

Five 1 x 1m plots: *attributes are essential to assess as used in scoring, however assessment of all attributes improves your ability to more accurately visualise proportions of each of the attributes.

Native other grass (if relevant)*					1	
Native forbs and other species (non-grass)						
Native shrubs (<1m in height)	20					
Non-native grass						
Non-native forbs and shrubs						
Rock		10			10	
Bare ground						
Cryptograms						
Total	100%	100%	100%	100%	100%	100

100 x 50m area: *from benchmark doc.
Eucalypt large tree DBH*: 38
Non-eucalypt large tree DBH*:
No. of large eucalypt trees: 2
No. of large non-eucalypt trees:
Total large trees: 4

100m transect:
Tree Canopy Cover: (Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present *If trees are in the same layer and continuous along the transect you can group them)

C	0-3	3	S	2-4	2							
	8-15	7	S	5-9	4							
	17-26	9	S	15-16	1							
	43-55	12		28-35	7							
	57-62	5		1	1							
	68-72	4										
	75-77	2										
		42								S	Total C:	42
										S	Total S:	15
											Total E:	1

Shrub Canopy Cover: * denote as native or exotic. Only native shrub cover is used in the scoring.

N	1		E	0.5											
	1														
	1														
	1														
														Total native:	4
														Total exotic:	0.5

BC 4 RE 12.8.17 30/3/2021 ST, JC

Habitat Description: FRG, CRE, MEL non rem open forest with grazed grassy understorey

EDL Height: 17 S Subcanopy Height: 9 S

Spot Photos ✓ BC4 NESW

Coarse Woody 17.4 (174) Per ha ~~total~~ (174)

Total Native Trees (4)
Species: FRG c ✓ Tess
CRE c ✓
MEL c ✓
Recruitment: ~~100~~ % (75)

large trees
DBH: 38.
Total: 2 (4)

Native Sp Richness:

Shrub (3)
Sida sub. ere
Sida cordi

Grass (8)
Meteorop
Aristida.
Panicum
Cymbo
Cyperus
Fimbristylis.
R. laevet
Cyperus 2

Forbs / Other (20)
Lily Crinum
Cheilanthes
Portulaca
Spathoden.
Dianella
Bindweed.
Fabaceae
Glycine l
Emilia
Herb 3
Deomodium.
Purple herb
Menthes
Yellow flower
Yellow Buttons
Small purple
Small yellow 2 (pic)
Cheilanthes
W Apple Chenopo

Non native cover: <5% (~~forbs~~)

Canopy cover:

Plots

1 Exotic Forb 30
Native Grass (30)
Litter (40)
Grass = (33)

2 Native G (60)
Native F 15
Bare 15
Litter (10)

3 Native G (70)
Bare 10
Litter (10)
N Forb 10
Litter = (34)

4 Bare 50
Litter (50)

5 Bare 50
N Grass (5)
N Forbs 5
Litter (40)

Canopy (5)

2.5 - 12.	9.5
18 - 30.	12
43 - 49	6
73 - 87	14
93 - 100	7

(48.5)

Sub-canopy (2)

0.5
88 - 92 (55)
1

Native Shrub 0.5 + (0.5)

Exotic Shrub (0)

BIOCONDITION SITE ASSESSMENT DATASHEET

Queensland Government

OFFICE USE ONLY
Entered:
Checked:
Corrected:

Site ID: BC5 N, E, S, W
DATE: 30 / 3 / 2021 BioCon survey number:
OBSERVERS: ST, JC.

SITE INFORMATION

General habitat survey number:

LOCATION: (GPS reference) Bioregion:

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: Location derivation:

Road: zone: easting: northing: Plot Centre Direction: m at degrees

Plot Origin: zone: easting: northing: Accuracy:

Plot Centre zone: easting: northing: Accuracy:

Plot bearing: Plot alignment description:

Locality description (include tenure and reserve number):

REGIONAL ECOSYSTEM AND TREE HEIGHTS:

Habitat Description: Cobra open woodland (non-rem) over grassy (native) understorey.

Regional Ecosystem: 12.8.17 Tree Canopy (EDL*) height: 15 Tree subcanopy and/or emergent ht: 8 S: E:

SITE PHOTOS: (Photo Numbers) Plot centre: North ✓ South ✓ East ✓ West ✓

Landscape photo(s): Spot photo(s):

50 x 20m area: (NB: All logs >10cm, >0.5m within 50 x 20m area measured to the plot boundary)

Coarse woody debris:

Length: 27.9m

Site Total:
Per ha Total: 270/m

100 x 50m area: (NB: *Ecologically Dominant Layer. Tree defined as single stemmed over 2m. All tree species in the 100 x 50m (not just EDL species))

Total native tree spp richness:

MEL
CRE ✓

Total: 2

Proportion of dominant canopy (EDL) species with evidence of recruitment: 50 %

50 x 10m area: Native Plant Spp Richness: (NB: List species if known or count if unknown. Shrub is defined as single stemmed below 2m or multi-stemmed from base or below 20cm)

		Total
Shrub spp. richness:	CRE, Sida sub	2
Grass spp. richness:	Themeda, Heteropogon, Lovegrass, Comets,	4
Forbs and others spp. richness:	Sida check?, Bindweed, Yellow B, Yellow F, NMint, PortWash, Cyperus, Cyperus 2, Glycine, Cheilanthes, Murdannia, Clitoria 2, Clitoria 3, Commelina, Alph, Chamto, Pimelea, Brachycoma,	17
Non-native plant cover (%):	1% forbs only	1 %

BC5

BIOCONDITION SITE ASSESSMENT DATASHEET cont...

Five 1 x 1m plots: *attributes are essential to assess as used in scoring, however assessment of all attributes improves your ability to more accurately visualise proportions of each of the attributes.

Native other grass (if relevant)*						
Native forbs and other species (non-grass)						
Native shrubs (<1m in height)						
Non-native grass						
Non-native forbs and shrubs						
Rock						
Bare ground		20			10	
Cryptograms						
Total	100%	100%	100%	100%	100%	100%

100 x 50m area: *from benchmark doc.

Eucalypt large tree DBH*: 38

Non-eucalypt large tree DBH*: —

No. of large eucalypt trees: 3

No. of large non-eucalypt trees:

Total large trees: 6

100m transect:

Tree Canopy Cover: (Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present *If trees are in the same layer and continuous along the transect you can group them)

C	0–4	4	S	48–55	7						
C	14–24	10	S	72–78	6						
									2 S	Total C: 14 Total S: 13 Total E: 1	

Shrub Canopy Cover: * denote as native or exotic. Only native shrub cover is used in the scoring.

														Total native: 0 Total exotic: 0	

BIOCONDITION SITE ASSESSMENT DATASHEET

Queensland Government

OFFICE USE ONLY
Entered:
Checked:
Corrected:

Site ID: BC6
DATE: 30 / 3 / 2021
BioCon survey number:
OBSERVERS: JC ST.

SITE INFORMATION

General habitat survey number:

LOCATION: (GPS reference) Bioregion:

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: Location derivation:

Road: zone: easting: northing: Plot Centre Direction: m at degrees

Plot Origin: zone: easting: northing: Accuracy:

Plot Centre zone: easting: northing: Accuracy:

Plot bearing: Plot alignment description:

Locality description (include tenure and reserve number):

REGIONAL ECOSYSTEM AND TREE HEIGHTS:

Habitat Description: E. melanophloia open woodland with grassy understorey. Significant canopy dieback. Exotics present in understorey

Regional Ecosystem: 12.8.17 Tree Canopy (EDL*) height: 11 Tree subcanopy and/or emergent ht: S: 4 E:

SITE PHOTOS: (Photo Numbers) Plot centre: North ✓ South ✓ East ✓ West ✓

Landscape photo(s): Spot photo(s):

50 x 20m area: (NB: All logs >10cm, >0.5m within 50 x 20m area measured to the plot boundary)

Coarse woody debris:

Length: 18.2m

Site Total:
Per ha Total: 182

100 x 50m area: (NB: *Ecologically Dominant Layer. Tree defined as single stemmed over 2m. All tree species in the 100 x 50m (not just EDL species))

Total native tree spp richness:

Dogwood
MER c ✓
Xanth
CRE c ✓

Total: 4

Proportion of dominant canopy (EDL) species with evidence of recruitment: 100 %

50 x 10m area: Native Plant Spp Richness: (NB: List species if known or count if unknown. Shrub is defined as single stemmed below 2m or multi-stemmed from base or below 20cm)

		Total
Shrub spp. richness:	Cre., Dodonea, Notoleae, Seda SBS	4
Grass spp. richness:	Heteropo, Cypens, lovegrass, Cypens 2,	4
Forbs and others spp. richness:	Yellow fl., Cheilanthes, Glycine 1, Oxalis, Portulaca, Glycine 2, Emilia, Eustrephus, Clinelo Stella Yellow fl?	9
Non-native plant cover (%):	30% understorey Weeds.	30 %

Version 2.2 27/01/2015 The Database Manager, DSITIA Queensland Herbarium: 3896 9230

4486 - Notolea?

BCb
N, E, S, W

BIOCONDITION SITE ASSESSMENT DATASHEET cont...

Five 1 x 1m plots: *attributes are essential to assess as used in scoring, however assessment of all attributes improves your ability to more accurately visualise proportions of each of the attributes.

Native other grass (if relevant)*						
Native forbs and other species (non-grass)						
Native shrubs (<1m in height)					75	
Non-native grass						
Non-native forbs and shrubs		20	80	50	15	
Rock						
Bare ground			10			
Cryptograms						
Total	100%	100%	100%	100%	100%	100

100 x 50m area: *from benchmark doc.

Eucalypt large tree DBH*: 38

Non-eucalypt large tree DBH*: .....

No. of large eucalypt trees: 5 alive, 7 dead

No. of large non-eucalypt trees: .....

Total large trees: 10

100m transect:

Tree Canopy Cover: (Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present *If trees are in the same layer and continuous along the transect you can group them)

C	95-90	5	S	0.5	0.5							
	82-77	5										
	74-70	4										
	48-44	4										
	39-34	5										
									2	Total C: 23		
									0	Total S: 0.5		
										Total E:		

Shrub Canopy Cover: * denote as native or exotic. Only native shrub cover is used in the scoring.

N				E	1	2						
					1							
										Total native: 0		
										Total exotic: 2		

BCT 12 12.9-10.7 30/3/2021 ST, JC

Hab Description: cleared, open pasture with occasional low trees. Predom native grasses.

EDL Height: 0 Subcanopy: 6

Spot pics: NESW ✓

Coarse Woody: 0 P/ha = 0

Total Native Trees: MEL, BATW, ~~ACACIA~~ (#8) (7)

large trees: (0)

Recruitment: (0)

Native Sp. Richness

Shrub
Sida subs.
(1)

Grass
Hetaro
Fimbri
(2)

Forbs/Other.
Bindweed
Yell Fl.
Yell BUT
Christo.
Cheilanthes
Oxalis
Glycine
Pat Weed
Brachsome
Fabaceae.
(10)

Non-native cover: 10% Grass + Shrub.

Plots

(1) Grass 80
Forb 10
Exotic Forb 10

Litter = 0.

Grass = 76%

(2) Grass 70
Bare 10
Rock 10
Forb 10

(3) Grass 90
Forb 5
Ex Forb 5

(4) Grass 50
Bare 25
Rock 25

(5) Grass 90
Ex Forb 5
Forb 5

Canopy cover:

Canopy: (0 m)

Sub-can = (0m)

Native Shrub = 0.4 + 0.1 + 0.1 + 0.2.
(0.8)

Exotic Shrub = (0.5)

BIOCONDITION SITE ASSESSMENT DATASHEET

Queensland Government

OFFICE USE ONLY
Entered:
Checked:
Corrected:

Site ID: BC 8
DATE: 30 / 3 / 2021
BioCon survey number:
OBSERVERS: ST JC

SITE INFORMATION

General habitat survey number:

LOCATION: (GPS reference) Bioregion:

Datum: [ ] AGD84 [ ] GDA94 (WGS84) OTHER: Location derivation:

Road: zone: easting: northing: Plot Centre Direction: m at degrees

Plot Origin: zone: easting: northing: Accuracy:

Plot Centre zone: easting: northing: Accuracy:

Plot bearing: Plot alignment description:

Locality description (include tenure and reserve number):

REGIONAL ECOSYSTEM AND TREE HEIGHTS:

C = 15
S = 5

Habitat Description: FRG on alluvial plains
Grazed understorey

Regional Ecosystem: 12.3.3 Tree Canopy (EDL*) height: 20 Tree subcanopy and/or emergent ht: S: 9 E:

SITE PHOTOS: (Photo Numbers) Plot centre: North ✓ South ✓ East ✓ West ✓

Landscape photo(s): Spot photo(s):

50 x 20m area: (NB: All logs >10cm, >0.5m within 50 x 20m area measured to the plot boundary)

Coarse woody debris:

Length:
52 · 09
520 · 9
Site Total:
Per ha Total: 521

100 x 50m area: (NB: *Ecologically Dominant Layer. Tree defined as single stemmed over 2m. All tree species in the 100 x 50m (not just EDL species))

Total native tree spp richness:

FRG C ✓
CRE C ✓
Total: 2

Proportion of dominant canopy (EDL) species with evidence of recruitment: 100 %

50 x 10m area: Native Plant Spp Richness: (NB: List species if known or count if unknown. Shrub is defined as single stemmed below 2m or multi-stemmed from base or below 20cm)

		Total
Shrub spp. richness:	Dodonea, cre, FRG, Sida sbs	4
Grass spp. richness:	Hetero, Panicum, Cyperus, Them, Comet, Red Barnyard, Bimbastylis	7
Forbs and others spp. richness:	Yellow Cat, Hawden, Emilia, Pimelea, Glycine 1, Bracky sore, Herb1, Bamia, Glycine 2, Winter Apple, Mordanna, Chinsto, Herb 2	13
Non-native plant cover (%):	5 (grass)	5 %

BC8
N, E, S, W

BIOCONDITION SITE ASSESSMENT DATASHEET cont...

Five 1 x 1m plots: *attributes are essential to assess as used in scoring, however assessment of all attributes improves your ability to more accurately visualise proportions of each of the attributes.

Ground Cover:	1	2	3	4	5	Mean
Native perennial ('decreaser') grass cover*	50	50	40	90	35	53
Native other grass (if relevant)*						
Native forbs and other species (non-grass)						
Native shrubs (<1m in height)						
Non-native grass	50		30		50	26
Non-native forbs and shrubs						
Litter*		50	30	10	15	21
Rock						
Bare ground						
Cryptograms						
Total	100%	100%	100%	100%	100%	100

100 x 50m area: *from benchmark doc.

Eucalypt large tree DBH*: 47

Non-eucalypt large tree DBH*:

No. of large eucalypt trees: 10

No. of large non-eucalypt trees:

Total large trees: 20

100m transect:

Tree Canopy Cover: (Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present *If trees are in the same layer and continuous along the transect you can group them)

Tree or tree group* (C or S or E)	Distance (m)	Total	Tree or tree group* (C or S or E)	Distance (m)	Total	Tree or tree group* (C or S or E)	Distance (m)	Total	Tree or tree group* (C or S or E)	Distance (m)	Total
C	0-5	5	47-48	1							
	20-28	8	66-73	7							
	35-52	17	2	2							
	1										
	3	4					Canopy	64%		= 5	
							Sub			5	
										Total C: 34	
										Total S: 10	
										Total E:	

Shrub Canopy Cover: * denote as native or exotic. Only native shrub cover is used in the scoring.

Shrubs	Distance (m)	Total	Shrubs	Distance (m)	Total	Shrubs	Distance (m)	Total	Shrubs	Distance (m)	Total
										Total native: 0	
										Total exotic: 0	

BIOCONDITION SITE ASSESSMENT DATASHEET

Queensland Government

OFFICE USE ONLY
Entered:
Checked:
Corrected:

Site ID: BC9
DATE: 30/3/2021 BioCon survey number:
OBSERVERS: JC ST

SITE INFORMATION

General habitat survey number:

LOCATION: (GPS reference) Bioregion:

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: Location derivation:

Road: zone: easting: northing: Plot Centre Direction: m at degrees

Plot Origin: zone: easting: northing: Accuracy:

Plot Centre zone: easting: northing: Accuracy:

Plot bearing: Plot alignment description:

Locality description (include tenure and reserve number):

REGIONAL ECOSYSTEM AND TREE HEIGHTS:

Habitat Description: FRG open woodland with a CRE sub-canopy over grazed grasses. C=5 S=

Regional Ecosystem: 12.3.3 Tree Canopy (EDL*) height: 22 Tree subcanopy and/or emergent ht: S: 11 E:

SITE PHOTOS: (Photo Numbers) Plot centre: North ✓ South ✓ East ✓ West ✓

Landscape photo(s): Spot photo(s):

50 x 20m area: (NB: All logs >10cm, >0.5m within 50 x 20m area measured to the plot boundary)

Coarse woody debris:

Length:
55.12
551.2
Site Total:
Per ha Total: 551

100 x 50m area: (NB: *Ecologically Dominant Layer. Tree defined as single stemmed over 2m. All tree species in the 100 x 50m (not just EDL species))

Total native tree spp richness:

FRG ✓
CRE ✓
Total: 2

Proportion of dominant canopy (EDL) species with evidence of recruitment: 100 %

50 x 10m area: Native Plant Spp Richness: (NB: List species if known or count if unknown. Shrub is defined as single stemmed below 2m or multi-stemmed from base or below 20cm)

		Total
Shrub spp. richness:	CRE, FRG, Sida sps.	3
Grass spp. richness:	Heteropogon, Cyperus, Fimbri, Lomet, Panicum, Red Barnyard, Cyperus 2, Cymbopogon,	8
Forbs and others spp. richness:	W Apple, Glycine, Emilia, Mentha, Yellow Butt, Rmelea, Spermacoce, Chamaesyce	8
Non-native plant cover (%):	<5 (forbs)	5 %

BC9
NESW

BIOCONDITION SITE ASSESSMENT DATASHEET cont...

Five 1 x 1m plots: *attributes are essential to assess as used in scoring, however assessment of all attributes improves your ability to more accurately visualise proportions of each of the attributes.

Native other grass (if relevant)*						
Native forbs and other species (non-grass)					10	
Native shrubs (<1m in height)						
Non-native grass	35		25		15	
Non-native forbs and shrubs	15	20		15	10	
Rock						
Bare ground			25	25	20	
Cryptograms						
Total	100%	100%	100%	100%	100%	100

100 x 50m area: *from benchmark doc.

Eucalypt large tree DBH*: 47

Non-eucalypt large tree DBH*: .....

No. of large eucalypt trees: 2

No. of large non-eucalypt trees: .....

Total large trees: 4

100m transect:

Tree Canopy Cover: (Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present *If trees are in the same layer and continuous along the transect you can group them)

~~E~~	~~0-3~~		S	0-3	3						
	~~2-15~~			9-27	18						
				43-87	14						
C	68-75	7		~~88~~							
	76-88	12		72-80	8		Canopy				
				94-100	6		35%	=	2		
							SD	=	3		
										Total C:	19
										Total S:	49
										Total E:	

Shrub Canopy Cover: * denote as native or exotic. Only native shrub cover is used in the scoring.

										Total native:	0
										Total exotic:	0

BIOCONDITION SITE ASSESSMENT DATASHEET

Queensland Government

OFFICE USE ONLY
Entered:
Checked:
Corrected:

Site ID: BC10
DATE: 31/3/2021 BioCon survey number:
OBSERVERS: JC ST

SITE INFORMATION

General habitat survey number:

LOCATION: (GPS reference) Bioregion:

Datum: [ ] AGD84 [ ] GDA94 (WGS84) OTHER: Location derivation:

Road: zone: easting: northing: Plot Centre Direction: m at degrees

Plot Origin: zone: easting: northing: Accuracy:

Plot Centre zone: easting: northing: Accuracy:

Plot bearing: Plot alignment description:

Locality description (include tenure and reserve number):

REGIONAL ECOSYSTEM AND TREE HEIGHTS:

Habitat Description: E tereticornis with E crebra + Emolucana over grassy, grazed understorey

Regional Ecosystem: 12.9-10.7 Tree Canopy (EDL*) height: 20 Tree subcanopy and/or emergent ht: S: 11 E:

SITE PHOTOS: (Photo Numbers)

Plot centre: North ✓ South ✓ East ✓ West ✓

Landscape photo(s): Spot photo(s):

50 x 20m area:

Coarse woody debris: (NB: All logs >10cm, >0.5m within 50 x 20m area measured to the plot boundary)

Length: 24.09 (241)

Site Total: Per ha Total: 240.9

100 x 50m area:

Total native tree spp richness: (NB: *Ecologically Dominant Layer. Tree defined as single stemmed over 2m. All tree species in the 100 x 50m (not just EDL species)

Mel c ✓
Tess
Cre c ✓
FRG c ✓
Acacia salicina
PBW

Total: 6

Proportion of dominant canopy (EDL) species with evidence of recruitment: 100 %

50 x 10m area: Native Plant Spp Richness: (NB: List species if known or count if unknown. Shrub is defined as single stemmed below 2m or multi-stemmed from base or below 20cm)

		Total
Shrub spp. richness:	Grewia, Sida subspicata, Cre, Alph, Sida corod.	5
Grass spp. richness:	Heteropogon, Cyperus, Cymbo, Aristida, Fimbristylis, Cyperus 2,	6
Forbs and others spp. richness:	Glycine rounded, Small Yellow, Emilia, Glycine tab, Pimelea, Sida cordi, Yellow Buttons, Herb1, Mentha, Eberdantes, Fabaceae, W.Apple, Rhynch, Wahlenbergia, Lomandra, Flemingia, Bidiella, Christo	18

Non-native plant cover (%): 40 (minimal grasses) %

BC10
NESW

BIOCONDITION SITE ASSESSMENT DATASHEET cont...

Five 1 x 1m plots: *attributes are essential to assess as used in scoring, however assessment of all attributes improves your ability to more accurately visualise proportions of each of the attributes.

Native other grass (if relevant)*				1	1	7
Native forbs and other species (non-grass)		10				2
Native shrubs (<1m in height)						
Non-native grass						
Non-native forbs and shrubs						
Rock						8
Bare ground	80			5	10	19
Cryptograms						
Total	100%	100%	100%	100%	100%	100

100 x 50m area: *from benchmark doc.
Eucalypt large tree DBH*: 39
Non-eucalypt large tree DBH*:
No. of large eucalypt trees: 4
No. of large non-eucalypt trees:
Total large trees: 8

100m transect:
Tree Canopy Cover: (Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present *If trees are in the same layer and continuous along the transect you can group them)

C	39-55	16	S	0-2							
				0.5	2.5						
				14-20	6						
				26-28	2						
				46-48	2						
				61-68	7						
				90-97	7						
					26.5						
									2/3	Total C: 16 Total S: 26.5 Total E:	

Shrub Canopy Cover: * denote as native or exotic. Only native shrub cover is used in the scoring.

														Total native: 0 Total exotic: 6	

BIOCONDITION SITE ASSESSMENT DATASHEET

Queensland Government

OFFICE USE ONLY
Entered:
Checked:
Corrected:

Site ID: BC11
DATE: 30 / 3 / 2021
BioCon survey number:
OBSERVERS: JC ST

SITE INFORMATION

General habitat survey number:

LOCATION: (GPS reference) Bioregion:

Datum: [ ] AGD84 [ ] GDA94 (WGS84) OTHER: Location derivation:

Road: zone: easting: northing: Plot Centre Direction: in at degrees

Plot Origin: zone: easting: northing: Accuracy:

Plot Centre zone: easting: northing: Accuracy:

Plot bearing: Plot alignment description:

Locality description (include tenure and reserve number):

REGIONAL ECOSYSTEM AND TREE HEIGHTS:

Habitat Description: Eucalyptus open forest over grassy understorey (grazed)

Regional Ecosystem: 12.9-10.7 Tree Canopy (EDL*) height: 17 Tree subcanopy and/or emergent ht: S: 8 E:

SITE PHOTOS: (Photo Numbers)

Plot centre: North ✓ South ✓ East ✓ West ✓

Landscape photo(s): Spot photo(s):

50 x 20m area:

Coarse woody debris: (NB: All logs >10cm, >0.5m within 50 x 20m area measured to the plot boundary)

Length: 24.8

Site Total: Per ha Total: 248

100 x 50m area:

Total native tree spp richness: (NB: *Ecologically Dominant Layer. Tree defined as single stemmed over 2m. All tree species in the 100 x 50m (not just EDL species))

CRE cv
Tess cv

Total: 2

Proportion of dominant canopy (EDL) species with evidence of recruitment: 100 %

50 x 10m area: Native Plant Spp Richness: (NB: List species if known or count if unknown. Shrub is defined as single stemmed below 2m or multi-stemmed from base or below 20cm)

	Total
Shrub spp. richness: cre, Sida sobs.	2
Grass spp. richness: Cypens, Aristida, Heteropo, Lomat, Cypens large, Fimbristylis, Il Cymbo,	7
Forbs and others spp. richness: ~~Sida~~ ~~yellow~~ ~~vv~~, Glycine 1, Pimelea, W Apple, Emilia, Mentha, Glycine 2, Portulaca, Dianella, Chryso, Bracty.	10
Non-native plant cover (%): ~~2~~ 5 (forbs)	5 %

BC11
NESW

BIOCONDITION SITE ASSESSMENT DATASHEET cont...

Five 1 x 1m plots: *attributes are essential to assess as used in scoring, however assessment of all attributes improves your ability to more accurately visualise proportions of each of the attributes.

Native other grass (if relevant)*	80	70	70	60	50	66
Native forbs and other species (non-grass)		10	10	10	40	14
Native shrubs (<1m in height)						
Non-native grass						
Non-native forbs and shrubs		10		10		4
Rock						1
Bare ground			10			
Cryptograms						2
Total	100%	100%	100%	100%	100%	100

100 x 50m area: *from benchmark doc.
Eucalypt large tree DBH*: 39
Non-eucalypt large tree DBH*: –
No. of large eucalypt trees: 4
No. of large non-eucalypt trees:
Total large trees: 8

100m transect:
Tree Canopy Cover: (Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present *If trees are in the same layer and continuous along the transect you can group them)

C	12-19	7	S	0-1							
	22-29	7		1							
	42-47	5		1							
	49-54	5									
	59-61	2			3						
	63-79	16									
	83-93	10									
		52									
									5	Total C:	52
									2	Total S:	3
										Total E:	

Shrub Canopy Cover: * denote as native or exotic. Only native shrub cover is used in the scoring.

										Total native:	6
										Total exotic:	6

BIOCONDITION SITE ASSESSMENT DATASHEET

Queensland Government

OFFICE USE ONLY
Entered:
Checked:
Corrected:

Site ID: BC 12 N, E, S, W
DATE: 30 / 3 / 2021 BioCon survey number:
OBSERVERS: ST, JC

SITE INFORMATION

General habitat survey number:

LOCATION: (GPS reference) Bioregion:

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: Location derivation:

Road: zone: easting: northing: Plot Centre Direction: m at degrees

Plot Origin: zone: easting: northing: Accuracy:

Plot Centre zone: easting: northing: Accuracy:

Plot bearing: Plot alignment description:

Locality description (include tenure and reserve number):

REGIONAL ECOSYSTEM AND TREE HEIGHTS:

Habitat Description: Cretra + tess non-remnant open forest / woodland on grazed grasses.

Regional Ecosystem: 12.9-10.7 Tree Canopy (EDL*) height: 12 Tree subcanopy and/or emergent ht: S: 4 E: -

SITE PHOTOS: (Photo Numbers) Plot centre: North ✓ South ✓ East ✓ West ✓

Landscape photo(s): Spot photo(s):

50 x 20m area: (NB: All logs >10cm, >0.5m within 50 x 20m area measured to the plot boundary)

Coarse woody debris:

Length: 24.9 m

Site Total:
Per ha Total: 249

100 x 50m area: (NB: *Ecologically Dominant Layer. Tree defined as single stemmed over 2m. All tree species in the 100 x 50m (not just EDL species)

Total native tree spp richness:

CRE ✓
TESS ✓
MEL ✗

Total: 3

Proportion of dominant canopy (EDL) species with evidence of recruitment: 67 %

50 x 10m area: Native Plant Spp Richness: (NB: List species if known or count if unknown. Shrub is defined as single stemmed below 2m or multi-stemmed from base or below 20cm)

		Total
Shrub spp. richness:	cre, tess, Sida spp.	3
Grass spp. richness:	Het contort; Themeda, Rd Barnyard W?, Cypens, Fimbristylis, Cymbopogon, Appendix 2, Aristida.	8
Forbs and others spp. richness:	Glycine; Pimelea; Yellow B, Glycine 2; Glycine 3; Hibbertia, Portulaca, Emilia, Bindweed, Chrysanthemum, Christo,	11
Non-native plant cover (%):	10% forbs + grasses only	10 %

BC12

BIOCONDITION SITE ASSESSMENT DATASHEET cont...

Five 1 x 1m plots: *attributes are essential to assess as used in scoring, however assessment of all attributes improves your ability to more accurately visualise proportions of each of the attributes.

Ground cover*						
Native other grass (if relevant)*			1			
Native forbs and other species (non-grass)	10			5		
Native shrubs (<1m in height)						
Non-native grass				20		
Non-native forbs and shrubs	40			5		
Rock						
Bare ground	25			40		
Cryptograms						
Total	100%	100%	100%	100%	100%	100

55 3 49 16 13

100 x 50m area: *from benchmark doc.
Eucalypt large tree DBH*: 39
Non-eucalypt large tree DBH*: —
No. of large eucalypt trees: 7
No. of large non-eucalypt trees:
Total large trees: 14

100m transect:
Tree Canopy Cover: (Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present *If trees are in the same layer and continuous along the transect you can group them)

C	100-93	7	S		1						
C	83-66	7	S		1						
C	65-57	8									
C	55-49	6									
C	22-17	5									
C	14-10	4									
C	7-0	7									
								5 2	Total C: 44 Total S: 2 Total E:		

Shrub Canopy Cover: * denote as native or exotic. Only native shrub cover is used in the scoring.

S	N	1													
	N	0.5													
														Total native:	1.5
														Total exotic:	0

BIOCONDITION SITE ASSESSMENT DATASHEET

Queensland Government

OFFICE USE ONLY
Entered:
Checked:
Corrected:

Site ID: BC13
DATE: 30 / 3 / 2021
BioCon survey number:
OBSERVERS: TC ST

SITE INFORMATION

General habitat survey number:

LOCATION: (GPS reference) Bioregion:

Datum: ☐ AGD84 ☐ GDA94 (WGS84) OTHER: Location derivation:

Road: zone: easting: northing: Plot Centre Direction: m at degrees

Plot Origin: zone: easting: northing: Accuracy:

Plot Centre zone: easting: northing: Accuracy:

Plot bearing: Plot alignment description:

Locality description (include tenure and reserve number):

REGIONAL ECOSYSTEM AND TREE HEIGHTS:

Habitat Description: E crebra open forest / woodland over grazed understorey

Regional Ecosystem: 12-9-107 Tree Canopy (EDL*) height: 18 Tree subcanopy and/or emergent ht: S: 8 E:

SITE PHOTOS: (Photo Numbers) Plot centre: North ✓ South ✓ East ✓ West ✓

Landscape photo(s): Spot photo(s):

50 x 20m area:

Coarse woody debris: (NB: All logs >10cm, >0.5m within 50 x 20m area measured to the plot boundary)

Length: 16·4

Site Total:
Per ha Total: 164

100 x 50m area:

Total native tree spp richness: (NB: *Ecologically Dominant Layer. Tree defined as single stemmed over 2m. All tree species in the 100 x 50m (not just EDL species)

Tess C ✓
Cra C ✓
Dodonaea

Total: 3

Proportion of dominant canopy (EDL) species with evidence of recruitment: 100 %

50 x 10m area: Native Plant Spp Richness: (NB: List species if known or count if unknown. Shrub is defined as single stemmed below 2m or multi-stemmed from base or below 20cm)

		Total
Shrub spp. richness:	Cre, Sida subs.	2
Grass spp. richness:	Hetero, Cyperus, Lomet, Fimbristylis, Cymbo, Panicum, Barnyard Red, Aristida,	8
Forbs and others spp. richness:	Mentha, Whistle, Emilia, Cyperus 2, Cheilanthes, Brunella, Yellow ft, Portulaca, Rimelea, Glycine, Wahlenbergia, Native Cobblers	12
Non-native plant cover (%):	<5 forbs	5 %

BC 13
NESW

BIOCONDITION SITE ASSESSMENT DATASHEET cont...

Five 1 x 1m plots: *attributes are essential to assess as used in scoring, however assessment of all attributes improves your ability to more accurately visualise proportions of each of the attributes.

Native other grass (if relevant)*						1 22
Native forbs and other species (non-grass)			10		20	6
Native shrubs (<1m in height)						
Non-native grass						
Non-native forbs and shrubs	10		10	20	10	10
Rock						18
Bare ground	90	40	20	50	20	44
Cryptograms						
Total	100%	100%	100%	100%	100%	100

100 x 50m area: *from benchmark doc.
Eucalypt large tree DBH*: 39
Non-eucalypt large tree DBH*:
No. of large eucalypt trees: 1
No. of large non-eucalypt trees:
Total large trees: 2

100m transect:
Tree Canopy Cover: (Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present *If trees are in the same layer and continuous along the transect you can group them)

C	54-65	11	S	0-1	1						
	74-77	3		0.5							
	83-90	7		0.5	1						
	93-98	5		1	1						
				71-74	3						
				1							
				1	2						
									5	Total C:	26
									5	Total S:	8
										Total E:	

Shrub Canopy Cover: * denote as native or exotic. Only native shrub cover is used in the scoring.

N	1										
										Total native:	1
										Total exotic:	0

APPENDIX 7

Fauna recorded at Camera Stations

Fauna captured on wildlife detection camera traps deployed throughout the project area from 4th to 16th December, 2020. Refer **Figure 3.5** of main report for locations where cameras were installed.

B1



Whiptail Wallaby

B4



Red-necked Wallaby



Wild Dog



Brush-tailed Possum



Hare



Cows



Scrub Turkey



Northern Brown Bandicoot



Lace Monitor

B7


Brush-tailed Possum


Koala


Horse and rider


Australian Magpie

B11


Horses


Eastern Grey Kangaroo

B12


Brush-tailed Phascogale


Northern Brown Bandicoot


Unidentified small rodent


Owlet Nightjar


Whiptail Wallaby


Dove

 Cow	 Lace Monitor	 Lactating Pig
 Echidna		
B13		
 Lace Monitor	 Domestic Dog	 Wallaby
 Hare	 Cows	 Horse
 Domestic Dog	 Red-necked Wallaby	 Crow
 Laughing Kookaburra	 Brush-tailed Possum	 Northern Brown Bandicoot

CAM		
 Horses	 Brush-tailed Possum	 Australian Magpie
 Hare	 Wild Dog	 Rufous Betton

APPENDIX 8

Site Environmental Management Plan

APPENDIX 9

Impact Site Habitat Quality Score Tables

IMPACT - Fauna Species: Koala

Assessment Unit - Regional Ecosystem	AU 1 - RE 12.8.17 remnant (now split into 2 AUs)									AU2 Non-remnant													AU3 cleared pasture						
Site Reference	Benchmark	BC1 (now AU1a)			BC2 (now AU1b)			Average % benchmark	Average Score	Benchmark	BC3			BC4			BC5			BC6			Average % benchmark	Average Score	Benchmark	BC7			Average % benchmark	Average Score	Benchmark
	12.8.17	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score			12.8.17	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score			12.8.17	Raw Data	% Benchmark	Score			12.9-10.7
Site Condition																														
Recruitment of woody perennial species in EDL	100	50	50	3	100	100	5			100	100	100	5	75	75	5	50	50	3	100	100	5	81	4.5	100	0	0	0	0	0	100
Native plant species richness - trees	7	5	71	2.5	9	129	5			7	7	100	5	4	57	2.5	2	29	2.5	4	57	2.5	61	3.125	7	0	0	0	0	0	3
Native plant species richness - shrubs	5	3	60	2.5	6	120	5			5	5	100	5	3	60	2.5	2	40	2.5	4	80	2.5	70	3.125	5	1	20	0	20	0	5
Native plant species richness - grasses	12	6	50	2.5	6	50	2.5			12	7	58	2.5	8	67	2.5	4	33	2.5	4	33	2.5	48	2.5	12	2	17	0	17	0	8
Native plant species richness - forbes	27	10	37	2.5	16	59	2.5			27	13	48	2.5	20	74	2.5	17	63	2.5	9	33	2.5	55	2.5	27	10	37	2.5	37	2.5	26
Tree canopy height (m)	19	12	63	3	20	105	5			19	17	89	5	17	89	5	15	79	5	11	58	3	79		19	0	0	0	37		21
Tree subcanopy height (m)	10	5	50	3	10	100	5			10	9	90	5	9	90	5	8	80	5	4	40	3	75		10	6	60	3	37		10
Tree canopy height (average of emergent, canopy, sub-canopy)				3			5						5			5			5			3		4.5				1.5		1.5	
Tree canopy cover (%)	48	4	8	0	50	104	5			48	42	88	5	48.5	101	5	14	29	2	23	48	2	66		48	0	0	0	37		40
Tree subcanopy cover (%)	20	36	180	5	11	55	5			20	15	75	5	5.5		0	13	65	5	0.5	3	0	36		20	0	0	0	37		8
Tree canopy cover (average of emergent, canopy, sub-canopy)				2.5			5						5			2.5			3.5			1	3					0		0
Shrub canopy cover	5	0	0	0	2	40	3			5	4	80	5	6	120	5	0	0	0	0	0	0	50	2.5	5	1	20	3	20	3	3
Native grass cover	32	26	81	3	30	94	5			32	92	288	5	33	103	5	90	281	5	50	156	5	207	5	32	76	238	5	238	5	61
Organic litter	21	0	0	0	0	0	0			21	0	0	0	34	162	5	0	0	0	0	0	0	40	1.25	21	0	0	0	0	0	20
Large trees (euc plus non-euc)	24	0	0	0	30	125	15			24	4	17	5	4	17	5	6	25	5	10	42	5	25	5	24	0	0	0	0	0	18
Coarse woody debris	234	442	189	5	271	116	5			234	265	113	5	174	74	5	270	115	5	182	78	5	95	5	234	0	0	0	0	0	272
Non-native plant cover	0	80		0	30		3			0	5		5	0		10	1		10	30		3	0	7	0	10		5		5	0
Quality and availability of food and foraging habitat				1			5						1			1			1			1					1		1	
Quality and availability of shelter				1			10						1			1			1			1					1		1	
Site Condition Score				28.5			76																51						19		
MAX Site Condition Score				*100*			*100*																*100*						*100*		
Site Condition Score - out of 3				**0.86**			**2.28**																**1.53**						**0.57**		
Site Context																															
Size of patch				10			10						10			10		10.00			10.00		10					10		10	
Connectedness				2			2						2			2		2			2		2					2		2	
Context				5			5						5			5		5			5		5					5		5	
Ecological Corridors				6			6						6			6		6			6		6					6		6	
Role of site location to species overall population in the state				5			5						5			5		5			5		5					5		5	
Threats to the species				7			7						7			7		7.00			7.00		7					7		7	
Species mobility capacity				10			10						10			10		10.00			10.00		10					10		10	
Site Context Score				45			45																45						45		
MAX Site Context Score				*56*			*56*																*56*						*56*		
Site Context Score - out of 3				**2.41**			**2.41**																**2.41**						**2.41**		

Species Stocking Rate (SSR)						AU1a	AU1b	AU2	AU3	AU4	AU5	AU6	AU7
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	Score	0			10	10	10	10	10	10	10	10	10
		No	Yes - adjacent		Yes - on site								
Species usage of the site (habitat type & evidenced usage)	Score	0	5	10	15	10	10	15	5	5	15	15	5
		Not habitat	Dispersal	Foraging	Breeding								
Approximate density (per ha)	Score	0	10			20	20	10	0	0	10	10	0
		0%	0.013										
Role/importance of species population on site*	Score (*Total from supplementary table below*)	0				0	0	5	0	0	5	5	0
		0											
Total SRR score (out of 70)						40	40	40	15	15	40	40	15
SRR Score (out of 4)						**2.28571429**	**2.28571429**	**2.2857143**	**0.85714286**	**0.85714286**	**2.285714286**	**2.28571429**	**0.85714286**

***SSR Supplementary Table**				
*Key source population for breeding	Score	0		0
		No	Yes/ Possibly	
*Key source population for dispersal	Score	0		0
		No	Yes/ Possibly	
*Necessary for maintaining genetic diversity	Score	0		0
		No	Yes/ Possibly	
*Near the limit of the species range	Score	0		0
		No	Yes	

Impact for ALL STAGES COMBINED

Final habitat quality score (weighted)	**AU1a**	**AU1b**	**AU2**	**AU3**	**AU4**	**AU5**	**AU6**	**AU7**	**verage/Final**
Site Condition score (out of 3)	0.86	2.28	1.53	0.57	0.65	2.18	1.91	0.68	1.33
Site Context Score (out of 3)	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41
Species Stocking Rate Score (out of 4)	2.29	2.29	2.29	0.86	0.86	2.29	2.29	0.86	1.75
Habitat Quality score (out of 10)	*5.55*	*6.98*	*6.23*	*3.84*	*3.91*	*6.88*	*6.60*	*3.94*	5.49
Assessment Unit area (ha)	4.58	4.58	113.59	41.50	12.71	6.30	70.95	5.48	259.70
Total impact area (ha) for this MNES	259.70	259.70	259.70	259.70	259.70	259.70	259.70	259.70	259.70
Size Weighting	0.02	0.02	0.44	0.16	0.05	0.02	0.27	0.02	1.00
Weighted Habitat Quality Score	***0.10***	***0.12***	***2.72***	***0.61***	***0.19***	***0.17***	***1.80***	***0.08***	***5.80***

Impact for EACH STAGE

	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2	
Final habitat quality score (weighted)	**AU1a**	**AU1a**	**AU1b**	**AU1b**	**AU2**	**AU2**	**AU3**	**AU3**	**AU4**	**AU4**	**AU5**	**AU5**	**AU6**	**AU6**	**AU7**	**AU7**	Average/Final
Site Condition score (out of 3)	0.86	0.86	2.28	2.28	1.53	1.53	0.57	0.57	0.65	0.65	2.18	2.18	1.91	1.91	0.68	0.68	1.33
Site Context Score (out of 3)	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41
Species Stocking Rate Score (out of 4)	2.29	2.29	2.29	2.29	2.29	2.29	0.86	0.86	0.86	0.86	2.29	2.29	2.29	2.29	0.86	0.86	1.75
Habitat Quality score (out of 10)	*5.55*	*5.55*	*6.98*	*6.98*	*6.23*	*6.23*	*3.84*	*3.84*	*3.91*	*3.91*	*6.88*	*6.88*	*6.60*	*6.60*	*3.94*	*3.94*	5.49
Assessment Unit area (ha)	0.00	4.58	0.00	4.58	5.93	107.66	24.69	16.81	12.71	0.00	5.91	0.40	50.54	20.41	5.48	0.00	259.71
Total impact area (ha) for this MNES	259.71	259.71	259.71	259.71	259.71	259.71	259.71	259.71	259.71	259.71	259.71	259.71	259.71	259.71	259.71	259.71	259.71
Size Weighting	0.00	0.02	0.00	0.02	0.02	0.41	0.10	0.06	0.05	0.00	0.02	0.00	0.19	0.08	0.02	0.00	1.00
Weighted Habitat Quality Score	***0.00***	***0.10***	***0.00***	***0.12***	***0.14***	***2.58***	***0.36***	***0.25***	***0.19***	***0.00***	***0.16***	***0.01***	***1.28***	***0.52***	***0.08***	***0.00***	***5.80***

		% Offset
Stage 1 Weighted Quality Habitat Score	2.22	0.383065513
Stage 2 Weighted Quality Habitat Score	3.58	0.616934487
Weighted Quality Habitat Score	***5.80***	

| AU7 cleared pasture | | |

IMPACT - Fauna Species: Grey-headed Flying-fox

Assessment Unit - Regional Ecosystem	AU 1 - RE 12.8.17 remnant (now split into 2 AUs)									AU2 Non-remnant													AU5 non-remnant								
Site Reference	Benchmark	BC1			BC2			Average % benchmark	Average Score	Benchmark	BC3			BC4			BC5			BC6			Average % benchmark	Average Score	Benchmark	BC8			BC9			Average % benchmark	Average Score
	12.8.17	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score			12.8.17	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score			12.3.3	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
Site Condition																																
Recruitment of woody perennial species in EDL	100	50	50	3	100	100	5			100	100	100	5	75	75	5	50	50	3	100	100	5	81	4.5	100	100	100	5	100	100	5	100	5
Native plant species richness - trees	7	5	71	2.5	9	129	5			7	7	100	5	4	57	2.5	2	29	2.5	4	57	2.5	61	3.125	5	2	40	2.5	2	40	2.5	40	2.5
Native plant species richness - shrubs	5	3	60	2.5	6	120	5			5	5	100	5	3	60	2.5	2	40	2.5	4	80	2.5	70	3.125	5	4	80	2.5	3	60	2.5	70	2.5
Native plant species richness - grasses	12	6	50	2.5	6	50	2.5			12	7	58	2.5	8	67	2.5	4	33	2.5	4	33	2.5	48	2.5	9	7	78	2.5	8	89	2.5	83	2.5
Native plant species richness - forbes	27	10	37	2.5	16	59	2.5			27	13	48	2.5	20	74	2.5	17	63	2.5	9	33	2.5	55	2.5	25	13	52	2.5	8	32	2.5	42	2.5
Tree canopy height (m)	19	12	63	3	20	105	5			19	17	89	5	17	89	5	15	79	5	11	58	3	79		25	22	88	5	22	88	5	88	5
Tree subcanopy height (m)	10	5	50	3	10	100	5			10	9	90	5	9	90	5	8	80	5	4	40	3	75		9	9	100	5	11	122	5	111	5
Tree canopy height (average of emergent, canopy, sub-canopy)				3			5						5			5			5			3		4.5				5			5		5
Tree canopy cover (%)	48	4	8	0	50		0			48	42	88	5	48.5	101	5	14	29	2	23	48	2	66		40	34	85	5	19	48	2	66	
Tree subcanopy cover (%)	20	36	180	5	11		0			20	15	75	5	5.5		0	13	65	5	0.5	3	0	36		8	10	125	5	49	613	3	369	
Tree canopy cover (average of emergent, canopy, sub-canopy)				2.5			0						5			2.5			3.5			1		3				5			2.5		3.75
Shrub canopy cover	5	0	0	0	2	40	3			5	4	80	5	6	120	5	0	0	0	0	0	0	50	2.5	4	0	0	0	0	0	0	0	0
Native grass cover	32	26	81	3	30	94	5			32	92	288	5	33	103	5	90	281	5	50	156	5	207	5	52	53	102	5	19	37	1	69	3
Organic litter	21	0	0	0	0	0	0			21	0	0	0	34	162	5	0	0	0	0	0	0	40	1.25	20	21	105	5	33	165	5	135	5
Large trees (euc plus non-euc)	24	0	0	0	30	125	15			24	4	17	5	4	17	5	6	25	5	10	42	5	25	5	14	20	143	15	4	29	5	86	10
Coarse woody debris	234	442	189	5	271	116	5			234	265	113	5	174	74	5	270	115	5	182	78	5	95	5	588	521	89	5	551	94	5	91	5
Non-native plant cover	0	80		0	30		3			0	5		5	0		10	1		10	30		3	0	7	0	5		5	5		5	0	5
Quality and availability of food and foraging habitat				10			10						10			10			10			1	7.75				10			5		10
Quality and availability of shelter				5			5						5			5			5			1	4				5			5		5
Site Condition Score				41.5			71						90			87.5			78.5			47	60.75				95			73.5		76.75
MAX Site Condition Score				*100*			*100*						*100*			*100*			*100*			*100*	*100*				*100*			*100*		*100*
Site Condition Score - out of 3				**1.25**			**2.13**						**2.70**			**2.63**			**2.36**			**1.41**	**1.82**				**2.85**			**2.21**		**2.30**
Site Context																																
Size of patch				2			2						0			0			0			0	0				0			0		0
Connectedness				2			2						2			2			2			2	2				2			2		2
Context				2			2						2			2			2			2	2				2			2		2
Ecological Corridors				6			6						6			6			6			6	6				6			6		6
Role of site location to species overall population in the state				5			5						5			5			5			1	4				5			5		5
Threats to the species				15			15						1			1			1			1	1				1			1		1
Species mobility capacity				7			7						7			7			7			7	7				7			7		7
Site Context Score				39			39																22								23	
MAX Site Context Score				*56*			*56*																*56*								*56*	
Site Context Score - out of 3				**2.09**			**2.09**																**1.18**								**1.23**	

Species Stocking Rate (SSR)						
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	Score	0			10	10
		No	Yes - adjacent		Yes - on site	
Species usage of the site (habitat type & evidenced usage)	Score	0		10		10
		Not habitat	Dispersal	Foraging	Breeding	
Approximate density (per ha)	Score	0	10			10
		0%				
Role/importance of species population on site*	Score (*Total from supplementary table below*)	0				0
		0				
Total SRR score (out of 70)						30
SRR Score (out of 4)						**1.714286**

***SSR Supplementary Table**				
*Key source population for breeding	Score	0		0
		No	Yes/ Possibly	
*Key source population for dispersal	Score	0		0
		No	Yes/ Possibly	
*Necessary for maintaining genetic diversity	Score	0		0
		No	Yes/ Possibly	
*Near the limit of the species range	Score	0		0
		No	Yes	

Impact for ALL STAGES COMBINED

Final habitat quality score (weighted)	**AU1a**	**AU1b**	**AU2**	**AU5**	**AU6**	**Average/Final**
Site Condition score (out of 3)	1.25	2.13	1.82	2.30	2.00	1.90
Site Context Score (out of 3)	2.09	2.09	1.18	1.23	1.18	1.55
Species Stocking Rate Score (out of 4)	1.71	1.71	1.71	1.71	1.71	1.71
Habitat Quality score (out of 10)	*5.05*	*5.93*	*4.72*	*5.25*	*4.89*	5.17
Assessment Unit area (ha)	4.58	4.58	113.59	6.30	70.95	**200.01**
Total impact area (ha) for this MNES	200.01	200.01	200.01	200.01	200.01	200.01
Size Weighting	0.02	0.02	0.57	0.03	0.35	**1.00**
Weighted Habitat Quality Score	***0.12***	***0.14***	***2.68***	***0.17***	***1.73***	***4.83***

Impact for EACH STAGE

	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2	
Final habitat quality score (weighted)	**AU1a**	**AU1a**	**AU1b**	**AU1b**	**AU2**	**AU2**	**AU5**	**AU5**	**AU6**	**AU6**	Average/Final
Site Condition score (out of 3)	1.25	1.25	2.13	2.13	1.82	1.82	2.30	2.30	2.00	2.00	1.90
Site Context Score (out of 3)	2.09	2.09	2.09	2.09	1.18	1.18	1.23	1.23	1.18	1.18	1.55
Species Stocking Rate Score (out of 4)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
Habitat Quality score (out of 10)	*5.05*	*5.05*	*5.93*	*5.93*	*4.72*	*4.72*	*5.25*	*5.25*	*4.89*	*4.89*	5.17
Assessment Unit area (ha)	0.00	4.58	0.00	4.58	5.93	107.66	5.91	0.40	50.54	20.41	200.02
Total impact area (ha) for this MNES	200.02	200.02	200.02	200.02	200.02	200.02	200.02	200.02	200.02	200.02	200.02
Size Weighting	0.00	0.02	0.00	0.02	0.03	0.54	0.03	0.00	0.25	0.10	1.00
Weighted Habitat Quality Score	***0.00***	***0.12***	***0.00***	***0.14***	***0.14***	***2.54***	***0.16***	***0.01***	***1.24***	***0.50***	***4.83***

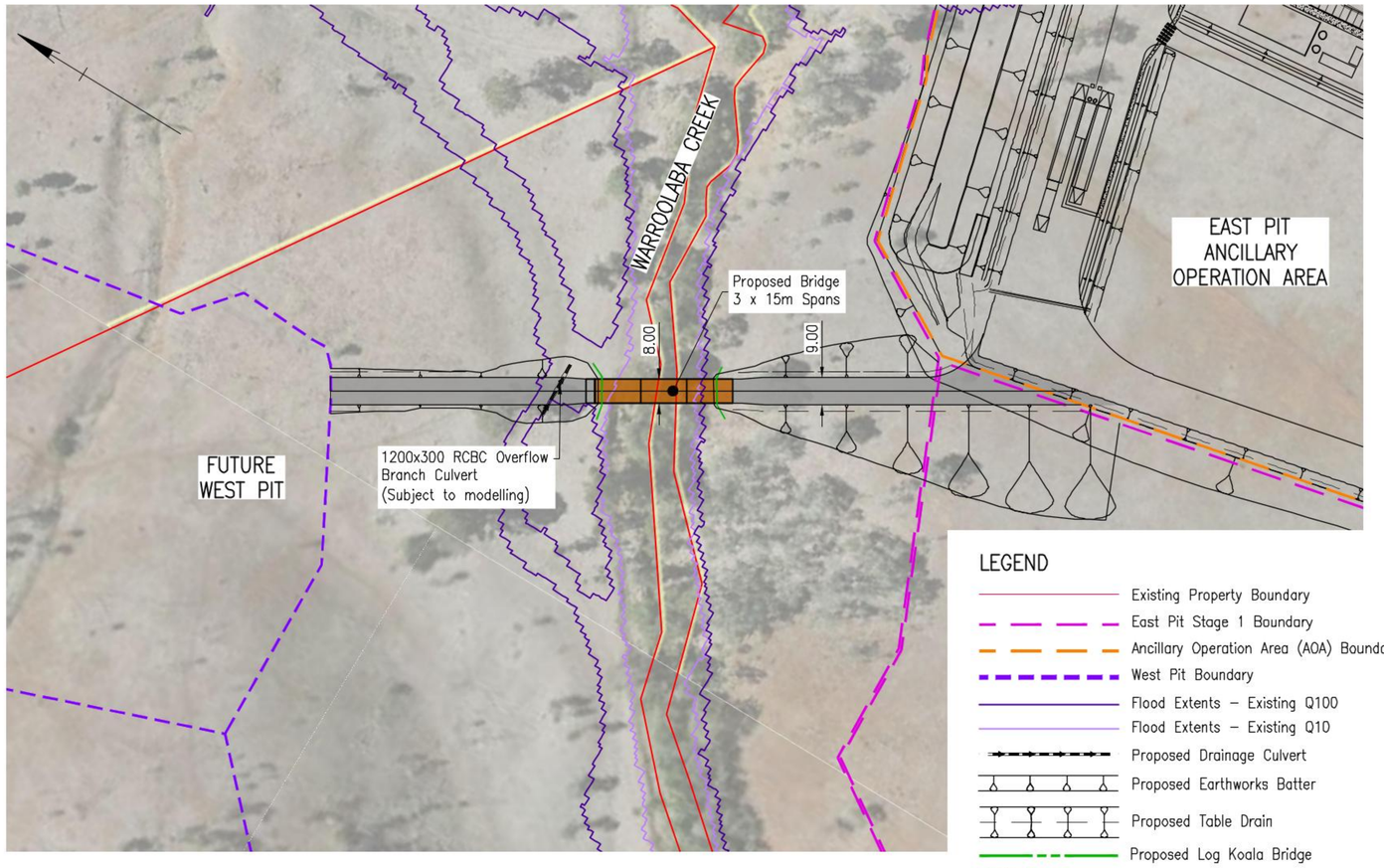
		% Offset
Stage 1 Weighted Quality Habitat Score	1.53	0.316827
Stage 2 Weighted Quality Habitat Score	3.30	0.683173
Weighted Quality Habitat Score	***4.83***	

AU6 non-remnant															
Benchmark 12.9-10.7	BC10			BC11			BC12			BC13			**Average %**	**Average Score**
	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score	Raw Data	% Benchmark	Score		
100	100	100	5	100	100	5	67	67	3	100	100	5	92	4.5
3	6	200	5	2	67	2.5	3	100	5	3	100	5	117	4.375
5	5	100	5	7	140	5	3	60	2.5	2	40	2.5	85	3.75
8	6	75	2.5	10	125	5	8	100	5	8	100	5	100	4.375
26	18	69	2.5	5	19	0	11	42	2.5	12	46	2.5	44	1.875
21	20	95	5	17	81	5	12	57	3	18	86	5	80	
10	11	110	5	8	80	5	4	40	3	8	80	5	78	
			5	13		5			3			5		4.5
40	16	40	2	52	130	5	44	110	5	26	65	5	86	
8	26.5	331	3	3	38	2	2	25	2	8	100	5	123	
			2.5			3.5			3.5			5		3.625
3	0	0	0	0	0	0	1.5	50	5	1	33	3	21	2
61	70	115	5	60	98	5	55	90	5	22	36	1	85	4
20	8	40	3	10	50	5	16	80	5	18	90	5	65	4.5
18	8	44	5	8	44	5	14	78	10	2	11	5	44	6.25
272	241	89	5	248	91	5	249	92	5	164	60	5	83	5
0	0		10	5		5	10		5	<5		0	0	5
			10			10			10			5		8.75
			5			5			5			1		4
			85.5			83			87.5			75		66.50
			100			*100*			*100*			*100*		*100*
			2.57			**2.49**			**2.63**			**2.25**		**2.00**
			0			0			0			0		0
			2			2			2			2		2
			2			2			2			2		2
			6			6			6			6		6
			5			5			5			1		4
			1			1			1			1		1
			7			7			7			7		7
														22
														56
														1.18

APPENDIX 10

Conceptual Design for Creek Crossing

Concept ONLY for Planning Purposes



LEGEND

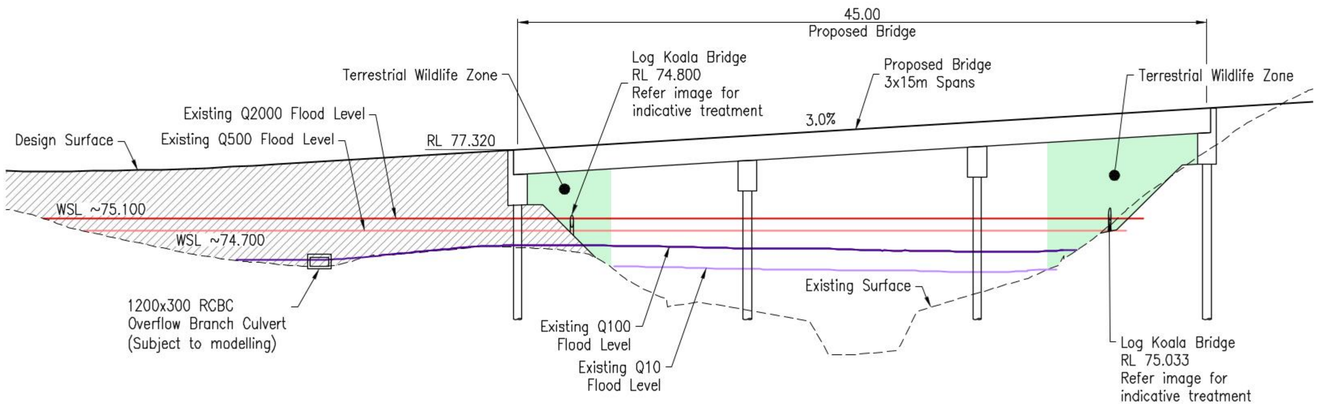
- Existing Property Boundary
- East Pit Stage 1 Boundary
- Ancillary Operation Area (AOA) Boundary
- West Pit Boundary
- Flood Extents – Existing Q100
- Flood Extents – Existing Q10
- Proposed Drainage Culvert
- Proposed Earthworks Batter
- Proposed Table Drain
- Proposed Log Koala Bridge

NOTES

Koala proof fencing is required to meet Environmental Protection and Biodiversity Conservation Act 1999 requirements. Refer to EPBC 2020/8684 for details.

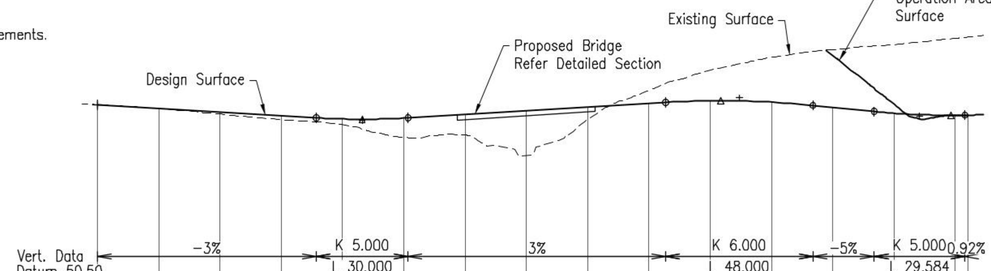


EXAMPLE KOALA CROSSING



1:200 0 2 4 6 8m
1:100 0 1 2 3 4m

PROPOSED BRIDGE SECTION
Scale 1:200H 1:100V



Vert. Data Datum 50.50		−3%		K 5.000 L 30.000		3%					K 6.000 L 48.000		−5%	K 5.000 L 29.584	0.92%	
Ewks.	Cut	60	27	7	0	0	0	0	0	345	1817	3610	4773	5097	4528	758
	Fill	0	19	86	126	554	802	0	0	29	0	0	0	40	40	3
Design Height		78.999	78.399	77.799	77.199	76.672	76.816	77.413	78.013	78.613	79.213	79.639	79.423	78.575	77.616	77.272 77.299
Natural Surface		79.007	78.364	77.506	76.593	75.739	73.666	74.056	70.694	76.538	81.328	84.627	86.741	87.930	88.788	88.823 90.040
Chainage		0	20	40	60	80	100	120	140	160	180	200	220	240	260	280 284.114

HORIZONTAL SCALE 1:1000
VERTICAL SCALE 1:500

LONGITUDINAL SECTION CREEK CROSSING

1:1000 0 10 20 30 40m
1:500 0 5 10 15 20m

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CLIENT :

DRAWING TITLE :
WARROOLABA CREEK CROSSING
CONNECTION TO FUTURE WEST PIT

PROJECT :
WARRILL VIEW QUARRY, SILVERDALE

PRELIMINARY
NOT FOR CONSTRUCTION OR TENDER

SCALE AT FULL SIZE (A1) :

DEVEL. APPLIC. No. :
DATE : 10/10/2025
PROJECT LEADER :
DESIGNER : M.DASS
DRAFTSPERSON :
CHECKED :
APPROVED FOR AND ON BEHALF OF
BURCHILLS ENGINEERING SOLUTIONS ABN 76 166 942 365

PROJECT No.:	DRAWING No. :	VERSION:
BE250123	0000-SKH-0040	4

APPENDIX 11

Offset Area Management Plan

ADDITIONAL INFORMATION FOR PRELIMINARY DOCUMENTATION (2020/8684)

OFFSET AREA MANAGEMENT PLAN, COLORADO PROPERTY, MONSILDALE

Prepared for
SLR on behalf of Neilsens Quality Gravels Pty Ltd

Biodiversity Assessment and Management Pty Ltd
PO Box 1376
CLEVELAND 4163

BAAM
ECOLOGICAL CONSULTANTS

Specialised ecological knowledge that reduces your risk

Document Control Sheet

File Number: 0049-110a

Project Manager/s: Jedd Appleton

Client: SLR

Project Title: Offset Area Management Plan, Colorado Property, Monsildale

Project Author/s: Jedd Appleton, Nicole Bonney, Conor O'Brien

Project Summary: An Offset Area Management Plan (OAMP) for the "Colorado" Property located in Monsildale, Queensland (offset area) has been developed to compensate for residual impacts on MNES as a result of the proposed Warrill View Hard Rock Quarry development (impact area).

Draft Preparation History:

Draft No.	Date draft completed	Reviewed by	Issued by
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PDF – backup – archived	A	29/04/2026	0	07/05/2026	1	15/06/2026		

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Purpose of Report

Biodiversity Assessment and Management Pty Ltd has produced this report in its capacity as {consultants} for and on the request of SLR (the "Client") for the sole purpose of providing an Offset Area Management Plan for the “Colorado” Property located in Monsildale, Queensland to compensate for residual impacts on MNES as a result of the proposed Warrill View Hard Rock Quarry development (the "Specified Purpose"). This information and any recommendations in this report are particular to the Specified Purpose and are based on facts, matters and circumstances particular to the subject matter of the report and the Specified Purpose at the time of production. This report is not to be used, nor is it suitable, for any purpose other than the Specified Purpose. Biodiversity Assessment and Management Pty Ltd disclaims all liability for any loss and/or damage whatsoever arising either directly or indirectly as a result of any application, use or reliance upon the report for any purpose other than the Specified Purpose.

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Signed on behalf of
Biodiversity Assessment and Management Pty Ltd

Date: 15/06/2026



Director

OFFSET AREA MANAGEMENT PLAN

COLORADO PROPERTY, MONSILDALE

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Table of Terms and Abbreviations

ALA	Atlas of Living Australia
AU	Assessment Unit
BAAM:	Biodiversity Assessment and Management Pty Ltd
BC	BioCondition
BoM	Bureau of Meteorology
DAF	Queensland Department of Agriculture and Fisheries
DBH	diameter at breast height
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
EDL	Ecologically dominant layer
EOP	Environmental offset policy
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
GPS	Global Positioning System
ha	Hectare(s)
HVR	High Value Regrowth
LGA	Local Government Area
MHQA	Modified Habitat Quality Assessment
MNES	Matters of National Environmental Significance
NRM	Natural Resource Management
OAMP	Offset Area Management Plan
PMAV	Property Map of Assessable Vegetation
QPWS	Queensland Parks and Wildlife Service
RE	Regional Ecosystem
VM Act	Queensland *Vegetation Management Act 1999*
WONS	Weed(s) of National Significance

1.0 INTRODUCTION

This Offset Area Management Plan (OAMP) has been developed for the Warrill View Hard Rock Quarry development, located at 299 Hayes Road, Silverdale, Queensland.

The Warrill View Hard Rock Quarry development was referred under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and subsequently declared a "Controlled Action" on 28 July 2020 (EPBC 2020/8684), requiring assessment via Preliminary Documentation pursuant to sections 18 and 18A (listed threatened species and communities). The controlling provision was triggered due to potential significant impacts on threatened species which include:

- Koala (*Phascolarctos cinereus*) – listed as Vulnerable under the EPBC Act at the time of referral
- Grey-headed Flying-fox (*Pteropus poliocephalus*) – listed as Vulnerable at the time of referral

As part of the Preliminary Documentation requirements, a proposal was developed to offset the impacts of clearing 258 ha of known/potential foraging and dispersal habitat for Koala and 199 ha of potential foraging habitat for Grey-headed Flying-fox. This offset area, comprising the dedication and rehabilitation of 972 ha of land at the “Colorado” Property (the offset area), is proposed to offset significant impacts on the above listed species associated with the Warrill View Hard Rock Quarry development (EPBC 2020/8684).

1.1 PURPOSE

This OAMP has been developed to satisfy Item 6 of the Additional Information required for Preliminary Documentation and the EPBC Environmental Offset Policy (EOP), guiding the implementation and management of offset activities. Survey methodologies to ensure the approval conditions are met were agreed upon with the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) during the Preliminary Documentation phase.

The purpose of this OAMP is to establish key milestones and measurable actions, including success criteria, for the Colorado offset area. Specifically, this plan outlines:

- The methodology used to determine ecological outcomes, based on baseline survey results, and proposed milestones that quantify the environmental gain of the offset.
- The management measures to achieve the required ecological outcomes.
- The ongoing monitoring of these management measures, including identifiable and quantifiable performance indicators.
- Contingency measures should the ecological outcomes compensating for the proposed action not be achieved.

This OAMP has been prepared considering:

- The Commonwealth legislative offsets framework.
- The combined results of ecological investigations at the proposed offset location.
- Advice from the DCCEEW.
- The results of the application of the EPBC Act Offsets Assessment Guide.
- Conservation and ecological outcomes.

Following approval, the offset area will be legally secured, with evidence provided to the DCCEEW. This OAMP will be published on the project website in accordance with approval conditions. Any non-compliances will be addressed in the relevant Annual Compliance Report.

1.2 OFFSET OUTCOMES AND OBJECTIVES

This OAMP details the existing habitat quality for Koala and Grey-headed Flying-fox within the Colorado offset area. It outlines the management actions designed to achieve required targets. This will be achieved through a direct offset proportionate to each species’ statutory protection, ensuring the offset's size and scale are proportionate to the Warrill View Hard Rock Quarry development’s residual impacts.

1.2.1 Environmental Outcomes

To achieve offsets proportionate to statutory requirements, this OAMP aims to achieve the following environmental outcomes:

- Food Availability: Increase food and shelter tree availability by establishing new trees.
- Recruitment: Maintain recruitment at 100% of the Ecologically Dominant Layer (EDL).
- Habitat Structure: Enhance habitat structure by:
    - Increasing native plant species richness.
    - Improving tree canopy height and cover.
    - Improving shrub cover.
    - Maintaining native grass cover.
    - Improving organic litter cover.
    - Reducing non-native plant cover.
- Habitat Quality: Improve food, foraging, and shelter habitat quality and availability.
- Ecosystem Resilience: Enhance patch size and connectivity.
- Threat Management: Control/decrease threats to the target species.
- Stocking Rates: Improve species stocking rates (where relevant).

1.2.2 Management Objectives

Aligned with the EPBC EOP, this OAMP's management objectives are:

- Conservation Gain: Provide a conservation gain for Koala and Grey-headed Flying-fox beyond existing, legal requirements.
- Proportionality: Ensure the offset is proportionate to the impacts and species' protection levels.
- Risk Management: Effectively manage risks of not achieving objectives.
- Efficiency and Transparency: Be efficient, effective, timely, transparent, scientifically robust, and reasonable, with transparent governance.

The achievement of these outcomes will be measured using the methodologies, monitoring, and maintenance detailed in **Section 6**. Management actions aim to achieve EPBC Act approval offset targets, focusing on protecting, restoring, and reconnecting habitat.

2.0 IMPACT SITE

The action associated with this offset is for a hard rock quarry development located at 299 Hayes Road, Silverdale, Queensland (EPBC 2020/8684). The referable action requires an impact area of 258 ha, which includes quarry pits, ancillary operations areas and a new access road. A total of 258 ha of known/potential foraging and dispersal habitat for Koala and 199 ha of potential foraging habitat for Grey-headed Flying-fox is proposed to be impacted. No additional clearing will be required in relation to asset protection or for any other purpose beyond this proposed disturbance footprint.

Adjacent and neighbouring land is currently used for rural pursuits, primarily for grazing of cattle. A number of horses are also kept on the property. All onsite vegetation and habitats to be retained within 100m of the proposed disturbance footprint will be protected from potential adverse impacts associated with adjacent clearing and construction activities through designated and demarcated exclusion/management zones, and regular monitoring of the health of retained vegetation/habitat therein. The intended purpose for retained areas outside the exclusion/management zones is the continuation of existing uses. The site also contains a dwelling with ancillary sheds, which are proposed to be retained as a caretaker's residence.

Figure 2.1 shows the site context and **Figure 2.2** shows an aerial view of the site.

The majority of vegetation across the site comprises regrowth eucalypt woodland with mature vegetation generally restricted to the narrow riparian community lining Warroolaba Creek and adjacent, low-lying, alluvial land associated with the floodplain. The majority of the impact area (aside of the non-navigable steep sections and a band of vegetation associated with the main drainage feature [Warroolaba Creek]) have been historically cleared and used for cattle grazing. The flatter sections of the site remain heavily disturbed and contain evidence of long periods of grazing activities.

The topography of the project area consists of two Tertiary volcanic plugs, or hills, between which Warroolaba Creek is defined by almost canyon scale, near vertical cuttings. The steep nature of the creek results in the majority of this watercourse being dry for the most part of the year, with a number of ponds and standing water areas along the extent being present during wet periods.

Habitat quality for Koala and Grey-headed Flying-fox within the impact area was scored using a Modified Habitat Quality Assessment (MHQA). Eight (8) AUs were defined across the site to reflect the differing states of in situ vegetation composition, with transects completed within each assessment unit (**Figure 2.2**). The eight AUs were deciphered based upon aerial imagery and field survey, and it was determined that quantifying the vegetation condition of these vegetation communities separately would provide the most accurate insight into the differing state of the vegetation across the AUs.

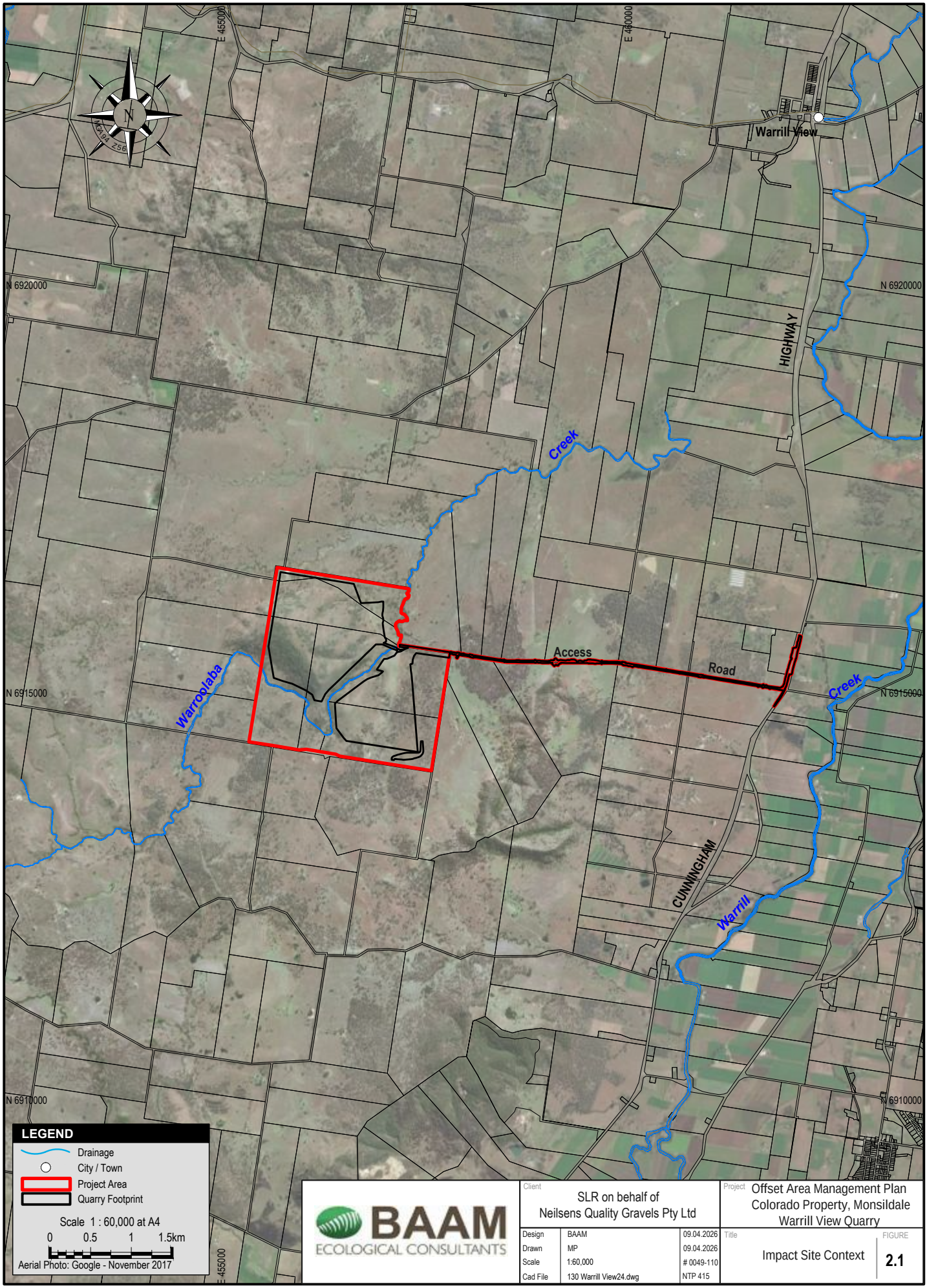
The eight AUs and associated impact areas and transect site numbers are summarised in **Table 2.1**.

For the purposes of enabling the proposed offset to be delivered in two (overlapping) stages, two corresponding impact stages have been identified, as follows:

- **Stage 1:** Clearing for the development of the access road, the East Pit and associated ancillary operations area, and a creek diversion around the south-eastern corner of the East Pit.
- **Stage 2:** Construction of the bridge over Warroolaba Creek, and clearing for the development of the West Pit and associated ancillary operations area.

Habitat quality scores for Koala and Grey-headed Flying-fox at the impact site are summarised in **Tables 2.2 and 2.3**, respectively. An overall score of 6 (out of 10) for Koala and 5 (out of 10) for Grey-headed Flying-fox indicates the impact area represents moderate quality habitat for these species.

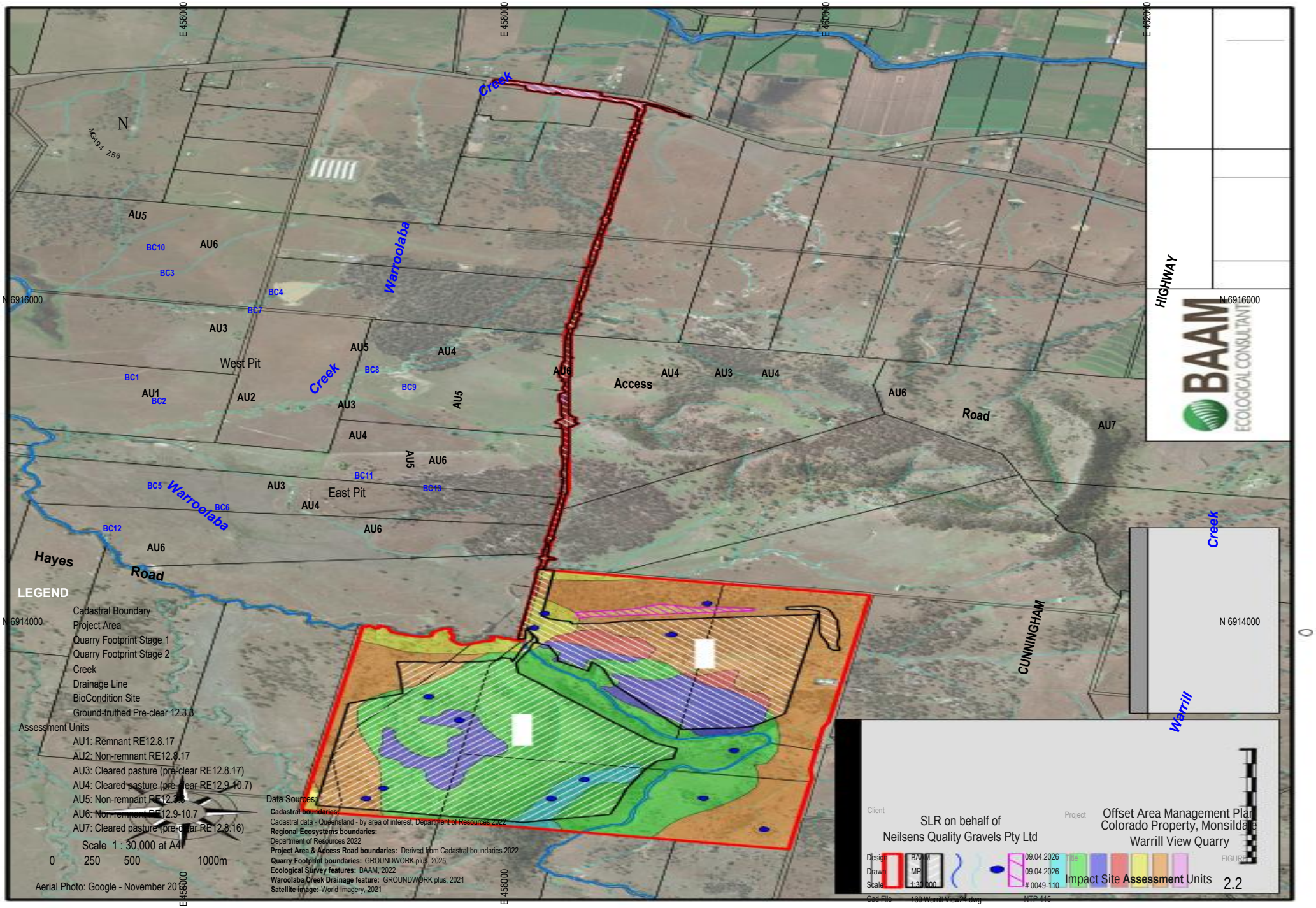
Tables 2.2 and 2.3 also confirm the percentage of the offset obligation associated with each impact stage that is to be covered by the corresponding offset stage for each species.



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Client	SLR on behalf of Neilsens Quality Gravels Pty Ltd	
Project	Offset Area Management Plan Colorado Property, Monsildale Warrill View Quarry	
Design	BAAM	09.04.2026
Drawn	MP	09.04.2026
Scale	1:60,000	# 0049-110
Cad File	130 Warrill View24.dwg	NTP 415
Title	Impact Site Context	FIGURE 2.1

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Table 2.1. Assessment Units and Transects assigned over the impact site

Assessment Unit	Pre-clear RE and current state	Total Impact (ha)	Transects established
AU1a[1]	Remnant RE12.8.17 (with canopy dieback)	4.58	BC1
AU1b[3]	Remnant RE12.8.17 (without canopy dieback)	4.58	BC2
AU2	Non-remnant RE12.8.17 (with regrowth/scattered trees)	113.59	BC3, BC4, BC5, BC6
AU3	Cleared pasture (pre-clear RE12.8.17)	41.50	BC7[2]
AU4	Cleared pasture (pre-clear RE12.9-10.7)	12.71	BC7 (refer to footnote)
AU5	Non-remnant RE12.3.3 (with regrowth/scattered trees)	6.30	BC8, BC9
AU6	Non-remnant RE12.9-10.7 (with regrowth/scattered trees)	70.95	BC10, BC11, BC12, BC13
AU7	Cleared pasture (pre-clear RE12.8.16)	5.48	BC7 (refer to footnote)

Table 2.2. Total Current Koala habitat score for the impact site.

Component	AU1a		AU1b		AU2		AU3		AU4		AU5		AU6		AU7		Average/Final
	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2	
Site Condition score (out of 3)	0.86	0.86	2.13	2.13	1.53	1.53	0.57	0.57	0.65	0.65	2.18	2.18	1.91	1.91	0.68	0.68	1.31
Site Context Score (out of 3)	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41
Species Stocking Rate Score (out of 4)	2.29	2.29	2.29	2.29	2.29	2.29	0.86	0.86	0.86	0.86	2.29	2.29	2.29	2.29	0.86	0.86	1.75
Habitat Quality score (out of 10)	*5.55*	*5.55*	*6.83*	*6.83*	*6.23*	*6.23*	*3.84*	*3.84*	*3.91*	*3.91*	*6.88*	*6.88*	*6.60*	*6.60*	*3.94*	*3.94*	5.47
Assessment Unit area (ha)	0.00	4.58	0.00	4.58	5.93	107.66	24.69	16.81	12.71	0.00	5.91	0.40	50.54	20.41	5.48	0.00	259.71
Total impact area (ha) for this MNES	259.71	259.71	259.71	259.71	259.71	259.71	259.71	259.71	259.71	259.71	259.71	259.71	259.71	259.71	259.71	259.71	259.71
Size Weighting	0.00	0.02	0.00	0.02	0.02	0.41	0.10	0.06	0.05	0.00	0.02	0.00	0.19	0.08	0.02	0.00	1.00
Weighted Habitat Quality Score	***0.00***	***0.10***	***0.00***	***0.12***	***0.14***	***2.58***	***0.36***	***0.25***	***0.19***	***0.00***	***0.16***	***0.01***	***1.28***	***0.52***	***0.08***	***0.00***	***5.80***

		% Offset
Stage 1 Weighted Quality Habitat Score	2.22	38.32
Stage 2 Weighted Quality Habitat Score	3.58	61.68
Weighted Quality Habitat Score	***5.80***	

Table 2.3 Total Current Grey-headed Flying-fox habitat score for the impact site.

Component	AU1a		AU1b		AU2		AU3		AU4		Average/Final
	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2	Stage 1	Stage 2	
Site Condition score (out of 3)	1.25	1.25	2.13	2.13	1.82	1.82	2.30	2.30	2.00	2.00	1.90
Site Context Score (out of 3)	2.09	2.09	2.09	2.09	1.18	1.18	1.23	1.23	1.18	1.18	1.55
Species Stocking Rate Score (out of 4)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
Habitat Quality score (out of 10)	*5.05*	*5.05*	*5.93*	*5.93*	*4.72*	*4.72*	*5.25*	*5.25*	*4.89*	*4.89*	5.17
Assessment Unit area (ha)	0.00	4.58	0.00	4.58	5.93	107.66	5.91	0.40	50.54	20.41	200.02
Total impact area (ha) for this MNES	200.02	200.02	200.02	200.02	200.02	200.02	200.02	200.02	200.02	200.02	200.02
Size Weighting	0.00	0.02	0.00	0.02	0.03	0.54	0.03	0.00	0.25	0.10	1.00
Weighted Habitat Quality Score	***0.00***	***0.12***	***0.00***	***0.14***	***0.14***	***2.54***	***0.16***	***0.01***	***1.24***	***0.50***	***4.83***

		% Offset
Stage 1 Weighted Quality Habitat Score	1.53	31.68
Stage 2 Weighted Quality Habitat Score	3.30	68.32
Weighted Quality Habitat Score	***4.83***	

[1] AU1a and AU1b were originally combined as AU1, but were subsequently split into separate AUs due to the presence of canopy dieback in AU1a, which affected the BioCondition score.
[2] BC7was the only transect assessed for the 'cleared pasture' condition state. This result was extrapolated for all other 'cleared pasture' AUs on site (i.e. AU4 and AU7)

3.0 OFFSET PROPERTY

3.1 OFFSET PROPERTY DESCRIPTION

"Colorado" is located on Louisadale Road, in the locality of Monsildale, approximately 25km north-west of the town of Kilcoy in the Somerset Regional Council LGA, and approximately 120km north of the impact area (**Figure 3.1**). The property covers 1,564 ha and is comprised of five lots:

- Lot 9 on SP169632.
- Lot 69 on C311668.
- Lot 116 on RP809269.
- Lot 115 on CG48.
- Lot 8 on RP851331.

As shown on **Figure 3.2**, the proposed offset area[3] will comprise the majority of the property, with other uses proposed for portions of Lots 9, 8 and 116. The portions of Lot 69 that do not form part of the proposed offset area are already required to undergo restoration of vegetation under State legislation, as described in **Section 3.3**.

Colorado adjoins the south-western boundary of Conondale National Park, which forms part of the Jimna Range extending through Jimna State Forest (**Figure 3.3**). The northern and eastern portions of the property form part of a State corridor identified by the Queensland Government's biodiversity planning assessment for south-east Queensland and recognised within the Somerset Regional Council Planning Scheme (**Figure 3.4**).

Within Colorado, elevated ridgelines fall steeply to undulating foothills, lower colluvial slopes and, eventually, narrow alluvial zones bordering minor creeklines (**Figure 3.5**) that flow westwards through the property to join Monsildale Creek, which flows into the upper reaches of the Brisbane River. There are also several permanent springs on the property, which could provide valuable water for Koala forage during extended dry periods.

The closest weather station with up to date climate statistics is Danewood Vale Station (40635), approximately 10 km to the south-east, which has been operational since 1963.

Mean annual rainfall is 1052.8 mm/year, with the majority falling between December to March. The mean maximum temperature is 23.7^{o}C, ranging from 28.2^{o}C in January to 18^{o}C in June and July; the highest maximums recorded were just below 40^{o}C (BoM, 2024).

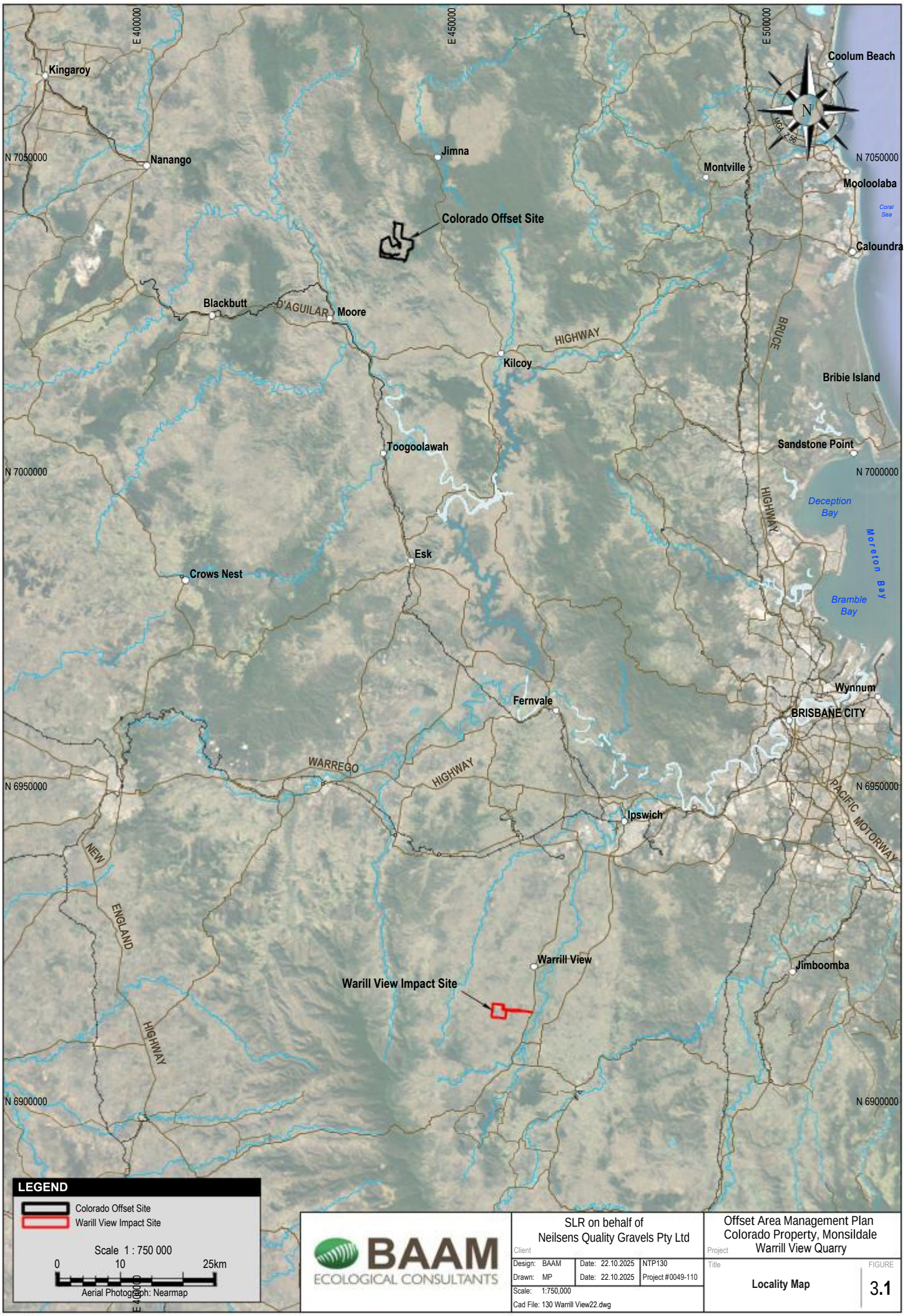
3.2 MANAGEMENT HISTORY

Colorado has been historically used for cattle grazing, including maintaining cleared pastures on creek flood zones and undulating tablelands (**Photos 3.1 and 3.2**). More than 20 dams have been established on the property, some of which have been built around natural spring expressions on elevated tablelands (**Photos 3.3 and 3.4**). The property also contains three sets of cattle yards and two camping huts. Cattle have not been fenced from watercourses, and evidence of overgrazing, bank/gully erosion and weed proliferation (particularly Lantana *Lantana camar*a) is apparent in watercourses on the lower slopes and alluvial plains and steep gorge/gully areas (**Photos 3.5 - 3.8**). Stock trails are evident on slopes, which are likely to be very compacted and subject to rill erosion.

Fire has been used as a tool on the site and neighbouring properties to reduce fuel loads and decrease risk of wildfire. Most neighbours burn heavily each year to avoid a repeat of the intense fires that ravaged the area in late 2019, and the effects of which are evident across the property (refer **Photos 3.9-3.10**).

The portions of the property within which the offset is proposed to be delivered (hereafter referred to as the "proposed offset area"), totalling 978 ha, have been selected to allow similar land uses as those described above to continue within the balance of the property. These balance lands (totalling 586 ha) will be managed to ensure there are no adverse impacts on the value of the proposed offset for the relevant species (e.g. appropriate management of fire, weeds, pests, etc).

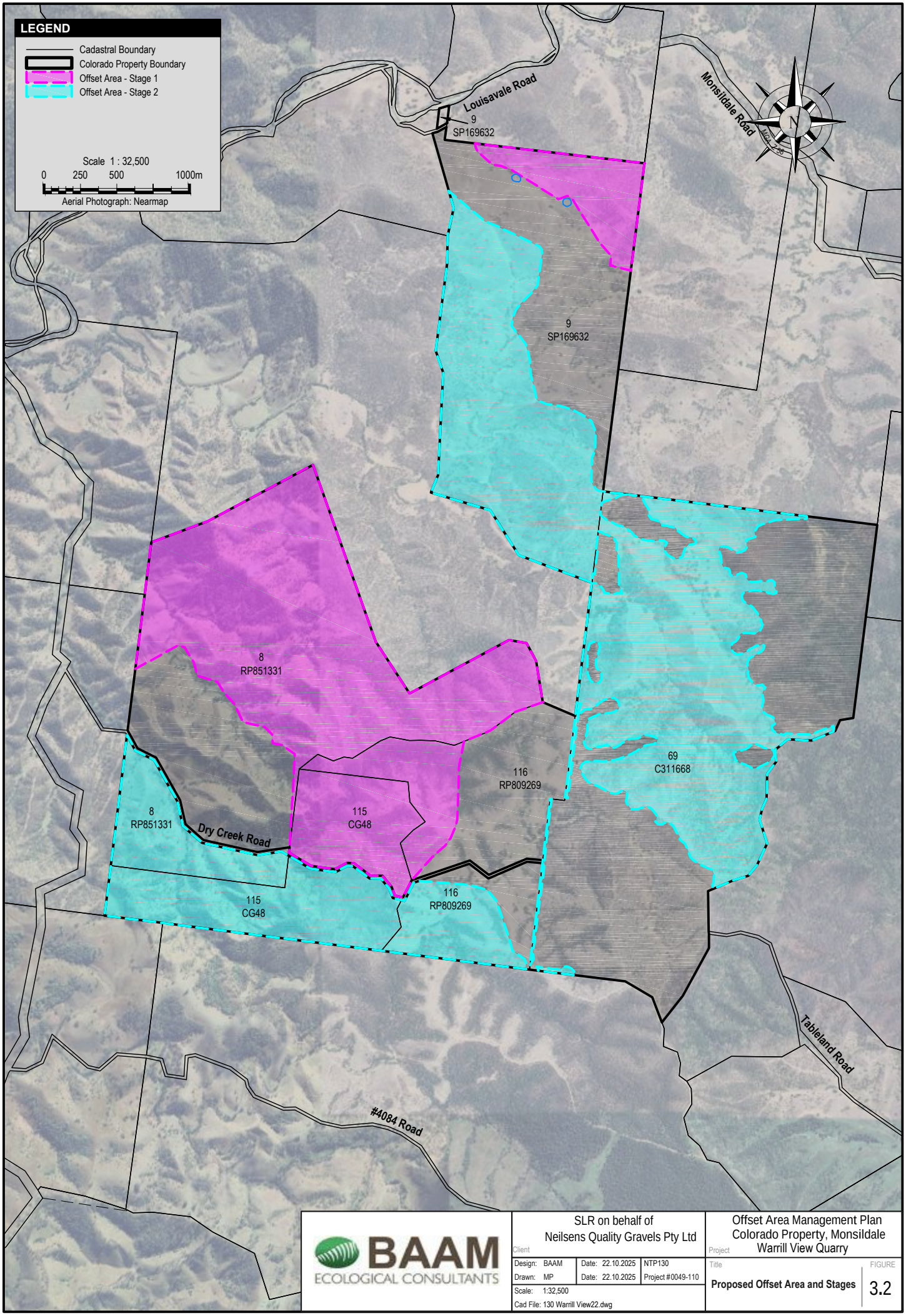
[3] The boundaries of the proposed offset area are indicative only at this stage, until suitable fencing locations/alignments are determined. Any adjustments are expected to be very minor in terms of the total area of the proposed offset area (i.e. + or - <10ha).



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Client	SLR on behalf of Neilsens Quality Gravels Pty Ltd	
Project	Offset Area Management Plan Colorado Property, Monsildale Warrill View Quarry	
Design: BAAM	Date: 22.10.2025	NTP130
Drawn: MP	Date: 22.10.2025	Project #0049-110
Scale: 1:750,000		
Cad File: 130 Warrill View22.dwg		
Title	Locality Map	FIGURE 3.1

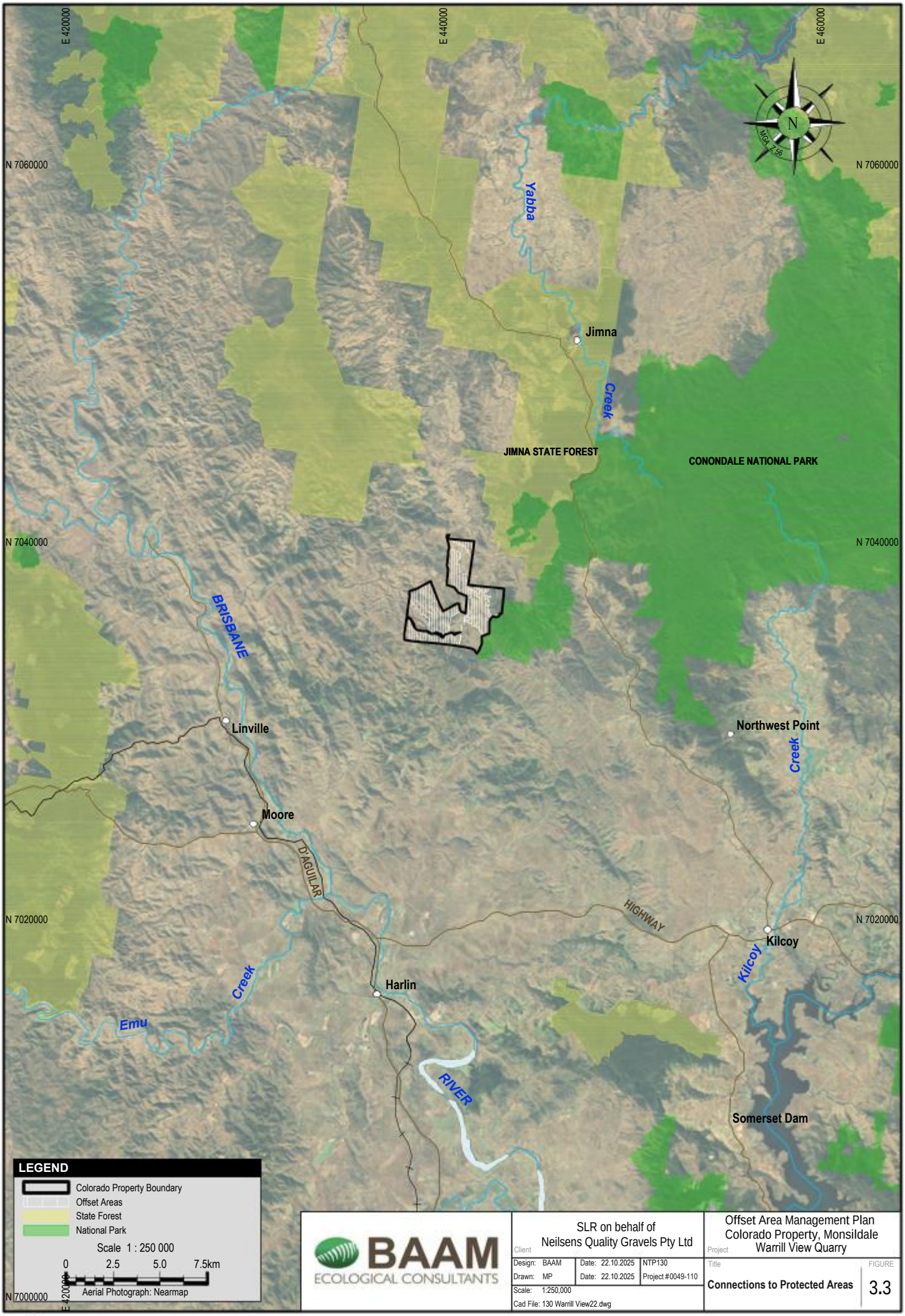
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Drawn: MP	Date: 22.10.2025	Project #0049-110	
Scale: 1:32,500			
Cad File: 130 Warrill View22.dwg			
Title	Proposed Offset Area and Stages	FIGURE	3.2

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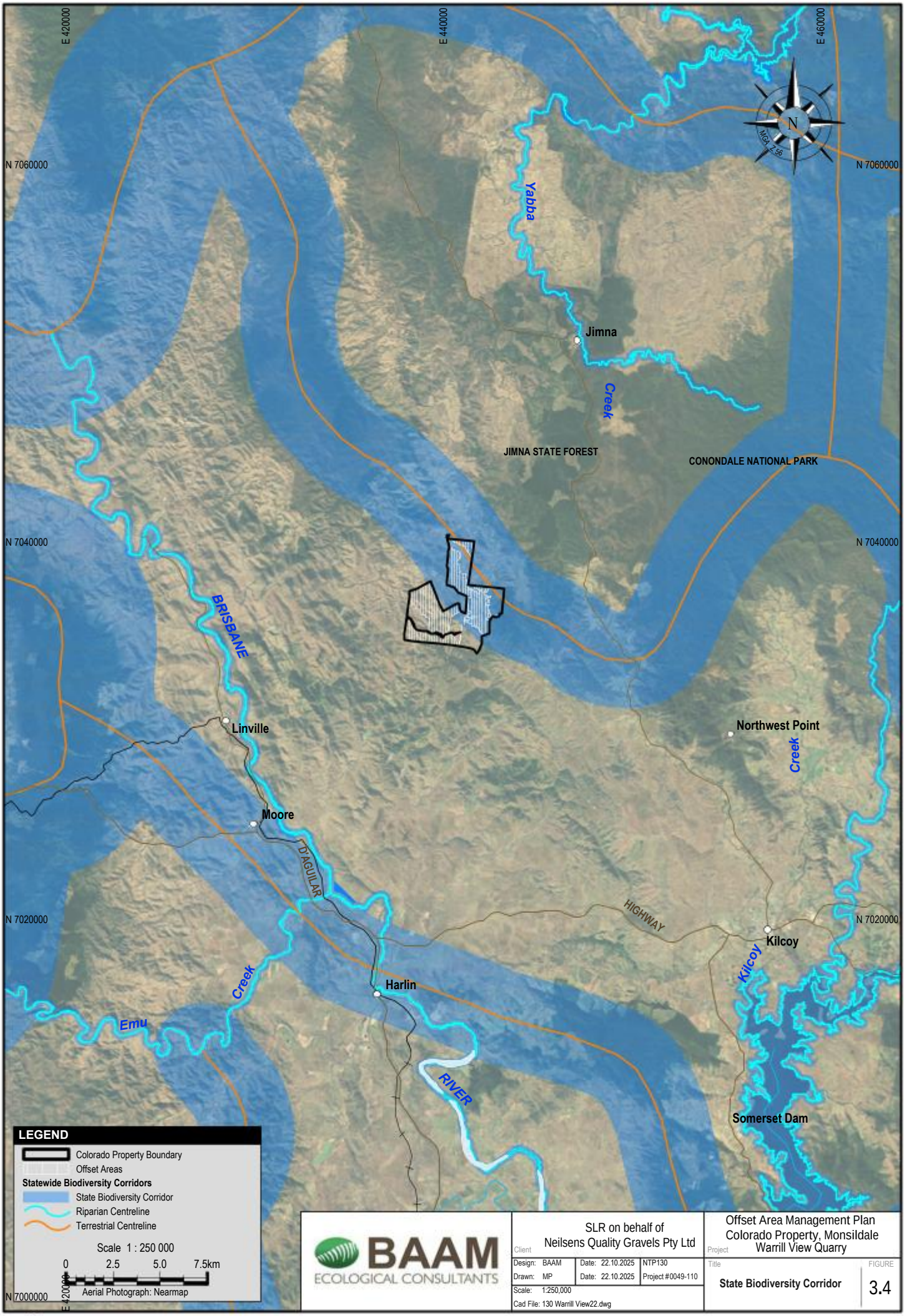


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Drawn: MP	Date: 22.10.2025	Project #0049-110	
Scale: 1:250,000			
Cad File: 130 Warrill View22.dwg			

Project	Offset Area Management Plan Colorado Property, Monsildale Warrill View Quarry
Title	Connections to Protected Areas
FIGURE	3.3

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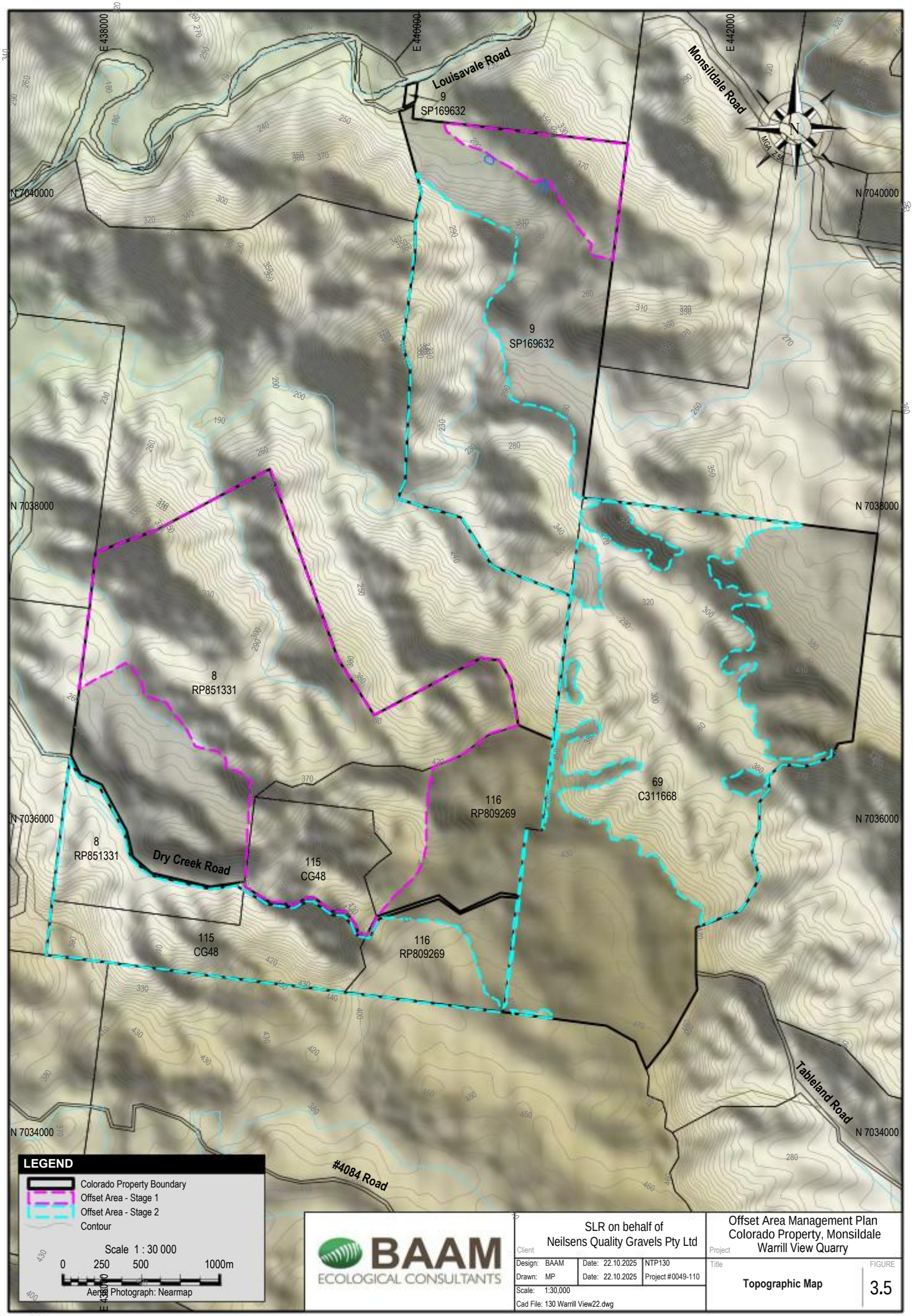
Client	SLR on behalf of Neilsens Quality Gravels Pty Ltd		
Design: BAAM	Date: 22.10.2025	NTP130	
Drawn: MP	Date: 22.10.2025	Project #0049-110	
Scale: 1:250,000			
Cad File: 130 Warrill View22.dwg			

Project: Offset Area Management Plan
Colorado Property, Monsildale
Warrill View Quarry

Title: State Biodiversity Corridor

FIGURE 3.4

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Client	SLR on behalf of Neilsens Quality Gravels Pty Ltd	Project	Offset Area Management Plan Colorado Property, Monsildale Warrill View Quarry
Design: BAAM	Date: 22.10.2025	NTP130	
Drawn: MP	Date: 22.10.2025	Project #0049-110	
Scale: 1:30,000			
Cad File: 130 Warrill View22.dwg		Title	Topographic Map
		FIGURE	3.5

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Photo 3.1. Cleared pasture on lower slopes



Photo 3.2. Cleared pasture on floodplain



Photo 3.3. Dam in lower part of site



Photo 3.4. Spring-fed dam perched adjacent to a ridgeline



Photo 3.5. Creek bank erosion



Photo 3.6. Lantana thicket



Photo 3.7. Drainage line with dense Lantana infestation



Photo 3.8. Steep gorge area with dense Lantana infestation



Photo 3.9. Dieback of large trees has resulted from fire damage



Photo 3.10. Dieback of large patches of vegetation has resulted from fire damage

3.3 VEGETATION/HABITAT

Figure 3.6 shows the majority of the property (approximately 1,036 ha) is mapped by the Queensland Government as 'non-remnant' (i.e. neither 'remnant'[4] or 'high value regrowth'[5] [HVR]) and, therefore, generally exempt from clearing regulations under the Queensland *Vegetation Management Act 1999* (VM Act). The remainder of the property comprises remnant (approximately 427 ha) and HVR (approximately 101 ha) vegetation.

It is noted that Lots 9 SP169632, 116RP809269, 115CG48 and 8RP851331 have been the subject of property maps of assessable vegetation (PMAVs) in the past, which has "locked-in" the extent of mapped non-remnant vegetation for the purposes of the VM Act, regardless of the actual maturity of the vegetation within the mapped area.

It is also noted that unauthorised clearing activities were undertaken over 218.8 ha of areas mapped as remnant within Lot 69 C311668 between 2006 and 2009, and these areas are subject to a vegetation restoration notice from the Queensland Government; hence, these areas may not yet actually comprise remnant vegetation, but are protected as remnant vegetation for the purposes of the VM Act (refer **Figure 3.6**). As these areas are already required to undergo restoration of vegetation under State legislation, they do not form part of the proposed offset area.

Table 3.1 provides the areas of each category of State mapped vegetation within the proposed offset area, using the State's pre-clear RE mapping to attribute cleared land to REs.

Recent field surveys have confirmed that the State's mapping of remnant and high value regrowth is generally accurate in terms of extent, although some discrepancies were noted in terms of their remnant status and vegetation composition; i.e.:

- The mapped patch of remnant RE 12.12.12 in the north-east corner of Lot 9 was found to comprise regrowth, rather than remnant, vegetation.
- A portion of a patch of regrowth RE 12.12.15 (mixed open forest including combinations of *Eucalyptus propinqua, E. siderophloia, Corymbia intermedia, E. microcorys, Lophostemon confertus* open forest on Mesozoic to Proterozoic igneous rocks) in Lot 8 was found to comprise vegetation more representative of remnant RE 12.12.12 (*Eucalyptus tereticornis, Corymbia intermedia, E. crebra* +/- *Lophostemon suaveolens* woodland on Mesozoic to Proterozoic igneous rocks).
- Other patches of remnant and regrowth RE 12.12.15 were found to comprise vegetation dominated by Brushbox *Lophostemon confertus*; i.e. more representative of RE 12.12.15b (*Lophostemon confertus* open forest +/- *Eucalyptus microcorys, E. siderophloia, E. carnea, E. propinqua* and vine forest species often present in understorey), which typically occurs in gullies and exposed ridges on Mesozoic to Proterozoic igneous rocks often amongst vine forest.

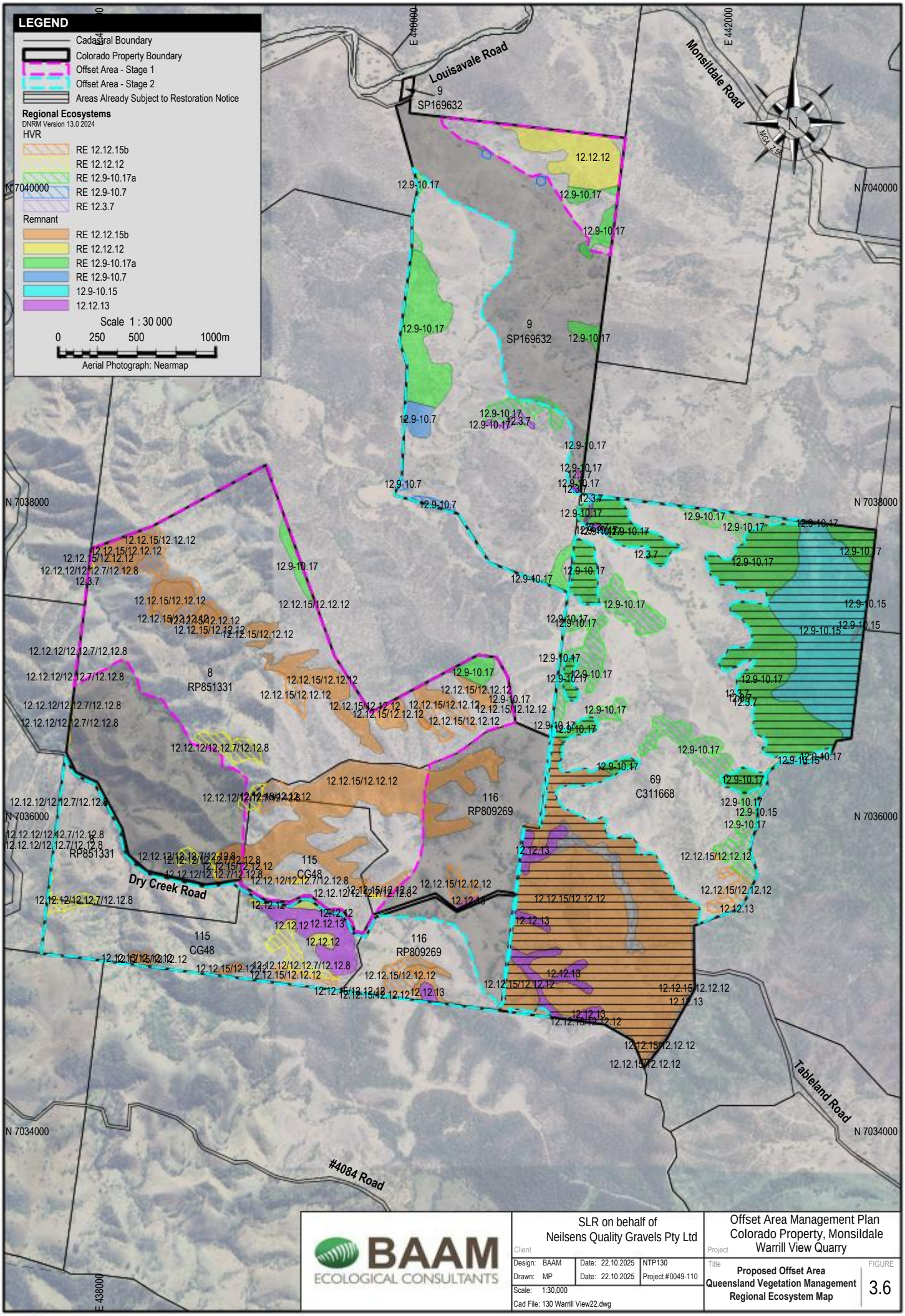
Table 3.1. Queensland state government mapping of vegetation types within the proposed offset area, as per the *Vegetation Management Act* Map spatial layer, version 12.0

REs	Cleared/Non-remnant (ha)*	High Value Regrowth (ha)	Remnant (ha)
12.12.12	-	-	19.22
12.12.12/12.12.7/12.12.8	163.44	12.81	-
12.12.12/12.12.8/12.12.13	12.47	-	-
12.12.13	5.65	-	12.13
12.12.15/12.12.12	218.23	32.64	74.93
12.3.7	16.93	1.30	-
12.9-10.17	274.24	43.75	35.28
12.9-10.7	49.96	1.54	3.27

*Based on Pre-clear mapping.

[4] Vegetation that has or has not been cleared but where the dominant canopy has greater than 70% of the height and greater than 50% of the cover relative to the undisturbed height and cover of that stratum and is dominated by species characteristic of the vegetation's undisturbed canopy.

[5] Vegetation (not otherwise classified as remnant) in an area that has not been cleared for at least 15 years.



BAAM ECOLOGICAL CONSULTANTS	SLR on behalf of Neilsens Quality Gravels Pty Ltd (Client)	Offset Area Management Plan Colorado Property, Monsildale Warrill View Quarry (Project)	
	Design: BAAM; Date: 22.10.2025; NTP130	Title: Proposed Offset Area Queensland Vegetation Management Regional Ecosystem Map	FIGURE 3.6
	Drawn: MP; Date: 22.10.2025; Project #0049-110		
	Scale: 1:30,000		
	Cad File: 130 Warrill View22.dwg		

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- Patches of remnant and regrowth RE 12.9-10.17 (*Eucalyptus acmenoides, E. major, E. siderophloia +/- Corymbia citriodora subsp. variegata* open forest on sedimentary rocks) were found to comprise vegetation dominated by Brushbox *Lophostemon confertus*; i.e. more representative of RE 12.9-10.17a (*Lophostemon confertus or L. suaveolens* dominated open forest usually with emergent *Eucalyptus* and/or *Corymbia* species), which typically occurs in gullies and southern slopes on Cainozoic and Mesozoic sediments.

Table 3.2 provides the areas of each category of State mapped vegetation within the proposed offset area, using the State's pre-clear RE mapping to attribute cleared land to REs, and accounting for the results of recent ground-truthing surveys outlined above.

The recent field surveys also found that overgrazing and bank erosion from stock movement has resulted in greatly reduced species diversity along riparian areas, and there are no native grasses and very limited native forbs found along adjacent flood plains. Native grasses and forbs are in abundance on slopes, while the extent of pasture grasses is greatly reduced, except along the top of ridgelines where there is no canopy vegetation. Lantana is present in wetter gullies, but occurs in relatively low amounts on the slopes.

Surveys undertaken on 1, 9-11 and 29-30 April and 1 May 2025 included targeted observations and representative transects (refer **Figure 3.7**) to delineate the proposed offset property into distinct weed treatment zones, based on characteristic weed assemblages in terms of species and densities, as summarised in **Table 3.3** and shown on **Figure 3.8.**

Weeds of National Significance (WoNS) and other, State-restricted weeds identified within the proposed offset area include:

- Lantana *Lantana camara*
- Creeping Lantana *Lantana montevidensis*
- Giant Rats-tail Grass *Sporobolus pyramidalis / S. natalensis*
- Broad-leaved Pepper *Schinus terebinthifolius*
- Prickly Pear *Opuntia tomentosa*
- Balloon Vine *Cardiospermum grandiflorum*
- Cat's Claw Creeper *Dolichandra unguis-cati*

Other environmental weeds recorded include:

- Ballon Bush *Gomphocarpus physocarpus*
- Red Natal Grass *Melinis repens*
- Fountain Grass *Pennisetum setaceum*
- Scotch Thistle *Onopordum acanthium*
- South African Pigeon Grass *Setaria sphacelate*
- Medic *Medicago polymorpha*
- Purple Top Verbena *Verbena bonariensis*
- Roundleaf Sensitive Pea *Chamaecrista rotundifolia*
- Biddens *Biddens ilosa'*
- Rhodes Grass *Chloris gayana*
- Arsenic Bush *Senna septemtrionalis*
- Wild Tobacco *Solanum mauritianum*
- Bunchy Sedge *Cyperus polystchyos*
- Flannel Weed *Sida cordifolia*
- Blue Heliotrope *Heliotropium amplexicaule*

In order to quantify the relative condition of vegetation and associated habitats, BioCondition assessments were undertaken in accordance with Eyre *et al.* (2015) - *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual. Version 2.2* in representative areas of vegetation communities recorded within the proposed offset property. As per the prescribed methodology, the property was divided into Assessment Units (AUs), these being areas of relatively homogenous vegetation defined by a distinct RE and broad condition state. A description of the AUs assigned across the property, and the associated BioCondition and habitat quality scores, are provided in **Sections 5.1 and 5.2**. The results indicate vegetation across the majority of the property is in poor-moderate condition, averaging 3.5-6.9 out of 10. Remnant areas are in relatively good condition, averaging 5.5-8.6 out of 10.

Table 3.2. Queensland state government mapping of vegetation types within the proposed offset area, as per the *Vegetation Management Act* Map spatial layer, version 12.0, accounting for the results of recent ground-truthing surveys

REs	Cleared/Non-remnant (ha)*#	High Value Regrowth (ha) #	Remnant (ha) #
12.12.12	-	29.38	3.41
12.12.12/12.12.7/12.12.8	165.39	-	-
12.12.12/12.12.8/12.12.13	12.47	-	-
12.12.13	5.65	-	12.13
12.12.15/12.12.12	221.95	-	-
21.12.15b	-	33.20	75.54
12.3.7	16.95	1.31	-
12.9-10.17	275.45	-	-
12.9-10.17a	-	45.87	35.96
12.9-10.7	50.08	1.56	3.29

*Based on Pre-clear mapping.

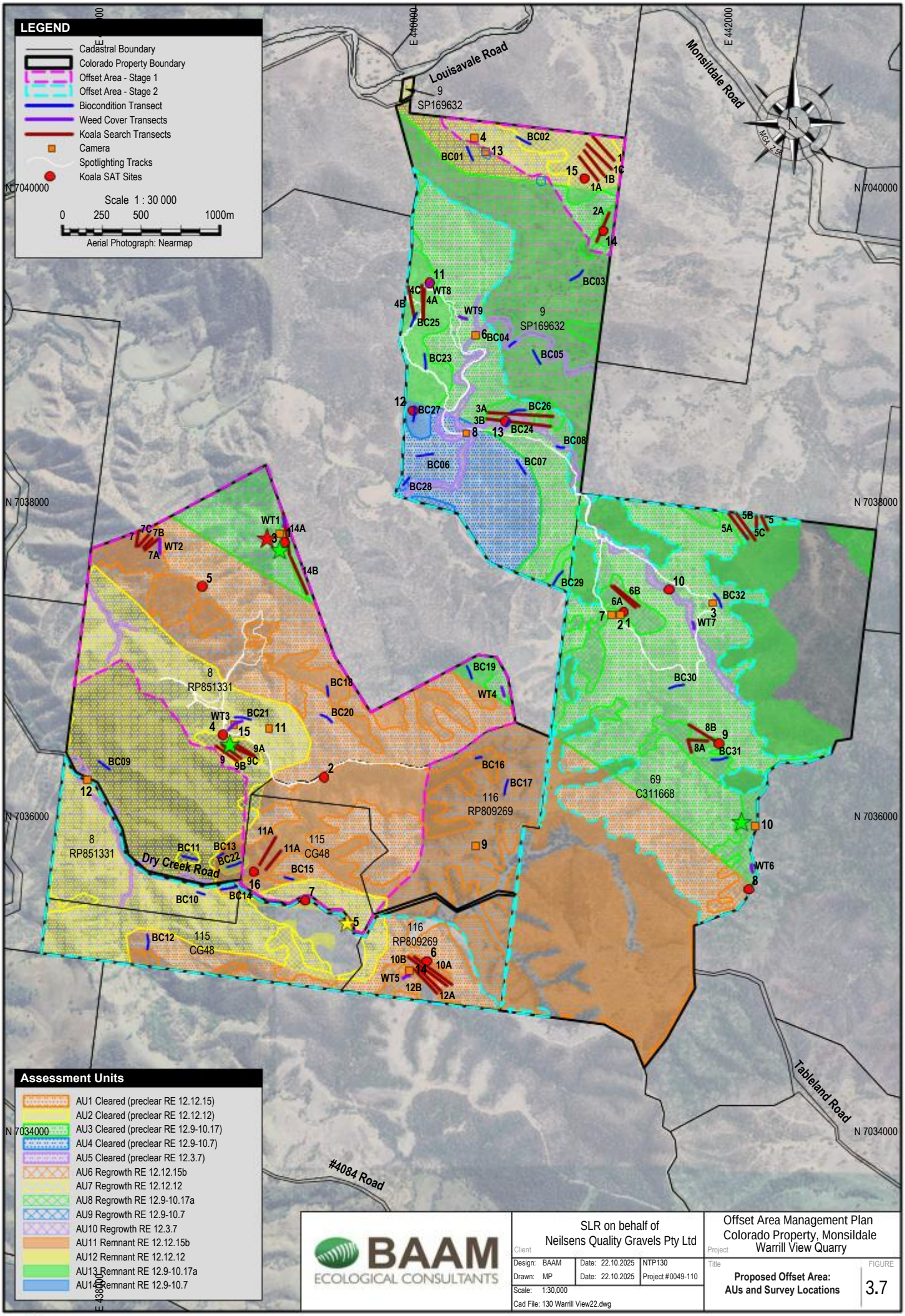
The boundaries of the proposed offset area are indicative only at this stage, until suitable fencing locations/alignments are determined. Any adjustments are expected to be very minor in terms of the total area of the proposed offset area (i.e. + or - <10ha), and associated AUs.

Table 3.3. Weed Zones

Zone*/Description	Representative Photograph
Zone 1a Dense stands of Lantana *Lantana camara* and other woody weeds within creek lines and surrounding slopes. Often becoming less dense with increasing distance and elevation from creek. **Significant weeds:** • Lantana • Balloon Vine • Cats Claw Creeper	
Zone 1b Dense stands of Lantana within steep gullies. **Significant weeds:** • Lantana	

Zone*/Description	Representative Photograph
Zone 2 Mid-dense stands of Lantana on steep slopes. **Significant weeds:** • Lantana • Creeping Lantana	
Zone 3 Dense patches of herbaceous weeds in open pasture areas, predominantly Balloon Cotton Bush *Gomphocarpus physocarpus*	
Zone 4 Occasional Lantana on slopes co-dominated by pasture grasses or eucalypt regrowth. Lantana mostly occurring underneath retained paddock trees. **Significant weeds:** • Lantana • Creeping Lantana • Giant Rat's Tail Grass • Swamp Foxtail Grass	
Zone 5 Groundcover generally dominated by native pasture grasses.	

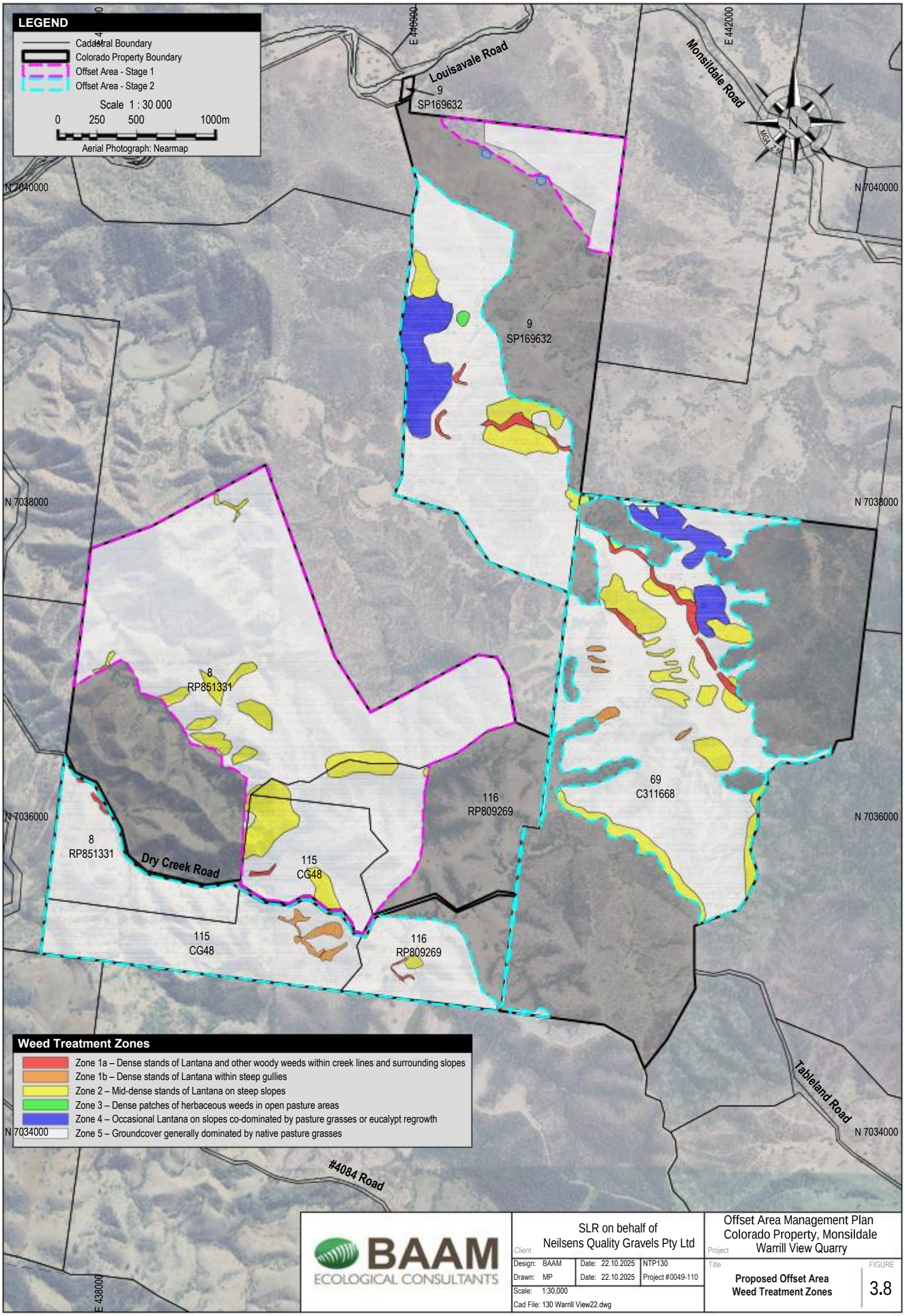
*Refer **Figure 3.8.**



BAAM ECOLOGICAL CONSULTANTS

Client	SLR on behalf of Neilsens Quality Gravels Pty Ltd		
Project	Offset Area Management Plan Colorado Property, Monsildale Warrill View Quarry		
Design: BAAM	Date: 22.10.2025	NTP130	
Drawn: MP	Date: 22.10.2025	Project #0049-110	
Scale: 1:30,000			
Cad File: 130 Warrill View22.dwg			
Title	Proposed Offset Area: AUs and Survey Locations	FIGURE	3.7

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Scale: 1:30,000			
Cad File: 130 Warrill View22.dwg			
Title	**Proposed Offset Area Weed Treatment Zones**	FIGURE	3.8

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4.0 SUITABILITY FOR IMPACT MNES SPECIES

4.1 SUITABILITY FOR KOALA

Existing and historic (pre-clear) RE mapping is shown on **Figures 3.6 and 4.1**, indicating the presence of remnant, high value regrowth and pre-clear REs 12.2.12, 12.12.13, 12.12.15, 12.9-10.17 and 12.9-10.7 on the ridges and slopes and RE 12.3.7 along creeks and drainage lines within and adjacent to Colorado. It contains, and is bordered to the north-west and south-east by, areas mapped by the Queensland Government as Koala habitat (**Figure 4.2**), associated with REs 12.2.12, 12.12.15, 12.9-10.17, 12.9-10.7 and 12.3.7.

RE 12.12.12 is described as *Eucalyptus tereticornis, Corymbia intermedia, E. crebra +/- Lophostemon suaveolens* woodland on Mesozoic to Proterozoic igneous rocks. A 'special value' of the RE from the RE description is that it is known to provide suitable habitat for Koalas (State of Queensland, 2023). Consideration of the dominant canopy species indicates the RE has high foraging value for Koala (DAWE 2022a), while the Queensland Government's *Spatial modelling for koalas in South East Queensland v4.0* (State of Queensland, 2023) ranks this RE as of medium value for Koala.

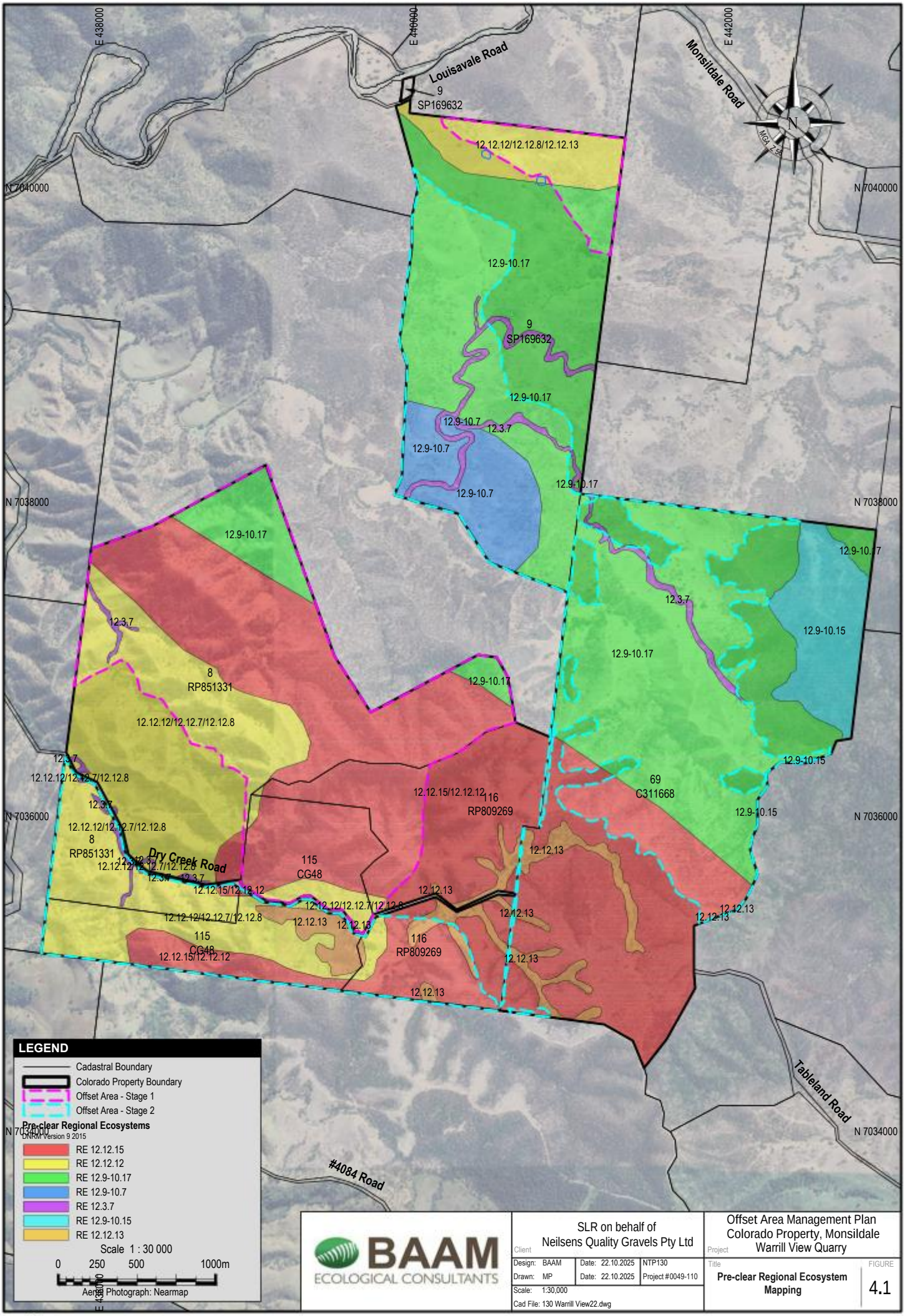
RE 12.12.15 is described as mixed open forest including combinations of *Eucalyptus propinqua, E. siderophloia, Corymbia intermedia, E. microcorys, Lophostemon confertus* open forest on Mesozoic to Proterozoic igneous rocks. A 'special value' of the RE from the RE description is that it is known to provide suitable habitat for Koalas. Consideration of the dominant canopy species indicates the RE can have high foraging value for Koala (DAWE 2022a), while this RE is ranked as providing medium value for Koala (State of Queensland, 2023). As noted in **Section 3.1.3**, remnant and regrowth patches of this RE on site were found to be more representative of RE 12.12.15b (*Lophostemon confertus* open forest +/- *Eucalyptus microcorys, E. siderophloia, E. carnea, E. propinqua* and vine forest species often present in understorey), which is also ranked as of medium value for Koala by State of Queensland (2023).

RE 12.9-10.17 is described as *Eucalyptus acmenoides, E. major, E. siderophloia +/- Corymbia citriodora subsp. variegata* open forest on sedimentary rocks. A 'special value' of the RE from the RE description is that it is known to provide suitable habitat for Koalas. This RE is ranked as providing high value for Koala (State of Queensland, 2023). As noted in **Section 3.1.3**, remnant and regrowth patches of this RE on site were found to be more representative of RE 12.9-10.17a (*Lophostemon confertus or L. suaveolens* dominated open forest usually with emergent *Eucalyptus* and/or *Corymbia* species), which is ranked as of low value for Koala by State of Queensland (2023).

RE 12.9-10.7 is described as *Eucalyptus crebra +/- E. tereticornis, Corymbia tessellaris, Angophora spp. and E. melanophloia woodland on sedimentary rocks*. A 'special value' of the RE from the RE description is that it is known to provide suitable habitat for Koalas. Consideration of the dominant canopy species indicates the RE can have high foraging value for Koala (DAWE 2022a), while this RE is ranked as providing medium value for Koala (State of Queensland, 2023).

RE 12.3.7 is described as *Eucalyptus tereticornis, Casuarina cunninghamiana subsp. cunninghamiana +/- Melaleuca spp. fringing woodland*. A 'special value' of the RE from the RE description is that it is known to provide suitable habitat for Koalas. Consideration of the dominant canopy species indicates the RE has high foraging value for Koala (DAWE 2022a), while this RE is ranked as providing medium value for Koala (State of Queensland, 2023).

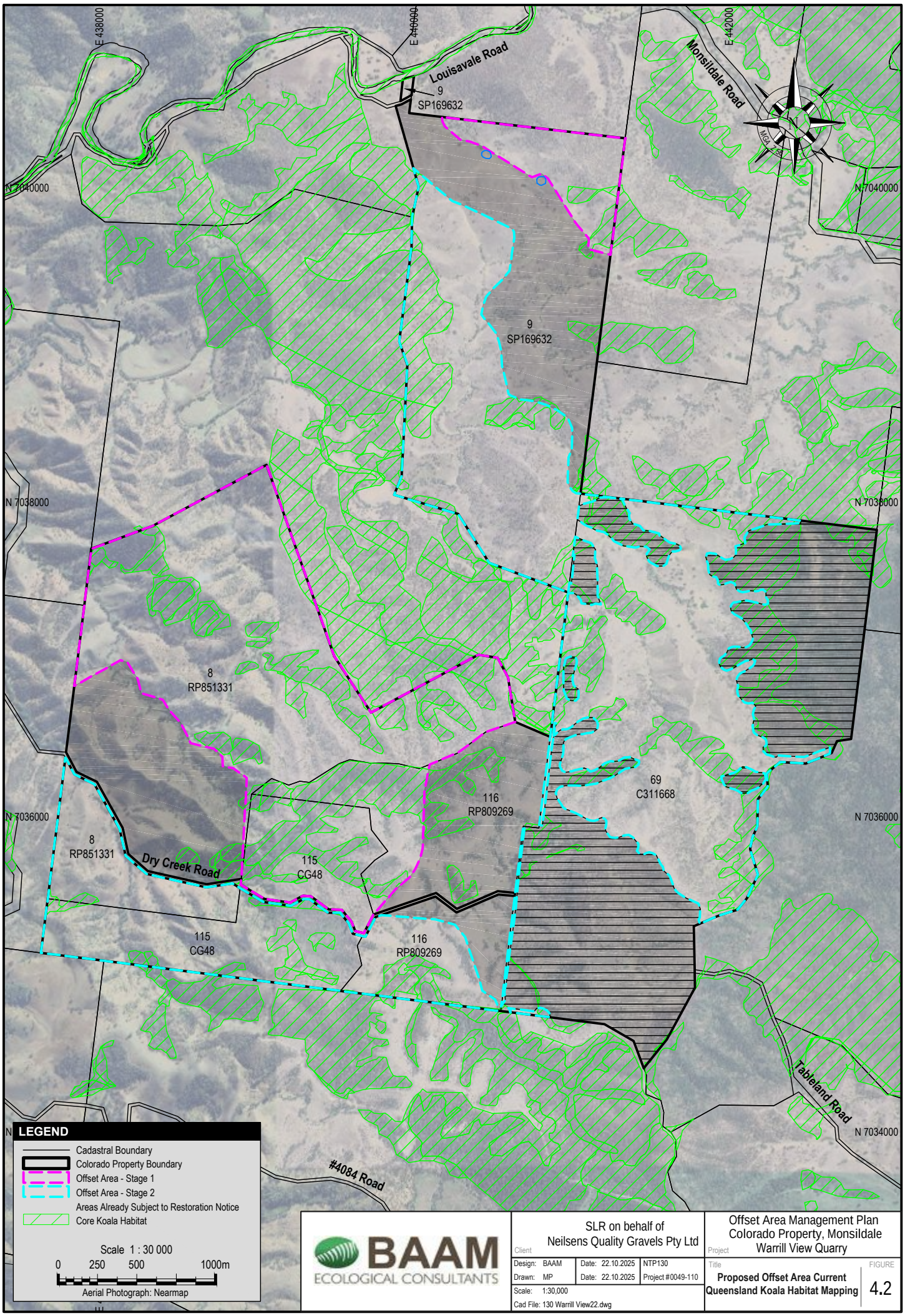
RE 12.12.13 is a microphyll/notophyll vine forest RE, which is not considered to represent suitable Koala habitat, although this only makes up a relatively small area of the existing and historic vegetation on the property, and only 17.7 ha (1.8%) of the proposed offset area.



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Scale: 1:30,000			
Cad File: 130 Warrill View22.dwg		Title	Pre-clear Regional Ecosystem Mapping
		FIGURE	4.1

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Project: Offset Area Management Plan Colorado Property, Monsildale Warrill View Quarry

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Drawn: MP	Date: 22.10.2025	Project #0049-110
Scale: 1:30,000		
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Title: **Proposed Offset Area Current Queensland Koala Habitat Mapping**

FIGURE 4.2

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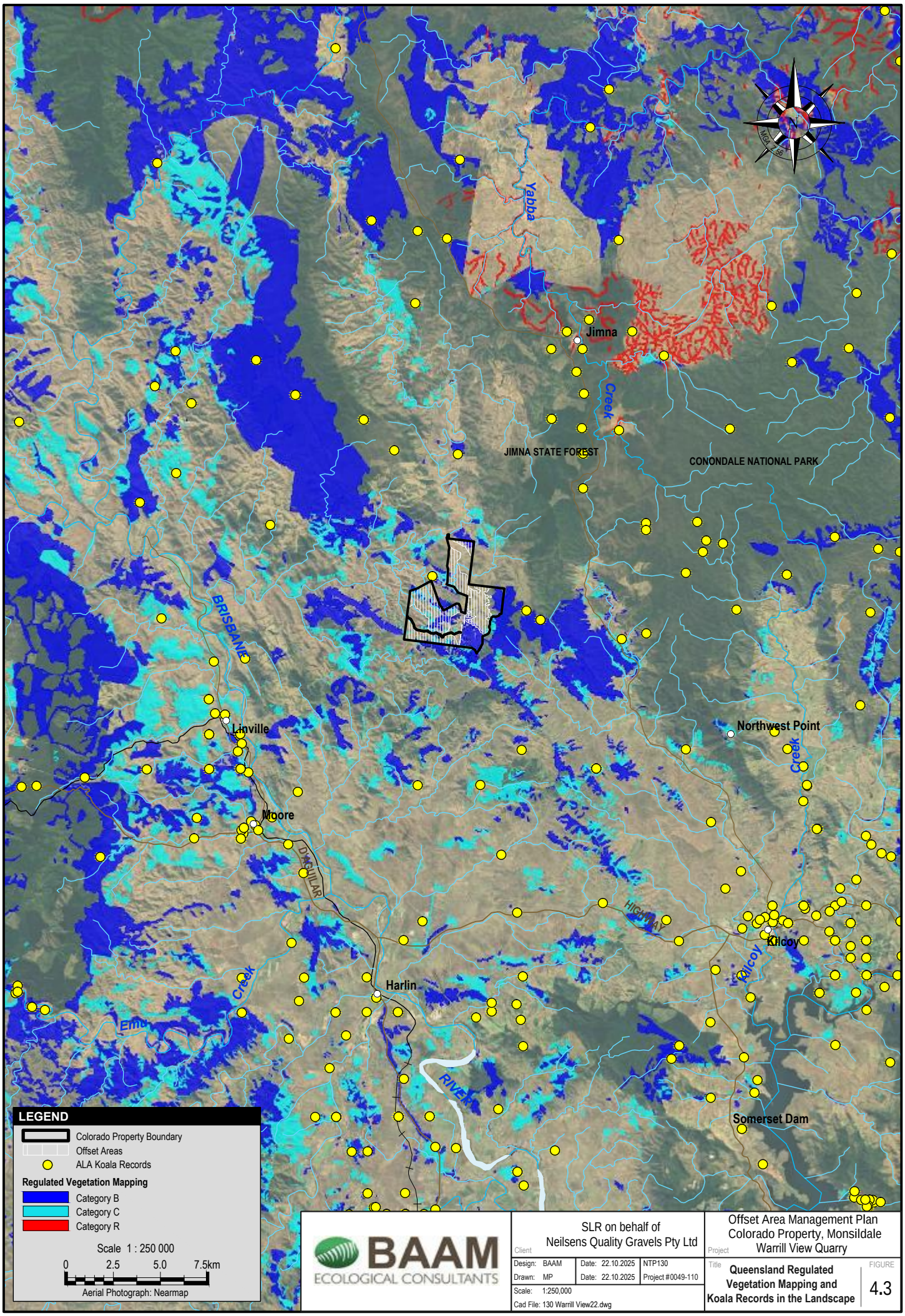
Colorado is well-located to provide valuable Koala habitat on the tablelands, ridges, slopes and wetter, more fertile lower slopes and flood zones of the drainage lines, which are currently cleared and are similarly cleared in much of the surrounding landscape where beef cattle production dominates land use. Riparian habitats provide particularly important refuge for Koalas during times of drought (Reed and Lunney 1990), facilitate local movement (Davies *et al*. 2013), and are important for long distance dispersal (McAlpine et al. 2006; Norman *et al.* 2019), with Koala persistence within riparian areas supported by the presence of intact, non-riparian habitat (Smith *et al.* 2013).

At present, the riparian habitats are largely degraded by cattle access and weed growth, and are not bordered by non-riparian habitat due to clearing of hill slopes and flood zones for grazing purposes. Restoring and maintaining Koala habitat connectivity between the riparian and ridgeline habitats would have significant benefits by enabling Koalas to safely inhabit and move between the range of altitudinal habitats for feeding and breeding purposes and to seek refuge during periods of climatic extremes. Revegetation of most of the property would also consolidate larger patches of Koala habitat to the north-west and south-east, and enhance connections between the adjacent Conondale National Park and other protected areas to the north, including Squirrel Creek and Jimna State Forests.

There are 303 post-1980 records of Koala in the Queensland WildNet database within 20km of the property (**Appendix 1**). The Atlas of Living Australia (ALA) provides publicly available location data for species, including those records held by the Queensland Government. **Figure 4.3** shows the locations of these Koala records in the landscape over the Queensland Government's Regulated Vegetation Mapping (where "Category B" represents remnant vegetation, "Category C" represents HVR, and "Category R" represents native woody vegetation located within 50 metres of a watercourse in particular Great Barrier Reef catchments). There are multiple Koala records from the surrounding area, present within mapped remnant and regrowth vegetation, and throughout the lands mapped as 'non-remnant' (Category X), which incorporates cleared, regrowth and sometimes remnant vegetation that was not mapped as remnant or regrowth vegetation in 2016 when the Queensland Government allowed landholders to "lock in" unmapped vegetation as Category X to avoid a rush to clear remnant vegetation prior to changes to the VM Act. It is also noted that protected areas (i.e. National Parks and State Forests) are not mapped as "Regulated Vegetation" as the clearing of these areas is regulated under other legislation.

Surveys undertaken on 1, 9-11 and 29-30 April and 1 May 2025 included targeted diurnal and nocturnal searches for Koala, as well as targeted searches for evidence of Koala activity (i.e. thoroughly searching the ground surface beneath trees for distinctive scats) using the Spot Assessment Technique (SAT) method described in Phillips and Callaghan (2011) (refer **Figure 3.7** for survey locations). These surveys confirmed the presence of Koala on the proposed offset property, including an opportunistic sighting in the north-eastern portion of Lot 69, and the presence of scats in Lots 8, 9 and 115 (**Photo 4.1 and 4.2, Figure 4.4**). A Koala was also sighted on an adjacent property during initial site investigations in late 2023 (**Photo 4.3, Figure 4.4**). Overall, the survey results suggest Koalas currently occur low densities, with only five of the 16 SAT sites, and 5% of trees searched at SAT sites overall, showing evidence of Koalas, while no Koalas were observed along targeted, diurnal search transects or during spotlighting (refer to survey data in **Appendix 2**).

Seven camera traps were also deployed over the period 9/10 April to 30 April/1 May 2025 (refer **Figure 3.7**), which confirmed the presence of Dingo/wild dog and foxes (recognised threats to Koala) in Lots 8, 69 and 115 (**Photos 4.4-4.6, Figure 4.4, Appendix 2**).



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Project: Offset Area Management Plan Colorado Property, Monsildale Warrill View Quarry

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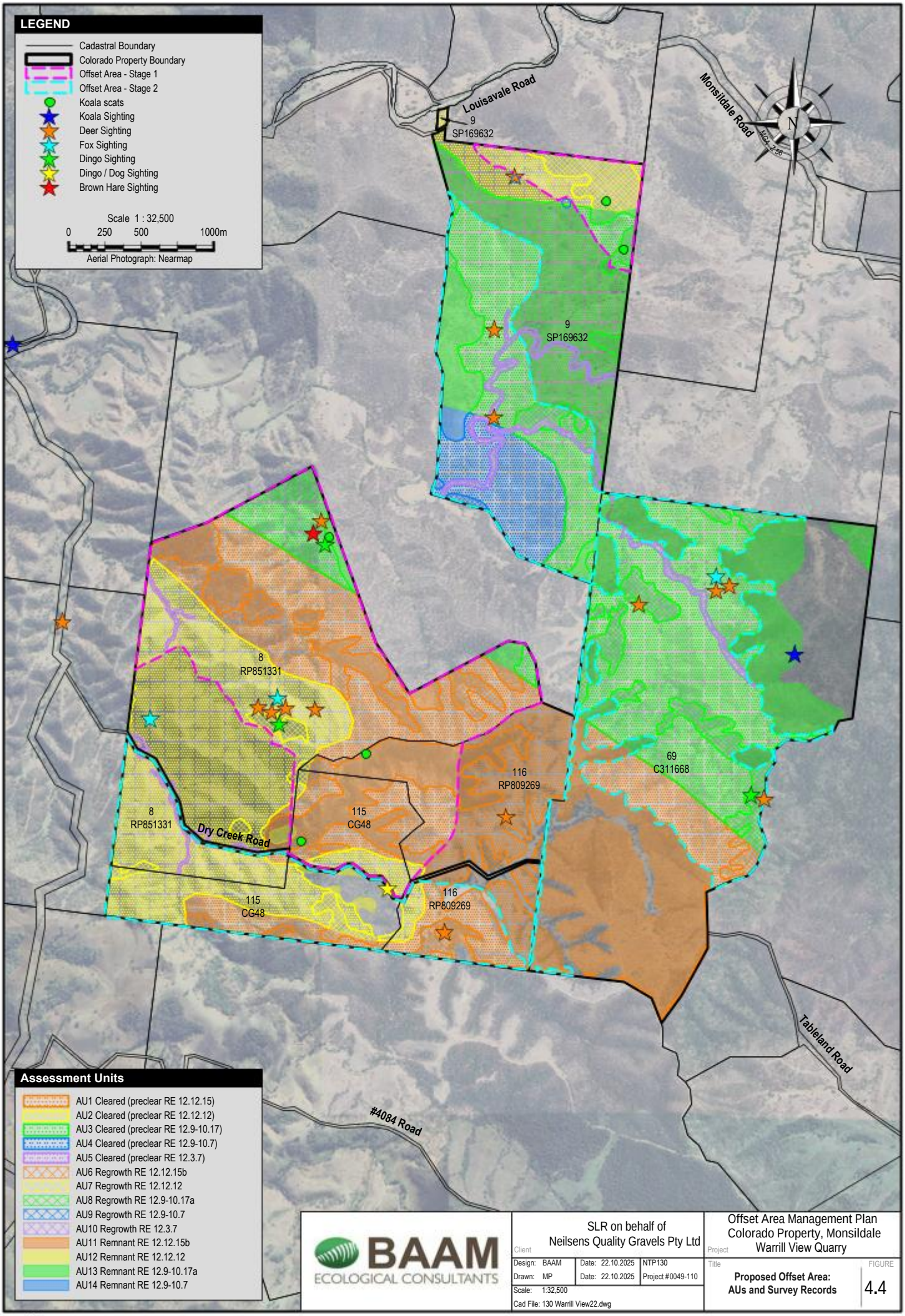
Scale: 1:250,000

Cad File: 130 Warrill View22.dwg

Title: **Queensland Regulated Vegetation Mapping and Koala Records in the Landscape**

FIGURE 4.3

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Design: BAAM	Date: 22.10.2025	NTP130	
Drawn: MP	Date: 22.10.2025	Project #0049-110	
Scale: 1:32,500			
Cad File: 130 Warrill View22.dwg		Title	Proposed Offset Area: AUs and Survey Records
		FIGURE	4.4

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Photo 4.1. Koala sighted on Colorado property



Photo 4.2. Koala sighted adjacent to Colorado property



Photo 4.3. Koala scats from SAT site 15 (highest Koala activity here)



Photo 4.4. Dingo recorded on Colorado property



Photo 4.5. Dingo recorded on Colorado property



Photo 4.6. Fox recorded on Colorado property

4.2 SUITABILITY FOR GREY-HEADED FLYING-FOX

There are four records of Grey-headed Flying-fox in the Atlas of Living Australian and five records in the Queensland WildNet databases within 20km of the property (**Figure 4.5**). These records are not anticipated to be the full representation of the species abundance and distribution in the landscape, due to: (1) Grey-headed Flying-fox is listed as common in Queensland and has therefore not historically been targeted for survey, (2) the species is active nocturnally (often in extensive and inaccessible woodlands and forests in response to flowering events), and (3) Grey-headed Flying-fox can be difficult to distinguish from Black Flying-fox for untrained observers.

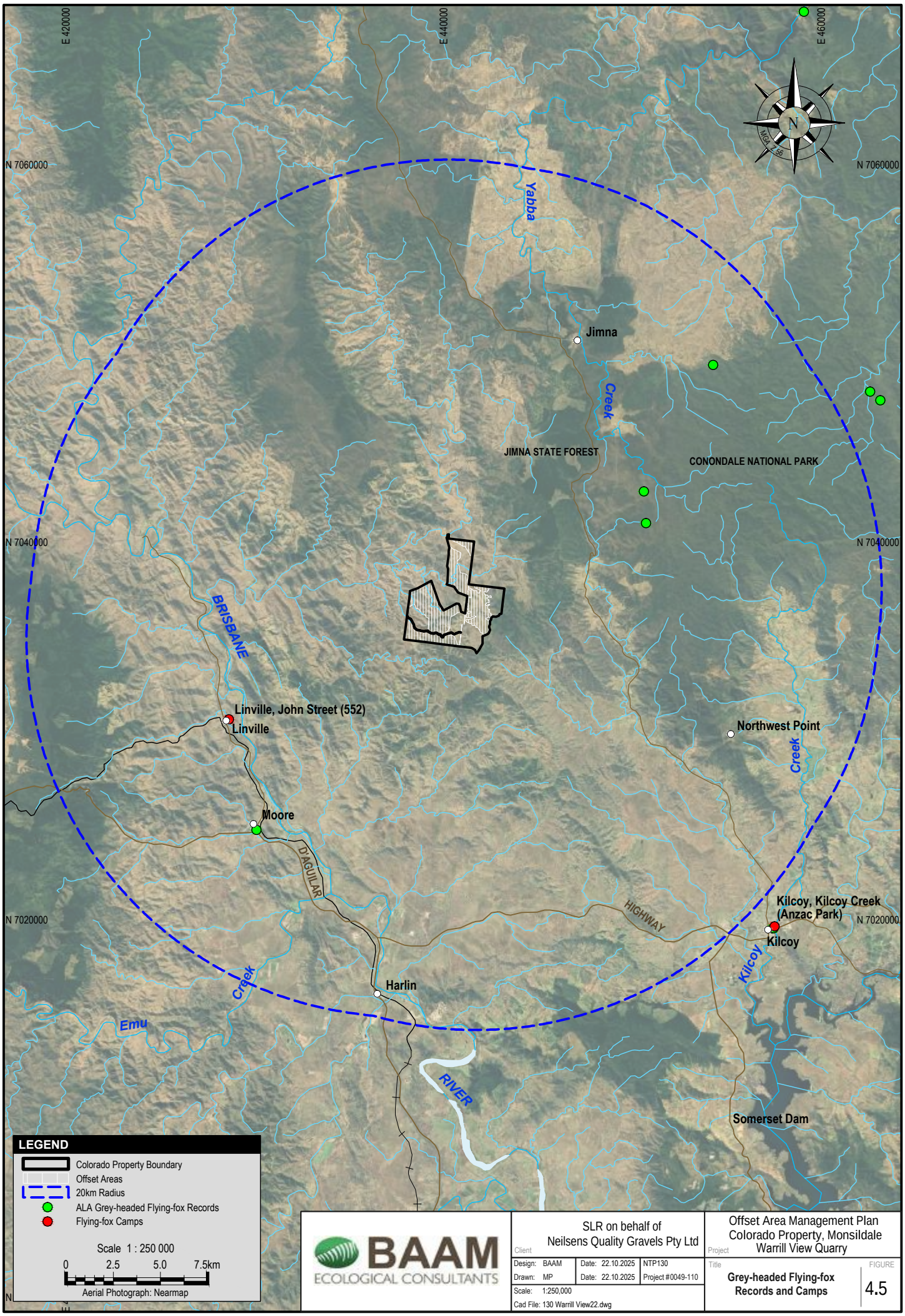
Spotlighting surveys undertaken on 29 and 30 April 2025 did not record Grey-headed Flying-fox within the proposed offset area during spotlighting, although it is acknowledged that the national *Survey Guidelines for Australia's Threatened Bats* (DEWHA 2010) states (in relation to Grey-headed Flying-fox) the following:

- Presence will be dependent on food resources. The time and location of flowering and fruiting of diet plants varies among seasons and years. In particular, drought years can have a strong influence on eucalypt flowering times. Sites noted as important in one year or period may not be visited again in the following year. In short, the presence or absence of this species at a site during a particular time or year may not necessarily be indicative of the importance of that habitat area to the species.
- The Grey-headed Flying-fox occupies most areas in their distribution in highly irregular patterns, and therefore surveys based on animal sightings are unlikely to be reliable. A more effective survey method is to search appropriate databases and other sources for the locations of camps, and to conduct vegetation surveys to identify feeding habitat.
- Consultants should demonstrate that they have sought information about the location of historic camps from the appropriate authoritative sources as outlined above. It should also be demonstrated that a comprehensive vegetation survey has been completed for the survey area, and a clear assessment of the contribution of the project area in terms of food plants, especially in relation to the broader region, is provided.

The majority of REs on Colorado and in the surrounding landscape are dominated by vegetation species that are important habitat for Grey-headed Flying-fox, such as *Eucalyptus tereticornis* and *E. crebra* and *E. siderophloia* (DAWE 2021).

Within 20km of Colorado, there is one flying-fox camp in which Grey-headed Flying-fox has been recorded (at Linville), while another camp is located at Kilcoy (21km to the south-east) (see **Figure 4.5**). Camps at Woodford and Maleny (40-45km to the east) are identified as 'nationally important flying-fox camps', which are camps that have contained ≥10,000 Grey-headed Flying-foxes in more than one year in the last 10 years, or have been occupied by more than 2,500 Grey-headed Flying-foxes permanently or seasonally every year for the last 10 years.

At night, Grey-headed Flying-foxes typically feed on blossoms and fleshy fruits within 20km of their roosts (although they can travel as much as 50km), feeding in remnant forest, patches of vegetation on cleared land and urbanised areas (Roberts *et al.* 2012). Habitats are within the typical foraging distance of the two camps shown on **Figure 4.5**, and within the potential foraging distance of a further eight camps. Consideration of the dominant canopy species within the REs present indicates REs 12.2.12, 12.12.15, 12.9-10.17, 12.9-10.7 and 12.3.7 can all have high value for Grey-headed Flying-fox (DAWE 2021, Eby and Law 2008).



BAAM ECOLOGICAL CONSULTANTS

Client: SLR on behalf of Neilsens Quality Gravels Pty Ltd

Project: Offset Area Management Plan Colorado Property, Monsildale Warrill View Quarry

Design: BAAM	Date: 22.10.2025	NTP130	
Drawn: MP	Date: 22.10.2025	Project #0049-110	
Scale: 1:250,000			
Cad File: 130 Warrill View22.dwg			

Title: Grey-headed Flying-fox Records and Camps

FIGURE 4.5

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5.0 METHODOLOGY FOR HABITAT QUALITY ASSESSMENTS AND SCORING

The method used to quantify habitat quality is a Modified Habitat Quality Assessment (MHQA) method, recognised by DCCEEW as a best-practice approach to derive habitat quality scores for input to the EPBC Offset Assessment Guide (offset calculator). The offset calculator is a component of the EPBC Environmental Offset Policy that is applied to environmental assessments under parts 7 – 9 of the EPBC Act. The MHQA method is accompanied by an Excel spreadsheet for entering measured attribute data, benchmark values and recording the associated attribute score.

DCCEEW's How to use the Offsets Assessment Guide[6] provides overarching guidance on the development and application of Habitat Quality Scoring methods. These methods are intended to generate a habitat quality score that represents key habitat values provided by a site (Site Condition) and values of its surrounding landscape (Site Context). When applied to threatened species, habitat quality scores also quantify the value of both the site and the species population (Species Stocking Rate). More specifically:

Site condition is the condition of a site in relation to the ecological requirements of a threatened species or ecological community. This includes considerations such as vegetation condition and structure, the diversity of habitat species present, and the number of relevant habitat features.

Site context is the relative importance of a site in terms of its position in the landscape, taking into account the connectivity needs of a threatened species or ecological community. This includes considerations such as movement patterns of the species, the proximity of the site in relation to other areas of suitable habitat, and the role of the site in relation to the overall population or extent of a species or community.

Species stocking rate is the usage and/or density of a species at a particular site. The principle acknowledges that a particular site may have a high value for a particular threatened species, despite appearing to have poor condition and/or context. It includes considerations such as survey data for a site in regard to a particular species population. It also includes consideration of the role of the site population in regard to the overall species population viability or community extent.

The term 'modified' arises from the MHQA's origin in the Queensland State government offset policy framework, and further modification by DCCEEW to meet the requirements of the EPBC Environmental Offset Policy. Given this origin, the MHQA draws heavily from the Queensland Guide to Determining Terrestrial Habitat Quality Version 1.2 (State of Queensland 2017) and Regional Ecosystem descriptions and benchmark values associated with *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual. Version 2.2* (Eyre et al. 2015).

Consistent with the Queensland State government offset policy framework, the EPBC Environmental Offset Policy also applies habitat quality scores that:

- represent the quality of a defined area of threatened species habitat using indicators that measure and combine relevant habitat attributes which influence the viability of the species.
- Are rounded to the nearest whole number (scores between 0 to 10).

Under the EPBC Environmental Offset Policy framework, habitat quality scores at both impact and land-based offset site(s) are applied in the offset calculation, using habitat quality score values which represent:

- the quality of the impact site – representing the impact site habitat quality score at the time of the EPBC Assessment.
- the start quality of the offset site – representing the offset site habitat quality score at the time of the EPBC Assessment

[6] DCCEEW. 2020. How to use the Offsets assessment guide (dcceew.gov.au)

- projected future quality (without offset) at the offset site – representing the continuation of current land management practices (e.g., the status quo) at time until ecological benefit (generally, a maximum of 20 years or less).
- projected future quality (with offset) at the offset site – representing the habitat quality score associated with the management of the offset site and resulting conservation benefits at the time until ecological benefit (generally, a maximum of 20 years)

To maximise alignment between Commonwealth and State government habitat quality score methods, the MHQA modifies the weighting of individual attribute scores and each components contribution to the final HQS. The MHQA adopts default weightings for the MHQA, which are Site Condition (30%) + Site Context (30%) + SSR (40%).

The scoring methods for individual attributes of each component are described in the following sections.

5.1 ASSESSMENT UNITS

Habitat assessment surveys were undertaken in February and June 2024 to compare with the habitat quality identified for Koala and Grey-headed Flying fox in the proposed impact area.

Table 5.1 summarises the AUs assigned over the proposed offset property, the areas of each AU within the proposed offset area, the transects sampled within each AU. The location of each AU and associated transect is shown in **Figure 3.7**.

It is noted that, while areas comprising, or historically comprising, REs 12.12.13 also occur within the proposed offset area, no AUs have been assigned to this RE as it does not represent suitable habitat for Koala. Its inclusion as part of the proposed offset area is to ensure the configuration of the offset area is practical from a land management perspective only.

5.2 SITE CONDITION

For both species, all 13 x BioCondition attributes and corresponding assessment methods, scoring matrices and associated biodiversity and spatial information are applied to derive a BioCondition score at each sampling site in accordance with Eyre et al. (2015), using the most recent Queensland Herbarium Biocondition Benchmarks (Version 3.6, released in 2025).

The average BioCondition score for each AU is included in **Table 5.1**. **Appendix 3** provides the results for each BioCondition attribute at each site, and associated scores against the relevant RE benchmarks.[7]

Scores for Quality and Availability of Food and Foraging habitat and Quality and Availability of Shelter were then applied, as described below.

All Site Condition scores were derived from the data collected at each Biocondition site.

[7] As noted in **Section 3.3**, patches of remnant and regrowth REs 12.12.15 and 12.9-10.17 were found to comprise vegetation dominated by Brushbox *Lophostemon confertus*; i.e. more representative of REs 12.12.15b and 12.9-10.17a, respectively. Accordingly, Biocondition Benchmarks for REs 12.12.15b and 12.9-10.17a were used to score remnant and regrowth patches mapped as 12.12.15 and 12.9-10.17, respectively.

Currently cleared areas mapped as historically containing (pre-clear) RE 12.12.15 and 12.9-10.17 were scored using Biocondition Benchmarks for REs 12.12.15 and 12.9-10.17d, as the intention would be to rehabilitate these areas with vegetation more typical of the parent RE, which has relatively high value for Koala and Grey-headed Flying-fox compared to sub-REs 12.12.15b and 12.9-10.17a. As no Biocondition Benchmark currently exists for 12.9-10.17, the benchmark for 12.9-10.17d was used as it has the closest vegetation structure to the parent RE 12.9-10.17 that is dominated by preferred forage tree species for Koala and Grey-headed Flying-fox.

Table 5.1. Ground-truthed vegetation types and condition at Colorado, with determined Assessment Units and completed transects

Description	Area (ha) within the proposed offset area*		Sampling sites completed	Average BC Score
	Stage 1#	Stage 2#		
AU1 Cleared (preclear RE 12.12.15)	143.32	78.64	4 (BCs 12, 14, 17 & 20)	5.23
AU2 Cleared (preclear RE 12.12.12)	90.24	87.62	4 (BCs 1, 9, 10 & 21)	4.53
AU3 Cleared (preclear RE 12.9-10.17)	37.71	237.74	4 (BCs 3, 5, 30 & 32)	3.45
AU4 Cleared (preclear RE 12.9-10.7)	-	50.08	2 (BCs 6 & 7)	5.22
AU5 Cleared (preclear RE 12.3.7)	1.74	15.20	2 (BCs 4 & 8)	4.81
AU6 Regrowth RE 12.12.15b	22.80	10.40	2 (BCs 13 & 15)	6.59
AU7 Regrowth RE 12.12.12	22.97	6.42	2 (BCs 2 & 11)	5.66
AU8 Regrowth RE 12.9-10.17a	-	45.86	2 (BCs 26 & 31)	6.56
AU9 Regrowth RE 12.9-10.7	-	1.56	1 (BC 28)	6.44
AU10 Regrowth RE 12.3.7	-	1.30	1 (BC 24)	4.19
AU11 Remnant RE 12.12.15b	70.78	4.76	2 (BCs 16 & 18)	7.16
AU12 Remnant RE 12.12.12	0.33	3.29	1 (BC 22)	5.69
AU13 Remnant RE 12.9-10.17a	11.30	24.66	4 (BCs 19, 23, 25 & 29)	5.48
AU14 Remnant RE 12.9-10.7	-	3.29	1 (BC 27)	8.63

*Based on **Table 3.2**

Refer to **Section 6.3** for an explanation of the proposed staging of the Offset.

5.2.1 Koala Site Condition: Quality and availability of Koala food and foraging habitat

Scoring shown in **Table 5.2** takes into account the following information:

- Existing/pre-clear REs that are ranked as either ' 'High', 'Medium' or 'Low' suitability in the report *Spatial modelling for koalas in South East Queensland V4.0* (State of Queensland 2023);
- Koalas' preference for trees in the larger size classes of 25-30 cm diameter-at-breast-height (dbh) and above (Phillips and Wallis 2016). While Koalas are known to feed on trees of all sizes that can support their weight (Youngentob *et al.* 2021), they generally prefer trees in the larger size classes of 25-30 cm diameter-at-breast-height (dbh) and above (Phillips and Wallis 2016).
- Presence of high canopy cover as yielding more forage resources.

Table 5.2. Scoring for quality and availability of Koala food and foraging habitat

Score	Description
10 (high)	Biocondition sites with existing/pre-clear RE ranked as "High", and >50% of the RE benchmark for attribute 'number of large trees' and/or 'canopy cover'
5 (moderate)	Biocondition sites with existing/pre-clear RE is ranked as "High", and 25-50% of the RE benchmark for attribute 'number of large trees' and/or 'canopy cover'
	Biocondition sites with existing/pre-clear RE is ranked as "Medium", and >50% of the RE benchmark for attribute 'number of large trees' and/or 'canopy cover'
1 (low)	Biocondition sites with existing/pre-clear RE is ranked as "High", and <25% of the RE benchmark for attribute 'number of large trees' and/or 'canopy cover'
	Biocondition sites with existing/pre-clear RE is ranked as "Medium", and <50% of the RE benchmark for attribute 'number of large trees' and/or 'canopy cover'
	Biocondition sites with existing/pre-clear RE is ranked as "Low"

5.2.2 Grey-headed Flying-fox Site Condition: Quality and availability of Grey-headed Flying-fox food and foraging habitat

Scoring shown in **Table 5.3** takes into account the following information:

- Important winter food trees Grey-headed Flying-fox listed in the *National Recovery Plan for the Grey-headed Flying-fox 'Pteropus poliocephalus'* (DAWE 2021). Coastal lowlands in northern New South Wales and southern Queensland provide relatively reliable winter flowering forage, with important winter and spring habitats including vegetation communities that contain *Eucalyptus tereticornis, E. albens, E. crebra, E. fibrosa, E. melliodora, E. paniculata, E. pilularis, E. robusta, E. siderophloia, Banksia integrifolia, Castanospermum australe, Corymbia citriodora citriodora, C. eximia, C. maculata, Grevillea robusta* or *Melaleuca quinquenervia*.
- Whether or not the above species are dominant canopy species (i.e. comprise ≥ 50% of the canopy at each Biocondition site).
- Presence of larger/taller trees and high canopy cover as yielding more forage resources.

Table 5.3. Scoring for quality and availability of Grey-headed Flying-fox food and foraging habitat

Score	Description
10	Biocondition sites containing important winter food trees as dominant canopy species, and >75% of the RE benchmark for at least two of 'number of large trees', 'canopy cover' and 'canopy height'
5	Biocondition sites containing important winter food trees as dominant canopy species, and >50% of the RE benchmark for at least two of 'number of large trees', 'canopy cover' and 'canopy height' (but not >75%)
1	Biocondition sites not meeting the above criteria

5.2.3 Koala Site Condition: Quality and availability of Koala shelter

Larger, tall trees and high canopy cover in ecosystems supporting known Koala food species are important factors for measuring the quality of shelter for Koalas while resting, feeding and dispersing. Briscoe *et al.* (2014) found that large trees may be important in some landscapes for thermoregulation due to their effects on local microclimates, greater canopy cover and larger thermal mass (cited in Youngentob *et al.* 2021), and studies have indicated that smaller trees are often preferred for feeding at night and larger trees for resting during the day (Youngentob *et al.* 2021). A recent remote sensing study in south-east Queensland also found that Koalas prefer areas of higher tree canopy height within their home ranges (Mitchell *et al.* 2023).

Scoring for 'high', 'medium' and 'low' quality and availability of shelter is shown in **Table 5.4** and relies on combinations of ecosystem measurements providing scaled levels of two or more attributes that are important for quality and availability of shelter.

Table 5.4. Scoring for Quality and Availability of Shelter for Koalas

Score	Description
10	Biocondition sites with >25% of the RE benchmark for attributes 'number of large trees', 'canopy cover' and 'canopy height', and >75% of the RE benchmark for at least two of these three attributes.
5	Biocondition sites with >25% of the RE benchmark for attributes 'number of large trees', 'canopy cover' and 'canopy height', and >50% of the RE benchmark for at least two of these three attributes (but not >75%)
1	Biocondition sites not meeting the above criteria

5.2.4 Grey-headed Flying-fox Site Condition: Quality and availability of Grey-headed Flying-fox shelter

Scoring shown in **Table 5.5** takes into account the following information:

- Presence of a roost or suitable roosting conditions (i.e. dense vegetation close to water, primarily rainforest patches, stands of melaleuca, mangroves or riparian vegetation).
- Presence of larger/taller trees and high canopy cover as providing more shelter.

Table 5.5. Scoring for Quality and Availability of Shelter for GHFFs

Score	Description
10 (high)	Site contains a roost or suitable roosting conditions = 10.
5 (moderate)	Sites with >25% of the RE benchmark for attributes 'number of large trees', 'canopy cover' and 'canopy height', and >75% of the RE benchmark for at least two of these three attributes = 5.
1 (low)	Sites not meeting the above criteria = 1.

5.3 SITE CONTEXT

5.3.1 Koala Site Context: Patch size, Connectivity, Context and Ecological Corridors

Statutory documentation for Koala indicates local information must be used when determining Koala habitat. For this reason, either Queensland State reporting or scientific publications that describe Koala food and shelter habitat in the south-east Queensland region were used to collate information and classify Koala habitat to apply to Patch Size, Connectivity and Context analyses.

REs were classified as Koala habitat based on the report: *Spatial Modelling for Koalas in South East Queensland V5.0* (State of Queensland 2023); REs ranked as High, Medium and Low Koala suitability were incorporated as Koala habitat. REs that did not fit these criteria were excluded as Koala habitat. Koala habitat was then classified as either:

- Koala breeding/foraging habitat – remnant and regrowth vegetation with Koala suitable REs, or
- Koala dispersal habitat – non-remnant/cleared vegetation for which the State Government's pre-clear mapping indicates a Koala suitable RE historically occurred (i.e. prior to clearing).

For all classifications, the ground-truthed vegetation mapping was used within the Site, and the Queensland Government's RE mapping outside of the Site.

While it is acknowledged certain areas mapped as non-remnant/cleared may support scattered trees suitable for foraging by Koala, limiting the definition of Koala breeding/foraging habitat to areas mapped as remnant and regrowth vegetation is considered appropriate for the purposes of this landscape scale analysis, where the ground-truthing of all Koala habitat within the area subject to analysis (e.g. a 20km radius for measuring context) is not practical. It is reasonable to consider that areas comprising denser, more mature vegetation are of significantly higher value for Koala and more representative of typical foraging/breeding habitat for the species, at least for the purposes of a landscape scale analysis, and this is consistent with the Queensland Government's approach to mapping Koala habitat areas in south-east Queensland, which is restricted to remnant and regrowth vegetation comprising Koala suitable REs.

A "patch" includes all Koala food, shelter and dispersal habitat within and directly connected to the AU polygon within which Biocondition sites are located, which is bordered by "breaks", such as major roadways, rail lines and major waterways, and excludes industrial developments and intensive cropping areas. Consequently, it can extend well beyond the AU polygon.

Table 5.6. Scoring of Patch Size for Koala

Description	Score
≥201 ha Koala breeding/foraging/dispersal habitat within and directly connected with the AU polygon	10
101-200 ha Koala breeding/foraging/dispersal habitat within and directly connected with the AU polygon	7
≥25-100 ha Koala breeding/foraging/dispersal habitat within and directly connected with the AU polygon	5
≥5-25 ha Koala breeding/foraging/dispersal habitat within and directly connected with the AU polygon	2
<5 ha Koala breeding/foraging/dispersal habitat within and directly connected with the AU polygon	0

Connectivity is scored using the perimeter of the AU polygon within which each Biocondition site is located.

Table 5.7. Scoring of Connectivity for Koala

Description	Score
The AU polygon is connected with adjacent Koala breeding/foraging habitat along >75% of its perimeter **OR** includes >500 ha Koala breeding/foraging habitat.	5
The AU polygon is connected with adjacent Koala breeding/foraging habitat along 50% to 75% of its perimeter.	4
The AU polygon is connected with adjacent Koala breeding/foraging habitat along >10% to <50% of its perimeter; OR Is connected with adjacent Koala breeding/foraging habitat along <10% of its perimeter AND is connected with adjacent Koala dispersal habitat >25% of its perimeter	2
The AU polygon is not connected using any of the above descriptions.	0

Context for Koala is scored by spatially analysing all land within a 20km radius of each Biocondition site. The use of a 20km radius to inform the scoring of context for Koala is based on previous advice from the Commonwealth Government on how to calculate habitat quality for Koala, taking into account typical home ranges and dispersal ability.

Table 5.8. Scoring of Context for Koala

Description	Score
Land within a 20km radius of the Biocondition site comprises ≥75% Koala breeding/foraging habitat	5
Land within a 20km radius of the Biocondition site comprises ≥30-75% Koala breeding/foraging habitat **OR** ≥10-30% Koala breeding/foraging habitat **AND** ≥30% Koala dispersal habitat.	4
Land within a 20km radius of the Biocondition site comprises ≥10-30% Koala breeding/foraging habitat **AND** <30% Koala dispersal habitat **OR** <10% Koala breeding/foraging habitat **AND** ≥30% Koala dispersal habitat.	2
Land within a 20km radius of the Biocondition site comprises <10% Koala breeding/foraging habitat **AND** <30% Koala dispersal habitat.	0

Scores for ecological corridors are based on the proximity of each AU polygon within which each Biocondition site is located to corridors identified as part of the Queensland Government's biodiversity planning assessment for south-east Queensland (https://www.qld.gov.au/environment/plants-animals/biodiversity/southeast-qld), which can be accessed via Queensland Globe (https://qldglobe.information.qld.gov.au/) (refer **Figure 3.4**).

Table 5.9. Ecological Corridors scoring

Score	0	4	6
Description	Not within	Sharing a common boundary	Within (whole or part)

5.3.2 Grey-headed Flying-fox Site Context: Patch size, Connectivity, Context and Ecological Corridors

For the purposes of determining patch size, connectivity and context, "Grey-headed Flying-fox habitat" is defined as remnant or regrowth REs that contain flora species known to be food sources of Grey-headed Flying-fox as per Eby and Law (2008), Eby et al (2019), DAWE (2021), with ground-truthed vegetation mapping was used within the Site, and the Queensland Government's RE mapping outside of the Site.

While it is acknowledged that certain areas mapped as non-remnant/cleared may support scattered trees suitable for foraging by Grey-headed Flying-fox, limiting the definition of Grey-headed Flying-fox breeding/foraging habitat to areas mapped as remnant and regrowth vegetation is considered appropriate for the purposes of this landscape scale analysis, where the ground-truthing of all Grey-headed Flying-fox habitat within the area subject to analysis (e.g. a 20km radius for measuring context) is not practical. It is reasonable to consider that areas comprising denser, more mature vegetation are of significantly higher value for Grey-headed Flying-fox and more representative of typical habitat for the species, at least for the purposes of a landscape scale analysis.

A "patch" includes all Grey-headed Flying-fox habitat within and directly connected to the AU polygon within which each Biocondition site is located, which is bordered by ground-truthed or State-mapped non-remnant vegetation. Consequently, it can extend well beyond each AU polygon, depending on where ground-truthed or State-mapped non-remnant vegetation occurs. Conversely, AU polygons not comprising Grey-headed Flying-fox habitat are not considered part of a patch, and score 0 for this attribute.

Table 5.10. Scoring of Patch Size for Grey-headed Flying-fox

Description	Score
≥201 ha remnant Grey-headed Flying-fox habitat within and directly connected with the AU polygon	10
101-200 ha remnant Grey-headed Flying-fox habitat within and directly connected with the AU polygon **OR** >200 ha remnant and regrowth Grey-headed Flying-fox habitat within and directly connected with the AU polygon **OR** >200 ha regrowth Grey-headed Flying-fox habitat within and directly connected with the AU polygon	7
26-100 ha remnant Grey-headed Flying-fox habitat within and directly connected with the AU polygon **OR** ≥25 – 200 ha remnant and regrowth Grey-headed Flying-fox habitat within and directly connected with the AU polygon **OR** ≥25 – 200 ha regrowth Grey-headed Flying-fox habitat within and directly connected with the AU polygon	5
5-25 ha remnant **AND/OR** regrowth Grey-headed Flying-fox habitat within and directly connected with the AU polygon	2
<5 ha remnant **AND/OR** regrowth Grey-headed Flying-fox habitat within and directly connected with the AU polygon OR No remnant or regrowth Grey-headed Flying-fox habitat within the AU polygon	0

Connectivity was determined on the basis of the number of recognised Grey-headed Flying-fox roost camps (including inactive camps) occurring within a 20km radius, using Grey-headed Flying-fox camp data obtained from the DAWE National Flying-fox monitoring viewer (https://www.environment.gov.au/webgis-framework/apps/ffc-wide/ffc-wide.jsf).

Table 5.11. Scoring of Connectivity for GHFF

Description	Score
>5 GHFF habitat camps (including inactive camps) within a 20km radius	5
3 – 5 GHFF habitat camps (including inactive camps) within a 20km radius	4
1 – 2 GHFF habitat camps (including inactive camps) within a 20km radius	2
No GHFF habitat camps (including inactive camps) within a 20km radius	0

Context for Grey-headed Flying-fox is scored by spatially analysing all land within a 20km radius of each Biocondition site. The use of a 20km radius to inform the scoring of context for Grey-headed Flying-fox is considered appropriate, given the species typically travels distances of 6-28 km to forage (DAWE 2021).

Table 5.12. Scoring of Context for Grey-headed Flying-fox

Description	Score
Land within a 20km radius of the Biocondition site comprises:	
≥76% Grey-headed Flying-fox habitat	5
31-5% Grey-headed Flying-fox habitat	4
10-30% Grey-headed Flying-fox habitat	2
<10% Grey-headed Flying-fox habitat	0

Scores for ecological corridors are based on the proximity of each AU polygon within which each Biocondition site is located to corridors identified as part of the Queensland Government's biodiversity planning assessment for south-east Queensland, which can be accessed via Queensland Globe (https://qldglobe.information.qld.gov.au/).

Table 5.13. Ecological Corridors scoring

Score	0	4	6
Description	Not within	Sharing a common boundary	Within (whole or part)

5.3.3 Koala Site Context: Role of site location to species overall population in the State

This score takes into account the observed usage of habitat within the AU polygon within which each Biocondition site is located during targeted Koala surveys, the presence of breeding/foraging habitat, and likely movement pathways for dispersal, as shown in **Table 5.14**.

Table 5.14. Role of site location scoring for Koalas

Score	Description
5	Critical to species survival – AU polygons with evidence of usage
4	Likely to be critical to species' survival - AU polygons without evidence of usage, but providing breeding/foraging habitat and/or likely to be used for dispersal
1	Not or unlikely to be critical to species' survival - AU polygons without evidence of usage, not providing breeding/foraging habitat, and unlikely to be used for dispersal

5.3.4 Grey-headed Flying-fox Site Context: Role of site location to species overall population in the State

Scoring shown in **Table 5.15** takes into account the following information for each AU polygon within which each Biocondition site is located:

- Important winter food trees listed in the *National Recovery Plan for the Grey-headed Flying-fox 'Pteropus poliocephalus'* (DAWE 2021). Coastal lowlands in northern New South Wales and southern Queensland provide relatively reliable winter flowering forage, with important winter and spring habitats including vegetation communities that contain *Eucalyptus tereticornis, E. albens, E. crebra, E. fibrosa, E. melliodora, E. paniculata, E. pilularis, E. robusta, E. siderophloia, Banksia integrifolia, Castanospermum australe, Corymbia citriodora citriodora, C. eximia, C. maculata, Grevillea robusta* or *Melaleuca quinquenervia*.
- Whether or not the above species are dominant canopy species (i.e. comprise ≥ 50% of the canopy at each Biocondition site).
- Presence of larger/taller trees and high canopy cover as yielding higher densities of forage resources.
- Presence of a roost or suitable roosting conditions (i.e. dense patches of rainforest, melaleuca, mangroves or other riparian vegetation close to water).

Table 5.15. Role of site location scoring for Grey-headed Flying-foxes

Score	Description
5	Critical to species survival - AU polygon contains a roost or suitable roosting conditions AND/OR contains important winter food trees as dominant canopy species, and >75% of the RE benchmark for at least two of 'number of large trees', 'canopy cover' and 'canopy height'
4	Likely to be critical to species' survival - AU polygon contains important winter food trees as dominant canopy species, and >50% of the RE benchmark for at least two of 'number of large trees', 'canopy cover' and 'canopy height' (but not >75%)
1	Not or unlikely to be critical to species' survival - AU polygons not meeting the above criteria

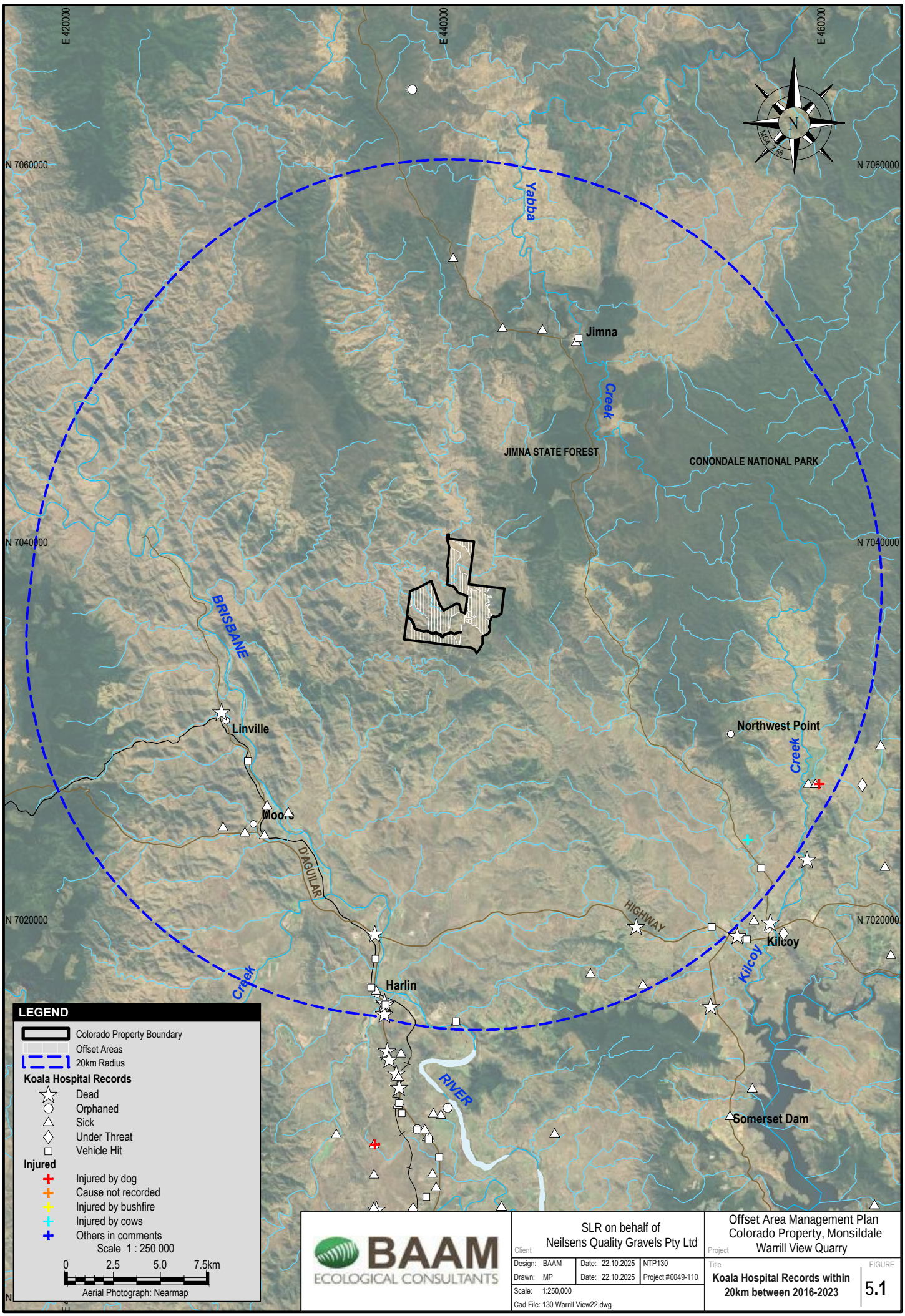
5.3.5 Koala Site Context: Absence of threats

Threats to Koala were assessed based on the key threats identified in the EPBC Koala Conservation Advice (DAWE 2022a). These threats are climate change and associated threats (drought, heat waves, high intensity bushfires), and human related activities (clearing/fragmentation of habitat, disease, mortality from vehicle strike and dogs).

The proposed offset area is currently being used for rural pursuits, primarily for grazing of cattle, and the predominant use for surrounding sites is also for cattle grazing. The majority of the proposed offset area has been historically cleared and used for cattle grazing, while the flatter sections of the site remain heavily disturbed and contain evidence of long periods of grazing activities.

Queensland Government Koala Hospital records from 2016-2022 show no records of sick Koalas or Koalas impacted by dogs or vehicles within 10km of the proposed offset property, and few such records within 20km (**Figure 5.1**), although this could be expected, given the small number of public roads and very low density of people inhabiting or visiting this area.

Wild dogs are known to visit the site (refer **Figure 4.4**) and neighbouring properties, and maul young livestock on occasion (refer **Section 6.4**).



BAAM ECOLOGICAL CONSULTANTS

Client: SLR on behalf of Neilsens Quality Gravels Pty Ltd

Project: Offset Area Management Plan Colorado Property, Monsildale Warrill View Quarry

Design: BAAM	Date: 22.10.2025	NTP130
Drawn: MP	Date: 22.10.2025	Project #0049-110

Scale: 1:250,000

Cad File: 130 Warrill View22.dwg

Title: Koala Hospital Records within 20km between 2016-2023

FIGURE 5.1

©Biodiversity Assessment and Management Pty Ltd. While every care is taken to ensure the accuracy of this data, Biodiversity Assessment and Management makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation liability in negligence) for all expenses, losses, damages (including indirect consequential damage) and costs which might be incurred as a result of the data being inaccurate or incomplete in any way and for any reason.

Table 5.16 assigns relative risk ratings for each of the key threats, with the maximum risk rating for each key threat reflecting the overall risk assigned to each key threat in Table 2 of the current Koala Conservation Advice (DAWE 2022a). The maximum risk rating across all key threats then determines the score for the Absence of Threats attribute, as summarised in **Table 5.17**. Further details regarding the risk rating criteria are as follows:

- Climate change is predicted to impact Koalas through an increase in the frequency of extreme drought and heatwaves (DAWE 2022b), with Queensland expected to experience a median 79% decline in Koala habitat by 2070. Current and future climate change projections indicate a progressive eastward and southwards contraction in the Koala's suitable climate envelope and consequent suitable habitat (Adams-Hosking et al. 2011 [cited in DAWE 2022a]). This is illustrated in Figure 6 of the recovery plan (DAWE 2022b), and the Site's location on this climate suitability map is used to determine the relative risk from climate change and associated impacts, which is applied across all AUs.
- Habitat clearing is a major historical, current and future threat to Koalas, the risk of which is influenced by recent/current uses of the Site, statutory regulations and protection mechanisms, and future development plans/zonings for the Site and surrounding area. Clearing of habitat in the adjacent landscape can also threaten the viability of Koalas using the Site. Consequently, the relative risk of habitat clearing is based on a combination of these factors, as they relate to each AU polygon within which each Biocondition site is located.
- Queensland Koala Hospital records (https://www.data.qld.gov.au/dataset/koala-hospital-data) indicate disease is a ubiquitous issue in the south-east Queensland Koala population, although the prevalence of disease has been found to increase following extreme stress from hot weather, drought, habitat loss and fragmentation (Lunney et al. 2012; Davies et al. 2013 [cited in DAWE 2022a]). The relative risk of disease is based on site observations of Koala health, Koala Hospital records for the local area (i.e. within 10km of the project area), and whether the prevalence of disease is likely to have been exacerbated by recent changes in local landscape conditions (i.e. drought, habitat loss and fragmentation), with the determined risk rating applied across all AUs.
- Mortality from dog attack and vehicle strike is assessed as a combined threat in the current Koala Conservation Advice, with an overall moderate risk (i.e. individuals are adversely affected but there is no effect at the population level) (DAWE 2022a). Consequently, relative risk ratings of low and medium are assigned as per **Table 5.15**, based on any site observations of mortality from dog attack and/or vehicle strike, Koala Hospital records within the project area and surrounding properties/roads, the presence of unrestrained dogs and/or high/volume roads on/adjacent to the Site, and whether there are formal measures in place to minimise the risk of dog attack and/or vehicle strike. The determined risk rating is applied across all AUs.

Table 5.16. Threat risk ratings for Koala

Key Threat	Risk Rating Criteria	Risk Rating
Climate change and associated impacts	The Site is within an area that 0-2 species distribution models predict will be climatically suitable for Koalas in 2070 under a high global emissions scenario (i.e. yellow or pale green on Figure 6 in DAWE [2022b]).	**high - very high**
	The Site is within an area that 3-6 species distribution models predict will be climatically suitable for Koalas in 2070 under a high global emissions scenario (i.e. bright / dark green on Figure 6 in DAWE [2022b]).	**moderate**
	The Site is within an area that >6 species distribution models predict will be climatically suitable for Koalas in 2070 under a high global emissions scenario (i.e. light / dark blue on Figure 6 in DAWE [2022b]).	**low**
Clearing of Koala habitat	Habitat clearing is occurring or has recently occurred within the AU polygon and/or adjacent landscape, or is not constrained by State/Local legislation and is reasonably likely to occur within the AU polygon for development or other/existing land uses	**high - very high**

Key Threat	Risk Rating Criteria	Risk Rating
	Habitat clearing is not occurring or has not recently occurred within the AU polygon or adjacent landscape, **and** Habitat clearing is not constrained by State/Local legislation, but is reasonably unlikely to occur within the AU polygon for development or other/existing land uses; **or** Habitat clearing within the AU polygon and/or adjacent landscape is constrained by State/Local legislation, but is not prohibited by State/Local legislation or protected via legally binding mechanisms for an offset and/or formalised protected area	**moderate**
	Habitat clearing is not occurring or has not recently occurred within the AU polygon or adjacent landscape, **and** Habitat within the AU polygon is protected via legally binding mechanisms for an offset and/or formalised protected area, or is otherwise heavily constrained or prohibited, such that habitat clearing is highly unlikely	**low**
Koala disease	There is evidence of mortality or poor health from disease on the Site **and/or** There are records of regular mortality from disease within the local area (i.e. within 5-10km of the Site), as determined through interrogation of the Queensland Government's Koala hospital data (https://www.data.qld.gov.au/dataset/koala-hospital-data), **and** The prevalence of disease is likely to have been exacerbated by recent changes in local landscape conditions (i.e. drought, habitat loss and fragmentation).	**high - very high**
	There are records of regular mortality from disease within the local area (i.e. within 5-10km), **and** The prevalence of disease is unlikely to have been exacerbated by recent changes in local landscape conditions (i.e. drought, habitat loss and fragmentation).	**moderate**
	None of the above	**low**
Mortality from vehicles and/or dogs	There is evidence of mortality from dog attack or vehicle strike on the Site; **and/or** There are records of regular mortality from dog attack or vehicle strike within surrounding properties/roads; **and/or** Known presence of unrestrained dogs on the Site / adjacent properties and no formal control/preventative measures are in place; **and/or** High speed (>50km/hr) and high volume roads occur within / adjacent to the Site and lack fauna sensitive design measures.	**moderate**
	None of the above.	**low**

Table 5.17. Absence of threats scoring for Koala

Description	Score
At least two* "high – very high" risks from **Table 5.15**	**1**
At least one "high – very high" risk or at least two "moderate" risks from **Table 5.15**	**7**
No "high – very high" or "moderate" risks from **Table 5.15**	**15**

*DCCEEW have advised that only sites subject to multiple and cumulative threats to Koala warrant a score of 1.

5.3.6 Grey-headed Flying-fox Site Context: Absence of threats

The key threat to GHFF is loss of habitat (DAWE 2021). The loss of habitat, particularly important habitat such as reliable winter resources along the east coast, has continued to lead to population decline.

Sites not mapped PMAV category X are scored as low threat (15). All other sites are scored as high threat (1), taking into account existing land uses (grazing and associated clearing).

5.3.7 Koala Site Context: Species mobility capacity

This attribute is measured in consideration of the presence and severity of factors that would contribute to a reduction in the mobility of the species. For example, when a barrier or obstacle to movement is created within or between habitats that is likely to result in a long-term reduction in genetic fitness or access to important resources. Mobility capacity for Koalas been determined for according to the scoring shown in **Table 5.18.**

Table 5.18. Species mobility capacity

Score	Description
1 Severely restricted (>90% reduction)	The AU polygon is functionally isolated from other appropriate habitat for the species, with much of the landscape considered a barrier to species mobility.
4 Highly restricted (>70-90% reduction)	The AU polygon is likely isolated to regular movement of the species into or out of habitat contiguous to the AU polygon.
7 Moderately restricted (>25-70% reduction)	The AU polygon is representative of a temporary refuge or stepping stone in the landscape between other patches of habitat, with potential regular movement into or out of habitat contiguous to the AU polygon.
10 Minor restriction (0-25% reduction)	Movement by the species into and out of the AU polygon is relatively unrestricted and unhampered by barriers/obstacles.

5.3.8 Grey-headed Flying-fox Site Context: Species mobility capacity

DAWE (2021) cites studies that indicate (a) Grey-headed Flying-foxes have been known to fly as far as 40 km to feed, before returning to their roost the same night, and (b) the mean distance of a Grey-headed Flying-fox foraging site from the camp in which the animal had roosted and to which it returned was 10.9 km (quartile range from 6.2 - 27.9 km).

Table 5.19. Species mobility capacity scoring

Score	Description
1 Severely restricted	GHFF camp (including inactive camps) >40 km
4 Highly restricted	GHFF camp (including inactive camps) within 40 km
7 Moderately restricted	GHFF camp (including inactive camps) within 28 km
10 Minor restriction	GHFF camp (including inactive camps) within 11 km

5.4 STOCKING RATE

The assessment of species stocking rate has been undertaken for each AU in accordance with the modified Habitat Quality Spreadsheet for Queensland, as shown in **Table 5.20**.

5.4.1 Koala Species Stocking Rate: Koala presence

All AUs scored the maximum possible 10 points as Koalas were recorded on the proposed offset property during the recent surveys (refer **Figure 4.4**).

5.4.2 Grey-headed Flying-fox Species Stocking Rate: Grey-headed Flying-fox presence

Targeted surveys for Grey-headed Flying-fox were not undertaken, although the species is expected to visit the proposed offset area during flowering events of important winter/spring feed trees; therefore, this parameter scored 10 for all sites where food trees are present (i.e. consistent with the scoring approach for the impact site).

5.4.3 Koala Species Stocking Rate: Koala usage

AUs within which Koalas or Koala evidence has been recorded, and within which breeding/foraging habitat is present, were scored 15 points. AUs where no Koalas or Koala evidence was recorded, but breeding/foraging habitat is present, scored 10 points. AUs that do not support breeding/foraging habitat but could be traversed by Koala were scored 5 points.

5.4.4 Grey-headed Flying-fox Species Stocking Rate: Grey-headed Flying-fox usage

The proposed offset area does not support a roost (breeding) site, but the species is expected to forage within the proposed offset area during flowering events of important winter/spring feed trees; therefore, this parameter scored 10 for all sites where food trees are present (i.e. consistent with the scoring approach for the impact site).

Table 5.20. Species stocking rate scoring

Species Stocking Rate (SSR)					
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	Score	0	5	10	
		No	Yes - adjacent	Yes - on site	
Species usage of the site (habitat type & evidenced usage)	Score	0	5	10	15
		Not habitat	Dispersal	Foraging	Breeding
Approximate density (per ha)	Score	0	10	20	30
		Not habitat	1-50%	51-85%	86-100%
Role/importance of species population on site*	Score (Total from supplementary table below)	0	5	10	15
			5 - 15	20 - 35	40 - 45
Total SRR score (/ 70) **SRR Score (out of 4)**					

***SSR Supplementary Table**			
*Key source population for breeding	Score	0	10
		No	Yes/ Possibly
*Key source population for dispersal	Score	0	5
		No	Yes/ Possibly
*Necessary for maintaining genetic diversity	Score	0	15
		No	Yes/ Possibly
*Near the limit of the species range	Score	0	15
		No	Yes

5.4.5 Koala Species Stocking Rate: Koala density

There is scant information relating to Koala densities in the habitats of the Scenic Rim LGA. A relevant reference is a study by Dissanayake *et al.* (2021), where Koala densities for south-east Queensland were estimated using a predictive model based on Koala sightings from 1997 to 2013. The area in which the project area is located was modelled as supporting 0.0005-0.01 Koalas/km^2 (0.000005-0.0001 Koalas/ha). However, it is likely that, in the local area, which has a sparse human population, Koalas are sighted less often than in more populated regions and, therefore, the predicted Koala density range for this location was not well-informed.

The spatial model of Rhodes *et al.* (2015) in the eastern LGAs of the Koala Coast (excluding the Scenic Rim LGA within which the project area is located) predicted the highest Koala densities occurring along the coastal regions of south-east Queensland, but particularly in the central and southern coastal regions, with average densities across the region estimated as being relatively low at 0.04 koalas/ha and ranging from 0 to 6.54 Koalas/ha. Rhodes *et al.* (2015) noted an unexpected prediction for higher Koala densities in some of the western portions of the study area (see **Image 5.1**), although these were areas where surveys were not conducted and there was high uncertainly in the density estimates in these areas.

The Rhodes *et al*. (2015) modelling was based on covariates that were chosen based on hypothesised links with Koala density that had an ability to be mapped across the entire study region. Notably, moist to dry eucalypt open-forests to woodlands on basalt areas categorised as BVG11a (including REs 12.8.16 and 12.8.17) and woodlands and open woodlands on alluvial areas categorised as BVG16c (including RE 12.3.3), were designated as 'high suitability' for Koalas, while woodlands on granitic and metamorphic ranges categorised as BVG16c (including RE12.9-10.7) were designated as 'suitable' for Koalas. These constitute the REs of the project area.

In the absence of data more specific to the local area, Koala density estimates for the project area are based on the results of the thermal Koala surveys undertaken to inform an offset strategy for Stage 1 of the Queensland Government's 'Coomera Connector' project in 2022 (BAAM, 2022). The survey covered approximately 107 ha of a property within the Scenic Rim LGA at Tabooba, approximately 50km south-east of the project area (and comprising similar habitats to those within the project area, including RE 12.8.16). With a detection probability of 90%, a density of approximately 0.08 Koalas/ha was recorded in the surveyed area. Koala density was highest within the remnant vegetation areas (0.23-0.25/ha), followed by advanced regrowth (0.04-0.07/ha). No Koalas were recorded within young regrowth or in the predominantly cleared.

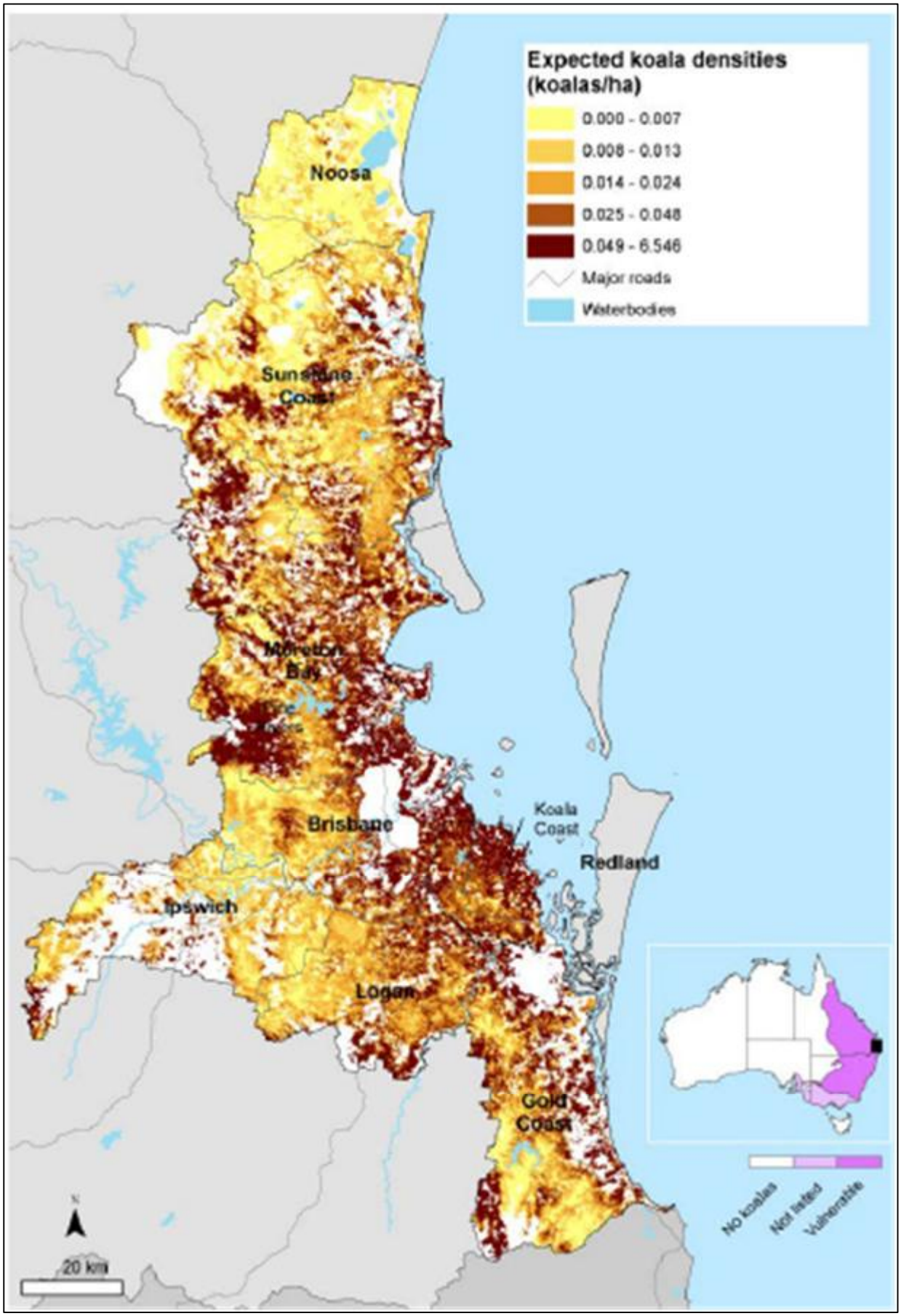


Image 5.1. Koala density modelling results of Rhodes et al. (2015)

These results support the logical assumption that, where there are not otherwise factors that are expected to significantly influence the presence and abundance of Koalas (i.e. such as access difficulties, threats from dog attack or vehicle strike, etc), sites comprising denser, more mature habitat are likely to support a higher density of Koalas. Accordingly, the scoring applied in relation to Koala density is based on the observed and expected relative densities, while making the conservative assumption that the highest relative densities would be typical of those in the broader area (thereby achieving the maximum score):

- Remnant vegetation with evidence of Koala use = 30.
- Remnant vegetation with no evidence of Koala use = 20.
- Regrowth with evidence of Koala use = 10.
- Regrowth with no evidence of Koala use, or cleared areas = 0.

5.4.6 Grey-headed Flying-fox Species Stocking Rate: Grey-headed Flying-fox density

Given the impracticality of measuring actual density of Grey-headed Flying-foxes at a given site, density was scored on the basis of the number of recognised Grey-headed Flying-fox roost camps (including inactive camps) occurring within a 20km radius of AUs with recognised food trees (based on a typical foraging distance of 6-28 km (DAWE 2021), using data obtained from the DCCEEW National Flying-fox monitoring viewer (https://www.environment.gov.au/webgis-framework/apps/ffc-wide/ffc-wide.jsf), as outlined in **Table 5.21**.

Table 5.21. Grey-headed Flying-fox Density

Description	Score
>5 Grey-headed Flying-fox habitat camps (including inactive camps) within a 20km radius of the AU	30
3 – 5 camps (including inactive camps) within a 20km radius of the AU	20
1 – 2 camps (including inactive camps) within a 20km radius of the AU	10
No camps (including inactive camps) within a 20km radius of the AU	0

5.4.7 Koala Species Stocking Rate: Role/importance of site to Koala

In terms of the role/importance of the Koala population on site, the site is not known to support a key source population for breeding or a key source population for dispersal, or be necessary for maintaining genetic diversity, nor is the site near the limit of the species range. Even so, a score of 5 has been applied to areas where Koalas/Koala evidence has been observed, in accordance with the precautionary principle.

5.4.8 Grey-headed Flying-fox Species Stocking Rate: Role/importance of site to Grey-headed Flying-fox

As there are no barriers to dispersal from outside of the project area, and the project area does not support a flying-fox roost (breeding) site, it is considered GHFF within the project area are unlikely to be part of a source population for breeding, dispersal or for maintaining genetic diversity. Nor is the project area at the limit of the species' range. Therefore, all AUs scored 0 for this parameter.

5.5 TOTAL CURRENT HABITAT QUALITY SCORES FOR THE PROPOSED OFFSET PROPERTY

A summary of the total, weighted habitat quality scores for Koala and Grey-headed Flying-fox are provided in **Tables 5.22 and 5.23**, respectively. An overall score of 5 (out of 10) for Koala and 4 (out of 10) for Grey-headed Flying-fox indicates habitats within the proposed offset property are currently of low-moderate quality for both species. Proposed Stages 1 and 2 of the offset (refer **Section 6.3**) also both scored 5 (out of 10) for Koala and 4 (out of 10) for Grey-headed Flying-fox.

Detailed scoring tables are provided in **Appendix 4**.

Table 5.22a. Total Current Koala habitat score for the proposed offset area.

Component	AU1	AU2	AU3	AU4	AU5	AU6	AU7	AU8	AU9	AU10	AU11	AU12	AU13	AU14	Average/Final
Site Condition score (out of 3)	1.32	1.15	0.89	1.31	1.28	1.64	1.42	1.64	1.61	1.07	1.84	1.43	1.38	2.52	1.46
Site Context Score (out of 3)	2.20	2.12	2.42	2.36	2.36	2.17	2.22	2.36	2.36	2.46	2.20	2.14	2.41	2.36	2.29
Species Stocking Rate Score (out of 4)	1.14	1.14	1.14	1.14	1.14	2.29	2.29	1.14	1.14	1.14	3.43	2.29	3.43	2.29	1.80
Habitat Quality score (out of 10)	*4.66*	*4.41*	*4.46*	*4.81*	*4.78*	*6.10*	*5.93*	*5.14*	*5.11*	*4.67*	*7.46*	*5.85*	*7.22*	*7.16*	5.55
Assessment Unit area (ha)	221.95	177.86	275.45	50.08	16.95	33.20	29.38	45.87	1.56	1.31	75.54	3.41	35.96	3.29	**971.83**
Total impact area (ha) for this MNES	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83
Size Weighting	0.23	0.18	0.28	0.05	0.02	0.03	0.03	0.05	0.00	0.00	0.08	0.00	0.04	0.00	**1.00**
Weighted Habitat Quality Score	***1.06***	***0.81***	***1.26***	***0.25***	***0.08***	***0.21***	***0.18***	***0.24***	***0.01***	***0.01***	***0.58***	***0.02***	***0.27***	***0.02***	***5.00***

Table 5.22b. Total Current Koala habitat score for Stage 1 of the proposed offset area.

Component	AU1	AU2	AU3	AU4	AU5	AU6	AU7	AU8	AU9	AU10	AU11	AU12	AU13	AU14	Average/Final
Site Condition score (out of 3)	1.32	1.15	0.89	1.31	1.28	1.64	1.42	1.64	1.61	1.07	1.84	1.43	1.38	2.52	1.46
Site Context Score (out of 3)	2.20	2.12	2.42	2.36	2.36	2.17	2.22	2.36	2.36	2.46	2.20	2.14	2.41	2.36	2.29
Species Stocking Rate Score (out of 4)	1.14	1.14	1.14	1.14	1.14	2.29	2.29	1.14	1.14	1.14	3.43	2.29	3.43	2.29	1.80
Habitat Quality score (out of 10)	4.66	4.41	4.46	4.81	4.78	6.10	5.93	5.14	5.11	4.67	7.46	5.85	7.22	7.16	5.55
Assessment Unit area (ha)	143.32	90.24	37.71	0.00	1.74	22.80	22.97	0.00	0.00	0.00	70.78	0.33	11.30	0.00	**401.19**
Total impact area (ha) for this MNES	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19
Size Weighting	0.36	0.22	0.09	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.18	0.00	0.03	0.00	**1.00**
Weighted Habitat Quality Score	***1.66***	***0.99***	***0.42***	***0.00***	***0.02***	***0.35***	***0.34***	***0.00***	***0.00***	***0.00***	***1.32***	***0.00***	***0.20***	***0.00***	***5.30***

Table 5.22c. Total Current Koala habitat score for Stage 2 of the proposed offset area.

Component	AU1	AU2	AU3	AU4	AU5	AU6	AU7	AU8	AU9	AU10	AU11	AU12	AU13	AU14	Average/Final
Site Condition score (out of 3)	1.32	1.15	0.89	1.31	1.28	1.64	1.42	1.64	1.61	1.07	1.84	1.43	1.38	2.52	1.46
Site Context Score (out of 3)	2.20	2.12	2.42	2.36	2.36	2.17	2.22	2.36	2.36	2.46	2.20	2.14	2.41	2.36	2.29
Species Stocking Rate Score (out of 4)	1.14	1.14	1.14	1.14	1.14	2.29	2.29	1.14	1.14	1.14	3.43	2.29	3.43	2.29	1.80
Habitat Quality score (out of 10)	4.66	4.41	4.46	4.81	4.78	6.10	5.93	5.14	5.11	4.67	7.46	5.85	7.22	7.16	5.55
Assessment Unit area (ha)	78.64	87.62	237.74	50.08	15.20	10.40	6.42	45.86	1.56	1.30	4.76	3.09	24.66	3.29	**570.63**
Total impact area (ha) for this MNES	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63
Size Weighting	0.14	0.15	0.42	0.09	0.03	0.02	0.01	0.08	0.00	0.00	0.01	0.01	0.04	0.01	**1.00**
Weighted Habitat Quality Score	***0.64***	***0.68***	***1.86***	***0.42***	***0.13***	***0.11***	***0.07***	***0.41***	***0.01***	***0.01***	***0.06***	***0.03***	***0.31***	***0.04***	***4.79***

Table 5.23a. Total Current Grey-headed Flying-fox habitat score for the proposed offset area.

Component	AU1	AU2	AU3	AU4	AU5	AU6	AU7	AU8	AU9	AU10	AU11	AU12	AU13	AU14	Average/Final
Site Condition score (out of 3)	1.32	1.18	0.89	1.31	1.28	1.64	1.55	1.64	1.61	1.07	1.78	1.55	1.38	2.52	1.48
Site Context Score (out of 3)	1.04	1.08	1.29	1.29	1.37	1.82	2.12	2.14	2.04	2.14	2.14	1.98	2.44	2.63	1.82
Species Stocking Rate Score (out of 4)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
Habitat Quality score (out of 10)	*4.08*	*3.98*	*3.89*	*4.31*	*4.36*	*5.18*	*5.38*	*5.49*	*5.36*	*4.92*	*5.63*	*5.24*	*5.53*	*6.86*	5.01
Assessment Unit area (ha)	221.95	177.86	275.45	50.08	16.95	33.20	29.38	45.87	1.56	1.31	75.54	3.41	35.96	3.29	**971.83**
Total impact area (ha) for this MNES	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83
Size Weighting	0.23	0.18	0.28	0.05	0.02	0.03	0.03	0.05	0.00	0.00	0.08	0.00	0.04	0.00	**1.00**
Weighted Habitat Quality Score	***0.93***	***0.73***	***1.10***	***0.22***	***0.08***	***0.18***	***0.16***	***0.26***	***0.01***	***0.01***	***0.44***	***0.02***	***0.20***	***0.02***	***4.36***

Table 5.23b. Total Current Grey-headed Flying-fox habitat score for Stage 1 of the proposed offset area.

Component	AU1	AU2	AU3	AU4	AU5	AU6	AU7	AU8	AU9	AU10	AU11	AU12	AU13	AU14	Average/Final
Site Condition score (out of 3)	1.32	1.18	0.89	1.31	1.28	1.64	1.55	1.64	1.61	1.07	1.78	1.55	1.38	2.52	1.48
Site Context Score (out of 3)	1.04	1.08	1.29	1.29	1.37	1.82	2.12	2.14	2.04	2.14	2.14	1.98	2.44	2.63	1.82
Species Stocking Rate Score (out of 4)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
Habitat Quality score (out of 10)	4.08	3.98	3.89	4.31	4.36	5.18	5.38	5.49	5.36	4.92	5.63	5.24	5.53	6.86	5.01
Assessment Unit area (ha)	143.32	90.24	37.71	0.00	1.74	22.80	22.97	0.00	0.00	0.00	70.78	0.33	11.30	0.00	**401.19**
Total impact area (ha) for this MNES	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19
Size Weighting	0.36	0.22	0.09	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.18	0.00	0.03	0.00	**1.00**
Weighted Habitat Quality Score	***1.46***	***0.89***	***0.37***	***0.00***	***0.02***	***0.29***	***0.31***	***0.00***	***0.00***	***0.00***	***0.99***	***0.00***	***0.16***	***0.00***	***4.49***

Table 5.23c. Total Current Grey-headed Flying-fox habitat score for Stage 2 of the proposed offset area.

Component	AU1	AU2	AU3	AU4	AU5	AU6	AU7	AU8	AU9	AU10	AU11	AU12	AU13	AU14	Average/Final
Site Condition score (out of 3)	1.32	1.18	0.89	1.31	1.28	1.64	1.55	1.64	1.61	1.07	1.78	1.55	1.38	2.52	1.48
Site Context Score (out of 3)	1.04	1.08	1.29	1.29	1.37	1.82	2.12	2.14	2.04	2.14	2.14	1.98	2.44	2.63	1.82
Species Stocking Rate Score (out of 4)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
Habitat Quality score (out of 10)	4.08	3.98	3.89	4.31	4.36	5.18	5.38	5.49	5.36	4.92	5.63	5.24	5.53	6.86	5.01
Assessment Unit area (ha)	78.64	87.62	237.74	50.08	15.20	10.40	6.42	45.86	1.56	1.30	4.76	3.09	24.66	3.29	**570.63**
Total impact area (ha) for this MNES	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63
Size Weighting	0.14	0.15	0.42	0.09	0.03	0.02	0.01	0.08	0.00	0.00	0.01	0.01	0.04	0.01	**1.00**
Weighted Habitat Quality Score	***0.56***	***0.61***	***1.62***	***0.38***	***0.12***	***0.09***	***0.06***	***0.44***	***0.01***	***0.01***	***0.05***	***0.03***	***0.24***	***0.04***	***4.26***

6.0 OFFSET MANAGEMENT MEASURES

The identified management actions for the proposed offset area have been determined to achieve the following key objectives:

- Protect against the loss or degradation of Koala and Grey-headed Flying-fox habitat;
- Increase extent and quality of habitat available to Koala and Grey-headed Flying-fox; and
- Mitigate identified threats to Koala and Grey-headed Flying-fox.

Based on the proposed land uses, current condition and offset goals, as well as the risks identified in **Section 8**, the following offset management measures are considered most appropriate for the proposed offset area:

- Restoration of habitat resources for Koala and Grey-headed Flying-fox through assisted natural regeneration and revegetation;
- Limiting vegetation clearing to only those areas required for maintaining fences, fire breaks, road/track access and/or thinning of invasive native species that are impacting Koala or Grey-headed Flying-fox habitat targets;
- Monitoring and controlling feral animals that are likely to be detrimental to threatened fauna or the restoration of threatened fauna habitat (e.g. dogs, pigs, deer);
- Monitoring and controlling weeds, particularly those that inhibit fauna usage, dispersal or habitat restoration;
- Prohibiting alternate land use and activities (e.g. timber harvesting, cropping, etc.);
- Monitoring and managing livestock densities to ensure no degradation to present, naturally recruiting or revegetated threatened fauna habitat; and
- Monitoring and managing fuel loads and fire risk.

The following sections detail the management, monitoring and reporting that will be undertaken for each Management Zone within the proposed offset area, as shown on **Figure 6.1**.

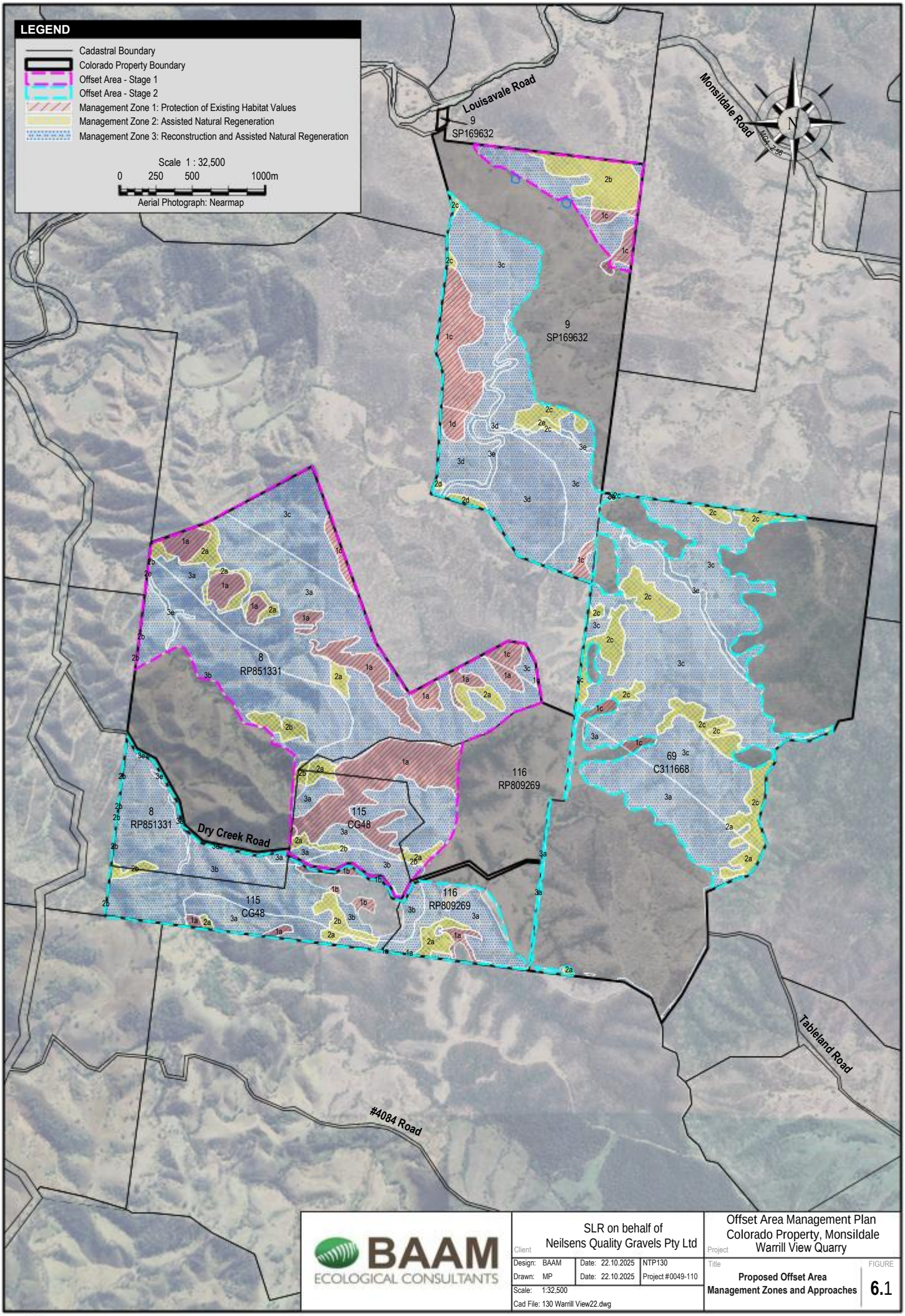
6.1 PROTECTION AND ENHANCEMENT OF EXISTING HABITAT VALUES

Management Zone 1 (refer **Figure 6.1**) comprises remnant vegetation, which currently represents the most intact habitat for Koala and Grey-headed Flying-fox. Protection and enhancement of these areas is necessary to ensure persistence of the existing habitat values supporting Koalas and Grey-headed Flying-fox and provide a source for natural regeneration in adjacent areas of limited habitat value.

Weed management in Management Zone 1 will be targeted to reduce overall non-native plant cover, with prioritisation given to the control of weed species that would threaten mature vegetation, increase fire risk and/or present barriers to movement for Koala (e.g. dense Lantana).

Evidence of prior fire disturbance within some portions of the proposed offset area leading to reduced canopy cover and tree death highlights the importance of protecting existing habitat from the impacts of bushfire. A Fire Management Plan for the proposed offset area will be developed that incorporates recommended fire management guidelines/regimes for each existing/target vegetation community, and includes management of fuel loads and identification of water sources that can be utilised for fire-fighting, if required. Vehicle tracks will be maintained as firebreaks by removing weeds and woody regrowth and, if required, additional access tracks will be installed in the proposed offset area that are wide enough to allow the passage of a fire fighting vehicle. On-going monitoring will assess fuel loads within remnant protection areas and requirement for adaptive management, including amended weed control and ecological burn regimes, and intermittent “crash” grazing, to limit risk of loss to uncontrolled fire.

All vegetation within the proposed offset area will receive legal protection against direct clearing through the offset securement process. Permissible clearing activities will be limited to the minimum required to maintain fire breaks, vehicle tracks and fence lines. Selective thinning of invasive native species impacting on the restoration of Koala or Grey-headed Flying-fox habitat values will also be implemented if identified as necessary during monitoring.



BAAM ECOLOGICAL CONSULTANTS

Client	SLR on behalf of Neilsens Quality Gravels Pty Ltd	Project	Offset Area Management Plan Colorado Property, Monsildale Warrill View Quarry
Design: BAAM	Date: 22.10.2025	NTP130	
Drawn: MP	Date: 22.10.2025	Project #0049-110	
Scale: 1:32,500			
Cad File: 130 Warrill View22.dwg		Title	Proposed Offset Area Management Zones and Approaches
		FIGURE	6.1

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6.2 HABITAT RESTORATION APPROACH

Management Zones 2 and 3 (refer **Figure 6.1**) will require active rehabilitation to increase the extent of habitat for Koala and Grey-headed Flying-fox. Two broad approaches informed by the *South East Queensland Ecological Restoration Framework* (Chenoweth EPLA and Bushland Restoration Services, 2012), will be utilised, depending on the level of rehabilitation required to achieve habitat quality targets.

6.2.1 Assisted Natural Regeneration

Assisted natural regeneration is a suitable approach to rehabilitate native vegetation communities that are largely healthy and functional, and displaying intact topsoil and a viable native seedbank, but are impacted by weeds and grazing. Minor intervention in the form of weed control and removal of livestock will allow the community to recover.

The assisted natural regeneration approach will be applied to Management Zone 2 where the canopy is relatively intact but weed infestation (principally Lantana and non-native pasture grasses) and grazing has led to a reduction in native plant species richness and native cover. This approach will also be applied in the riparian areas along drainage lines and in other areas within Management Zone 3 exhibiting strong natural recruitment of native woody species or where broadscale revegetation is not feasible due to poor accessibility (i.e. on steep slopes). It is expected the removal of livestock, Lantana and other understorey weeds will facilitate the regeneration of native species and (with maintenance) allow restoration of each original vegetation community.

Supplementary planting will occur in portions of Management Zone 2 that display a more open canopy or limited species diversity and in which natural recruitment would take longer to restore the original community, as determined through on-going monitoring. This also presents an opportunity to increase the proportion/quantity of preferred food tree species for Koala and Grey-headed Flying-fox that occur naturally within each associated vegetation community.

Targeted revegetation in eroded creek banks will also be necessary if natural recruitment alone is insufficient to provide adequate bank stabilisation following the exclusion of cattle and removal of Lantana; where this is necessary, the banks will be densely planted with native bank retention species (e.g. *Lomandra*).

6.2.2 Reconstruction

The reconstruction approach is best applied to areas where native vegetation has been largely removed and is not naturally recruiting, but site topography remains unchanged. A high degree of exotic weed control is typically required in these areas.

Within the proposed offset area, the reconstruction approach will be applied to Management Zone 3 (refer **Figure 6.1**), where native vegetation has been cleared to such an extent that it is preferable to re-plant native species representative of the pre-clearing vegetation community, with a focus on preferred food tree species for Koala and Grey-headed Flying-fox, rather than rely on natural regeneration. Weed removal will also be carried out in these areas prior to and following planting to assist in the successful establishment of the planted community.

6.3 REHABILITATION METHODOLOGY

6.3.1 Timing of Offset Delivery

Rehabilitation works will commence upon commencement of the proposed action to reduce lag time between impact occurrence and achievement of habitat quality targets at the offset site. However, the total size of the proposed offset area is significant and, in the initial few decades of the project, will be much larger than what is required to compensate for the total extent of on ground impacts to MNES from the proposed action during that time. That is, a significant portion of the impact will not occur for many years after commencing the proposed action. The progression of the footprint of disturbance associated with quarries occurs vertically thence horizontally resulting in a very gradual disturbance of the land surface over time. Hence, vegetation clearing for quarry develop occurs progressively and is staged in line with extraction. In this instance, the total impact is likely to be realised over a period of up to 100 years.

Consequently, it is proposed that management of the total offset area be achieved in two stages over a combined period of 30 years:

1. Upon commencement of the proposed action (allowing for suitable climatic conditions), rehabilitation will commence within a portion of the offset area (identified as "Stage 1" on **Figure 6.1**) that (as determined by the Commonwealth's Offset Assessment Guide/Calculator) is sufficient to compensate for Stage 1 of the impact (identified as "Stage 1" on **Figure 2.2**) within 20 years of commencement of rehabilitation.
2. No later than 10 years following commencement of the action, rehabilitation will commence within the remainder of the offset area (identified as "Stage 2" on **Figure 6.1**) that (as determined by the Commonwealth's Offset Assessment Guide/Calculator) is sufficient to compensate for Stage 2 of the impact (identified as "Stage 2" on **Figure 2.2**) within 20 years of commencement of rehabilitation.

The purpose of this is to enable the proponent additional flexibility in the establishment of the offset site, while also providing reassurance to DCCEEW that the offset will be progressed in a timely manner.

In addition to the above, some level of management will occur within portions of the offset area prior to the commencement of corresponding impacts (e.g. weed control and reduced grazing may occur within Stage 2 of the offset area before Stage 2 of the impact is commenced, which could promote natural regeneration). In such cases, it is expected that efforts to commence/allow rehabilitation in advance of the associated impact will be recognised by allowing additional time for rehabilitation of these areas to achieve the proposed habitat quality targets – i.e. rehabilitation of these other areas will only need to achieve the proposed habitat quality targets within 30 years of commencement of the action.

6.3.2 Access

The current vehicle track network throughout the site will be retained as access points, with additional tracks created, as necessary. These access points and tracks will be wide enough to allow the passage of a water truck and, where, where serving as fire management tracks, will be wide enough to allow the passage of a fire fighting vehicle. Existing vehicle tracks across much of the property, especially along slopes, ridgelines and around dam walls, will require improvement through track widening and addition of rock to allow safe vehicle access. Where such improvement is not considered practical, additional tracks will be established and aligned strategically to limit disturbance to existing native vegetation and avoid points in the landscape prone to water retention leading to increased risk of bogging.

Access into the proposed offset area will be restricted to only that necessary for rehabilitation activities and associated maintenance and monitoring, fire control, pest animal management, fence replacement/repair, and general land care practices.

6.3.3 Fencing

Unless otherwise permitted for the management of fire fuel loads within the proposed offset area, cattle/horses will be removed and additional stock exclusion fencing will be erected where necessary prior to the commencement of rehabilitation works to promote natural regeneration of native species and limit impacts of grazing on planted seedlings. All new fencing installations will be designed to facilitate the movement of native fauna between the proposed offset area and adjacent areas using rural, plain wire, with no barbed wire fencing installed on top or bottom runs to prevent entanglement and injury. Installation of new fencing along the boundary of the offset area will also allow a 5m buffer for any vegetation clearing required for installation and/or maintenance.

Existing barbed wire fencing will either be removed from the proposed offset area (where no longer required for stock or vehicle exclusion), or (where retained along the proposed offset area boundaries or otherwise considered necessary) amended to allow safe movement of native fauna through replacement of at least the top and bottom barbed wire strings with plain wire.

The Land Manager or their representative will ensure the integrity of fencing is routinely checked on a quarterly basis, with any breaks in the fence line or opportunities for cattle/horse entry to be rectified.

6.3.4 Weed Management

Initial weed management has already commenced within the broader property, primarily focused on the control of Lantana (particularly within creeklines) (**Photos 6.1-6.2**) and Giant Rat's-tail Grass (which has regrown in the northern portion of the property following fuel load reduction burning) (**Photo 6.3**), as well as Cat's Claw Creeper (**Photo 6.4**), Fireweed, Yellow Bells, Bathurst Burr, Scotch Thistle and Tobacco Weed. This has involved five 5-11 day visits since June 2024, which have appeared to have resulted in >90% mortality of Lantana in heavily infested areas, and effective control of Giant Rat's-tail Grass, at a cost of approximately $62,000. Treatment is planned to continue from September 2025.

All post-approval weed control works are to be undertaken by an experienced rehabilitation contractor familiar with both weed and native plant species occurring within the proposed offset area. The contractor must also have a thorough understanding of the restoration principles and techniques set out in the *South East Queensland Ecological Restoration Framework* (Chenoweth EPLA and Bushland Restoration Services 2012) and be appropriately licenced to undertake herbicide application. Use of herbicides will be in strict compliance with Queensland Department of Agriculture and Fisheries' (DAF) guidelines, and advice will be sought from DAF as necessary to confirm the suitability of herbicides and ensure weed management practices are consistent with those advised by DAF. Only amphibian-friendly herbicides will be used in areas adjacent to waterways and drainage lines. Prior to entering and upon leaving the proposed offset area, all equipment will be cleaned to remove seeds and sediment to prevent the introduction of new weed species into the proposed offset area and spread of weeds outside the proposed offset area.

The prioritisation and planning of future weed control works has been informed by the mapping of weed treatment zones presented in **Figure 3.8**, to ensure habitat quality targets are achieved within the appropriate timeframes.

WoNS and other, State-restricted weeds identified within the proposed offset property are recognised as having the greatest priority for control and will be the primary focus of the weed management program, to contain existing infestations and prevent further spread, as well as preventing the introduction and establishment of other restricted invasive species. Control options are outlined in **Table 6.1**, with additional notes on chemical control methodologies (including current preferred chemical/active constituent and environmental factors affecting herbicide control) identified in **Table 6.2**. A particular focus of weed management will be the removal of Lantana, which was recorded throughout the proposed offset area and is especially prevalent in the riparian areas.

Much of the ground layer within the cleared portions of the proposed offset area is dominated by exotic grasses that are likely to proliferate following cattle exclusion. Dependent on the level of impacts (e.g. cover, density and height of exotic grasses has reached a stage that it precludes natural regeneration), adaptive management measures are to be initiated; this would include slashing of grasses, controlled burns, crash grazing and/or herbicide treatment.

In areas where assisted natural regeneration is applied as the primary restoration approach, control of grasses will be limited to controlled burns and foliar spray treatment. Patches of native groundcover are to be protected and encouraged to gradually spread out through targeted treatment of non-native grasses within and surrounding the native patches. Foliar spray treatment will be prioritised during periods of active growth (i.e. regrowth following burn or during wet season December to March) to maximise herbicide uptake. Brushcutting or whipper-snipping non-native grass to ground level followed by a foliar spray treatment of active regrowth will be the primary treatment method. Hand-removal may be required in some areas to avoid off-target damage.

Introduced pasture grasses are especially prevalent in the lower-lying floodplain areas, where revegetation will be prioritised. Early establishment of canopy species through revegetation will eventually reduce light infiltration to the ground layer and limit the growth of exotic pastures, allowing replacement with native grasses and forbs. To ensure effective resource distribution, non-native grasses in these areas will initially be managed specifically to reduce immediate competition with planted trees and maximise rate of canopy establishment through regular foliar spray treatment within the planted rows and slashing between rows. Once the planted tree stock has established, attention can then be given to the control of pasture grasses between the tree rows and outwards beyond the revegetated areas through regular foliar spray treatments until planted and/or naturally regenerating native groundcovers are established.



Photo 6.17. Sprayed Lantana



Photo 6.2. Sprayed Lantana



Photo 6.3. Sprayed Giant Rat's Tail Grass



Photo 6.4. Sprayed Cat's Claw Creeper

Table 6.1. Weed control options for WoNS and other, State-restricted weeds identified within the proposed offset areas

Weed Species	Weed Control Options			
	Mechanical Control	Chemical/Herbicide Control	Biological Control*	Integrated Management
Lantana *Lantana camara and Lantana montevidensis*	Grubbing /Cultivating: – Physical removal plants by digging up roots and removing plant material. Dozer/Stick Raking: – Reduce density of larger infestations by removal with large scale machinery. – Land disturbance assured, follow up with herbicide treatment. Slashing/Cutting (including Razorback mower for slopes): – Regular cutting back to reduce vigour and disrupt flowering/fruiting. Requires ongoing maintenance and/or follow up herbicide control.	Foliar spraying: – Apply herbicides to the leaves, ensuring good coverage. Cut Stump Treatment: – Apply herbicides to cut stumps, effective in areas with erosion potential. Low Volume Application (LVA): – Use splatter guns with species-specific nozzle where foliar spraying is difficult due to terrain or in environmentally sensitive areas (e.g. flowing or temporarily dry creek lines with presence of native tree recruitment and groundcover species).	Biological control agents: – Lantana Beetle	Control programs: – Density targeting, light infestations targeted first working towards denser infestations. Follow up control: – Monitoring to determine follow up methods. Fire Management: – Appropriate fire regimes may become part of a management program to reduce invasion and increase native pasture. Minimize Land Disturbance Revegetation: – Consider revegetation (both assisted and unassisted) to prevent weed re-establishment, particularly along creek lines.
Giant Rat's-tail Grass *Sporobolus pyramidalis / S. natalensis*	Grubbing/Hand Pulling: – For small, isolated infestations, hand-chip, bag and remove, then burn.	Foliar Spray – Apply herbicide to actively growing plants, ensuring thorough coverage via boom spray. – Wick Wipe – Spot spray fence lines, headlands, drainage lines, shelter belts and any surviving or newly established weed areas.		Control programs: – Density targeting: light infestations targeted first, working towards denser infestations. Follow up control: – Monitoring to determine follow up methods. Pasture Management: – Implement good pasture management practices to encourage vigorous growth of desirable species. Fire Management: – Appropriate fire regimes (to reduce seed bank) may become part of a management program to reduce invasion and increase native pasture Minimize Land Disturbance Quarantine control: – Livestock and machinery Revegetation: – Consider revegetation (both assisted and unassisted) to prevent weed re-establishment

Weed Species	Weed Control Options			
	Mechanical Control	**Chemical/Herbicide Control**	**Biological Control***	**Integrated Management**
Broad Leaved Pepper *Schinus terebinthifolius*	Grubbing/Hand Removal: – For seedlings and small plants. Cut Stump Treatment: – For large plants.	Spraying (Foliar) – Apply herbicides to leaves and stems, ensuring thorough coverage. Basal Bark Spraying – For larger trees.		Control programs: – Density targeting: light infestations targeted first, working towards denser infestations. Follow up control: – Monitoring to determine follow up methods. Minimize Land Disturbance – Stick to designated roads and tracks and avoid GRT infested areas. Revegetation: – Consider revegetation (both assisted and unassisted) to prevent weed re-establishment
Prickly Pear *Opuntia tomentosa*	Grubbing/Hand Removal: – Smaller infestations, physical removal of individual plants and cladodes. Dozer stick raking: – Large, dense infestations; use machinery to pile and remove plants. Follow up with herbicide treatment.	Foliar spraying: – Apply herbicides to cladodes (pads), ensuring thorough coverage. Stem injection: – Inject individual cladodes or stems with herbicide	Biological control agents: – Cactoblastis Moth – Cochineal Insect	Control programs: – Density targeting: light infestations targeted first, working towards denser infestations. Follow up control. – Monitoring to determine follow up methods. Minimize Land Disturbance Revegetation: – Consider revegetation (both assisted and unassisted) to prevent weed re-establishment
Balloon Vine *Cardiospermum grandiflorum*	Grubbing/Hand Removal: – For seedlings and small plants and infestations Cut Stump Treatment: – For large plants	Foliar spraying: – Apply herbicides to the leaves, ensuring good coverage (below shoulder height) Cut Stump Treatment: – Apply herbicides to cut stumps; effective in areas with erosion potential.		Control programs: - Density targeting, in creeklines - Regular follow up control - Monitor to determine follow up methods Revegetation: – Both assisted (tubestock) and unassisted, especially along creek lines
Cat's Claw Creeper *Dolichandra unguis-cati*	Grubbing/Hand Removal: – For seedlings and small plants, and one off isolated plant Cut Stump Treatment: – Pull down foliage prior to cut stump	Foliar spraying: – Apply herbicides to the leaves, ensuring good coverage (regrowth) Cut Stump Treatment: – Apply herbicides to cut stumps; effective in areas with erosion potential.	Biological control agents – Tingid bug *Carvalhotingis visenda* – Leaf-tying moth *Hypocosmia pyrochroma*	Control programs: - Active monitoring - Density targeting, in creeklines - Regular follow up control - Monitor to determine follow up methods Revegetation: – Both assisted (tubestock) and unassisted, especially along creek lines

*Used in co-ordination with other control methodology.

Table 6.2. Additional notes on chemical weed control methodologies

Weed Species	Herbicide/Active Constituent	Methodology Notes (including environmental factors affecting herbicide uptake)
Lantana *Lantana camara and Lantana montevidensis*	Glyphosate 360 (Foliar spray) Flupropanate (Splatter gun and Foliar spray)	• Spray during periods of active growth, typically after good rains and when minimum temperatures exceed 15°C. • Avoid dry season - do not apply herbicide during the dry season or when plants are under water stress.
Giant Rat's-tail Grass *Sporobolus pyramidalis / S. natalensis*	Glyphosate 360 (Foliar spray - wick wiper & reapply boom application) Flupropanate (spot spray)	• Spray to actively growing plants July to December • Wick wipe spray when natural pasture dormant. • Do not apply in severe droughts or to weeds retarded by burning. • Boom application as split treatment (on regrowth)
Broad Leaved Pepper *Schinus terebinthifolius*	Fluroxypyr (foliar and basal bark spray- with diesel/kerosene) Glyphosate 360 (cut stump)	• Foliar spray leaves • Basal bark spray - apply herbicide to the lower 30cm of the trunk. • Cut the tree close to the ground and immediately apply herbicide to the stump.
Prickly Pear *Opuntia tomentosa*	Aminopyralid + picloram + triclopyr (Foliar spray cladode) Glyphosate 360 (Stem injection)	• Stem injection particularly effective for larger plants or dense infestations.
Balloon Vine *Cardiospermum grandiflorum*	Glyphosate 360 (Foliar spray) Picloram + Aminopyralid (cut stump)	• Foliar spray leaves • Apply a 3–5 mm layer of gel for stems less than 20 mm diameter. Apply 5 mm layer on stems above 20 mm diameter.
Cat's Claw Creeper *Dolichandra unguis-cati*	Glyphosate 360 (foliar spray and cut stump)	• Foliar spray on regrowth • Cut stump and apply immediately and repeat (multiple tubers)

6.3.5 Revegetation

Broadscale revegetation will be required in the lower-lying areas of Management Zone 3 where extensive grazing and coverage of non-native pasture grasses has resulted in poor natural recruitment of native vegetation. To achieve the habitat quality targets for Management Zone 3 (refer **Section 6.5**) within the timeframe of the offset management period, early planting of canopy species will be prioritised using a systematic and replicable approach for optimised efficiency.

Supplementary planting will also occur in areas Management Zone 2 that display a more open canopy or limited species diversity and in which natural recruitment would take longer to restore the original community, as determined through on-going monitoring. This also presents an opportunity to increase the proportion/quantity of preferred food tree species for Koala and Grey-headed Flying-fox that occur naturally within each pre-clear community.

Recognised food tree species for Koala and Grey-headed Flying-fox that naturally occur within each Management Zone and typical canopy stem densities (based on the technical description for the associated regional ecosystem) are provided in **Table 6.3**.

In preparation for planting, grass height throughout the revegetation areas will be kept low to allow easy visibility and vehicle accessibility. Whilst cattle are to be excluded during revegetation and on-going maintenance, crash grazing may be considered prior to commencement of revegetation works to reduce overall grass height for ease of access and enhance seedling establishment; alternatively, a controlled burn or slashing may also be utilised.

Broadscale planting of pre-grown seedlings in rows is considered the most suitable approach to ensure the desired species composition and spacing is achieved, and allow efficient maintenance to be undertaken across the revegetation areas; 5m spacings between rows will allow access for slashing during maintenance. In preparation for planting, the planting rows (1-1.5m wide) will be marked (e.g. with spray paint) and strip-sprayed to kill all groundcover vegetation prior to tilling (if required) and mulching.

A weed-free mulch will be laid over the planting rows to a depth of 100mm prior to planting. Care will be taken during the planting process to ensure mulch does not touch the plant stems to avoid stem rot.

Plants are to be 50mm “tube-stock” size; this size is cost effective and has higher survival rates and faster growth rates than advanced stock. Tube stock shall be provided in forestry tubes with a minimum plant height of 20cm and a well-developed root system. Seedlings are to be healthy and displaying signs of active growth – any plants displaying yellowing, disease, root curling or are root bound are not to be planted, nor are any plants with weeds growing in the pot. The plant supplier will be instructed to “harden off” the plants before delivery to site to allow greater survival rates.

Seedlings must be moist at time of planting and, if necessary, watered prior to planting. Tree guards will be installed around each planted tree to protect against grazing by native and exotic fauna.

Following planting, emerging non-native grasses and forbs within the planted strips will be foliar sprayed during regular maintenance visits, with care taken to avoid naturally recruiting native species. The grass height between the planted rows will be managed through regular slashing to be kept below the height of the planted trees until these are established and self-sustaining. If this area is maintained free of pasture grasses, regeneration of native grasses from self-seeding is likely to be highly effective.

Once the trees have established, the inter-row spaces between trees can be revegetated with native shrubs as per the methodology for trees, using typically occurring species and densities from the relevant RE technical descriptions.

Maintenance will consist of ongoing weed control around plantings and watering when required. Dead or damaged plants and depleted mulch will be replaced according to the methods described above.

Table 6.3. Recognised food tree species for Koala and Grey-headed Flying-fox that naturally occur within each exclusion/management zone and typical canopy stem densities

Exclusion/ Management Zone (associated RE)	Recognised food tree species for Koala and Grey-headed Flying-fox	Typical Canopy Stem Density
Management Zones 3a and 2a (RE 12.12.15)	*Corymbia intermedia* *Eucalyptus acmenoides* *Eucalyptus carnea* *Eucalyptus microcorys* *Eucalyptus propinqua* *Eucalyptus siderophloia* *Eucalyptus tereticornis*	1/6m^2 (at least 1603/ha)
Management Zones 3b and 2b (RE 12.12.12)	*Corymbia intermedia* *Corymbia tessellaris* *Eucalyptus crebra* *Eucalyptus propinqua* *Eucalyptus tereticornis*	1/14m^2 (at least 740/ha)*
Management Zones 3c and 2c (RE 12.9-10.17)	*Corymbia citriodora* *Corymbia intermedia* *Eucalyptus acmenoides* *Eucalyptus carnea* *Eucalyptus microcorys* *Eucalyptus propinqua* *Eucalyptus siderophloia* *Eucalyptus tereticornis*	1/14m^2 (at least 732/ha)**
Management Zones 3d and 2d (RE 12.9-10.7)	*Corymbia tessellaris* *Eucalyptus crebra* *Eucalyptus tereticornis*	1/20m^2 (at least 480/ha)
Management Zones 3e and 2e (RE 12.3.7)	*Corymbia intermedia* *Corymbia tessellaris* *Eucalyptus tereticornis*	1/17m^2 (at least 606/ha)

*No typical stem density provided for RE 12.12.12. Stem density based on relative canopy cover of 12.12.12 vs 12.12.15.

**No typical stem density provided for RE 12.9-10.17. An average of the typical stem densities for 12.9-10.17b and 12.9-10.17d has been used.

Detailed planning of revegetation works will commence upon acceptance of the offset. A suitably qualified ecologist or rehabilitation contractor will be engaged to delineate and map specific planting areas and prepare a detailed revegetation plan that includes:

- Species lists for planting in each area, based on the pre-clear RE to be restored and prioritisation of species known to support Koala and Grey-headed Flying-fox.
- Plant densities/spacings determined through consideration of stem densities given in the corresponding RE technical descriptions, and recommended spacings given in Chenoweth EPLA and Bushland Restoration Services (2012).
- Determination of ground preparation requirements (e.g. grass control, tilling, fertiliser application, etc.).
- Identification of water fill points (noting that existing stock water tanks may be utilised) for use in irrigation.
- Timing and schedule for ground preparation works, planting, watering, and follow-up maintenance.

6.3.6 Land Form Considerations

In addition to the different management zones, the Colorado property has a range of geological land forms that, to some extent, will dictate the approach to habitat restoration. Key considerations are noted in the following, with reference to **Photos 6.5-6.8**.

Alluvial Flats and Creeklines (Management Zones 3e and 2e)

The alluvial flats and creeklines vary in width, from narrow sections to broader expanses. Many of these areas are heavily infested with Lantana, which is currently undergoing a spraying program. Ongoing monitoring will be necessary to ensure effective control while minimizing the risk of harming new native vegetation. A refined spraying methodology will be required during the restoration process to selectively target Lantana while preserving emerging native species.

To promote ecological restoration, assisted vegetation through the strategic tubestock planting of *Eucalyptus tereticornis* (and scattered *Corymbia intermedia* and *C. tessellaris*) will be undertaken to support the establishment of preferential food trees for Koala and Grey-headed Flying-fox.

As intensive stock movement has contributed to bank erosion and reduced biodiversity across riparian zones, degraded areas must also be stabilized through dense planting of mini tubestock ground cover species—particularly *Lomandra*, which is well-suited for bank retention. A planting density of 3–4 plants/m^2 will provide effective soil stabilization and support long-term ecological recovery.

Mid-slopes (Management Zones 3a-d and 2a-d)

These areas exhibit varying vegetation density, ranging from occasional to mid-dense Lantana growth. In some sections, vegetation loss is predominantly due to past fire damage, as evidenced by the presence of dead wood. In mid-slope areas where the fire intensity was lower or absent, natural revegetation is already underway. This regeneration process is expected to continue and be facilitated by the removal of stock and ongoing control of grazing pests, and will be prioritized as the primary restoration strategy.

Some steeper slopes display steppe erosion, characterized by compacted tracks running in contour patterns around the terrain. Following stock removal, these tracks may function as natural benches, facilitating vegetation growth, provided excessive compaction has not occurred. Monitoring these areas will be essential to assess the viability of passive regeneration and ensure effective erosion control.

Ridge-tops (Management Zones 3a-c and 2a-c)

The open flat ridge tops primarily consist of grasslands and are largely free from Lantana and other weeds. These areas have been heavily utilized for grazing and serve as key zones for stock movement.

Many ridge areas lack tree cover and will need to be closely monitored for natural regrowth after stock exclusion and fencing.

If natural regeneration proves insufficient, assisted revegetation through tubestock planting will be required. However, maintaining and watering newly planted trees in these ridge environments presents logistical challenges, other than where there are spring-fed, perched dams in proximity. To improve survival rates of tubestock plantings, strategies for reliable water access will be explored, including:

- Planting around existing dams to utilize available water sources.
- Installing portable water tanks in strategic locations.
- Using 100-litre tanks mounted on ATVs to facilitate watering during dry spells.

Steep Gullies/Gorges (Management Zones 3a-c and 2a-c)

Steep gullies/gorges within the property are characterized by dense thickets of Lantana, which require removal and ongoing monitoring to prevent reinfestation.

Given the higher moisture content of these steep gullies, natural, unassisted vegetative regrowth is expected to be the most effective restoration approach. As Lantana is progressively cleared, pioneer rainforest species are likely to establish themselves initially, supporting broader ecological recovery.



Photo 6.5. Lantana occurs on steep banks and slopes. Removal of stock and control of Lantana and deer numbers will allow unassisted revegetation to occur on slopes. Splatter gun spraying suggested for Lantana in creekline, followed by assisted revegetation (planted tubestock) along alluvial flats (at forefront of photo – currently dominated by Blady Grass).



Photo 6.6. Mid-slopes without Lantana with past fire damage. Unassisted regrowth very slowly starting to occur. Once stock is removed, this would be the preferred rehabilitation method.



Photo 6.7. Natural, unassisted regrowth is occurring along slopes (in distance). This will be facilitated by fencing and removal of stock removed. Will require cool, mosaic burning fire regime, especially in areas of more sizeable regeneration (i.e. that can tolerate cool burn), to reduce higher grass fuel load and facilitate self-germination of native species through smoke and ash.



Photo 6.8. Assisted revegetation (planted tubestock) required along alluvial flats (in foreground). Bare hill in background is a good example of the bare vegetation on the broader top of slopes and ridges that, once fenced, is suggested to be monitored for a couple of years to determine if unassisted vegetation is occurring.

6.4 FERAL ANIMAL CONTROL

Herds of feral deer are known to occur within the proposed offset area, with regular sightings by the site manager and BAAM personnel during site visits/surveys. The high number of sightings may be a result of herds being funnelled into the property following extensive burns on neighbouring properties, and the recent control of Lantana along creeklines assisting detection. Whilst four deer species have been recorded as present, Red Deer *Cervus elaphus* is the most prevalent on site.

Sightings by survey personnel and camera traps deployed over the period 9/10 April to 30 April/1 May 2025 confirmed that Red Deer currently occur across the property, including confirmed sightings in lots 8, 9, 69 and 116 (**Figure 4.4, Appendix 2**). The most frequent sightings were from around dams in the central portion of lot 8 and the southern portion of lot 116 (**Photos 6.9 and 6.10**). Observed numbers ranged from individual bucks to small herds of up to eight individuals comprising bucks, does and large juveniles. Buck rutting was audibly detected across the northern section of the property, indicating breeding behaviour.

As outlined in **Section 4.1**, the presence of Dingo/wild dog and foxes was also confirmed during recent surveys. Feral pigs are also common in the Somerset region and are known to occur within the proposed offset area and surrounds on occasion, although no pigs or evidence of their presence was recorded during the recent surveys.

A Brown Hare *Lepus europaeus* was recorded on a camera trap and are expected to occur across the property, although no Rabbits *Oryctolagus cuniculus* are known to occur within the property or surrounding areas, with no WildNet records within 20km and no ALA records within 15km.

The grazing and bark stripping behaviour of deer is a particular risk to the establishment of revegetation and natural regeneration required for successful habitat restoration. Feral pigs also pose a threat to the restoration of habitat through digging activity and wallowing behaviour uprooting planted and naturally regenerating vegetation and ground disturbance favouring the proliferation of weeds. Dingoes/wild dogs and foxes pose a direct predation threat to Koalas coming to the ground to move between trees.



Photo 6.9. Around a dam within the central portion of lot 8 was the area of highest diurnal sighting of deer across the offset area



Photo 6.10. an active deer "wallow" was recorded in the southern portion of lot 116

Various methods exist for the management of these species, including trapping, shooting, baiting and canid pest injectors. Under the current land management regime, culling of wild dogs is undertaken in response to confirmed sightings or livestock attacks, with two dogs shot on Colorado in late 2024 and 14 dogs shot on neighbouring properties between November 2024 and January 2025. Baiting and soft jaw traps are also used on an adjacent property. Two Red Deer were shot on Colorado in late 2024, while a minimum of 12 Chital Deer *Axis axis* are being culled per night over two nights during ongoing fortnightly visits to a neighbouring property to the south; the latter being used to supply venison to restaurants on the Sunshine Coast. Several pigs have also been shot on adjacent properties in recent months, with none sighted on Colorado since December 2024.

To limit the potential risks to Koala and habitat values, ongoing, targeted control of deer, dingoes/wild dogs, foxes and pigs within the proposed offset area and broader property will continue to be undertaken in coordination with neighbouring private landholders, Somerset Regional Council (SRC) and Queensland Parks and Wildlife (QPWS) (responsible for management of neighbouring Conondale National Park). This is expected to be facilitated by the management of Lantana, which assists in the detection of deer and the tracking of dogs and pigs. Quarterly inspections of the offset area will also be undertaken to monitor and document evidence of Dingo/wild dog, fox, deer and pig activity, to inform pest animal control actions and follow-up monitoring (refer **Table 6.5**).

In recognition of the challenges and low likelihood of eliminating the threat of dingo/wild dog and fox attack on Koala within an offset area of this size, and the reliance on surrounding properties to be equally committed to pest animal control, no improvement in the threat score for Koala is expected. Rather, the current threat score is predicted to be maintained through the continuation of the current pest animal management regime, which will be informed by the quarterly monitoring inspections.

Similarly, no improvement in habitat quality is expected as a direct result of controlling feral deer and feral pigs. Rather, the continuation of the current pest animal management regime (informed by the quarterly monitoring inspections) is expected to prevent feral deer and feral pigs activity from inhibiting the achievement of rehabilitation targets through the rehabilitation methods described in **Section 6.3**.

6.5 GRAZING MANAGEMENT

As noted above, intermittent “crash” grazing may be used prior to the commencement of revegetation and supplementary planting works in Management Zones 2 and 3 to reduce overall grass height for ease of access and enhance seedling establishment, and to control weeds, enhance natural recruitment and manage fuel loads in already established vegetation in Management Zones 1 and 2.

In all cases, specialist advice will be obtained to determine the necessity of crash grazing with regard to alternative measures (i.e. slashing, herbicide treatment, controlled burns, etc) and ensure the location, duration and intensity of crash grazing does not threaten the achievement of rehabilitation targets (refer **Section 6.6**). As a minimum, cattle will be excluded during revegetation works and on-going maintenance of planted areas, while the use of crash grazing for fuel load reduction is to be restricted to the dry season (April to November). Furthermore, no new livestock watering points will be established within the proposed offset area.

Monthly monitoring will be undertaken during periods of crash grazing to ensure livestock are contained within the specified area(s), and unanticipated threats to offset success from grazing activity are addressed.

As noted in **Section 6.1 and Table 6.5**, a Fire Management Plan for Stage 1 of the offset will be developed within 12 months of project approval that includes on-going monitoring to assess fuel loads and requirements for adaptive management, including amended weed control and ecological burn regimes, and intermittent “crash” grazing, to limit risk of loss to uncontrolled fire. A revised Fire Management Plan that incorporates recommended fire management guidelines/regimes for Stage 2 of the offset will then be prepared prior to commencing Stage 2.

As part of the overall fire management strategy for the offset area, and to ensure any intended crash grazing does not threaten the achievement of rehabilitation targets, a Crash Grazing Management Plan will also be prepared (and submitted to the Commonwealth for approval) within 12 months of project approval, and prior to any use of this management measure within the Offset Area.

The plan will outline/confirm:

- how grazing has been considered in conjunction with other fire management and grass/weed cover strategies.
- why grazing is the most effective and most appropriate strategy for reaching the proposed conservation gains.
- the number and species of livestock to be used for crash grazing.
- triggers to introduce grazing, and triggers to remove grazing once an acceptable fuel load or grass/weed cover has been reached.
- if seasonal changes to grazing thresholds are required based on fuel load variation.
- how livestock movement will be monitored, and controlled and at what frequency.
- where livestock will be kept when grazing is not required within the offset area.
- how grazing will be excluded from any areas within which revegetation is occurring (until it is of a size that grazing no longer poses a risk).

In recognition of the planned/expected requirement to manage fuel loads and grass/weed cover through controlled burns and crash grazing, current groundcover condition (represented by richness of native grass and forb species, native grass cover and organic litter cover) is predicted to be maintained at current levels, but not improved, while non-native grass cover is not expected to achieve benchmark levels for all Management Zones.

6.6 REHABILITATION TIMING AND TARGETS

As outlined in **Section 6.3.1**, rehabilitation of Stage 1 of the offset will commence upon commencement of Stage 1 of the action (i.e. rehabilitation of Stage 1 will be completed by year 20 of the action), while rehabilitation of Stage 2 of the offset will commence no later than 10 years following commencement of Stage 1 of the action (i.e. completed by year 30 of the action, well before the commencement of Stage 2 of the action and associated impacts).

The exact timing of specific rehabilitation tasks will depend on the prevailing climatic conditions; chemical weed control and revegetation works is best undertaken during conditions favouring active plant growth and, for the proposed offset area, warm conditions and the majority of rainfall is experienced in the December to March period, making it ideal for the successful uptake of herbicides and initial establishment of planted seeds/seedlings. Ground preparation work for planting such as slashing and soil ripping/tilling will be carried out prior to the onset of the wet season where machinery access is less likely to be hindered by slippery tracks and boggy ground.

Actions to be completed during each 5-year period of the 20-year offset management period (all of which are applicable to both offset stages), and the associated rehabilitation targets for each Management Zone, are presented in **Table 6.4**. Monitoring and reporting requirements, triggers for adaptive management, and corrective actions are outlined in **Tables 6.5-6.7**.

6.7 OFFSET MANAGEMENT ACTIONS SUMMARY

Table 6.5 summarises the discussed management objectives and actions, confirms responsible parties for implementing the management actions, and outlines monitoring and reporting requirements, triggers for adaptive management, and corrective actions and timing related to each identified management measure to be undertaken within the proposed offset area.

6.8 MONITORING AND REPORTING

Table 6.6 details the monitoring program to be implemented upon acceptance of the offset, including timing, methodologies and responsible parties undertaking each monitoring activity.

Table 6.7 specifies the reporting requirements and schedule associated with the offset monitoring described in **Table 6.6**, as well as reporting to be provided to the administrating authority overseeing compliance with the Project and Offset approval conditions (currently DCCEEW).

Table 6.4a. Rehabilitation timing and targets (applicable to Years 1-10 for offset stages 1 and 2)

Management Zone	Year 1-5 Actions for Both Offset Stages	Year 5 Biocondition Targets for Both Offset Stages			Year 6-10 Actions for Both Offset Stages	Year 10 Biocondition Targets for Both Offset Stages		
		General	Average Overall Score	Average Non-native Plant Cover Score		General	Average Overall Score	Average Non-native Plant Cover Score
Management Zone 1a (remnant RE 12.12.15b)	• Establish access and fencing • Targeted management of WONS/Declared weed species • Fuel load management • Feral animal control	• Cover of WONS and declared restricted invasive species listed under the Queensland *Biosecurity Act 2014* is reduced to <5% • Natural regeneration of the native vegetation community, including species known to support Koala and important winter food trees for Grey-headed Flying-fox, is evident within areas subjected to weed management works • All internal fencing facilitates safe fauna movement	7.44	7	• Targeted management of WONS/Declared weed species • Fuel load management • Feral animal control	• Cover of WONS and declared restricted invasive species listed under the Queensland *Biosecurity Act 2014* is maintained at <5%	7.94	8
Management Zone 1a (remnant RE 12.12.12)			5.88	6			6.25	7
Management Zone 1a (remnant RE 12.9-10.17a)			5.94	4			6.44	5
Management Zone 1a (remnant RE 12.9-10.7)			8.75	6			8.88	7
Management Zone 2a (regrowth RE 12.12.15b)	• Establish access and fencing • Targeted management of WONS/Declared weed species • Broadscale weed management along riparian zones • Stock removal, supplementary tree, shrub and groundcover plantings and associated maintenance along riparian zones • Feral animal control	• Cover of WONS and declared restricted invasive species listed under the Queensland *Biosecurity Act 2014* is reduced to <5% • Natural regeneration of the native vegetation community, including species known to support Koala and important winter food trees for Grey-headed Flying-fox, is evident in areas not targeted for supplementary plantings • All supplementary plantings achieve at least 90% survival rate by the end of the 36 month establishment and maintenance period. • All internal fencing facilitates safe fauna movement	7.03	8	• Targeted management of WONS/Declared weed species • Broadscale weed management in steep gullies and areas identified for supplementary plantings (i.e. where natural recruitment/ regeneration is not progressing) • Stock removal, tree and shrub plantings and associated maintenance in identified supplementary planting areas • Feral animal control	• Cover of WONS and declared restricted invasive species listed under the Queensland *Biosecurity Act 2014* is maintained at <5% • Vegetation structure along riparian zones reflects the relevant pre-clear regional ecosystem, and includes recognised food tree species for Koala and Grey-headed Flying-fox as dominant canopy species (based on >50% relative canopy cover). • All supplementary plantings achieve at least 90% survival rate by the end of the 36 month establishment and maintenance period.	7.41	9
Management Zone 1a (regrowth RE 12.12.12)			5.91	8			6.03	9
Management Zone 1a (regrowth RE 12.9-10.17a)			7.00	5			7.38	6
Management Zone 1a (regrowth RE 12.9-10.7)			6.56	6			6.94	7
Management Zone 2a (regrowth RE 12.3.7)			4.31	1			4.81	2
Management Zone 3a (cleared – pre-clear RE 12.12.15)	• Establish access and fencing • Targeted management of WONS/Declared weed species • Broadscale weed management in initial reconstruction areas • Stock removal, tree plantings and associated maintenance in initial reconstruction areas (particularly riparian zones, lower-lying floodplain areas and lower slopes) • Feral animal control	• Cover of WONS and declared restricted invasive species listed under the Queensland *Biosecurity Act 2014* is reduced to <5% • All restoration plantings achieve at least 90% survival rate by the end of the 36 month establishment and maintenance period. • All internal fencing facilitates safe fauna movement	5.56	4	• Targeted management of WONS/Declared weed species • Shrub plantings and associated maintenance in initial reconstruction areas • Broadscale weed management in steep gullies and secondary reconstruction areas (i.e. slopes and ridge tops) • Stock removal, tree plantings and associated maintenance in secondary reconstruction areas (i.e. slopes and ridgetops) • Feral animal control	• Cover of WONS and declared restricted invasive species listed under the Queensland *Biosecurity Act 2014* is maintained at <5% • Natural regeneration of the native vegetation community, including species known to support Koala and important winter food trees for Grey-headed Flying-fox, is evident in areas not targeted for reconstruction • Vegetation structure in initial reconstruction areas reflects the relevant pre-clear regional ecosystem, and includes recognised food tree species for Koala and Grey-headed Flying-fox as dominant canopy species (based on >50% relative canopy cover). • All restoration plantings achieve at least 90% survival rate by the end of the 36 month establishment and maintenance period.	5.94	5
Management Zone 3a (cleared – pre-clear RE 12.12.12)			4.75	5			5.00	6
Management Zone 3a (cleared – pre-clear RE 12.9-10.17)			4.00	5			4.75	6
Management Zone 3a (cleared – pre-clear RE 12.9-10.7)			5.47	6			5.84	7
Management Zone 3a (cleared – pre-clear RE 12.3.7)			5.09	3			5.59	4

Table 6.4b. Rehabilitation timing and targets (applicable to Years 11-20 for offset stages 1 and 2)

Management Zone	Year 11-15 Actions for Both Offset Stages	Year 15 Biocondition Targets for Both Offset Stages			Year 15-20 Actions for Both Offset Stages	Year 20 Biocondition Targets for Both Offset Stages		
		General	Average Overall Score	Average Non-native Plant Cover Score		General	Average Overall Score	Average Non-native Plant Cover Score
Management Zone 1a (remnant RE 12.12.15b)	• Targeted management of WONS/Declared weed species • Fuel load management • Feral animal control	• Cover of WONS and declared restricted invasive species listed under the Queensland *Biosecurity Act 2014* is maintained at <5%	8.19	8	• Targeted management of WONS/Declared weed species • Fuel load management • Feral animal control	• Cover of WONS and declared restricted invasive species listed under the Queensland *Biosecurity Act 2014* is maintained at <5%	8.28	8
Management Zone 1a (remnant RE 12.12.12)			6.50	9			6.69	10
Management Zone 1a (remnant RE 12.9-10.17a)			6.94	6			7.17	7
Management Zone 1a (remnant RE 12.9-10.7)			9.13	9			9.25	10
Management Zone 2a (regrowth RE 12.12.15b)	• Targeted management of WONS/Declared weed species • Fuel load management • Feral animal control	• Cover of WONS and declared restricted invasive species listed under the Queensland *Biosecurity Act 2014* is maintained at <5% • Vegetation structure in supplementary planting areas reflects the relevant pre-clear regional ecosystem, and includes recognised food tree species for Koala and Grey-headed Flying-fox as dominant canopy species (based on >50% relative canopy cover).	7.78	9	• Targeted management of WONS/Declared weed species • Fuel load management • Feral animal control	• Cover of WONS and declared restricted invasive species listed under the Queensland *Biosecurity Act 2014* is maintained at <5%	8.09	10
Management Zone 1a (regrowth RE 12.12.12)			6.28	9			6.47	10
Management Zone 1a (regrowth RE 12.9-10.17a)			7.63	7			7.63	8
Management Zone 1a (regrowth RE 12.9-10.7)			7.31	9			7.63	10
Management Zone 2a (regrowth RE 12.3.7)			5.19	3			5.44	3
Management Zone 3a (cleared – pre-clear RE 12.12.15)	• Targeted management of WONS/Declared weed species • Shrub plantings and associated maintenance in secondary reconstruction areas • Broadscale weed management in areas identified for supplementary plantings (i.e. where natural recruitment/ regeneration is not progressing) • Stock removal, tree and shrub plantings and associated maintenance in identified supplementary planting areas • Feral animal control	• Cover of WONS and declared restricted invasive species listed under the Queensland *Biosecurity Act 2014* is maintained at <5% • Vegetation structure in secondary reconstruction areas reflects the relevant pre-clear regional ecosystem, and includes recognised food tree species for Koala and Grey-headed Flying-fox as dominant canopy species (based on >50% relative canopy cover). • All restoration plantings achieve at least 90% survival rate by the end of the 36 month establishment and maintenance period.	6.56	6	• Targeted management of WONS/Declared weed species • Fuel load management • Feral animal control	• Cover of WONS and declared restricted invasive species listed under the Queensland *Biosecurity Act 2014* is maintained at <5% • Vegetation structure in supplementary planting areas reflects the relevant pre-clear regional ecosystem, and includes recognised food tree species for Koala and Grey-headed Flying-fox as dominant canopy species (based on >50% relative canopy cover).	6.86	7
Management Zone 3a (cleared – pre-clear RE 12.12.12)			5.63	7			5.80	7
Management Zone 3a (cleared – pre-clear RE 12.9-10.17)			5.25	7			5.78	8
Management Zone 3a (cleared – pre-clear RE 12.9-10.7)			6.34	9			6.59	10
Management Zone 3a (cleared – pre-clear RE 12.3.7)			5.97	4			6.22	4

Table 6.5 Summary of offset management actions, monitoring, triggers and corrective actions

Key objective	Management activity	Success criteria	Management actions	Responsible parties	Monitoring and reporting	Trigger for corrective action/s	Corrective action/s and timing
Protect against the loss or degradation of Koala and Grey-headed Flying-fox habitat	Protection against habitat clearing	The proposed offset area is legally protected against broadscale clearing	The offset area will be legally secured to provide enduring conservation protection on the title of land under relevant Queensland legislation, in relation to an offset site, or another enduring protection mechanism agreed to in writing by the department, to provide protection for the site against development incompatible with conservation.	Land Manager and associated contractors	The offset site will be secured as follows: a) initially under a Declared Area Declaration (lodged at the commencement of the Action). b) within 5 business days of placing the offset site under a Declared Area Declaration, DCCEEW will be provided written evidence demonstrating the offset site has been placed under a Declared Area Declaration, including shapefiles. c) within 2 years after commencement of the Action, secure the offset using a legally enforceable mechanism. d) within 5 business days of securing the offset site under a legally enforceable mechanism, provide to the department evidence that the offset site has been secured and shapefiles of the offset site. Legally enforceable mechanism means a mechanism to enable the protection of land that is set aside for environmental purposes on a permanent or long-term basis as described in section 7.2.1 of the Environmental Offset Policy. Reporting to the Commonwealth will be in accordance with any and all requirements given in the EPBC Act approval.	Any activities in contravention of the covenant.	Step 1: Identify cause of the trigger (e.g. unauthorised access) and appropriate corrective actions within one month of the trigger being detected. Step 2: Implement corrective action/s within two months of detection of the trigger. This includes reinforcing access gates and fencing, replacing locks, installing signage and security cameras, and engaging local law enforcement.
Protect against the loss or degradation of Koala and Grey-headed Flying-fox habitat	Vegetation management for accessibility	No unauthorised or intentional clearing is undertaken in the proposed offset area except that necessary for construction and maintenance of tracks, fences, fire breaks and ecological thinning.	Public access will be prevented through maintenance of boundary fencing, installation of signage identifying the area as an environmental offset and securing of all vehicle access gates with padlocks with keys distributed only by authorisation of the Offset Manager to contractors performing offset area monitoring and/or management tasks. All necessary boundary fencing, locks and signage will be installed within 12 months of the date of approval.	Land Manager	The Land Manager or their representative will routinely check boundary fencing and gates on a quarterly basis for any breaks or opportunities for public access.	The integrity of the boundary fencing/gates/locks has been compromised allowing public vehicle access.	
			Construction and maintenance of access tracks, firebreaks and fencing will be undertaken as described in **Section 6.1** and **6.3.** Vegetation clearing will be kept to the minimum extent required to maintain fences, fire breaks, road/track access and/or thinning of invasive native species that are impacting Koala or Grey-headed Flying-fox habitat targets. Installation of fencing along the boundary of the offset area will allow a 5m buffer for any vegetation clearing required for installation and/or maintenance. Vegetation clearing will be undertaken using minimal impact methods (e.g. tree cutting/felling with chainsaw) as necessary for the construction and maintenance of fencing, vehicle access and fire breaks. Any clearing and/or ecological thinning will be conducted in accordance with the advice of	Land Manager and associated contractors	Quarterly inspections of the proposed offset area will be undertaken by the Land Manager or their representative with all vegetation clearing documented including approved clearing (i.e. for track/fire break, fence maintenance etc.) and unapproved clearing.	Unauthorised clearing within the offset area has occurred.	

Key objective	Management activity	Success criteria	Management actions	Responsible parties	Monitoring and reporting	Trigger for corrective action/s	Corrective action/s and timing
			suitably qualified ecologist and in accordance with any applicable legislation.				
Protect against the loss or degradation of Koala and Grey-headed Flying-fox habitat	Fire management	Uncontrolled fire does not occur within the proposed offset area. Planned burns are conducted in accordance with the relevant RE fire management guidelines.	A Fire Management Plan for Stage 1 of the offset will be developed by an appropriately qualified and experienced consultant within 12 months of approval that incorporates recommended fire management guidelines/regimes for each target vegetation community, and includes management of fuel loads and identification of water sources that can be utilised for fire-fighting. A revised Fire Management Plan that incorporates recommended fire management guidelines/regimes for each target vegetation community within Stage 2 and includes management of fuel loads and identification of water sources that can be utilised for fire-fighting will be prepared prior to commencing Stage 2. The Fire Management Plan will be implemented during the offset management timeframe. Vehicle tracks will be maintained as firebreaks by removing weeds and woody regrowth and, if required, additional access tracks will be installed in the proposed offset area wide enough to allow the passage of a fire fighting vehicle.	Land Manager and associated contractors	Quarterly inspections will document any evidence of wildfire and will assess fuel loads across the proposed offset area and identify any areas of concern. Quarterly inspections will document if prescribed ecological burning has occurred in accordance with the Fire Management Plan and all burns will be recorded in the Annual report along with written advice pertaining to the burns from an ecologist or other suitably qualified person (e.g. Fire Warden). Rehabilitation monitoring as outlined below.	The occurrence of uncontrolled wildfire. Dry Matter Yield is above recommended levels at the beginning and end of the Dry Season (January/May) Habitat quality condition attributes are reduced due to a lack of appropriate fire management.	Emergency services (i.e. rural fire brigade) to be mobilised immediately upon discovery of an un-planned fire to extinguish the fire. Following the event of any uncontrolled fire within the Offset and within one month of the event, the Land Manager or other suitably qualified person will assess all firebreaks to determine if widening is necessary, and implement fuel load reduction practices as advised by a fire consultant or suitably qualified ecologist. Amend weed control (see below) and ecological burn regimes, and/or introduce intermittent “crash” grazing during the Dry Season (see below), to reduce the Dry Matter Yield to below recommended levels. Where habitat quality has degraded as a result of inappropriate fire management, a review of the adherence to the Fire Management Plan will be undertaken to determine if there has been a lapse in the implementation of the Plan or if amendment to the plan is necessary. Amendments will be undertaken by an appropriately qualified and experienced fire consultant within 6 months following the habitat quality assessment.
Protect against the loss or degradation of Koala and Grey-headed Flying-fox habitat	Weed management	Habitat quality targets for non-native plant cover and declared weed species are achieved as per **Table 6.4.** No new declared restricted invasive species listed under the Queensland *Biosecurity Act 2014* are introduced or established within the proposed offset area.	Weed treatment will be undertaken by a suitably qualified and experienced rehabilitation contractor and performed in accordance with techniques discussed in **Section 6.3.5**), as well as those set out in the *South East Queensland Ecological Restoration Framework* and weed management practices and herbicide guidelines advised by DAF. Prior to entering and upon leaving the proposed offset area, all equipment will be cleaned to remove seeds and sediment to prevent the introduction of new restricted invasive species into the proposed offset area and spread of weeds outside the proposed offset area. A suitably qualified ecologist or rehabilitation contractor will be engaged to re-map weed occurrences and densities throughout the proposed offset area and delineate specific areas requiring targeted treatment as part of ongoing habitat quality monitoring.	Land Manager, Rehabilitation Contractor, and all personnel entering the proposed offset area.	Rehabilitation contractors will supply to the Land Manager daily records of weed control works undertaken including details of the area and weed species treated, methods used, herbicides applied and photos of the treatment area. Quarterly inspections will document any occurrence of new weed species and weed control undertaken since the previous quarterly inspection including before and after photos of the weed treatment area. Weed mapping for the proposed offset area will be repeated in conjunction with ongoing habitat quality monitoring. Weed mapping will be included in the Offset Habitat Quality reporting.	Non-native plant cover and/or declared weed species cover fails to meet the performance targets (see **Table 6.4**) as determined through habitat quality monitoring. A new restricted invasive plant species is detected in the proposed offset area.	Increased weed control action will be applied to areas where weed mapping indicates an increase in extent and/or density or where habitat quality monitoring has identified a Management Zone as having failed to meet the respective non-native plant cover interim performance target for the monitoring period. Weed control actions will be initiated within 6 months of the monitoring period and receive follow-up maintenance as required to ensure all Management Zones are on track to achieve the rehabilitation targets (see **Table 6.4**). If a new restricted invasive species is detected, immediate (or at most within one month of detection) weed control action will be applied to contain and eradicate the weed from the proposed offset area using appropriate methods for the species as advised by DAF. Additional follow-up maintenance will be undertaken until eradication is achieved.
Protect against the loss or degradation of Koala and Grey-headed Flying-fox habitat	Grazing management	Livestock are effectively excluded from the proposed offset area except where grazing serves to benefit the Offset.	Livestock are removed and excluded from the proposed offset area through stock exclusion fencing except in instances where crash grazing is required for grass management in preparation for revegetation, weed management, and/or where grazing during the dry season (April to November) is determined to be an acceptable method for fuel load reduction. The Land Manager will obtain specialist advice on the use of cattle for fire fuel load and grass/weed management within the proposed offset area to ensure a suitable approach is determined which is compatible with achieving the habitat quality targets set out in this Strategy. As a minimum, cattle will be excluded during revegetation works and on-going maintenance of planted areas, while	Land Manager	Evidence of livestock presence will be monitored and documented during quarterly inspections. Additional monitoring and reporting details will be provided in the Crash Grazing Management Plan.	Livestock are detected in the proposed offset area outside of permissible periods (i.e. crash grazing in preparation for planting, or as required for fuel load management).	Immediately upon notification that prohibited livestock activity has been detected in the proposed offset area (or at most within one week of detection), cattle will be removed and all exclusion fencing and gates will be inspected to determine point/s of entry. The Land Manager will rectify any fence/gate failures within two weeks.

Key objective	Management activity	Success criteria	Management actions	Responsible parties	Monitoring and reporting	Trigger for corrective action/s	Corrective action/s and timing
			the use of crash grazing for fuel load reduction is to be restricted to the dry season (April to November). Furthermore, no new livestock watering points will be established within the proposed offset area. As part of the overall fire management strategy for the offset area, and to ensure any intended crash grazing does not threaten the achievement of rehabilitation targets, a Crash Grazing Management Plan will be prepared (and submitted to the Commonwealth for approval) within 12 months of project approval, and prior to any use of this management measure within the Offset Area. The plan will outline/confirm: • how grazing has been considered in conjunction with other fire management and grass/weed cover strategies. • the number and species of livestock to be used for crash grazing. • triggers to introduce grazing, and triggers to remove grazing once an acceptable fuel load or grass/weed cover has been reached. • if seasonal changes to grazing thresholds are required based on fuel load variation. • how livestock movement will be monitored, and controlled and at what frequency. • where livestock will be kept when grazing is not required within the offset area. • how grazing will be excluded from any areas within which revegetation is occurring (until it is of a size that grazing no longer poses a risk). Installation of additional stock exclusion fencing (if required) is achieved by year 2 of each offset management period.				
Protect against the loss or degradation of Koala and Grey-headed Flying-fox habitat	Feral animal control (deer, pigs)	No increase in evidence of feral deer and/or feral pig abundance/activity	Continue to engage with neighbouring land holders, SRRC and QPWS to conduct coordinated control actions.	Land Manager and pest animal subcontractors	Quarterly inspections undertaken by the Land Manager (or representative) will monitor and document evidence of feral deer and feral pig activity. GPS location and photos of actual sightings, grazing, bark stripping, digging, wallowing, tracks and scats will be recorded for utilisation in pest animal control actions and follow-up monitoring.	Evidence of feral deer and/or feral pig abundance/activity has increased from the previous quarterly inspection, in terms of the number and spatial location/extent of records	Within two months of monitoring recording an increase in feral pig or feral deer abundance/activity since the previous inspection, the Land Manager is to implement additional control measures aimed at reducing numbers, in coordination with neighbouring land holders, SRRC and QPWS.

Key objective	Management activity	Success criteria	Management actions	Responsible parties	Monitoring and reporting	Trigger for corrective action/s	Corrective action/s and timing
Increase extent and quality of habitat available to Koala and Grey-headed Flying-fox	Habitat restoration though assisted natural regeneration	Natural regeneration of the native vegetation community, including species known to support Koala and important winter food trees for Grey-headed Flying-fox, is occurring in Management Zone 1 within 2 years of commencing weed management works, and in areas of Management Zone 2 not targeted for reconstruction, within 2 years of commencing rehabilitation works. Habitat quality targets are achieved as per **Table 6.4.**	Natural regeneration of the native vegetation community will be assisted through removal of livestock and weed management. Weed treatment, focussing on the removal of Lantana and other understorey weeds to encourage establishment of naturally recruiting vegetation, will continue until habitat quality targets are achieved.	Land Manager, Rehabilitation Contractor, Ecologist	Rehabilitation contractors will supply to the Land Manager daily records of weed control works undertaken, including details of the area and weed species treated, methods used, herbicides applied and photos of the treatment area. Rehabilitation monitoring will be conducted by an ecologist annually in areas of Management Zones 1-3 targeted for restoration through assisted natural regeneration for the first 5 years of each offset management period (refer to offset delivery timing in **Section 6.3.1**) to assess progress towards interim performance targets specific to plant species richness, EDL recruitment, non-native plant cover and enable early intervention Habitat quality monitoring will be undertaken in years 1, 3, 5, 8, 10, 13, 15, 17, 19 and 20 of each offset management period (refer to offset delivery timing in **Section 6.3.1**) by a suitably qualified and experienced ecologist to determine site condition and progress towards habitat quality targets as per **Table 6.4**.	Year 5 interim performance targets for EDL recruitment and/or species richness have not been achieved and/or natural regeneration of species known to support Koala and important winter food trees for Grey-headed Flying-fox is not occurring.	Within two months of the year 5 monitoring indicating failure to achieve targets for EDL recruitment and/or species richness, and/or natural regeneration of species known to support Koala and important winter food trees for Grey-headed Flying-fox is not occurring, an investigation will be undertaken to determine cause of failure including an assessment of weed control and fire management practices undertaken to date. As advised through consultation with an ecologist and other relevant specialists (i.e. fire specialist, rehabilitation contractor), amendment to existing practices will be implemented, including increased frequency and intensity of weed control and/or modification of fire management practices. Supplementary planting will be planned and commence within 12 months of year 5 habitat quality monitoring to replicate EDL recruitment and/or increase species richness and establish Koala trees and important winter food trees for Grey-headed Flying-fox in areas where these targets have not been achieved. Supplementary planting will be planned through consultation with an ecologist and revegetation works will be executed by an appropriately qualified and experienced rehabilitation contractor. Plantings will be maintained and monitored as advised by the ecologist to ensure plants are established and self-sustaining by the following monitoring period (year 10).
Increase extent and quality of habitat available to Koala and Grey-headed Flying-fox	Habitat restoration through reconstruction (revegetation)	Vegetation structure reflects the relevant pre-clear regional ecosystem, and includes recognised food tree species for Koala and Grey-headed Flying-fox as dominant canopy species (based on >50% relative canopy cover), within 10 years of commencing restoration works. All restoration and supplementary plantings achieve at least 90% survival rate by the end of the 36 month establishment and maintenance period. Habitat quality targets are achieved as per **Table 6.4.**	A suitably qualified ecologist or rehabilitation contractor will be engaged to delineate and map specific planting areas and prepare a detailed revegetation plan meeting the requirements listed in **Section 6.3.6** upon acceptance of the Offset and no later than six months following approval. Revegetation works including ground preparation, planting and follow-up maintenance will be undertaken by a suitably qualified rehabilitation contractor as described in **Section 6.3.3** and in accordance with the prepared revegetation plan. Initial planting works will commence no later than year 2 of each offset management period (refer to offset delivery timing in **Section 6.3.1**). Plantings will be maintained by a suitably qualified rehabilitation contractor as per the requirements given in the revegetation plan until plants are established and self-sufficient.	Land Manager, Ecologist, Rehabilitation Contractor	Plantings will be monitored by the rehabilitation contractor in conjunction with follow-up maintenance, which is to occur at least monthly for the first 3 months following planting, then every 3 months until 12 months post-planting and every 6 months from 12-36 months. Revegetation monitoring will be undertaken by the rehabilitation contractor in accordance with **Table 6.6**. The rehabilitation contractor will provide daily reports including results of revegetation monitoring and details pertaining to follow-up maintenance works to the Land Manager within one week of the works taking place. Habitat quality monitoring will be undertaken in years 1, 3, 5, 8, 10, 13, 15, 17, 19 and 20 of each offset management period (refer to offset delivery timing in **Section 6.3.1**) by a suitably qualified and experienced ecologist to determine site condition and progress towards habitat quality targets as per **Table 6.4.**	A minimum 90% planting survival rate is not achieved. Interim habitat quality performance indicators are not achieved.	Within two months of monitoring recording failure to achieve 90% planting survival rate or failure to meet interim habitat quality performance indicators, an investigation will be undertaken to determine cause of failure including an assessment of watering, weed control and other maintenance tasks undertaken to date. Corrective actions determined through consultation with an ecologist or rehabilitation contractor will be implemented within 1 month of the investigation. Corrective actions include the following, depending on the identified cause of failure: • Infill planting to replace dead plants • Additional watering • Increased frequency of weed control • Addition of tree guards to prevent grazing of plant stock • Additional mulching to supress weed growth and increase soil moisture retention • Fertilization Scheduling of works will be dependent on the corrective action/s required and advised by the ecologist or rehabilitation contractor (e.g. infill planting to replace dead plants will be timed during optimal growing season whereas additional watering will need to be undertaken immediately to prevent further losses).
Mitigate other identified threats to Koala and Grey-headed Flying-fox.	Fencing	All internal fencing within the proposed offset area facilitates safe fauna movement.	All new internal fencing installations will consist of rural, plain wire fencing with no electric fencing and no barbed wire installed on top or bottom runs to prevent entanglement and injury.	Land Manager	The Land Manager or their representative will ensure the integrity of the exclusion fencing is routinely checked on a quarterly basis, with any breaks in the fence line or opportunities for cattle/horse entry to be rectified.	When fencing is repaired or new fences are installed.	All new fencing installations will consist of rural, plain wire fencing with no barbed wire installed on top or bottom runs.

Key objective	Management activity	Success criteria	Management actions	Responsible parties	Monitoring and reporting	Trigger for corrective action/s	Corrective action/s and timing
			Existing barbed wire fencing will be removed from the proposed offset area where no longer required for stock or vehicle exclusion. Where existing fencing aligns with proposed offset area boundaries or is otherwise considered necessary, these fences will be amended to allow safe movement of native fauna through replacement of at least the top barbed wire strings with plain wire. All new fencing installations and amendment of existing fences to be fauna-friendly within the proposed offset area will be achieved by year 2 of each offset management period (refer to offset delivery timing in **Section 6.3.1**).				Any existing fencing will have at least the top string replaced with plain wire.
Mitigate other identified threats to Koala and Grey-headed Flying-fox.	Feral animal control (dogs, foxes)	No increase in evidence of Dingo/wild dog or fox abundance/activity	Continue to engage with neighbouring land holders, SRRC and QPWS to conduct coordinated control actions.	Land Manager and pest animal subcontractors	Quarterly inspections undertaken by the Land Manager (or representative) will monitor and document evidence of Dingo/wild dog and fox presence and activity. GPS locations and photos of dens, tracks, scats and remains of predated animals, as well as any actual sightings, will be recorded for utilisation in pest animal control actions and follow-up monitoring.	Evidence of Dingo/wild dog and fox abundance/activity has increased from the previous quarterly inspection, in terms of the number and spatial location of records	Within two months of monitoring recording an increase in Dingo/wild dog and/or fox abundance/activity since the previous inspection, the Land Manager will implement additional control measures aimed at reducing numbers, in coordination with neighbouring land holders, SRRC and QPWS.

Table 6.6 Offset monitoring program and methodology

Monitoring	Attributes measured	Frequency	Method	Location/s	Responsible party
Habitat Quality Monitoring					
BioCondition Assessment	• Recruitment of woody perennial species in EDL • Native plant species richness for each of the four lifeforms: - Trees - Shrubs - Grasses - Forbs • Tree height • Tree cover • Shrub canopy cover • Native perennial grass cover • Organic litter • Large trees • Coarse woody debris • Non-native plant cover	In the same month (ideally between March and May) of years 1, 3, 5, 8, 10, 13, 15, 17, 19 and 20 of the offset management period for each offset stage (refer to offset delivery timing in **Section 6.3.1**).	Site-based assessment and scoring as per *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland Assessment Manual* v.2.2 (Eyre et al., 2015) using Queensland Herbarium benchmarks version 3.6 (Queensland Herbarium 2025)	At BioCondition plots, similarly located to sites presented in **Table 5.1** and **Figure 3.7**.	Ecologist
Koala Site Condition	• Quality and availability of Koala food and foraging habitat • Quality and availability of Koala shelter	In the same month (ideally between March and May) of years 1, 3, 5, 8, 10, 13, 15, 17, 19 and 20 of the offset management period for each offset stage (refer to offset delivery timing in **Section 6.3.1**).	Measured in conjunction with Biocondition Assessment (i.e. using same plots) and scored according to **Section 5**	At BioCondition plots established in Year 1, similarly located to sites presented in **Table 5.1** and **Figure 3.7**.	Ecologist
Grey-headed Flying-fox Site Condition	• Quality and availability of Grey-headed Flying-fox food and foraging habitat • Quality and availability of Grey-headed Flying-fox shelter	In the same month (ideally between March and May) of years 1, 3, 5, 8, 10, 13, 15, 17, 19 and 20 of the offset management period for each offset stage (refer to offset delivery timing in **Section 6.3.1**).	Measured in conjunction with Biocondition Assessment (i.e. using same plots) and scored according to **Sections 5**	At BioCondition plots established in Year 1, similarly located to sites presented in **Table 5.1** and **Figure 3.7**.	Ecologist
Koala Site Context	• Connectivity for Koala • Role of site location to species overall population in the State	In the same month (ideally between March and May) of years 1, 3, 5, 8, 10, 13, 15, 17, 19 and 20 of the offset management period for each offset stage (refer to offset delivery timing in **Section 6.3.1**).	Combination of GIS analysis and site assessment as described in **Sections 5**	Measured across each Management Zone	Ecologist
Grey-headed Flying-fox Site Context	• Patch Size for Grey-headed Flying-fox • Role of site location to species overall population in the State • Absence of threats	In the same month (ideally between March and May) of years 1, 3, 5, 8, 10, 13, 15, 17, 19 and 20 of the offset management period for each offset stage (refer to offset delivery timing in **Section 6.3.1**).	Combination of GIS analysis and site assessment as described in **Sections 5**	Measured across each Management Zone	Ecologist
Koala Species Stocking Rate	• Koala usage • Approximate Koala density	In the same month (ideally between March and May) of years 1, 3, 5, 8, 10, 13, 15, 17, 19 and 20 of the offset management period for each offset stage (refer to offset delivery timing in **Section 6.3.1**).	A combination of direct (e.g. strip transects) and indirect observation techniques (e.g. faecal pellet surveys) as described in Youngentob et al. (2021).	Measured across each Management Zone	Ecologist
Detailed Weed Mapping					
Weeds	Presence, density and areas of weed cover across the proposed offset area.	In the same month (ideally between March and May) of years 1, 3, 5, 8, 10, 13, 15, 17, 19 and 20 of the offset management period for each offset stage (refer to offset delivery timing in **Section 6.3.1**).	Weed species, densities and locations of infestations will be recorded based on visual assessment and photos with areas delineated with GPS. Results compiled into a comprehensive map indicating key areas of each dominant weed species for targeted management.	Across proposed offset area	Ecologist or suitably qualified rehabilitation contractor
Quarterly Inspections					
Suitability of access, security and fencing	• Exclusion of livestock • Security of gates and fencing to prevent unauthorised access • Condition of tracks • Accessibility to fencing, water, and rehabilitation areas	Quarterly	All fence lines will be walked to assess for breaks and accessibility. All gates checked and secured with appropriate locks. All vehicle access tracks, driven and checked for encroachment of vegetation, fallen timber, erosion.	Throughout proposed offset area	Land Manager

Monitoring	Attributes measured	Frequency	Method	Location/s	Responsible party
	• Presence or evidence of unauthorised access (e.g. debris, un-authorised vehicle tracks, camps)		General visual assessment and incidental observations.		
Unauthorised clearing	Evidence of logging or other unauthorised vegetation removal	Quarterly	General visual assessment across proposed offset area and incidental observations.	Throughout proposed offset area	Land Manager
Grazing	Livestock presence and stocking rates	Quarterly Monthly during periods of permitted grazing (i.e. crash grazing for grass management prior to revegetation or for fire fuel load reduction)	General visual assessment for presence of livestock and headcounts where appropriate.	Throughout proposed offset area Specific areas subject to crash-grazing or fire load management.	Land Manager
Fire	• Evidence of wildfire • Assessment of fire fuel loads • Assessment of prescribed ecological burns	Quarterly	General visual assessment across proposed offset area and incidental observations. Assessment of fire fuel loads and prescribed ecological burns as per Fire Management Plan.	Throughout proposed offset area	Land Manager
Weeds	• Occurrence of new weed species • Weed control undertaken since the previous quarterly inspection	Quarterly	Visual assessment and photos taken at treatment areas showing before and after treatment. Incidental observations.	Throughout proposed offset area	Land Manager
Feral animals	Evidence of feral animal presence and/or activity	Quarterly	Visual assessment and recording GPS location and photos of key activity areas. Incidental observations.	Throughout proposed offset area	Land Manager
Revegetation Monitoring					
Revegetation	• Plant survival rate • General plant health • Evidence of grazing • Soil moisture • Weed cover	In conjunction with initial follow-up maintenance. Monthly for first 3 months post-planting then every 3 months until 12 months post-planting and every 6 months from 12-36 months.	Visual assessment of entire planting area and total counts or plot-based counts for plant survival rates.	Revegetation areas	Rehabilitation Contractor

Table 6.7 Reporting Requirements

Report	Report details	Prepared by	Submitted to	Reporting period	Due date
Contractor work reports	A daily record of works undertaken by contractors at the Offset property including rehabilitation works and maintenance (i.e. planting, weed control), pest animal management, and prescribed burning activities. A brief summary of works undertaken including locations and photos where relevant, identification of any issues observed relevant to offset management and recommendations for further works.	Contractors conducting site works at the proposed offset area	Land Manager	Daily during period of works	Within 5 business days of work activity completion.
Quarterly Offset Area Management Report	Documents results of quarterly inspections undertaken by the Land Manager including details pertaining to general offset area maintenance and management and identification of issues to be addressed in the coming monitoring period.	Land Manager	Designated Consultant	Every 3 months from date of approval for the life of Offset.	Within 20 business days of the inspection.
Annual Offset Area Management Report	Details offset area management actions undertaken for the year including triggers for adaptive management and corrective actions implemented.	Designated Consultant with input from Land Manager and relevant contractors	DCCEEW	Every 12-month period from approval until end of offset management period.	Within 60 business days of the anniversary of approval.
Compliance Report	Addresses all project approval conditions given in the EPBC Act approval including relevant details to demonstrate compliance with the offset conditions.	Designated Consultant	DCCEEW	Every 12-month period from approval until end of offset management period.	Within 60 business days of the anniversary of approval.
Offset Habitat Quality Report	Details results of Habitat Quality Monitoring undertaken by an ecologist, including scoring of habitat attributes and assessment of progress or achievement of habitat quality targets. The report will identify failure to achieve targets and requirement for corrective actions including specific recommendations to achieve the relevant habitat quality scores. Detailed weed mapping will also be included in the report along with recommendations for targeted weed treatment in the following monitoring period. The results of the Koala Population Assessment will also be presented in the report including methodology utilised and discussion around habitat utilisation within the Offset in comparison to baseline surveys and available data from the wider landscape.	Ecologist	DCCEEW	In years 1, 3, 5, 8, 10, 13, 15, 17, 19 and 20 of each offset management period (refer to offset delivery timing in **Section 6.3.1**).	Within 60 business days from completion of the assessment.

6.9 EXPECTED IMPROVEMENT

Expected improvements in site condition attributes resulting from the proposed management actions over 20 years are summarised in **Table 6.8**.

Expected improvements in site context attributes over 20 years are summarised in **Table 6.9**, while expected improvements in species stocking rate attributes over 20 years are summarised in **Table 6.10**.

Table 6.8. Expected improvements in site condition attributes after 20 years

Site Attribute(s)	Predicted Improvement
Recruitment of woody perennial species in EDL	Recruitment of woody perennial species is already at benchmark levels across all Management Zones. Recruitment will be maintained at high levels through the cessation/control of grazing activities, removal and control of weeds, and implementation of appropriate fire regimes, which will promote natural regeneration, and revegetation using species appropriate for pre-clear REs, as described in **Sections 6.1-6.5**.
Native plant species richness	Native plant species richness is below benchmark levels across all Management Zones as a result of historical clearing and grazing practices and competition with non-native shrubs and groundcover species. Native plant species richness of trees and shrubs will achieve benchmark levels through the cessation of clearing and cessation/control of grazing activities, removal and control of weeds, implementation of appropriate fire regimes, and revegetation using species appropriate for pre-clear REs, as described in **Sections 6.1-6.5**. In recognition of the challenges of rehabilitating an offset area of this size and topography, and the planned/expected requirement to manage fuel loads and grass/weed cover through controlled burns and crash grazing, current native plant species richness of grasses and forbs is predicted to be maintained at current levels, but not improved.
Tree canopy height	Average tree canopy height is below benchmark levels across some areas as a result of historical clearing and grazing practices. Average tree canopy height will increase through the cessation of clearing and cessation/control of grazing activities, and areas with a tree canopy height of <25% of the benchmark are expected to achieve a tree canopy height of at least 25-70%% of the benchmark after 20 years, while areas with a tree canopy height of =>25% of the benchmark are expected to achieve a tree canopy height at least 71% of the benchmark after 20 years.
Tree canopy cover	Average tree canopy cover is below benchmark levels across most of the offset area as a result of historical clearing and grazing practices, and competition with non-native shrubs and groundcover species. Average tree canopy cover will increase through the cessation of clearing and cessation/control of grazing activities, removal and control of weeds, and implementation of appropriate fire regimes, which will promote natural regeneration, as well as revegetation of cleared areas using densities appropriate for pre-clear REs, as described in **Sections 6.1-6.5**. Areas with a tree canopy cover of <10% of the benchmark are expected to achieve a tree canopy cover at least 10-49% of the benchmark after 20 years, while areas with a tree canopy cover of ≥10% of the benchmark are expected to achieve a tree canopy cover of 50-100% of the benchmark after 20 years.
Shrub cover	Average shrub canopy cover is below benchmark levels across most of the offset area as a result of historical clearing and grazing practices, and competition with non-native shrubs and groundcover species. Average shrub canopy cover will increase through the cessation of clearing and cessation/control of grazing activities, removal and control of weeds, and implementation of appropriate fire regimes, which will promote natural regeneration, as well as revegetation of cleared areas using densities appropriate for pre-clear REs, as described in **Sections 6.1-6.5**. Areas with a shrub cover of <10% of the benchmark are expected to achieve a shrub cover at least 10-49% of the benchmark after 20 years, while areas with a shrub cover of ≥10% of the benchmark are expected to achieve a shrub cover of 50-100% of the benchmark after 20 years.
Native grass cover	Native grass cover is already at benchmark levels across many portions of the offset area, but below benchmark levels across other portions as a result of relatively high levels of non-native plant cover and relatively low native tree and shrub cover. In recognition of the challenges of rehabilitating an offset area of this size and topography, and the planned/expected requirement to manage fuel loads and grass/weed cover through controlled burns and crash grazing, current native grass cover is predicted to be maintained at current levels (but not improved) through the cessation/control of grazing activities, removal and control of weeds, and implementation of appropriate fire regimes, as described in **Sections 6.1-6.5**.
Organic litter	Organic litter is below benchmark levels across most of the offset area as a result of relatively high levels of historical grazing practices and relatively low native tree and shrub cover in cleared areas.

Site Attribute(s)	Predicted Improvement
	In recognition of the challenges of rehabilitating an offset area of this size and topography, and the planned/expected requirement to manage fuel loads and grass/weed cover through controlled burns and crash grazing, current organic litter cover is predicted to be maintained at current levels (but not improved) through the cessation/control of grazing activities, removal and control of weeds, and implementation of appropriate fire regimes, as described in **Sections 6.1-6.5**.
Number of large trees	Offset management activities are not expected to result in an increase in the number of large trees after a 20 year timeframe.
Coarse woody debris	Offset management activities are not expected to result in an increase in the presence of coarse woody debris after a 20 year timeframe.
Non-native plant cover	In recognition of the challenges of rehabilitating an offset area of this size and topography, and the planned/expected requirement to manage fuel loads and grass/weed cover through controlled burns and crash grazing, non-native grass cover is not expected to achieve benchmark levels for all Management Zones. Rather, it is expected this attribute will improve by at least one scoring category for each Management Zone, by undertaking active weed management and monitoring, as described in **Sections 6.1-6.5**.

Table 6.9. Expected improvement in site context attributes after 20 years

Site Attribute	Predicted Improvement
Size of Patch and Connectedness	Over a 20 year period, the expected changes outlined in **Table 6.8**, based on the implementation of the measures outlined in **Sections 6.1-6.5** to promote natural regeneration and include active revegetation, would result in an increase in the cover of regrowth and remnant vegetation across the offset area, and an associated increase in patch size for Grey-headed Flying-fox. Patch size scores for Koala are already at the maximum level, as the entire property and neighbouring properties represent foraging/breeding and/or dispersal habitat for Koala.
Connectedness	Over a 20 year period, the expected changes outlined in **Table 6.8**, based on the implementation of the measures outlined in **Sections 6.1-6.5** to promote natural regeneration and include active revegetation, would result in an increase in the cover of regrowth and remnant vegetation across the offset area, and an associated increase in connectedness for Koala. The connectedness score for Grey-headed Flying-fox is influenced by the number of camps within 20km, which will not be influenced by management of the proposed offset property
Context	As context is based on the percentage of habitat within 20km of the proposed offset property, which will not be influenced by management of the proposed offset property, no change to the existing context score is accounted for.
Ecological Corridors	The State's mapping of ecological corridors is unlikely to be influenced by management of the proposed offset property, such that no change to the existing corridor score is accounted for.
Role of site location to state population	Over a 20 year period, the expected changes outlined in **Table 6.8**, based on the implementation of the measures outlined in **Sections 6.1-6.5** to promote natural regeneration and include active revegetation, would facilitate an increase in Koala utilisation and results in an increase in foraging habitat quality for Grey-headed Flying-fox, thereby increasing the "Role of Site Location" score for both species, particularly in current non-remnant areas.
Absence of Threats	Threats to both species will be addressed through the rehabilitation and formal protection of habitats currently impacted by clearing or under threat of clearing, the removal of barbed wire fencing, and the continuation of current pest animal management, as outlined in **Sections 6.1-6.5**. As the key threat to Grey-headed Flying-fox (i.e. clearing) will be ceased and prevented, the maximum score (reflecting a low level of all threats) is expected for this species. In recognition of the challenges and low likelihood of eliminating the threat of dingo/wild dog and fox attack on Koala within an offset area of this size, and the reliance on surrounding properties to be equally committed to pest animal control, no improvement in the threat score for Koala is expected. Rather, the current threat score is predicted to be maintained through the continuation of the current pest animal management regime.
Species mobility capacity	Mobility capacity for both species is already at the maximum level, such that no improvement is accounted for.

Table 6.10. Expected improvement in species stocking rate attributes after 20 years

Site Attribute	Predicted Improvement
Species presence	Recent surveys have confirmed the presence of Koalas on site, and Grey-headed Flying-fox are already known in the local landscape and expected to occur on the proposed offset property, such that no improvement is accounted for.
Species Usage and Approximate density	Over a 20 year period, the expected changes outlined in **Table 6.8**, based on the implementation of the measures outlined in **Sections 6.1-6.5** to promote natural regeneration and include active revegetation, would result in an increase in the cover of regrowth and remnant vegetation across the offset area, and an associated increase in foraging habitat quality, which will facilitate an increase in Koala utilisation in current non-remnant areas, and accommodate an increase in Koala density. Grey-headed Flying-fox density is scored based on the number of camps within a 20km radius of the property, which will not be influenced by management of the proposed offset property.
Role/importance of species population on site	For Koala, a score of 5 has been applied to all Management Zones after 20 years, consistent with the approach for scoring existing remnant and regrowth Management Zones. For Grey-headed Flying-fox, a score of 0 has been applied to all Management Zones after 20 years, consistent with the approach for scoring existing Management Zones.

Appendix 5 provides the results for each habitat quality attribute for Koala and Grey-headed Flying-fox, respectively, based on the expected score improvements outlined above.

A summary of the predicted total, weighted habitat quality scores for Koala and Grey-headed Flying-fox are provided in **Tables 6.11 and 6.13**, respectively. An overall score of 7 (out of 10) for Koala and 6 (out of 10) for Grey-headed Flying-fox indicates habitats within the proposed offset property are expected to be of moderate-high quality after 20 years of dedicated habitat management. Proposed Stages 1 and 2 of the offset are also both expected to score 7 (out of 10) for Koala and 6 (out of 10) for Grey-headed Flying-fox after 20 years of targeted management.

Interim habitat quality scores are provided for each Management Zone for years 5, 10 and 15 in **Tables 6.12 and 6.14**, to inform progress monitoring (refer **Section 6.8**).

Table 6.11a. Total Predicted Koala habitat score for the proposed offset area.

Component	Management Zone														Average/Final
	3a	3b	3c	3d	3e	2a	2b	2c	2d	2e	1a	1b	1c	1d	
Site Condition score (out of 3)	1.74	1.51	1.45	1.64	1.81	2.06	1.67	2.01	1.89	1.49	2.21	1.67	1.98	2.67	1.84
Site Context Score (out of 3)	2.30	2.30	2.57	2.57	2.57	2.25	2.41	2.57	2.57	2.57	2.41	2.25	2.57	2.57	2.46
Species Stocking Rate Score (out of 4)	2.29	2.29	2.29	2.29	2.29	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.02
Habitat Quality score (out of 10)	*6.33*	*6.10*	*6.30*	*6.50*	*6.66*	*7.74*	*7.51*	*8.01*	*7.89*	*7.49*	*8.05*	*7.34*	*7.98*	*8.67*	7.33
Assessment Unit area (ha)	221.95	177.86	275.45	50.08	16.95	33.20	29.38	45.87	1.56	1.31	75.54	3.41	35.96	3.29	**971.83**
Total impact area (ha) for this MNES	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83
Size Weighting	0.23	0.18	0.28	0.05	0.02	0.03	0.03	0.05	0.00	0.00	0.08	0.00	0.04	0.00	**1.00**
Weighted Habitat Quality Score	***1.44***	***1.12***	***1.79***	***0.33***	***0.12***	***0.26***	***0.23***	***0.38***	***0.01***	***0.01***	***0.63***	***0.03***	***0.30***	***0.03***	***6.67***

Table 6.11b. Total Predicted Koala habitat score for Stage 1 of the proposed offset area.

Component	Management Zone														Average/Final
	3a	3b	3c	3d	3e	2a	2b	2c	2d	2e	1a	1b	1c	1d	
Site Condition score (out of 3)	1.74	1.51	1.45	1.64	1.81	2.06	1.67	2.01	1.89	1.49	2.21	1.67	1.98	2.67	1.84
Site Context Score (out of 3)	2.30	2.30	2.57	2.57	2.57	2.25	2.41	2.57	2.57	2.57	2.41	2.25	2.57	2.57	2.46
Species Stocking Rate Score (out of 4)	2.29	2.29	2.29	2.29	2.29	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.02
Habitat Quality score (out of 10)	6.33	6.10	6.30	6.50	6.66	7.74	7.51	8.01	7.89	7.49	8.05	7.34	7.98	8.67	7.33
Assessment Unit area (ha)	143.32	90.24	37.71	0.00	1.74	22.80	22.97	0.00	0.00	0.00	70.78	0.33	11.30	0.00	**401.19**
Total impact area (ha) for this MNES	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19
Size Weighting	0.36	0.22	0.09	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.18	0.00	0.03	0.00	**1.00**
Weighted Habitat Quality Score	***2.26***	***1.37***	***0.59***	***0.00***	***0.03***	***0.44***	***0.43***	***0.00***	***0.00***	***0.00***	***1.42***	***0.01***	***0.22***	***0.00***	***6.77***

Table 6.11c. Total Predicted Koala habitat score for Stage 2 of the proposed offset area.

Component	Management Zone														Average/Final
	3a	3b	3c	3d	3e	2a	2b	2c	2d	2e	1a	1b	1c	1d	
Site Condition score (out of 3)	1.74	1.51	1.45	1.64	1.81	2.06	1.67	2.01	1.89	1.49	2.21	1.67	1.98	2.67	1.84
Site Context Score (out of 3)	2.30	2.30	2.57	2.57	2.57	2.25	2.41	2.57	2.57	2.57	2.41	2.25	2.57	2.57	2.46
Species Stocking Rate Score (out of 4)	2.29	2.29	2.29	2.29	2.29	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.43	3.02
Habitat Quality score (out of 10)	6.33	6.10	6.30	6.50	6.66	7.74	7.51	8.01	7.89	7.49	8.05	7.34	7.98	8.67	7.33
Assessment Unit area (ha)	78.64	87.62	237.74	50.08	15.20	10.40	6.42	45.86	1.56	1.30	4.76	3.09	24.66	3.29	**570.63**
Total impact area (ha) for this MNES	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63
Size Weighting	0.14	0.15	0.42	0.09	0.03	0.02	0.01	0.08	0.00	0.00	0.01	0.01	0.04	0.01	**1.00**
Weighted Habitat Quality Score	***0.87***	***0.94***	***2.63***	***0.57***	***0.18***	***0.14***	***0.08***	***0.64***	***0.02***	***0.02***	***0.07***	***0.04***	***0.34***	***0.05***	***6.59***

Table 6.12. Interim Koala Habitat Quality Targets for the proposed offset area.

Component	Management Zone													
	3a	3b	3c	3d	3e	2a	2b	2c	2d	2e	1a	1b	1c	1d
Current Habitat Quality score (out of 10)	4.66	4.41	4.47	4.81	4.78	6.10	5.93	5.14	5.11	4.67	7.46	5.85	7.20	7.16
5 year Target Habitat Quality score (out of 10)	4.71	4.46	4.57	4.87	4.84	6.20	5.99	5.84	5.71	5.27	7.53	5.90	7.35	7.19
10 year Target Habitat Quality score (out of 10)	4.80	4.57	4.75	5.02	5.02	6.86	6.64	6.59	6.42	6.03	7.73	6.85	7.59	8.13
15 year Target Habitat Quality score (out of 10)	6.23	6.00	6.12	6.39	6.48	7.61	7.36	7.93	7.76	7.40	7.99	7.30	7.91	8.59
20 year (final) Target Habitat Quality score (out of 10)	6.33	6.10	6.30	6.50	6.66	7.71	7.51	8.01	7.89	7.49	8.05	7.34	7.96	8.67

Table 6.13a. Total Predicted Grey-headed Flying-fox habitat score for the proposed offset area.

Component	Management Zone														
	3a	3b	3c	3d	3e	2a	2b	2c	2d	2e	1a	1b	1c	1d	Average/Final
Site Condition score (out of 3)	1.74	1.55	1.45	1.64	1.94	2.12	1.75	2.16	1.89	1.76	2.08	1.67	1.81	2.67	1.87
Site Context Score (out of 3)	2.33	2.38	2.57	2.57	2.76	2.25	2.52	2.57	2.57	2.73	2.41	2.46	2.57	2.79	2.54
Species Stocking Rate Score (out of 4)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
Habitat Quality score (out of 10)	*5.78*	*5.65*	*5.73*	*5.93*	*6.42*	*6.09*	*5.98*	*6.45*	*6.18*	*6.20*	*6.20*	*5.84*	*6.10*	*7.17*	6.12
Assessment Unit area (ha)	221.95	177.86	275.45	50.08	16.95	33.20	29.38	45.87	1.56	1.31	75.54	3.41	35.96	3.29	**971.83**
Total impact area (ha) for this MNES	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83
Size Weighting	0.23	0.18	0.28	0.05	0.02	0.03	0.03	0.05	0.00	0.00	0.08	0.00	0.04	0.00	**1.00**
Weighted Habitat Quality Score	***1.32***	***1.03***	***1.62***	***0.31***	***0.11***	***0.21***	***0.18***	***0.30***	***0.01***	***0.01***	***0.48***	***0.02***	***0.23***	***0.02***	***5.86***

Table 6.13b. Total Predicted Grey-headed Flying-fox habitat score for Stage 1 of the proposed offset area.

Component	Management Zone														
	3a	3b	3c	3d	3e	2a	2b	2c	2d	2e	1a	1b	1c	1d	Average/Final
Site Condition score (out of 3)	1.74	1.55	1.45	1.64	1.94	2.12	1.75	2.16	1.89	1.76	2.08	1.67	1.81	2.67	1.87
Site Context Score (out of 3)	2.33	2.38	2.57	2.57	2.76	2.25	2.52	2.57	2.57	2.73	2.41	2.46	2.57	2.79	2.54
Species Stocking Rate Score (out of 4)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
Habitat Quality score (out of 10)	5.78	5.65	5.73	5.93	6.42	6.09	5.98	6.45	6.18	6.20	6.20	5.84	6.10	7.17	6.12
Assessment Unit area (ha)	143.32	90.24	37.71	0.00	1.74	22.80	22.97	0.00	0.00	0.00	70.78	0.33	11.30	0.00	**401.19**
Total impact area (ha) for this MNES	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19
Size Weighting	0.36	0.22	0.09	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.18	0.00	0.03	0.00	**1.00**
Weighted Habitat Quality Score	***2.07***	***1.27***	***0.54***	***0.00***	***0.03***	***0.35***	***0.34***	***0.00***	***0.00***	***0.00***	***1.09***	***0.00***	***0.17***	***0.00***	***5.86***

Table 6.13c. Total Predicted Grey-headed Flying-fox habitat score for Stage 2 of the proposed offset area.

Component	Management Zone														
	3a	3b	3c	3d	3e	2a	2b	2c	2d	2e	1a	1b	1c	1d	Average/Final
Site Condition score (out of 3)	1.74	1.55	1.45	1.64	1.94	2.12	1.75	2.16	1.89	1.76	2.08	1.67	1.81	2.67	1.87
Site Context Score (out of 3)	2.33	2.38	2.57	2.57	2.76	2.25	2.52	2.57	2.57	2.73	2.41	2.46	2.57	2.79	2.54
Species Stocking Rate Score (out of 4)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
Habitat Quality score (out of 10)	5.78	5.65	5.73	5.93	6.42	6.09	5.98	6.45	6.18	6.20	6.20	5.84	6.10	7.17	6.12
Assessment Unit area (ha)	78.64	87.62	237.74	50.08	15.20	10.40	6.42	45.86	1.56	1.30	4.76	3.09	24.66	3.29	**570.63**
Total impact area (ha) for this MNES	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63
Size Weighting	0.14	0.15	0.42	0.09	0.03	0.02	0.01	0.08	0.00	0.00	0.01	0.01	0.04	0.01	**1.00**
Weighted Habitat Quality Score	***0.80***	***0.87***	***2.39***	***0.52***	***0.17***	***0.11***	***0.07***	***0.52***	***0.02***	***0.01***	***0.05***	***0.03***	***0.26***	***0.04***	***5.86***

Table 6.14. Interim Grey-headed Flying-fox Habitat Quality Targets for the proposed offset area.

Component	Management Zone													
	3a	3b	3c	3d	3e	2a	2b	2c	2d	2e	1a	1b	1c	1d
Current Habitat Quality score (out of 10)	4.08	3.98	3.91	4.31	4.36	5.18	5.40	5.49	5.36	4.92	5.63	5.24	5.51	6.86
5 year Target Habitat Quality score (out of 10)	4.26	4.46	4.13	4.48	4.56	5.28	5.48	5.66	5.49	4.95	5.70	5.29	5.66	6.89
10 year Target Habitat Quality score (out of 10)	4.83	5.11	4.79	5.05	5.16	5.53	5.62	5.97	5.74	5.35	5.85	5.54	5.78	6.92
15 year Target Habitat Quality score (out of 10)	5.55	5.39	5.45	5.71	5.99	5.79	5.79	6.23	5.94	5.75	6.05	5.76	6.04	7.14
20 year (final) Target Habitat Quality score (out of 10)	5.78	5.63	5.73	5.93	6.42	6.09	5.99	6.45	6.18	6.20	6.20	5.96	6.08	7.17

7.0 OFFSET ASSESSMENT

7.1 OFFSET ASSESSMENT GUIDE RESULTS

The habitat scores derived for the impact site and proposed offset property have been used to assess whether the proposed offset property could be viewed as suitable in respect to meeting the offset obligation for the proposed action, using the Commonwealth's Offset Assessment Guide calculators. Values for the other parameters used in the calculators are summarised in **Table 7.1**.

Using these values, protection and management of the entire offset area accounts for 103% of the offset requirement for Koala and 160% of the offset requirement for Grey-headed Flying-fox in accordance with the Offset Assessment Guide (refer **Appendix 6**).

As shown in **Tables 2.2 and 2.3**, based on weighted quality habitat scores associated with each impact stage, Stage 1 of the offset must achieve at least 38.3% of the total offset obligation for Koala and at least 31.7% of the total offset obligation for Grey-headed Flying-fox. As shown in **Appendix 6**, protection and management of Stage 1 of the proposed offset accounts for 42.3% of the offset obligation for Koala and 66.0% of the offset obligation for Grey-headed Flying-fox in accordance with the Offset Assessment Guide, thereby meeting the respective requirements.

7.2 OFFSET SUITABILITY

Aside from meeting the offset obligations for the proposed action, an assessment of the suitability of the offset against the principles specified in the Commonwealth's Environmental Offsets Policy (Commonwealth of Australia [2012]) is provided in **Table 7.2**.

Table 7.3 sets out the relevant Conservation Advices, Recovery Plans and Threat Abatement Plans for the protected matters (as at April 2026) and describes how the proposed offset addresses each.

Table 7.1. Values for Offset Assessment Guide Parameters

Parameter	Scoring Rationale
Quantum of Impact (Area)	258 ha for Koala and 199 ha for Grey-headed Flying-fox
Quantum of Impact (Quality)	6 for Koala and 5 for Grey-headed Flying-fox (as per **Tables 2.2 and 2.3**)
Risk Related Time Horizon	The proposed offset area will be legally secured in perpetuity; hence, the maximum score of 20 years.
Time Until Ecological Benefit	Measures prescribed in **Section 6** are expected to achieve the predicted increase in habitat quality over a period of 20 years.
Start Area	972 ha, including 401 ha for Stage 1 and 571 ha for Stage 2
Start Quality	5 for Koala and 4 for Grey-headed Flying-fox (as per **Tables 5.22 and 5.23**)
Risk of Loss without Offset	It is understood risk of loss is to be set at 0% without any comprehensive evidence to the contrary.
Risk of Loss with Offset	It is understood risk of loss is to be set at 0% without any comprehensive evidence to the contrary.
Confidence in Result (Risk of Loss)	As risk of loss is set at 0%, a high score of 90% is used for confidence in result.
Future Quality without Offset	In the absence of this offset proposal, existing habitat quality is expected to be maintained, as the offset site would not be managed to improve or maintain native habitat values; instead, it would continue to be used for rural pursuits, including grazing, pasture maintenance, and associated

Parameter	Scoring Rationale
	land management activities, particularly as most of the proposed offset area has been subject to PMAVs that locks in the extent of unmapped vegetation. These ongoing uses are inconsistent with the natural regeneration or recovery of native vegetation and habitat. The following points demonstrate that, without the offset, habitat quality in the area would not improve on its own: 1. Existing Land Use and Rural Management Practices The offset area is currently used for rural pursuits, primarily grazing and related land management. These uses involve the deliberate suppression of vegetation regrowth to maintain open pastures and access for livestock. Management practices include mechanical clearing, slashing, targeted herbicide use, and controlled burning, which are carried out to sustain productive use of the land. Aerial imagery and landholder records demonstrate that these practices have been ongoing for over 100 years, resulting in a landscape where native vegetation has limited opportunity to re-establish. 2. Prevention of Regrowth and Bushland Re-establishment Natural regeneration of native vegetation is not permitted to progress beyond early successional stages due to management objectives tied to rural land use. This includes active clearing of advanced regrowth and maintaining clear areas even on steeper slopes, which are managed to reduce erosion, fire risk, or weed spread. Fire regimes are used strategically as part of rural land management to manage fuel loads and stimulate pasture grasses, further hindering native woody vegetation from establishing. 3. Degraded Baseline Condition and Low Likelihood of Passive Recovery The offset site exhibits compacted soils, altered ground cover from livestock, and observed invasive species. Without active intervention, these conditions limit the likelihood of natural regeneration. Rural activities such as fencing, water point access, and vehicular movement further contribute to the ongoing disturbance and suppression of habitat values. 4. No Existing Legal Protection or Incentive for Conservation Portions of the offset site are not protected under any conservation covenant or agreement, and are mapped as Category X (non-regulated) under State vegetation management legislation. As such, the unmapped areas are legally able to be cleared or maintained in its current state for rural production purposes. In the absence of an offset arrangement, there is no requirement or incentive for the landholder to alter management practices to support habitat restoration or conservation outcomes.
Future Quality with Offset	7 for Koala and 6 for Grey-headed Flying-fox (as per **Tables 6.9 and 6.11**)
Confidence in Result (Future Quality)	A conservative approach has been taken to predicting future quality; hence, the maximum score of 85%. In recognition of the challenges of rehabilitating an offset area of this size and topography, and the planned/expected requirement to manage fuel loads and grass/weed cover through controlled burns and crash grazing: • Current native plant species richness of grasses and forbs, and current levels of native grass cover and organic litter, are predicted to be maintained at current levels after 20 years of targeted rehabilitation/management, but not improved. • Only those areas already approaching benchmark levels for tree canopy height and cover, shrub cover and non-native plant cover are expected to achieve benchmark levels after 20 years of targeted rehabilitation/management, whereas partial score increases are predicted for areas that currently have low tree canopy height and cover and shrub cover, and moderate-high levels of non-native plant cover. Furthermore, offset management activities are not expected to result in an increase in the number of large trees or presence of coarse woody debris after a 20 year timeframe. In recognition of the challenges and low likelihood of eliminating the threat of dingo/wild dog and fox attack on Koala within an offset area of this size, and the reliance on surrounding properties to be equally committed to pest animal control, no improvement in the threat score for Koala is expected. Rather, the current threat score is predicted to be maintained through the continuation of the current pest animal management regime.

Table 7.2. Offset Suitability Assessment

Offset Principle	Offset Strategy Compliance
Deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment that is protected by national environment law	The offset area will deliver a conservation gain for the Koala and Grey-headed Flying-fox through: a) Committing to a total offset area of 972 ha for 258 ha of clearing. This offset will: 1. Transition 742 ha of non-remnant areas to remnant Koala and Grey-headed Flying-fox habitat. 2. Prevent the clearing of 111 ha of regrowth and expand this large area with intensive revegetation and assisted natural regeneration. 3. Protect and improve species diversity and ecosystem integrity through existing remnant vegetation areas. b) Preparing and funding an Offset Area Management Plan with actions to manage threats to Koala and Grey-headed Flying-fox in protected and created habitat areas. c) Averting the direct and indirect losses of large areas of unprotected habitat via a legally enforceable mechanism that removes future wholesale and selective clearing rights.
Be built around direct offsets but can include other compensatory measures	The Offset area includes legally securing the land area and undertaking necessary improvements to achieve a greater than 100% offset outcome for impacts calculated for the Warrill View Quarry development for Koala and Grey-headed Flying-fox habitat. The offset area is wholly achieved through direct delivery to land.
Be in proportion to the level of statutory protection that applies to the protected matter	At the time of referral, Koala and Grey-headed Flying-fox were scheduled within the EPBC Act as 'Vulnerable'. Under the International Union for Conservation of Nature data the probability of annual extinction is 0.2%. This factor applies through the meta data of the Offset Guide assessment calculation sheets for which each species has been assessed as achieving the required offset through the proposed offset area.
Be of a size and scale proportionate to the residual impacts on the protected matter	Impacts for the protected matters have been calculated at the impact site using the Modified Habitat Quality Assessment (MHQA) for Koala and Grey-headed Flying-fox. Within the Assessment Guide calculator, the Quantum Impact for the Warrill View Quarry development is: • 155 ha for Koala • 99 ha for Grey-headed Flying-fox To achieve an offset for these impacts, the offset area provides a direct land-based outcome of 972 ha, combing both the reinstatement of new habitat with the regrowth and remnant values already supporting existing and emerging levels of habitat. Management actions outlined within **Section 6** aim to protect and enhance Koala and Grey-headed Flying-fox habitat, compensating for and exceeding the habitat quality of the impact area. The offset and management actions will provide: • Legally secured and long-term protection of 971 ha of Koala and Grey-headed Flying-fox habitat. • Improvement of habitat through revegetation and natural regeneration of food and foraging trees, and removal of grazing impacts and weeds. • Long-term management of threats, through the removal of incompatible land uses, such as ongoing grazing, inappropriate fencing, unregulated fire regimes and targeted pest suppression. • Reduced risk to fauna through retro-fitted fencing. • Reduced risk of high intensity fire through management of fuel loads. The proposed offset is projected to exceed 100% of the required offset obligation for the relevant protected matters, as determined by the Commonwealth's offset assessment guide.
Effectively account for and manage the risks of the offset not succeeding	Confidence in the success of the offset is supported by the offset area selection, design of management actions, and proposed monitoring and reporting procedures (refer **Section 6**). Risks associated with the offset delivery will be mitigated and managed through the management actions outlined in **Section 6**. Management actions have been drawn from offset targets which aim to protect and conserve large, connected areas of Koala and Grey-headed Flying-fox habitat to support viable populations. Potential risks are assessed in **Section 8.**
Be additional to what is already required, determined by law or planning regulations, or agreed to under other schemes or programs	The offset land is owned in freehold by the proponent in a productive rural land area. The majority of the landholding contains no Local or State Government controls for the ongoing clearing of vegetation. The land is currently used for cattle grazing and this will continue in the absence of an approved offset (refer **Table 7.1**). Without the proposed offset, the subject land would continue to be used for rural pursuits that are incompatible with the recovery or persistence of native vegetation, and habitat quality would remain suppressed or further decline due to continued land use pressures. Legally securing the offset areas for the duration of the impact will ensure existing and future owners are prohibited from conflicting land uses, including clearing and grazing. Management beyond minimum legislative requirements is proposed across the whole area to ensure loss of

Offset Principle	Offset Strategy Compliance
	habitat values does not occur through intensification of weeds, destruction of habitat via hot intensive fires, increased risk of mortality or injury by predators and inappropriate fencing. Without the triggering of the EPBC Act and the Controlled Action Assessment, no offsets would be required for the Warrill View Quarry development and, importantly, no covenant or offset works would be implemented at the property. The protection of the proposed offset areas, and the management of the property for the purposes of compensating for impacts upon, and improving habitat for, Koala and Grey-headed Flying-fox, is not otherwise required by State or Local Government. While approximately 269 ha of the property is already subject to a vegetation restoration notice from the Queensland Government, these areas do not form part of the proposed offset areas within the property. The proposed offset would involve a formal and enforceable management plan to transition the land from rural use to a conservation area. This would include the exclusion of livestock, cessation of clearing, targeted weed control, assisted regeneration, and long-term ecological monitoring within the identified offset area. These commitments represent a substantial change in land use and ecological trajectory, delivering real and measurable gains for biodiversity that would not occur without the offset. The offset proposal provides a clear conservation benefit that is additional to what would occur under the existing or likely future land use scenario.
Be efficient, effective, timely, transparent, scientifically robust and reasonable	Efficient and Effective: • Management actions will ensure efficient delivery of outcomes over the offset area and proactive management, monitoring and reporting will ensure response/corrective actions are timely and focused. • Prior to the EPBC Act process, the offset area was not protected or managed for conservation outcomes. Protection and management of the offset area in accordance with this document aims to deliver an overall improved conservation outcome and net gain in Koala and Grey-headed Flying-fox habitat. Timely: • The offset area will be legally secured prior to the commencement of any works at the Warrill View Quarry site. Offset works will be programmed to commence upon legally securing the offset land. • The mix of remnant, regrowth and non-remnant vegetation provided within the offset areas allows for the achievement of immediate and long-term conservation outcomes. The offset areas are to be legally secured prior to the commencement of the action, and this will remove the risk of conflicting land uses occurring on the sites. Following approval of the action, management actions outlined within **Section 6** will commence. Adaptive management processes will ensure management actions respond to technology improvements, natural events and potential risks identified in the risk assessment. Transparent: • The baseline surveys established the survey methodology to be used for the monitoring required for the lifetime of the approval. Monitoring and reporting of the offset areas will be summarised within the Annual Compliance Reports for the impact action. Scientifically robust: • The proposed offset area was assessed by qualified and experienced ecologists. Ongoing management and monitoring actions will be conducted in collaboration with other qualified ecologists and regeneration specialists to achieve the outcomes specified within the EPBC Act approval and this document. Reasonable: • The offset is considered reasonable as the offset areas are greater than the significant residual impact on Koala and Grey-headed Flying-fox habitat and compensate for: o 103% of the quantum impact for the Koala, o 160% of the quantum impact for Grey-headed Flying-fox. This OAMP outlines appropriate management actions to achieve the offset outcomes specified within the EPBC Act approval and an overall improved conservation outcome and net gain in Koala and Grey-headed Flying-fox habitat, ensuring the long-term viability of the protected matters.
Have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced	This document provides a monitoring and reporting framework, performance criteria and corrective actions (refer to **Section 6**). These provide minimum requirements for success/failure of management actions and triggers for corrective actions. The Proponent will engage qualified and experienced consultants and specialists throughout the offset delivery to ensure the offset outcomes are achieved. Section 491 of the EPBC Act makes it an offence in certain circumstances to knowingly provide false or misleading information or documents to specified persons who are known to be performing a duty or carrying out a function under the EPBC Act or the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth). The offence is punishable on conviction by imprisonment or a fine, or

Offset Principle	Offset Strategy Compliance
	both. As such, engaged consultants and specialists are required to complete a declaration of accuracy in reports provided to the Department, acknowledging their responsibility and accountability for information provided to the Department. The approved Offset Area Management Plan will be retained on the Proponent's Website, available for public access. Achievement of the OAMP will be measured through the Annual Compliance Reports, which must be published on the Proponent's website in accordance with an EPBC Act approval, and may be subject to audit by the Department by 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.

Table 7.3. Conservation Advices, Recovery Plans and Threat Abatement Plans

Document name	Where and how the plan addresses the documents
Conservation Advice for *Phascolarctos cinereus* (Koala) combined populations of Queensland, New South Wales and the Australian Capital Territory (DAWE 2022a).	This offset strategy contributes to the on-ground strategies declared in the Conservation Advice for Koala (Qld, NSW and ACT), in particular Strategy 5: Strategic habitat restoration. Specifically, the offset area was selected due to its current and potential establishment of vegetation species that are significant to Koala. The dominant tree species present are significant for Koala, and there is good potential for restoration, with advanced and young regrowth of suitable tree species.
National Recovery Plan for the Koala *Phascolarctos cinereus* (combined populations of Queensland, New South Wales and the Australian Capital Territory) (DAWE 2022b).	The goal of the national Recovery Plan for the Koala (Qld, NSW and ACT) is to stop the trend of decline in population size of the listed Koala, by having resilient, connected and genetically healthy metapopulations across its range, and to increase the extent, quality and connectivity of habitat occupied. In particular, Objective 1 states: The area of occupancy and estimated size of populations that are either: a) suspected to be declining, or predicted to decline are instead stabilised then increased, or b) suspected and predicted to be stable are maintained or increased. In south-east Queensland, Koala populations are declining due to habitat clearing, degradation and fragmentation, urban development, and the subsequent indirect impacts such as vehicle collision and dog attacks (Rhodes *et al.* 2015). The proposed offset address the objective of the National Recovery Plan for the Koala stated above by protecting and restoring Koala vegetation in a landscape that is at threat of further clearing, degradation and fragmentation by pastoral land-use. The majority of the proposed offset area has been cleared for cattle grazing purposes, and adjoining regrowth and remnant vegetation is subject to land management practices designed to improve forage for cattle. Restoration and management of cleared areas, regrowth and remnant vegetation on the property as a Koala offset, including the introduction of burning practices to improve ecological condition, control of invasive Lantana and control of pet animals, will provide opportunity for natural levels of canopy tree recruitment. The subsequent reconnection of currently vegetated hillslopes to valuable riparian habitat within the property will provide increased habitat values and safer movement opportunities for Koalas.
National Recovery Plan for the Grey-headed Flying-fox *Pteropus poliocephalus* (DAWE 2021).	The National Recovery Plan for the Grey-headed Flying-fox details nine objectives with associated priority actions, of which this offset strategy contributes to: - Recovery Objective 1: Identify, protect and increase native foraging habitat that is critical to the survival of the Grey-headed Flying-fox; and - Priority Action 1.4: Increase the extent and viability of foraging habitat for the Grey-headed Flying-fox that is productive during winter and spring. The proposed offset area was selected due to its current and potential Grey-heading Flying-fox foraging habitats, and particularly those that provide important winter and spring forage. The proposed offset area includes vegetation communities that will provide significant Grey-headed Flying-fox foraging habitat, particularly during winter and spring.

8.0 RISK ANALYSIS

This section considers the risks that may inhibit achieving the management objectives and completion criteria for the proposed offset area, including risks that may be wholly outside the proponent's control. The risks have been assessed against the Risk Matrix in **Table 8.1**, supplied by DCCEEW. The risk analysis provided in **Table 8.2**:

- Identifies events and threats that will, may, or are likely to impact the attainment of the completion criteria
- Assesses the likelihood and consequences of those events and threats eventuating, both before and after risk controls are applied, and assesses residual risk levels
- Identifies levels of uncertainty in mitigating the risks, with appropriate trigger criteria for corrective actions should risks and threats eventuate.

Table 8.1. Risk Matrix

Qualitative measure of likelihood (how likely is it that this event/circumstances will occur after management activities are implemented)	
Highly Likely	Is expected to occur in most circumstances
Likely	Will probably occur during the life of the project
Possible	Might occur during the life of the project
Unlikely	Could occur but considered unlikely or doubtful
Rare	May occur in exceptional circumstances
Qualitative measure of consequences (what will be the consequence/result if the issue does occur)	
Critical	Severe, widespread loss of environmental amenity and irrecoverable environmental damage (e.g. plan objectives are unable to be achieved, with no evidenced mitigation strategies)
Major	Major loss of environmental amenity and real danger of continuing (e.g. plan objectives are unlikely to be achieved, with significant legislative, technical, ecological and/or administrative barriers to attainment that have no evidenced mitigation strategies)
High	Substantial instances of environmental damage that could be reversed with intensive efforts (e.g. medium-long term delays to achieving objectives, implementing uncertain, high cost/effort corrective actions)
Moderate	Isolated but substantial instances of environmental damage that could be reversed with intensive efforts (e.g. short-term delays to achieving plan objectives, implementing well-characterised, high-cost/effort corrective actions)
Minor	Minor incident of environmental damage that can be reversed (e.g. short-term delays to achieving plan objectives, implementing low-cost, well characterised corrective actions)

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

Table 8.2. Risk Analysis

Risk Event	Risk Description	Initial Risk Rating*			Management Measures / Actions	Residual Risk Rating*			Performance Criteria	Management Triggers	Corrective Actions	Monitoring Mechanism
		L	C	R		L	C	R				
***Force Majeure* Events**												
Drought	Extreme weather event, in the form of drought, causes habitat degradation and restoration challenges	Likely	High	High	Commence any necessary rehabilitation/ restoration actions in locations where there is greatest spring-fed water availability (e.g. creek flood zones and lower slopes), building outwards from these areas to take advantage of improved microclimatic conditions (reduced solar radiation and wind, increased humidity) from increased tree cover. Distribute existing cleared, stacked timber within rehabilitation/restoration areas to increase soil moisture retention. Exclude livestock from the offset area (i.e. for crash grazing/fuel load reduction) during periods of declared drought.	Likely	Moderate	Medium	Tree and/or sapling mortality in rehabilitation/ restoration areas is <10%	Rainfall is ≤25% of monthly averages over three months. Tree and/or sapling mortality in rehabilitation/ restoration areas is >10%.	Undertake supplemental watering of rehabilitation/ restoration areas	On a quarterly basis, examine monthly rainfall records and long-term forecasts. Monitor tree and sapling mortality in rehabilitation areas monthly during periods of drought. Monitor onsite dam, spring and bore levels monthly during periods of drought to inform available quantities for supplemental watering if required.
Cyclones/ Severe tropical lows / Flooding	Extreme weather event, in the form of severe storms and/or flooding, causes habitat degradation	Likely	Moderate	Medium	Understand on-site flood areas and select species for revegetation accordingly. Improve all-weather access if flooding could potentially restrict management access. Provide drainage (culverts) on access tracks where they are intersected by flows from spring water.	Likely	Minor	Low	All rehabilitation/ restoration areas are accessible following flooding or storms. Vegetation remains intact and healthy.	Tracks are not trafficable. Vegetation is impacted at minor to moderate levels. Weed establishment due to flooding is present.	Repair management tracks within 2 months. Assess and replace rehabilitation/ restoration area vegetation damaged by storms and/or flood. Increase weed management if required.	Establish and maintain flooding maps for the property by using available data and map flood levels following high rainfall events. Monitor tree and sapling mortality in any rehabilitation/ restoration areas post event. Monitor weed cover as per schedule to identify new infestations that require control measures.
Severe Fre Event	Catastrophic bushfire causes habitat loss/degradation	Likely	Critical	Severe	Fire breaks reformed every 2 years and slashed every 2 months in winter and every month in summer. Develop a wildfire response procedure. Undertake planned burns in accordance with the Fire Management Plan and consultation with neighbours, Council and the Rural Fire Brigade.	Possible	Major	High	Dry Matter Yield is below recommended levels at the beginning and end of the Dry Season (January/May)	Fire breaks not sufficiently clear. Dry Matter Yield is above recommended levels at the beginning and end of the Dry Season (January/May)	Increased fire break inspection and maintenance. Introduce/increase crash grazing during the Dry Season to reduce the Dry Matter Yield to below recommended levels. Undertake further fuel reduction burns if required and safe to do so considering habitat recovery and fauna targets. Implement other measures in accordance with the Fire Management Plan	Monitor local fire recommendations and regional plans, particularly in comparison to the Fire Management Plan. Quarterly inspection of fire breaks/fire control lines. Dry Matter Yield estimates to be carried out fortnightly during crash grazing. Dry Matter Yield estimates undertaken within each Management Zone at the beginning of the Dry Season. Undertake other monitoring as specified in the Fire Management Plan.
Standard Risks												
The offset failing (regardless of cause)	Failure to achieve completion criteria	Possible	High	Medium	Implement the management actions of the Final Offset Area Management Plan	Rare	High	Low	Interim completion criteria achieved	Failure to achieve the 5-yearly interim completion criteria	In the event of failure of the offset to achieve an interim or completion criteria, the proponent will undertake an independent audit of the offset area to establish the reason. The proponent will then work with DCCEEW to either extend the management period until the completion criteria are achieved or	Monitor and report on attainment of interim environmental performance targets

Risk Event	Risk Description	Initial Risk Rating*			Management Measures / Actions	Residual Risk Rating*			Performance Criteria	Management Triggers	Corrective Actions	Monitoring Mechanism
		L	C	R		L	C	R				
											provide a replacement offset. Any replacement offset must be agreed with DCCEEW within 24 months of the complete failure of the offset becoming apparent.	
Unplanned clearing and illegal access causing habitat degradation (i.e. Illegal timber harvesting/ collection, Illegal access by the public causes habitat degradation and increases fire risk)	Unplanned clearing / illegal access causes loss of trees and reduced habitat quality	Possible	Moderate	Medium	Clearing of native vegetation in the offset area is only permitted where it would result in a benefit for Koala/Grey-headed Flying-fox fodder and Koala shelter trees. Suitable fencing and signage of property to prevent access from unauthorised personnel.	Rare	Minor	Low	No unplanned clearing is carried out	Evidence of unplanned clearing / illegal timber harvesting. Damage to fencing allowing access.	Investigate cause of unplanned clearing and advise DCCEEW of impacts to interim and completion criteria. Identify the chain of events that led to unplanned clearing and implement procedures to prevent future incidents. Report illegal access to the proponent, DCCEEW and police. Fence repair and increased prevention of access.	Quarterly inspections of the property, including fence lines and management tracks.
Unplanned / uncontrolled fire in offset area or inappropriate fire regimes	Uncontrolled fire and inappropriate fire regimes causes loss of biodiversity and habitat quality	Likely	Critical	Severe	Fire breaks reformed every 2 years and slashed every 2 months in winter and every month in summer. Develop a wildfire response procedure. Undertake planned burns in accordance with the Fire Management Plan and consultation with neighbours, Council and the Rural Fire Brigade.	Rare	Moderate	Low	Dry Matter Yield is below recommended levels at the beginning and end of the Dry Season (January/May)	Fire breaks not sufficiently clear. Dry Matter Yield is above recommended levels at the beginning and end of the Dry Season (January/May)	Increased fire break inspection and maintenance. Introduce/increase crash grazing during the Dry Season to reduce the Dry Matter Yield to below recommended levels. Undertake further fuel reduction burns if required and safe to do so considering habitat recovery and fauna targets. Implement other measures in accordance with the Fire Management Plan	Monitor local fire recommendations and regional plans, particularly in comparison to the Fire Management Plan. Quarterly inspection of fire breaks/fire control lines. Dry Matter Yield estimates to be carried out fortnightly during crash grazing. Dry Matter Yield estimates undertaken within each Management Zone at the beginning of the Dry Season. Undertake other monitoring as specified in the Fire Management Plan.
New infestations of invasive weed species in the offset area.	New weed incursion causes loss of habitat quality	Likely	High	High	Control the spread of new infestation/s. Treat new infestation/s promptly to reduce the extent and spread of the infestation.	Possible	Moderate	Medium	No new infestations identified	New presence or increased spread of weeds	Consult with local NRM Catchment Group, Healthy Land and Water, Council and DAF to determine the invasiveness of the weed and tested/ recommended control measures. Perform appropriate weed control.	Quarterly inspections of the property, including fence lines and management tracks by a person suitably experienced to distinguish the presence of weed species. GPS the location and record the characteristics of the new weed infestation, photograph and collect a specimen for identification (if required). Map the extent of the infestation prior to and post control. Continue to monitor quarterly. Quarterly inspections and annual offset implementation reports, and 5 yearly ecology surveys and reports.

Risk Event	Risk Description	Initial Risk Rating*			Management Measures / Actions	Residual Risk Rating*			Performance Criteria	Management Triggers	Corrective Actions	Monitoring Mechanism
		L	C	R		L	C	R				
Expansion of existing infestations of invasive weed species in the offset area	Weeds reduce habitat quality and provide challenges for new recruitment of canopy tree species	Highly likely	High	High	Undertake weed mapping for the property and reporting on the potential for individual weed species to isolate Koala resources and/or prevent or supress recruitment of canopy tree species. Target those species in management actions. Investigate biocontrol and other methods for Lantana management in consultation with DAF.	Likely	Moderate	Medium	Reduction in the extent of target weeds Control or reduction of spread of non-target weeds.	Increase in the extent of target weeds	Increase management actions to control target weeds.	Update weed mapping annually to track target and other weed distribution/ extent.
Increased population of Dingoes/wild dogs in the offset area	Dingoes/wild dogs are a major threat to Koala individuals and populations	Highly likely	High	High	Implementation pest animal control program	Possible	Minor	Low	Number of individuals decreases.	Dingoes/wild presence on site. Dog predation on Koalas detected.	Increased monitoring and management of feral animals	Quarterly inspections of the property. Undertake other monitoring as specified in the pest animal control program
Increased population of feral animals in the offset area	Increased feral animals (e.g. pig, deer, etc.) can cause habitat degradation and reduction in target vegetation recruitment	Possible	Moderate	Medium	Implementation pest animal control program	Possible	Minor	Low	Number of individuals decreases.	Increased feral animal numbers Damage from feral animals on vegetation apparent.	Increased monitoring and management of feral animals	Quarterly inspections of the property. Undertake other monitoring as specified in the pest animal control program
Fencing inappropriate for the safety of Grey-headed Flying-fox	Continued use of barbed-wire fencing presents a threat of entanglement to Grey-headed Flying-fox	Possible	Minor	Low	Replace barbed wire fencing with standard wire fencing as fencing needs replacing	Possible	Minor	Low	Meters of fencing replaced	Recorded incidents of Grey-headed Flying-fox entanglement	Replace sections of barbed wire fencing where entanglement is recorded and risk is considered high for future incidents	Quarterly inspections of the fence lines.
Unauthorised or inappropriate grazing in offset area	Inappropriate grazing causes biodiversity loss, a reduction in habitat quality and reduction in target vegetation recruitment	Possible	High	Medium	Cattle grazing does not occur in the wet season. Exclude livestock from the offset area (i.e. for crash grazing/fuel load reduction) during periods of declared drought.	Unlikely	Minor	Low	There is no cattle grazing in the wet season or during periods of declared drought.	Cattle present in offset area during the wet season or during periods of declared drought	Remove cattle and fix fencing as required.	Quarterly inspections of exclusion fencing and cattle presence.

9.0 SECURITY MECHANISM

The offset area will be legally secured to provide enduring conservation protection on the title of land under relevant Queensland legislation, in relation to an offset site, to provide protection for the site against development incompatible with conservation.

The offset site will be secured as follows:

a. initially under a Declared Area Declaration (lodged prior to the commencement of the Action).
b. within 5 business days of placing the offset site under a Declared Area Declaration, DCCEEW will be provided written evidence demonstrating the offset site has been placed under a Voluntary Declaration, including shapefiles.
c. within 2 years after commencement of the Action, secure the offset using a legally enforceable mechanism
d. within 5 business days of securing the offset site under a legally enforceable mechanism, provide to the department evidence that the offset site has been secured and shapefiles of the offset site.

Legally enforceable mechanism means a mechanism to enable the protection of land that is set aside for environmental purposes on a permanent or long-term basis as described in section 7.2.1 of the Environmental Offset Policy.

Reporting to the Commonwealth will be in accordance with any and all requirements given in the EPBC Act approval.

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APPENDIX 1

Database Search Results for Proposed Offset Property: Wildlife Online

Queensland Government

WildNet species list

Search Criteria: Species List for a Specified Point
Species: Animals
Type: Native
Queensland status: All
Records: All
Date: Since 1980
Latitude: -26.7937
Longitude: 152.4038
Distance: 20
Email: jedd@baamecology.com
Date submitted: Friday 19 Jul 2024 14:07:45
Date extracted: Friday 19 Jul 2024 14:10:02

The number of records retrieved = 452

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Information about your Species lists request is logged for quality assurance, user support and product enhancement purposes only.
The information provided should be appropriately acknowledged as being derived from WildNet database when it is used. As the WildNet Program is still in a process of collating and vetting data, it is possible the information given is not complete. Go to the WildNet database webpage (https://www.qld.gov.au/environment/plants-animals/species-information/wildnet) to find out more about WildNet and where to access other WildNet information products approved for publication. Feedback about WildNet species lists should be emailed to wildlife.online@des.qld.gov.au.

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Hylidae	*Litoria balatus*	slender bleating treefrog		C		11/1
animals	amphibians	Hylidae	*Litoria brevipalmata*	green thighed frog		C		18
animals	amphibians	Hylidae	*Litoria caerulea*	common green treefrog		C		9
animals	amphibians	Hylidae	*Litoria chloris*	orange eyed treefrog		C		31
animals	amphibians	Hylidae	*Litoria fallax*	eastern sedgefrog		C		48
animals	amphibians	Hylidae	*Litoria gracilenta*	graceful treefrog		C		8
animals	amphibians	Hylidae	*Litoria latopalmata*	broad palmed rocketfrog		C		17
animals	amphibians	Hylidae	*Litoria nasuta*	striped rocketfrog		C		1
animals	amphibians	Hylidae	*Litoria pearsoniana*	cascade treefrog		V		414
animals	amphibians	Hylidae	*Litoria peronii*	emerald spotted treefrog		C		29
animals	amphibians	Hylidae	*Litoria rubella*	ruddy treefrog		C		10
animals	amphibians	Hylidae	*Litoria tyleri*	southern laughing treefrog		C		12
animals	amphibians	Hylidae	*Litoria verreauxii*	whistling treefrog		C		5
animals	amphibians	Hylidae	*Litoria wilcoxii*	eastern stony creek frog		C		75
animals	amphibians	Limnodynastidae	*Adelotus brevis*	tusked frog		V		99
animals	amphibians	Limnodynastidae	*Limnodynastes peronii*	striped marshfrog		C		36
animals	amphibians	Limnodynastidae	*Limnodynastes tasmaniensis*	spotted grassfrog		C		3
animals	amphibians	Limnodynastidae	*Limnodynastes terraereginae*	scarlet sided pobblebonk		C		14
animals	amphibians	Limnodynastidae	*Platyplectrum ornatum*	ornate burrowing frog		C		4
animals	amphibians	Myobatrachidae	*Assa darlingtoni*	pouched frog		V	V	32
animals	amphibians	Myobatrachidae	*Crinia parinsignifera*	beeping froglet		C		1
animals	amphibians	Myobatrachidae	*Crinia signifera*	clicking froglet		C		8
animals	amphibians	Myobatrachidae	*Mixophyes fasciolatus*	great barred frog		C		95
animals	amphibians	Myobatrachidae	*Mixophyes fleayi*	Fleay's barred frog		E	E	208
animals	amphibians	Myobatrachidae	*Mixophyes iteratus*	giant barred frog		V	V	45
animals	amphibians	Myobatrachidae	*Mixophyes sp.*			C		3
animals	amphibians	Myobatrachidae	*Pseudophryne major*	great brown broodfrog		C		8
animals	amphibians	Myobatrachidae	*Pseudophryne raveni*	copper backed broodfrog		C		20
animals	amphibians	Myobatrachidae	*Rheobatrachus silus*	southern gastric brooding frog		PE	EX	1
animals	amphibians	Myobatrachidae	*Uperoleia fusca*	dusky gungan		C		19
animals	birds	Acanthizidae	*Acanthiza chrysorrhoa*	yellow-rumped thornbill		C		17
animals	birds	Acanthizidae	*Acanthiza lineata*	striated thornbill		C		87
animals	birds	Acanthizidae	*Acanthiza nana*	yellow thornbill		C		16
animals	birds	Acanthizidae	*Acanthiza pusilla*	brown thornbill		C		141
animals	birds	Acanthizidae	*Acanthiza reguloides*	buff-rumped thornbill		C		23/4
animals	birds	Acanthizidae	*Gerygone fusca*	western gerygone		C		2
animals	birds	Acanthizidae	*Gerygone mouki*	brown gerygone		C		126
animals	birds	Acanthizidae	*Gerygone olivacea*	white-throated gerygone		C		53
animals	birds	Acanthizidae	*Pyrrholaemus sagittatus*	speckled warbler		C		6
animals	birds	Acanthizidae	*Sericornis citreogularis*	yellow-throated scrubwren		C		76
animals	birds	Acanthizidae	*Sericornis frontalis*	white-browed scrubwren		C		142
animals	birds	Acanthizidae	*Sericornis magnirostra*	large-billed scrubwren		C		78
animals	birds	Acanthizidae	*Smicrornis brevirostris*	weebill		C		13
animals	birds	Accipitridae	*Accipiter cirrocephalus*	collared sparrowhawk		C		8
animals	birds	Accipitridae	*Accipiter fasciatus*	brown goshawk		C		14
animals	birds	Accipitridae	*Accipiter novaehollandiae*	grey goshawk		C		29

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Accipitridae	*Aquila audax*	wedge-tailed eagle		C		38
animals	birds	Accipitridae	*Aviceda subcristata*	Pacific baza		C		14
animals	birds	Accipitridae	*Circus approximans*	swamp harrier		C		2
animals	birds	Accipitridae	*Elanus axillaris*	black-shouldered kite		C		6
animals	birds	Accipitridae	*Erythrotriorchis radiatus*	red goshawk		E	E	1
animals	birds	Accipitridae	*Haliaeetus leucogaster*	white-bellied sea-eagle		C		3
animals	birds	Accipitridae	*Haliastur sphenurus*	whistling kite		C		13
animals	birds	Accipitridae	*Hieraaetus morphnoides*	little eagle		C		1
animals	birds	Accipitridae	*Lophoictinia isura*	square-tailed kite		C		2
animals	birds	Acrocephalidae	*Acrocephalus australis*	Australian reed-warbler		C		2
animals	birds	Aegothelidae	*Aegotheles cristatus*	Australian owlet-nightjar		C		75
animals	birds	Alcedinidae	*Ceyx azureus*	azure kingfisher		C		29
animals	birds	Alcedinidae	*Dacelo novaeguineae*	laughing kookaburra		C		172
animals	birds	Alcedinidae	*Todiramphus macleayii*	forest kingfisher		C		11
animals	birds	Alcedinidae	*Todiramphus pyrrhopygius*	red-backed kingfisher		C		1
animals	birds	Alcedinidae	*Todiramphus sanctus*	sacred kingfisher		C		39
animals	birds	Alcedinidae	*Todiramphus sordidus*	Torresian kingfisher		C		1
animals	birds	Anatidae	*Anas castanea*	chestnut teal		C		2
animals	birds	Anatidae	*Anas gracilis*	grey teal		C		18
animals	birds	Anatidae	*Anas superciliosa*	Pacific black duck		C		75
animals	birds	Anatidae	*Aythya australis*	hardhead		C		3
animals	birds	Anatidae	*Chenonetta jubata*	Australian wood duck		C		78
animals	birds	Anatidae	*Cygnus atratus*	black swan		C		11
animals	birds	Anatidae	*Dendrocygna arcuata*	wandering whistling-duck		C		4
animals	birds	Anatidae	*Dendrocygna eytoni*	plumed whistling-duck		C		6
animals	birds	Anatidae	*Malacorhynchus membranaceus*	pink-eared duck		C		2
animals	birds	Anatidae	*Nettapus coromandelianus*	cotton pygmy-goose		C		1
animals	birds	Anatidae	*Spatula rhynchotis*	Australasian shoveler		C		5
animals	birds	Anhingidae	*Anhinga novaehollandiae*	Australasian darter		C		11
animals	birds	Anseranatidae	*Anseranas semipalmata*	magpie goose		C		4
animals	birds	Apodidae	*Hirundapus caudacutus*	white-throated needletail		V	V	10
animals	birds	Ardeidae	*Ardea alba modesta*	eastern great egret		C		9
animals	birds	Ardeidae	*Ardea intermedia*	intermediate egret		C		7
animals	birds	Ardeidae	*Ardea pacifica*	white-necked heron		C		5
animals	birds	Ardeidae	*Bubulcus ibis*	cattle egret		C		21
animals	birds	Ardeidae	*Egretta novaehollandiae*	white-faced heron		C		47
animals	birds	Ardeidae	*Nycticorax caledonicus*	nankeen night-heron		C		7
animals	birds	Artamidae	*Artamus cyanopterus*	dusky woodswallow		C		15
animals	birds	Artamidae	*Artamus leucorynchus*	white-breasted woodswallow		C		13
animals	birds	Artamidae	*Artamus minor*	little woodswallow		C		1
animals	birds	Artamidae	*Artamus personatus*	masked woodswallow		C		1
animals	birds	Artamidae	*Artamus superciliosus*	white-browed woodswallow		C		1
animals	birds	Artamidae	*Cracticus nigrogularis*	pied butcherbird		C		64
animals	birds	Artamidae	*Cracticus torquatus*	grey butcherbird		C		62
animals	birds	Artamidae	*Gymnorhina tibicen*	Australian magpie		C		155
animals	birds	Artamidae	*Strepera graculina*	pied currawong		C		182

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animals	birds	Burhinidae	*Burhinus grallarius*	bush stone-curlew		C		9
animals	birds	Cacatuidae	*Cacatua galerita*	sulphur-crested cockatoo		C		122
animals	birds	Cacatuidae	*Cacatua sanguinea*	little corella		C		5
animals	birds	Cacatuidae	*Calyptorhynchus banksii*	red-tailed black-cockatoo		C		6
animals	birds	Cacatuidae	*Calyptorhynchus lathami*	glossy black-cockatoo		V		2
animals	birds	Cacatuidae	*Calyptorhynchus lathami lathami*	glossy black-cockatoo (eastern)		V	V	24
animals	birds	Cacatuidae	*Eolophus roseicapilla*	galah		C		69
animals	birds	Cacatuidae	*Nymphicus hollandicus*	cockatiel		C		3
animals	birds	Cacatuidae	*Zanda funerea*	yellow-tailed black-cockatoo		C		41
animals	birds	Campephagidae	*Coracina lineata*	barred cuckoo-shrike		C		3
animals	birds	Campephagidae	*Coracina maxima*	ground cuckoo-shrike		C		3
animals	birds	Campephagidae	*Coracina novaehollandiae*	black-faced cuckoo-shrike		C		100
animals	birds	Campephagidae	*Coracina papuensis*	white-bellied cuckoo-shrike		C		15
animals	birds	Campephagidae	*Edolisoma tenuirostre*	common cicadabird		C		27
animals	birds	Campephagidae	*Lalage leucomela*	varied triller		C		33
animals	birds	Campephagidae	*Lalage tricolor*	white-winged triller		C		5
animals	birds	Charadriidae	*Elseyornis melanops*	black-fronted dotterel		C		5
animals	birds	Charadriidae	*Vanellus miles*	masked lapwing		C		34
animals	birds	Charadriidae	*Vanellus miles novaehollandiae*	masked lapwing (southern subspecies)		C		58
animals	birds	Cinclosomatidae	*Cinclosoma punctatum*	spotted quail-thrush		C		3
animals	birds	Cisticolidae	*Cisticola exilis*	golden-headed cisticola		C		16
animals	birds	Climacteridae	*Climacteris erythrops*	red-browed treecreeper		C		11
animals	birds	Climacteridae	*Climacteris picumnus*	brown treecreeper		C		6
animals	birds	Climacteridae	*Cormobates leucophaea*	white-throated treecreeper		C		25
animals	birds	Climacteridae	*Cormobates leucophaea metastasis*	white-throated treecreeper (southern)		C		123
animals	birds	Columbidae	*Chalcophaps longirostris*	Pacific emerald dove		C		9
animals	birds	Columbidae	*Columba leucomela*	white-headed pigeon		C		18
animals	birds	Columbidae	*Geopelia humeralis*	bar-shouldered dove		C		33
animals	birds	Columbidae	*Geopelia placida*	peaceful dove		C		22
animals	birds	Columbidae	*Leucosarcia melanoleuca*	wonga pigeon		C		64
animals	birds	Columbidae	*Lopholaimus antarcticus*	topknot pigeon		C		35
animals	birds	Columbidae	*Macropygia phasianella*	brown cuckoo-dove		C		104
animals	birds	Columbidae	*Ocyphaps lophotes*	crested pigeon		C		32
animals	birds	Columbidae	*Phaps chalcoptera*	common bronzewing		C		9
animals	birds	Columbidae	*Ptilinopus magnificus*	wompoo fruit-dove		C		42
animals	birds	Columbidae	*Ptilinopus regina*	rose-crowned fruit-dove		C		25
animals	birds	Columbidae	*Ptilinopus superbus*	superb fruit-dove		C		6
animals	birds	Coraciidae	*Eurystomus orientalis*	dollarbird		C		35
animals	birds	Corcoracidae	*Struthidea cinerea*	apostlebird		C		6
animals	birds	Corvidae	*Corvus coronoides*	Australian raven		C		2
animals	birds	Corvidae	*Corvus orru*	Torresian crow		C		183
animals	birds	Corvidae	*Corvus sp.*			C		7
animals	birds	Cuculidae	*Cacomantis flabelliformis*	fan-tailed cuckoo		C		45
animals	birds	Cuculidae	*Cacomantis pallidus*	pallid cuckoo		C		3
animals	birds	Cuculidae	*Cacomantis variolosus*	brush cuckoo		C		14
animals	birds	Cuculidae	*Centropus phasianinus*	pheasant coucal		C		44

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Cuculidae	*Chalcites basalis*	Horsfield's bronze-cuckoo		C		3
animals	birds	Cuculidae	*Chalcites lucidus*	shining bronze-cuckoo		C		26
animals	birds	Cuculidae	*Chalcites minutillus barnardi*	Eastern little bronze-cuckoo		C		6
animals	birds	Cuculidae	*Cuculus optatus*	oriental cuckoo		SL		1
animals	birds	Cuculidae	*Eudynamys orientalis*	eastern koel		C		31
animals	birds	Cuculidae	*Scythrops novaehollandiae*	channel-billed cuckoo		C		18
animals	birds	Dicaeidae	*Dicaeum hirundinaceum*	mistletoebird		C		78
animals	birds	Dicruridae	*Dicrurus bracteatus*	spangled drongo		C		36
animals	birds	Estrildidae	*Lonchura castaneothorax*	chestnut-breasted mannikin		C		7
animals	birds	Estrildidae	*Neochmia modesta*	plum-headed finch		C		2
animals	birds	Estrildidae	*Neochmia temporalis*	red-browed finch		C		106
animals	birds	Estrildidae	*Taeniopygia bichenovii*	double-barred finch		C		18
animals	birds	Eurostopodidae	*Eurostopodus mystacalis*	white-throated nightjar		C		6
animals	birds	Falconidae	*Falco berigora*	brown falcon		C		16
animals	birds	Falconidae	*Falco cenchroides*	nankeen kestrel		C		14
animals	birds	Falconidae	*Falco longipennis*	Australian hobby		C		4
animals	birds	Falconidae	*Falco peregrinus macropus*	Australian peregrine falcon		C		3
animals	birds	Falcunculidae	*Falcunculus frontatus*	crested shrike-tit		C		33
animals	birds	Hirundinidae	*Hirundo neoxena*	welcome swallow		C		80
animals	birds	Hirundinidae	*Petrochelidon ariel*	fairy martin		C		9
animals	birds	Hirundinidae	*Petrochelidon nigricans*	tree martin		C		20
animals	birds	Jacanidae	*Irediparra gallinacea*	comb-crested jacana		C		8
animals	birds	Laridae	*Chroicocephalus novaehollandiae*	silver gull		C		1
animals	birds	Laridae	*Hydroprogne caspia*	Caspian tern		SL		1
animals	birds	Locustellidae	*Cincloramphus mathewsi*	rufous songlark		C		3
animals	birds	Locustellidae	*Cincloramphus timoriensis*	tawny grassbird		C		11
animals	birds	Maluridae	*Malurus cyaneus*	superb fairy-wren		C		9
animals	birds	Maluridae	*Malurus lamberti*	variegated fairy-wren		C		86
animals	birds	Maluridae	*Malurus melanocephalus*	red-backed fairy-wren		C		48
animals	birds	Megapodiidae	*Alectura lathami*	Australian brush-turkey		C		29
animals	birds	Meliphagidae	*Acanthorhynchus tenuirostris*	eastern spinebill		C		102
animals	birds	Meliphagidae	*Anthochaera chrysoptera*	little wattlebird		C		3
animals	birds	Meliphagidae	*Caligavis chrysops*	yellow-faced honeyeater		C		146
animals	birds	Meliphagidae	*Entomyzon cyanotis*	blue-faced honeyeater		C		56
animals	birds	Meliphagidae	*Lichenostomus melanops*	yellow-tufted honeyeater		C		20
animals	birds	Meliphagidae	*Lichmera indistincta*	brown honeyeater		C		42
animals	birds	Meliphagidae	*Manorina melanocephala*	noisy miner		C		147
animals	birds	Meliphagidae	*Manorina melanophrys*	bell miner		C		124
animals	birds	Meliphagidae	*Meliphaga lewinii*	Lewin's honeyeater		C		250
animals	birds	Meliphagidae	*Melithreptus albogularis*	white-throated honeyeater		C		51
animals	birds	Meliphagidae	*Melithreptus brevirostris*	brown-headed honeyeater		C		5
animals	birds	Meliphagidae	*Melithreptus lunatus*	white-naped honeyeater		C		78
animals	birds	Meliphagidae	*Myzomela obscura*	dusky honeyeater		C		1
animals	birds	Meliphagidae	*Myzomela sanguinolenta*	scarlet honeyeater		C		102
animals	birds	Meliphagidae	*Philemon citreogularis*	little friarbird		C		34
animals	birds	Meliphagidae	*Philemon corniculatus*	noisy friarbird		C		119

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animals	birds	Meliphagidae	*Phylidonyris niger*	white-cheeked honeyeater		C		4
animals	birds	Meliphagidae	*Phylidonyris novaehollandiae*	New Holland honeyeater		C		25
animals	birds	Meliphagidae	*Plectorhyncha lanceolata*	striped honeyeater		C		8
animals	birds	Meliphagidae	*Ptilotula fusca*	fuscous honeyeater		C		10
animals	birds	Meliphagidae	*Ptilotula penicillata*	white-plumed honeyeater		C		2
animals	birds	Meropidae	*Merops ornatus*	rainbow bee-eater		C		58
animals	birds	Monarchidae	*Carterornis leucotis*	white-eared monarch		C		5
animals	birds	Monarchidae	*Grallina cyanoleuca*	magpie-lark		C		133
animals	birds	Monarchidae	*Monarcha melanopsis*	black-faced monarch		SL		53
animals	birds	Monarchidae	*Myiagra cyanoleuca*	satin flycatcher		SL		3
animals	birds	Monarchidae	*Myiagra inquieta*	restless flycatcher		C		46
animals	birds	Monarchidae	*Myiagra rubecula*	leaden flycatcher		C		62
animals	birds	Monarchidae	*Symposiachrus trivirgatus*	spectacled monarch		SL		25
animals	birds	Motacillidae	*Anthus novaeseelandiae*	Australasian pipit		C		8
animals	birds	Neosittidae	*Daphoenositta chrysoptera*	varied sittella		C		44
animals	birds	Oriolidae	*Oriolus sagittatus*	olive-backed oriole		C		48
animals	birds	Oriolidae	*Sphecotheres vieilloti*	Australasian figbird		C		67
animals	birds	Orthonychidae	*Orthonyx temminckii*	Australian logrunner		C		20
animals	birds	Pachycephalidae	*Colluricincla harmonica*	grey shrike-thrush		C		167
animals	birds	Pachycephalidae	*Colluricincla megarhyncha*	little shrike-thrush		C		18
animals	birds	Pachycephalidae	*Pachycephala pectoralis*	golden whistler		C		168
animals	birds	Pachycephalidae	*Pachycephala rufiventris*	rufous whistler		C		88
animals	birds	Pachycephalidae	*Pachycephala simplex peninsulae*	grey whistler		C		1
animals	birds	Pandionidae	*Pandion haliaetus cristatus*	eastern osprey		SL		1
animals	birds	Paradisaeidae	*Ptiloris paradiseus*	paradise riflebird		C		59
animals	birds	Pardalotidae	*Pardalotus punctatus*	spotted pardalote		C		98
animals	birds	Pardalotidae	*Pardalotus striatus*	striated pardalote		C		106
animals	birds	Pelecanidae	*Pelecanus conspicillatus*	Australian pelican		C		4
animals	birds	Petroicidae	*Eopsaltria australis*	eastern yellow robin		C		181
animals	birds	Petroicidae	*Microeca fascinans*	jacky winter		C		46
animals	birds	Petroicidae	*Petroica rosea*	rose robin		C		27
animals	birds	Petroicidae	*Tregellasia capito*	pale-yellow robin		C		16
animals	birds	Phalacrocoracidae	*Microcarbo melanoleucos*	little pied cormorant		C		35
animals	birds	Phalacrocoracidae	*Phalacrocorax carbo*	great cormorant		C		3
animals	birds	Phalacrocoracidae	*Phalacrocorax sulcirostris*	little black cormorant		C		18
animals	birds	Phalacrocoracidae	*Phalacrocorax varius*	pied cormorant		C		7
animals	birds	Phasianidae	*Synoicus ypsilophorus*	brown quail		C		8
animals	birds	Pittidae	*Pitta versicolor*	noisy pitta		C		40
animals	birds	Podargidae	*Podargus ocellatus plumiferus*	plumed frogmouth		V		40
animals	birds	Podargidae	*Podargus strigoides*	tawny frogmouth		C		26
animals	birds	Podicipedidae	*Poliocephalus poliocephalus*	hoary-headed grebe		C		1
animals	birds	Podicipedidae	*Tachybaptus novaehollandiae*	Australasian grebe		C		36
animals	birds	Pomatostomidae	*Pomatostomus temporalis*	grey-crowned babbler		C		18
animals	birds	Psittaculidae	*Alisterus scapularis*	Australian king-parrot		C		120
animals	birds	Psittaculidae	*Aprosmictus erythropterus*	red-winged parrot		C		3
animals	birds	Psittaculidae	*Parvipsitta pusilla*	little lorikeet		C		85

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Psittaculidae	*Platycercus adscitus*	pale-headed rosella		C		106
animals	birds	Psittaculidae	*Platycercus adscitus palliceps*	pale-headed rosella (southern form)		C		1
animals	birds	Psittaculidae	*Platycercus elegans*	crimson rosella		C		85
animals	birds	Psittaculidae	*Platycercus eximius*	eastern rosella		C		3
animals	birds	Psittaculidae	*Psephotus haematonotus*	red-rumped parrot		C		5
animals	birds	Psittaculidae	*Trichoglossus chlorolepidotus*	scaly-breasted lorikeet		C		107
animals	birds	Psittaculidae	*Trichoglossus moluccanus*	rainbow lorikeet		C		213
animals	birds	Psophodidae	*Psophodes olivaceus*	eastern whipbird		C		182
animals	birds	Psophodidae	*Psophodes sp.*			C		1
animals	birds	Ptilonorhynchidae	*Ailuroedus crassirostris*	green catbird		C		77/1
animals	birds	Ptilonorhynchidae	*Ailuroedus sp.*			C		1
animals	birds	Ptilonorhynchidae	*Ptilonorhynchus violaceus*	satin bowerbird		C		93
animals	birds	Ptilonorhynchidae	*Sericulus chrysocephalus*	regent bowerbird		C		44
animals	birds	Rallidae	*Fulica atra*	Eurasian coot		C		9
animals	birds	Rallidae	*Gallinula tenebrosa*	dusky moorhen		C		43
animals	birds	Rallidae	*Gallirallus philippensis*	buff-banded rail		C		5
animals	birds	Rallidae	*Porphyrio melanotus*	purple swamphen		C		11
animals	birds	Recurvirostridae	*Himantopus leucocephalus*	pied stilt		C		13
animals	birds	Rhipiduridae	*Rhipidura albiscapa*	grey fantail		C		199
animals	birds	Rhipiduridae	*Rhipidura leucophrys*	willie wagtail		C		140
animals	birds	Rhipiduridae	*Rhipidura rufifrons*	rufous fantail		SL		78
animals	birds	Strigidae	*Ninox boobook*	southern boobook		C		83
animals	birds	Strigidae	*Ninox connivens*	barking owl		C		2
animals	birds	Strigidae	*Ninox strenua*	powerful owl		V		4
animals	birds	Threskiornithidae	*Platalea flavipes*	yellow-billed spoonbill		C		4
animals	birds	Threskiornithidae	*Platalea regia*	royal spoonbill		C		12
animals	birds	Threskiornithidae	*Plegadis falcinellus*	glossy ibis		SL		2
animals	birds	Threskiornithidae	*Threskiornis molucca*	Australian white ibis		C		16
animals	birds	Threskiornithidae	*Threskiornis spinicollis*	straw-necked ibis		C		44
animals	birds	Turdidae	*Zoothera heinei*	russet-tailed thrush		C		14
animals	birds	Turdidae	*Zoothera lunulata*	Bassian thrush		C		5
animals	birds	Turdidae	*Zoothera sp.*			C		7/3
animals	birds	Turnicidae	*Turnix melanogaster*	black-breasted button-quail		V	V	16
animals	birds	Turnicidae	*Turnix sp.*			C		1
animals	birds	Turnicidae	*Turnix varius*	painted button-quail		C		7
animals	birds	Tytonidae	*Tyto javanica*	eastern barn owl		C		2
animals	birds	Tytonidae	*Tyto novaehollandiae*	masked owl		C		8
animals	birds	Tytonidae	*Tyto novaehollandiae novaehollandiae*	masked owl (southern subspecies)		C		2
animals	birds	Tytonidae	*Tyto sp.*			C		1
animals	birds	Tytonidae	*Tyto tenebricosa tenebricosa*	sooty owl		C		31
animals	birds	Zosteropidae	*Zosterops lateralis*	silvereye		C		90
animals	insects	Hesperiidae	*Trapezites genevieveae*	ornate ochre				1
animals	insects	Lycaenidae	*Catopyrops florinda*					1
animals	insects	Lycaenidae	*Jalmenus evagoras*	imperial hairstreak				1
animals	insects	Nymphalidae	*Acraea andromacha andromacha*	glasswing				4
animals	insects	Nymphalidae	*Charaxes sempronius sempronius*	tailed emperor				1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	insects	Nymphalidae	*Danaus petilia*	lesser wanderer				4
animals	insects	Nymphalidae	*Euploea corinna*	common crow				5
animals	insects	Nymphalidae	*Heteronympha mirifica*	wonder brown				2
animals	insects	Nymphalidae	*Hypocysta pseudirius*	grey ringlet				3
animals	insects	Nymphalidae	*Hypocysta sp.*					1
animals	insects	Nymphalidae	*Hypolimnas bolina nerina*	varied eggfly				2
animals	insects	Nymphalidae	*Junonia villida villida*	meadow argus				6
animals	insects	Nymphalidae	*Melanitis leda bankia*	evening brown				3
animals	insects	Nymphalidae	*Mynes geoffroyi guerini*	jezebel nymph				1
animals	insects	Nymphalidae	*Phaedyma shepherdi shepherdi*	white-banded plane (southern subspecies)				1
animals	insects	Nymphalidae	*Tirumala hamata hamata*	blue tiger				4
animals	insects	Nymphalidae	*Vanessa kershawi*	Australian painted lady				1
animals	insects	Papilionidae	*Cressida cressida cressida*	clearwing swallowtail				4
animals	insects	Papilionidae	*Graphium choredon*	blue triangle				2
animals	insects	Papilionidae	*Ornithoptera richmondia*	Richmond birdwing		V		1
animals	insects	Papilionidae	*Papilio aegeus aegeus*	orchard swallowtail (Australian subspecies)				3
animals	insects	Papilionidae	*Papilio demoleus sthenelus*	chequered swallowtail				1
animals	insects	Pieridae	*Belenois java teutonia*	caper white				5
animals	insects	Pieridae	*Catopsilia pomona*	lemon migrant				3
animals	insects	Pieridae	*Delias nigrina*	black jezebel				3
animals	insects	Pieridae	*Eurema hecabe*	large grass-yellow				3
animals	lobe-finned fishes	Ceratodontidae	*Neoceratodus forsteri*	Australian lungfish			V	1
animals	malacostracans	Parastacidae	*Cherax quadricarinatus*	redclaw				1
animals	malacostracans	Parastacidae	*Cherax sp.*					9
animals	malacostracans	Parastacidae	*Euastacus hystricosus*			E		1
animals	mammals	Acrobatidae	*Acrobates pygmaeus*	feathertail glider		C		2
animals	mammals	Canidae	*Canis familiaris (dingo)*	dingo				11
animals	mammals	Dasyuridae	*Antechinus flavipes flavipes*	yellow-footed antechinus (south-east Queensland)		C		7
animals	mammals	Dasyuridae	*Antechinus flavipes sensu lato*	yellow-footed antechinus		C		2
animals	mammals	Dasyuridae	*Antechinus sp.*			C		1
animals	mammals	Dasyuridae	*Antechinus subtropicus*	subtropical antechinus		C		37/6
animals	mammals	Dasyuridae	*Phascogale tapoatafa tapoatafa*	brush-tailed phascogale		C		1
animals	mammals	Emballonuridae	*Saccolaimus flaviventris*	yellow-bellied sheathtail bat		C		1
animals	mammals	Macropodidae	*Macropus giganteus*	eastern grey kangaroo		C		24
animals	mammals	Macropodidae	*Macropus sp.*			C		3
animals	mammals	Macropodidae	*Notamacropus dorsalis*	black-striped wallaby		C		2
animals	mammals	Macropodidae	*Notamacropus parryi*	whiptail wallaby		C		6
animals	mammals	Macropodidae	*Notamacropus rufogriseus*	red-necked wallaby		C		16
animals	mammals	Macropodidae	*Petrogale herberti*	Herbert's rock-wallaby		C		5/5
animals	mammals	Macropodidae	*Thylogale sp.*			C		2
animals	mammals	Macropodidae	*Thylogale thetis*	red-necked pademelon		C		10
animals	mammals	Macropodidae	*Wallabia bicolor*	swamp wallaby		C		8
animals	mammals	Miniopteridae	*Miniopterus australis*	little bent-wing bat		C		20

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	mammals	Miniopteridae	*Miniopterus schreibersii oceanensis*	eastern bent-wing bat		C		10
animals	mammals	Molossidae	*Austronomus australis*	white-striped freetail bat		C		12
animals	mammals	Molossidae	*Mormopterus lumsdenae*	northern free-tailed bat		C		1
animals	mammals	Molossidae	*Mormopterus norfolkensis*	east coast freetail bat		C		3
animals	mammals	Molossidae	*Mormopterus ridei*	eastern free-tailed bat		C		1
animals	mammals	Molossidae	*Mormopterus sp.*			C		2
animals	mammals	Muridae	*Hydromys chrysogaster*	water rat		C		8
animals	mammals	Muridae	*Melomys cervinipes*	fawn-footed melomys		C		59
animals	mammals	Muridae	*Melomys sp.*			C		2
animals	mammals	Muridae	*Pseudomys gracilicaudatus*	eastern chestnut mouse		C		1
animals	mammals	Muridae	*Rattus fuscipes*	bush rat		C		106
animals	mammals	Muridae	*Rattus lutreolus*	swamp rat		C		8
animals	mammals	Muridae	*Rattus sp.*			C		1
animals	mammals	Ornithorhynchidae	*Ornithorhynchus anatinus*	platypus		SL		5
animals	mammals	Peramelidae	*Isoodon macrourus*	northern brown bandicoot		C		8
animals	mammals	Peramelidae	*Perameles nasuta*	long-nosed bandicoot		C		23
animals	mammals	Petauridae	*Petaurus australis australis*	yellow-bellied glider (southern subspecies)		V	V	47
animals	mammals	Petauridae	*Petaurus breviceps*	sugar glider		C		1
animals	mammals	Petauridae	*Petaurus breviceps sensu lato*	sugar glider		C		30
animals	mammals	Petauridae	*Petaurus norfolcensis*	squirrel glider		C		2
animals	mammals	Phalangeridae	*Trichosurus caninus*	short-eared possum		C		22
animals	mammals	Phalangeridae	*Trichosurus sp.*			C		7
animals	mammals	Phalangeridae	*Trichosurus vulpecula*	common brushtail possum		C		26
animals	mammals	Phascolarctidae	*Phascolarctos cinereus*	koala		E	E	303
animals	mammals	Potoroidae	*Aepyprymnus rufescens*	rufous bettong		C		11
animals	mammals	Potoroidae	*Potorous tridactylus tridactylus*	long-nosed potoroo		V	V	3
animals	mammals	Pseudocheiridae	*Petauroides volans volans*	southern greater glider		E	E	52
animals	mammals	Pseudocheiridae	*Pseudocheirus peregrinus*	common ringtail possum		C		3
animals	mammals	Pteropodidae	*Nyctimene robinsoni*	eastern tube-nosed bat		C		1
animals	mammals	Pteropodidae	*Pteropus alecto*	black flying-fox		C		2
animals	mammals	Pteropodidae	*Pteropus poliocephalus*	grey-headed flying-fox		C	V	5
animals	mammals	Pteropodidae	*Pteropus sp.*	flying-fox		C		1
animals	mammals	Rhinolophidae	*Rhinolophus megaphyllus*	eastern horseshoe-bat		C		11
animals	mammals	Tachyglossidae	*Tachyglossus aculeatus*	short-beaked echidna		SL		7
animals	mammals	Vespertilionidae	*Chalinolobus gouldii*	Gould's wattled bat		C		7
animals	mammals	Vespertilionidae	*Chalinolobus morio*	chocolate wattled bat		C		15
animals	mammals	Vespertilionidae	*Chalinolobus nigrogriseus*	hoary wattled bat		C		1
animals	mammals	Vespertilionidae	*Kerivoula papuensis*	golden-tipped bat		C		4
animals	mammals	Vespertilionidae	*Nyctophilus bifax*	northern long-eared bat		C		25
animals	mammals	Vespertilionidae	*Nyctophilus geoffroyi*	lesser long-eared bat		C		6
animals	mammals	Vespertilionidae	*Nyctophilus gouldi*	Gould's long-eared bat		C		25
animals	mammals	Vespertilionidae	*Nyctophilus sp.*			C		1
animals	mammals	Vespertilionidae	*Scoteanax rueppellii*	greater broad-nosed bat		C		4
animals	mammals	Vespertilionidae	*Scotorepens balstoni*	inland broad-nosed bat		C		1
animals	mammals	Vespertilionidae	*Scotorepens orion*	south-eastern broad-nosed bat		C		5

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	mammals	Vespertilionidae	*Scotorepens sp.*			C		1
animals	mammals	Vespertilionidae	*Vespadelus darlingtoni*	large forest bat		C		1
animals	mammals	Vespertilionidae	*Vespadelus pumilus*	eastern forest bat		C		26
animals	ray-finned fishes	Ambassidae	*Ambassis agassizii*	Agassiz's glassfish				99
animals	ray-finned fishes	Anguillidae	*Anguilla reinhardtii*	longfin eel				25
animals	ray-finned fishes	Apogonidae	*Glossamia aprion*	mouth almighty				28
animals	ray-finned fishes	Atherinidae	*Craterocephalus marjoriae*	silverstreak hardyhead				61
animals	ray-finned fishes	Atherinidae	*Craterocephalus stercusmuscarum*	flyspecked hardyhead				97
animals	ray-finned fishes	Clupeidae	*Nematalosa erebi*	bony bream				12
animals	ray-finned fishes	Eleotridae	*Gobiomorphus australis*	striped gudgeon				1
animals	ray-finned fishes	Eleotridae	*Hypseleotris galii*	firetail gudgeon				129
animals	ray-finned fishes	Eleotridae	*Hypseleotris klunzingeri*	western carp gudgeon				83
animals	ray-finned fishes	Eleotridae	*Hypseleotris sp.*					2
animals	ray-finned fishes	Eleotridae	*Mogurnda adspersa*	southern purplespotted gudgeon				130
animals	ray-finned fishes	Eleotridae	*Philypnodon grandiceps*	flathead gudgeon				27
animals	ray-finned fishes	Eleotridae	*Philypnodon macrostomus*	dwarf flathead gudgeon				36
animals	ray-finned fishes	Gobiidae	*Redigobius bikolanus*	speckled goby				2
animals	ray-finned fishes	Hemiramphidae	*Arrhamphus sclerolepis*	snubnose garfish				1
animals	ray-finned fishes	Melanotaeniidae	*Melanotaenia duboulayi*	crimsonspotted rainbowfish				113
animals	ray-finned fishes	Percichthyidae	*Macquaria ambigua*	golden perch				1
animals	ray-finned fishes	Percichthyidae	*Macquaria novemaculeata*	Australian bass				1
animals	ray-finned fishes	Plotosidae	*Tandanus tandanus*	freshwater catfish				107
animals	ray-finned fishes	Pseudomugilidae	*Pseudomugil signifer*	Pacific blue eye				16
animals	ray-finned fishes	Retropinnidae	*Retropinna semoni*	Australian smelt				72
animals	ray-finned fishes	Terapontidae	*Amniataba percoides*	barred grunter				33
animals	ray-finned fishes	Terapontidae	*Leiopotherapon unicolor*	spangled perch				78
animals	reptiles	Agamidae	*Diporiphora nobbi*	nobbi		C		2
animals	reptiles	Agamidae	*Intellagama lesueurii*	eastern water dragon		C		28
animals	reptiles	Agamidae	*Lophosaurus spinipes*	southern angle-headed dragon		C		11
animals	reptiles	Agamidae	*Pogona barbata*	bearded dragon		C		1
animals	reptiles	Boidae	*Morelia spilota*	carpet python		C		23
animals	reptiles	Chelidae	*Chelodina expansa*	broad-shelled river turtle		C		1
animals	reptiles	Chelidae	*Elusor macrurus*	Mary River turtle		E	E	8
animals	reptiles	Chelidae	*Emydura macquarii krefftii*	Krefft's river turtle		C		1
animals	reptiles	Chelidae	*Emydura macquarii macquarii*	Murray turtle		C		1
animals	reptiles	Chelidae	*Wollumbinia latisternum*	saw-shelled turtle		C		2
animals	reptiles	Colubridae	*Dendrelaphis punctulatus*	green tree snake		C		7
animals	reptiles	Colubridae	*Tropidonophis mairii*	freshwater snake		C		2
animals	reptiles	Diplodactylidae	*Amalosia robusta*	robust velvet gecko		C		1
animals	reptiles	Diplodactylidae	*Oedura tryoni*	southern spotted velvet gecko		C		2
animals	reptiles	Elapidae	*Acanthophis antarcticus*	common death adder		V		1
animals	reptiles	Elapidae	*Cacophis harriettae*	white-crowned snake		C		1
animals	reptiles	Elapidae	*Cacophis krefftii*	dwarf crowned snake		C		1
animals	reptiles	Elapidae	*Cacophis squamulosus*	golden crowned snake		C		2
animals	reptiles	Elapidae	*Cryptophis nigrescens*	eastern small-eyed snake		C		12
animals	reptiles	Elapidae	*Demansia psammophis*	yellow-faced whipsnake		C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	reptiles	Elapidae	*Furina diadema*	red-naped snake		C		1
animals	reptiles	Elapidae	*Hemiaspis signata*	black-bellied swamp snake		C		2
animals	reptiles	Elapidae	*Hoplocephalus stephensii*	Stephens' banded snake		C		6/1
animals	reptiles	Elapidae	*Oxyuranus scutellatus*	coastal taipan		C		1
animals	reptiles	Elapidae	*Pseudechis guttatus*	spotted black snake		C		1
animals	reptiles	Elapidae	*Pseudechis porphyriacus*	red-bellied black snake		C		2
animals	reptiles	Elapidae	*Pseudonaja textilis*	eastern brown snake		C		1
animals	reptiles	Elapidae	*Tropidechis carinatus*	rough-scaled snake		C		4
animals	reptiles	Elapidae	*Vermicella annulata*	bandy-bandy		C		3
animals	reptiles	Gekkonidae	*Gehyra dubia*	dubious dtella		C		1
animals	reptiles	Gekkonidae	*Heteronotia binoei*	Bynoe's gecko		C		3
animals	reptiles	Scincidae	*Anomalopus verreauxii*	three-clawed worm-skink		C		9
animals	reptiles	Scincidae	*Bellatorias frerei*	major skink		C		1
animals	reptiles	Scincidae	*Bellatorias major*	land mullet		C		6
animals	reptiles	Scincidae	*Calyptotis lepidorostrum*	cone-eared calyptotis		C		1
animals	reptiles	Scincidae	*Calyptotis scutirostrum*	scute-snouted calyptotis		C		8
animals	reptiles	Scincidae	*Carlia pectoralis sensu lato*			C		10/1
animals	reptiles	Scincidae	*Carlia sp.*			C		6
animals	reptiles	Scincidae	*Carlia vivax*	tussock rainbow-skink		C		3
animals	reptiles	Scincidae	*Concinnia martini*	dark bar-sided skink		C		7
animals	reptiles	Scincidae	*Concinnia tenuis*	bar-sided skink		C		3
animals	reptiles	Scincidae	*Cryptoblepharus pulcher pulcher*	elegant snake-eyed skink		C		13/1
animals	reptiles	Scincidae	*Ctenotus arcanus*	arcane ctenotus		C		9
animals	reptiles	Scincidae	*Ctenotus spaldingi*	straight-browed ctenotus		C		2
animals	reptiles	Scincidae	*Ctenotus taeniolatus*	copper-tailed skink		C		2/1
animals	reptiles	Scincidae	*Cyclodomorphus gerrardii*	pink-tongued lizard		C		5
animals	reptiles	Scincidae	*Eroticoscincus graciloides*	elf skink		C		3
animals	reptiles	Scincidae	*Eulamprus quoyii*	eastern water skink		C		4
animals	reptiles	Scincidae	*Karma murrayi*	Murray's skink		C		5
animals	reptiles	Scincidae	*Lampropholis adonis*	diamond-shielded sunskink		C		1/1
animals	reptiles	Scincidae	*Lampropholis amicula*	friendly sunskink		C		6/1
animals	reptiles	Scincidae	*Lampropholis couperi*	plain-backed sunskink		C		4
animals	reptiles	Scincidae	*Lampropholis delicata*	dark-flecked garden sunskink		C		11/1
animals	reptiles	Scincidae	*Lerista punctatovittata*	eastern robust slider		C		1
animals	reptiles	Scincidae	*Lygisaurus foliorum*	tree-base litter-skink		C		4
animals	reptiles	Scincidae	*Morethia boulengeri*	south-eastern morethia skink		C		2
animals	reptiles	Scincidae	*Saproscincus rosei*	Rose's shadeskink		C		2
animals	reptiles	Scincidae	*Saproscincus sp.*			C		1
animals	reptiles	Scincidae	*Tiliqua scincoides scincoides*	eastern bluetongue		C		1
animals	reptiles	Typhlopidae	*Anilios sp.*			C		2
animals	reptiles	Varanidae	*Varanus varius*	lace monitor		C		39
animals	uncertain	Indeterminate	*Indeterminate*	Unknown or Code Pending				16

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992.*
The codes are Extinct (EX), Extinct in the Wild (PE), Critically Endangered (CR), Endangered (E), Vulnerable (V), Near Threatened (NT), Special Least Concern (SL) and Least Concern (C).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999.*
The values of EPBC are Extinct (EX), Extinct in the Wild (XW), Critically Endangered (CE), Endangered (E), Vulnerable (V) and Conservation Dependent (CD).

Records - The first number indicates the total number of records of the taxon (wildlife records and species listings for selected areas).
This number is output as 99999 if it equals or exceeds this value. A second number located after a / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.

APPENDIX 2

Baseline Survey Data for Proposed Offset Property

Table A2.1. Diurnal Koala Transect Data (refer Figure 6.11 for transect locations)

Site ID	Assessment Unit	Transect lines	Transect length	Transect Width	Total plot area (m^2)	Total plot area (ha)	Koalas sighted
T1	7 (Regrowth 12.12.12)	4	200	50	40000	4	0
T2	13 (Remnant 12.9-10.17a)	1	200	50	10000	1	0
T3	8 (Regrowth 12.9-10.17)	2	400	50	40000	4	0
T4	13 (Remnant 12.9-10.17a)	2	200	50	20000	2	0
T5	8 (Regrowth 12.9-10.17)	2 (lines A, B)	200	100	30000	3	0
		2 (lines C, D)	100	50			
T6	8 (Regrowth 12.9-10.17)	2	200	25	10000	1	0
T7	11 (Remnant 12.12.15b)	4	100	25	10000	1	0
T8A	8 (Regrowth 12.9-10.17)	1	200	50	10000	1	0
T8B	3 (Cleared 12.9-10.17)	1	200	50	10000	1	0
T9	7 (Regrowth 12.12.12)	4	150	25	15000	1.5	0
T10	1 (Cleared 12.12.15); 11 (Remnant 12.12.15b); 6 (Regrowth 12.12.15b)	2	300	25	15000	1.5	0
T11	11 (Remnant 12.12.15b)	1 (line A)	150	50			0
		1 (Line B)	200	50	17500	1.75	
T12	11 (Remnant 12.12.15b)	2	200	25	10000	1	0
T14	13 (Remnant 12.9-10.17a)	2	250	25	12500	1.25	0

Table A2.2. Koala SAT Data (refer Figure 6.11 for site locations)

Site ID	Assessment Unit	Scats detected	Trees with scat detected (out of 30)	Proportion of trees with scats detected
1	8 (Regrowth 12.9-10.17)	N	0	0.00
2	11 (Remnant 12.12.15b)	Y	7	0.23
3	13 (Remnant 12.9-10.17a)	Y	2	0.07
4	7 (Regrowth 12.12.12)	N	0	0.00
5	1 (Cleared 12.12.15)	N	0	0.00
6	6 (Regrowth 12.12.15b)	N	0	0.00
7	12 (Remnant 12.12.12)	N	0	0.00
8	6 (Regrowth 12.12.15b)	N	0	0.00
9	8 (Regrowth 12.9-10.17)	N	0	0.00
10	5 (Cleared 12.3.7)	N	0	0.00
11	13 (Remnant 12.9-10.17a)	N	0	0.00
12	14 (Remnant 12.9-10.7)	N	0	0.00
13	10 (Regrowth 12.3.7)	N	0	0.00
14	13 (Remnant 12.9-10.17a)	Y	3	0.10
15	7 (Regrowth 12.12.12)	Y	9	0.30
16	6 (Regrowth 12.12.15b)	Y	2	0.07

Table A2.3. Camera Data (refer Figure 6.11 for camera locations)

Camera Number (Habitat)	Coordinates	Species Recorded (highest count)	Photo example
1 (animal trail)	-26.77947, 152.38746	Nthn Bandicoot (1) Dingo (1) Brown Hare (1) Red Deer (1)	
2 (stream)	-26.78424, 152.40918	Red Deer (2)	

Camera Number (Habitat)	Coordinates	Species Recorded (highest count)	Photo example
3 (dam)	-26.78335, 152.41454	Red Fox (1) Red Deer (4) Common Brushtail Possum (1)	
4 (stream)	-26.75683, 152.4000		No native or pest species recorded
5 (track)	-26.80185, 152.39167	Dingo/Dog (2)	
6 (stream)	-26.76816, 152.40005		No native or pest species recorded
7 (stream)	-26.78415, 152.40918		No native or pest species recorded

Camera Number (Habitat)	Coordinates	Species Recorded (highest count)	Photo example
8 (stream)	-26.77377, 152.39942		No native or pest species recorded
9 (dam)	-26.79743, 152.39991	Red Deer (1)	
10 (track)	-26.79639, 152.4178	Dingo (3) Red Deer (1) Common Brushtail Possum (1) Dog (pet)(2)	

Camera Number (Habitat)	Coordinates	Species Recorded (highest count)	Photo example
11 (dam)	-26.79068, 152.38671	Red Deer (1)	
12 (stream)	-26.79357, 152.37505		No native or pest species recorded
13 (dam)	-26.75762, 152.40072	Red Deer (2)	

Camera Number (Habitat)	Coordinates	Species Recorded (highest count)	Photo example
14 (dam)	-26.80459,152.39562	Red Deer (4)	
15 (dam)	-26.79079, 152.38394	Dingo (1) Red Deer (2) Red Fox (1)	

APPENDIX 3

BioCondition Scoring Sheets

OFFSET - Fauna Species: Koala

Assessment Unit - Regional Ecosystem	AU1 Non-remnant 12.12.15														AU2 No-remnant 12.12.12												
Site Reference	Benchmark	BC12			BC14			BC17			BC20			Average	Benchmark	BC10			BC09			BC01			BC21			Average
	RE12.15.15	Data	% Bm	Score	Data	% Bm	Score	Data	% Bm	Score	Data	% Bm	Score	Score	RE 12.12.12	Data	% Bm	Score	Data	% Bm	Score	Data	% Bm	Score	Data	% Bm	Score	Score
Recruitment of woody perennial species in EDL	100	100	100	5	100	100	5	100	100	5	100	100	5	5	100	100	100	5	100	100	5	100	100	5	100	100	5	5
Native plant species richness - trees	8	5	63	2.5	6	75	2.5	4	50	2.5	4	50	2.5	3	4	2	50	2.5	3	75	2.5	1	25	2.5	4	100	5	3
Native plant species richness - shrubs	6	10	167	5	10	167	5	5	83	2.5	9	150	5	4	3	5	167	5	3	100	5	1	33	2.5	5	167	5	4
Native plant species richness - grasses	5	9	180	5	8	160	5	6	120	5	4	80	2.5	4	9	9	100	5	6	67	2.5	3	33	2.5	4	44	2.5	3
Native plant species richness - forbes	17	18	106	5	20	118	5	10	59	2.5	7	41	2.5	4	28	16	57	2.5	15	54	2.5	6	21	0	7	25	2.5	2
Tree canopy height (m)	24	10.0	42	3	16	67	3	0.0	0	0	24	100	5		22	12.0	55	3	16	73	5	0	0	0	12.0	55	3	
Tree subcanopy height (m)	10	6.0	60	3	6	60	3	5.0	50	3	4.5	45	3		11	4.0	36	3	9	82	5	0	0	0	6.0	55	3	
Tree canopy height (average of emergent, canopy, sub-canopy)				3			3			1.5			4	3				3			5			0			3	3
Tree canopy cover (%)	82	20.0	24	2	13.9	17	2	0.0	0	0	10.9	13	2		31	5.6	18	2	17.9	58	5	0	0	0	0.0	0	0	
Tree subcanopy cover (%)	55	11.3	21	2	4	7	0	2.0	4	0	0	0	0		12	1.6	13	2	13	108	5	0	0	0	2.0	17	2	
Tree canopy cover (average of emergent, canopy, sub-canopy)				2			1			0			1	1				2			5			0			1	2
Shrub canopy cover	5	3.4	68	5	1.8	36	3	0.0	0	0	0.9	18	3	3	5	1	20	3	7	140	5	0	0	0	3.0	60	5	3
Native grass cover	23	25.0	109	5	16.4	71	3	58.0	252	5	21	91	5	5	40	61.4	154	5	51	128	5	0	0	0	30.0	75	3	3
Organic litter	65	28.0	43	3	20	31	3	0.0	0	0	3.2	5	0	2	35	22	63	5	8.4	24	3	0	0	0	3.2	9	0	2
Large eucalypts per hectare	47	0	0		2			0			2				60	0	0		0			0			0			
Large non-eucalypts per hectare	10	10	100		0			0			0				0	0	#DIV/0!		0			0			0			
Large trees (euc plus non-euc)	57	10	18	5	2	4	5	0	0	0	2	4	5	4	60	0	0	0	0	0	0	0	0	0	0	0	0	0
Coarse woody debris	613	150	24	2	49	8	0	200	33	2	330	54	5	2	500	0	0	0	950	190	5	0	0	0	180	36	2	2
Non-native plant cover	0	10.0		5	10.0		5	80.0		0	30.0		3	3	0	10.0		5	1.0		10	80.0		0	80.0		0	4
BioCondition Score				52.5			45.5			26			43.5	41.875				43			55.5			12.5		34	36.25
MAX BioCondition Score				*80*			*80*			*80*			*80*	*80*				*80*			*80*			*80*		*80*	*80*
BioCondition Score - out of 10				**6.56**			**5.69**			**3.25**			**5.44**	**5.23**				**5.38**			**6.94**			**1.56**		**4.25**	**4.53**

AU3 Non-remnant 12.9-10.17													
Benchmark	BC03			BC05			BC30			BC32			**Average**
RE 12.9-10.17d	Data	% Bm	Score	Data	% Bm	Score	Data	% Bm	Score	Data	% Bm	Score	**Score**
100	100	100	5	100	100	5	100	100	5	100	100	5	5
8	5	63	2.5	1	13	0	0	0	0	1	13	0	1
13	4	31	2.5	1	8	0	9	69	2.5	5	38	2.5	2
9	5	56	2.5	5	56	2.5	6	67	2.5	5	56	2.5	3
17	18	106	5	10	59	2.5	9	53	2.5	9	53	2.5	3
26	10.0	38	3	0	0	0	16.0	62	3	16	62	3	
10	5.0	50	3	0	0	0	0.0	0	0	0	0	0	
			3			0			1.5			1.5	2
65	3.0	5	0	0	0	0	5.0	8	0	3	5	0	
13	2.5	19	2	0	0	0	0.0	0	0	0	0	0	
			1			0			0			0	0
5	0.0	0	0	0	0	0	0.0	0	0	0	0	0	0
23	24.0	104	5	18	78	3	48.4	210	5	11	48	1	4
46	15.0	33	3	4.6	10	3	6.0	13	3	6	13	3	3
45	0	0		0			0			0			
0	0	#DIV/0!		0			0			0			
45	0	0	0	0	0	0	0	0	0	0	0	0	0
439	1730	394	2	80	18	2	310	71	5	0	0	0	2
0	47.5		3	40		3	10.0		5	15.0		5	4
			34.5			21			32			23	27.625
			80			*80*			*80*			*80*	*80*
			4.31			**2.63**			**4.00**			**2.88**	**3.45**

AU4 Non-remnant 12.9-10.7							
Benchmark	BC06			BC07			**Average**
RE 12.9-10.7	Data	% Bm	Score	Data	% Bm	Score	**Score**
100	100	100	5	100	100	5	5
3	1	33	2.5	3	100	5	3.75
5	9	180	5	2	40	2.5	3.75
8	8	100	5	6	75	2.5	3.75
26	11	42	2.5	12	46	2.5	2.5
21	21.0	100	5	18	86	5	
10	9.0	90	5	9	90	5	
			5			5	5
40	0.0	0	0	2.5	6	0	
8	0.0	0	0	0	0	0	
			0			0	0
3	1.5	50	5	0	0	0	2.5
61	46.0	75	3	61.6	101	5	4
20	7.0	35	3	5.6	28	3	3
18		0		2			
0		#DIV/0!		0			
18	0	0	0	2	11	5	2.5
272	22.6	8	0	580	213	2	1
0	10.0		5	20.0		5	5
			41			42.5	41.75
			80			*80*	*80*
			5.13			**5.31**	**5.22**

AU5 Non-remnant 12.3.7							
Benchmark	BC04			BC08			**Average**
RE 12.3.7	Data	% Bm	Score	Data	% Bm	Score	**Score**
100	100	100	5	100	100	5	5
6	2	33	2.5	4	67	2.5	2.5
8	5	63	2.5	5	63	2.5	2.5
6	6	100	5	3	50	2.5	3.75
17	10	59	2.5	7	41	2.5	2.5
22	25.0	114	5	21	95	5	
12	9.0	75	5	13	108	5	
			5			5	5
31	8.2	26	2	17.9	58	5	
23	3.0	13	2	6.6	29	2	
			2			3.5	2.75
22	1.5	7	0	1.2	5	0	0
8	53.0	663	5	6.2	78	3	4
27	3.4	13	3	0	0	0	1.5
20	8	40		4			
40	0	0		12			
60	8	13	5	16	27	5	5
667	68	10	2	0	0	0	1
0	40.0		3	50.0		3	3
			42.5			34.5	38.5
			80			*80*	*80*
			5.31			**4.31**	**4.81**

AU6 Regrowth 12.12.15b								AU7 Regrowth 12.12.12								AU8 Regrowth 12.9-10.17a								AU9 Regrowth 12.9-10.7				
Benchmark	BC13			BC15			**Average**	**Benchmark**	BC02			BC11			**Average**	**Benchmark**	BC26			BC31			**Average**	**Benchmark**	BC28			**Average**
RE12.12.15b	Data	% Bm	Score	Data	% Bm	Score	**Score**	**RE 12.12.12**	Data	% Bm	Score	Data	% Bm	Score	**Score**	**RE 12.9-10.17a**	Data	% Bm	Score	Data	% Bm	Score	**Score**	**RE 12.9-10.7**	Data	% Bm	Score	**Score**
100	100	100	5	100	100	5	5	100	100	100	5	100	100	5	5	100	100	100	5	100	100	5	5	100	100	100	5	5
12	5	42	2.5	6	50	2.5	2.5	4	6	150	5	6	150	5	5	13	5	38	2.5	8	62	2.5	2.5	3	6	200	5	5
17	6	35	2.5	9	53	2.5	2.5	3	6	200	5	6	200	5	5	13	8	62	2.5	5	38	2.5	2.5	5	10	200	5	5
5	4	80	2.5	7	140	5	3.75	9	11	122	5	7	78	2.5	3.75	5	6	120	5	7	140	5	5	8	9	113	5	5
21	20	95	5	22	105	5	5	28	15	54	2.5	24	86	2.5	2.5	31	19	61	2.5	20	65	2.5	2.5	26	13	50	2.5	3
28	20.0	71	5	18	64	3		22	12.0	55	3	18	82	5		27	20.0	74	5	20	74	5		21	24.0	114	5	
11	12.0	109	5	8	73	5		11	9.0	82	5	10	91	5		13	8.0	62	3	11	85	5		10	7.0	70	5	
			5			4	4.5				4			5	4.5				4			5	4.5				5	5
78	19.9	26	2	28.6	37	2		31		0	0	51.9	167	5		85	46.9	55	5	45.5	54	5		40	12.7	32	2	
10	42.9	429	3	14.4	144	5		12		0	0	18.3	153	5		27	21.1	78	5	36.5	135	5		8	0.0	0	0	
			2.5			3.5	3				0			5	2.5				5			5	5				1	1
6	0.0	0	0	1.8	30	3	1.5	5	0	0	0	1.4	28	3	1.5	12	8.1	68	5	6	50	5	5	3	1.1	37	3	3
18	44.6	248	5	33.4	186	5	5	40	0	0	0	17.6	44	1	0.5	11	27.0	245	5	11	100	5	5	61	70.0	115	5	5
57	15.4	27	3	41.4	73	5	4	35	0	0	0	47.4	135	5	2.5	45	18.0	40	3	6	13	3	3	20	10.0	50	5	5
54	6	11		8				60	0	0		8				37	4	11		8				18	0	0		
5	0	0		0				0	0	#DIV/0!		0				0	0	#DIV/0!		0				0	0	#DIV/0!		
60	6	10	5	8	13	5	5	60	0	0	0	8	13	5	2.5	37	4	11	5	8	22	5	5	18	0	0	0	0
859	900	105	5	110	13	2	3.5	500	0	0	0	590	118	5	2.5	553	120	22	2	520	94	5	3.5	272	440	162	5	5
0	10.2		5	1.1		10	7.5	0	10		5	3.6		10	7.5	0	25.0		3	9.0		5	4	0	10.0		5	5
			48			57.5	52.75				31.5			59	45.25				49.5			55.5	52.5				51.5	51.5
			80			*80*	*80*				*80*			*80*	*80*				*80*			*80*	*80*				*80*	*80*
			6.00			**7.19**	**6.59**				**3.94**			**7.38**	**5.66**				**6.19**			**6.94**	**6.56**				**6.44**	**6.44**

AU10 Regrowth 12.3.7					AU11 Remnant 12.12.15b								AU12 Remnant 12.12.12					AU13 Remnant 12.9-10.17a												
Benchmark	BC24			Average	Benchmark	BC16			BC18			Average	Benchmark	BC22			Average	Benchmark	BC19			BC23			BC25			BC29			Average
RE 12.3.7	Data	% Bm	Score	Score	RE12.12.15b	Data	% Bm	Score	Data	% Bm	Score	Score	RE 12.12.12	Data	% Bm	Score	Score	RE 12.9-10.17a	Data	% Bm	Score	Data	% Bm	Score	Data	% Bm	Score	Data	% Bm	Score	Score
100	100	100	5	5	100	100	100	5	100	100	5	5	100	100	100	5	5	100	100	100	5	100	100	5	100	100	5	100	100	5	5
6	7	117	5	5	12	3	25	2.5	5	42	2.5	2.5	4	5	125	5	5	13	5	38	2.5	5	38	2.5	3	23	0	6	46	2.5	2
8	9	113	5	5	17	11	65	2.5	12	71	2.5	2.5	3	9	300	5	5	13	10	77	2.5	7	54	2.5	4	31	2.5	8	62	2.5	3
6	2	33	2.5	3	5	7	140	5	8	160	5	5	9	7	78	2.5	3	5	4	80	2.5	3	60	2.5	6	120	5	4	80	2.5	3
17	16	94	5	5	21	23	110	5	23	110	5	5	28	14	50	2.5	3	31	20	65	2.5	21	68	2.5	16	52	2.5	8	26	2.5	3
22	20.0	91	5		28	24.0	86	5	24	86	5		22	24.0	109	5		27	23.0	85	5	20	74	5	22	81	5	19	70	5	
12	8.0	67	3		11	13.0	118	5	13	118	5		11	12.0	109	5		13	17.0	131	5	9	69	3	10	77	5	10	77	5	
			4	4				5			5	5				5	5				5			4			5			5	5
31	5.3	17	2		78	31.0	40	2	27.7	36	2		31	16.4	53	5		85	37.5	44	2	27	32	2	21	25	2	0	0	0	
23	4.3	19	2		10	0.0	0	0	11.9	119	5		12	0.0	0	0		27	12.5	46	2	2	7	0	8	30	2	21.2	79	5	
			2	2				1			3.5	2.25				2.5	3				2			1			2			2.5	2
22	1.4	6	0	0	6	5.6	93	5	5	83	5	5	5	1.0	20	3	3	12	20.1	168	5	5.6	47	3	2	17	3	2.3	19	3	4
8	0.0	0	0	0	18	47.0	261	5	41	228	5	5	40	58.6	147	5	5	11	59.0	536	5	35	318	5	82	745	5	56.4	513	5	5
27	2.0	7	0	0	57	45.0	79	5	48.6	85	5	5	35	20.4	58	5	5	45	23.6	52	5	6.6	15	3	0	0	0	3.8	8	0	2
20	0	0			54		0		3				60	0	0			37	12	32		14			14			4			
40	0	0			5		0		0				0		#DIV/0!			0	0	#DIV/0!		0			0			0			
60	0	0	0	0	60	0	0	0	30	50	10	5	60	0	0	0	0	37	12	32	5	14	38	5	14	38	5	4	11	5	5
667	390	58	5	5	859	190	22	2	1010	118	5	3.5	500		0	0	0	553	290	52	5	223	40	2	158	29	2	440	80	5	4
0	70.0		0	0	0	1.0		10	30.0		3	6.5	0	10.0		5	5	0	10.0		5	60.0		0	20.0		5	30.0		3	3
			33.5	33.5				53			61.5	57.25				45.5	45.5				52		38			42			43.5	43.875
			80	*80*				*80*			*80*	*80*				*80*	*80*				*80*		*80*			*80*			*80*	*80*
			4.19	**4.19**				**6.63**			**7.69**	**7.16**				**5.69**	**5.69**				**6.50**		**4.75**			**5.25**			**5.44**	**5.48**

AU14 Remnant 12.9-10.7				
Benchmark	BC27			**Average**
RE 12.9-10.7	Data	% Bm	Score	**Score**
100	100	100	5	5
3	8	267	5	5
5	8	160	5	5
8	5	63	2.5	3
26	19	73	2.5	3
21	21.0	100	5	
10	11.0	110	5	
			5	5
40	26.5	66	5	
8	23.5	294	3	
			4	4
3	2.7	90	5	5
61	63.4	104	5	5
20	11.4	57	5	5
18	18	100		
0	0	#DIV/0!		
18	18	100	15	15
272	160	59	5	5
0	10.0		5	5
			69	69
			80	*80*
			8.63	**8.63**

APPENDIX 4

Current Habitat Quality Score Tables

OFFSET - Fauna Species: Koala

Assessment Unit - Regional Ecosystem	AU1 Non-remnant 12.12.15															AU2 No-remnant 12.12.12																AU3 Non-remnant 12.9-10.17									
Site Reference	Benchmark	BC12			BC14			BC17			BC20			Average % benchmark	Average Score	Benchmark	BC10			BC09			BC01			BC21			Average % benchmark	Score	Benchmark	BC03			BC05			BC30		
	RE12.12.15	Data	% Bm	Score	Data	% Bm	Score	Data	% Bm	Score	Data	% Bm	Score			RE 12.12.12	Data	% Bm	Score	Data	% Bm	Score	Data	% Bm	Score	Data	% Bm	Score			RE 12.9-10.17d	Data	% Bm	Score	Data	% Bm	Score	Data	% Bm	
Recruitment of woody perennial species in EDL	100	100	100	5	100	100	5	100	100	5	100	100	5	100	5	100	100	100	5	100	100	5	100	100	5	100	100	5	100	5	100	100	100	5	100	100	5	100	100	
Native plant species richness - trees	8	5	63	2.5	6	75	2.5	4	50	2.5	4	50	2.5	59	3	4	2	50	2.5	3	75	2.5	1	25	2.5	4	100	5	63	3	8	5	63	2.5	1	13	0	0	0	
Native plant species richness - shrubs	6	10	167	5	10	167	5	5	83	2.5	9	150	5	142	4	3	5	167	5	3	100	5	1	33	2.5	5	167	5	117	4	13	4	31	2.5	1	8	0	9	69	
Native plant species richness - grasses	5	9	180	5	8	160	5	6	120	5	4	80	2.5	135	4	9	9	100	5	6	67	2.5	3	33	2.5	4	44	2.5	61	3	9	5	56	2.5	5	56	2.5	6	67	
Native plant species richness - forbes	17	18	106	5	20	118	5	10	59	2.5	7	41	2.5	81	4	28	16	57	2.5	15	54	2.5	6	21	0	7	25	2.5	39	2	17	18	106	5	10	59	2.5	9	53	
Tree canopy height (m)	24	10.0	42	3	16	67	3	0.0	0	0	24	100	5			22	12.0	55	3	16	73	5	0	0	0	12.0	55	3			26	10.0	38	3	0	0	0	16.0	62	
Tree subcanopy height (m)	10	6.0	60	3	6	60	3	5.0	50	3	4.5	45	3			11	4.0	36	3	9	82	5	0	0	0	6.0	55	3			10	5.0	50	3	0	0	0	0.0	0	
Tree canopy height (average of emergent, canopy, sub-canopy)				3			3			1.5			4	0	3				3			5			0		3	0	3				3			0				
Tree canopy cover (%)	82	20.0	24	2	13.9	17	2	0.0	0	0	10.9	13	2			31	5.6	18	2	17.9	58	5	0	0	0	0.0	0	0			65	3.0	5	0	0	0	0	5.0	8	
Tree subcanopy cover (%)	55	11.3	21	2	4	7	0	2.0	4	0	0	0	0			12	1.6	13	2	13	108	5	0	0	0	2.0	17	2			13	2.5	19	2	0	0	0	0.0	0	
Tree canopy cover (average of emergent, canopy, sub-canopy)				2			1			0			1	0	1				2			5			0		1	0	2				1			0				
Shrub canopy cover	5	3.4	68	5	1.8	36	3	0.0	0	0	0.9	18	3	31	3	5	1	20	3	7	140	5	0	0	0	3.0	60	5	55	3	5	0.0	0	0	0	0	0	0.0	0	
Native grass cover	23	25.0	109	5	16.4	71	3	58.0	252	5	21	91	5	131	5	40	61.4	154	5	51	128	5	0	0	0	30.0	75	3	89	3	23	24.0	104	5	18	78	3	48.4	210	
Organic litter	65	28.0	43	3	20	31	3	0.0	0	0	3.2	5	0	20	2	35	22	63	5	8.4	24	3	0	0	0	3.2	9	0	24	2	46	15.0	33	3	4.6	10	3	6.0	13	
Large eucalypts per hectare	47	0	0		2			0			2					60	0	0		0			0			0					45	0	0		0			0		
Large non-eucalypts per hectare	10	10	100		0			0			0					0	0	#DIV/0!		0			0			0					0	0	#DIV/0!		0			0		
Large trees (euc plus non-euc)	57	10	18	5	2	4	5	0	0	0	2	4	5	6	4	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45	0	0	0	0	0	0	0	0	
Coarse woody debris	613	150	24	2	49	8	0	200	33	2	330	54	5	30	2	500	0	0	0	950	190	5	0	0	0	180	36	2	57	2	439	1730	394	2	80	18	2	310	71	
Non-native plant cover	0	10.0		5	10.0		5	80.0		0	30.0		3	0	3	0	10.0		5	1.0		10	80.0		0	80.0		0		4	0	47.5		3	40		3	10.0		
Quality and availability of food and foraging habitat				1			1			1			1		1				1			1			1				1				1			1				
Quality and availability of shelter				1			1			1			1		1				1			1			1				1				1			1				
Site Condition Score				54.5			47.5			28			45.5		43.875				45			57.5			14.5		36		38.25				36.5			23				
MAX Site Condition Score				*100*			*100*			*100*			*100*		*100*				*100*			*100*			*100*		*100*		*100*				*100*			*100*				
Site Condition Score - out of 3				**1.64**			**1.43**			**0.84**			**1.37**		**1.32**				**1.35**			**1.73**			**0.44**		**1.08**		**1.15**				**1.10**			**0.69**				
Site Context																																									
Size of patch				10.00			10.00			10.00			10.00		10				10.00			10.00			10.00		10.00		10				10.00			10.00				
Connectedness				2			2			5			4		3				2			2			2		2		2				2			2				
Context				5			5			5			5		5				5			5			5		5		5				5			5				
Ecological Corridors				0			0			6			0		2				0			0			6		0		2				6			6				
Role of site location to species overall population in the state				4			5			4			4		4				4			4			4		4		4				4			4				
Threats to the species				7.00			7.00			7.00			7.00		7				7.00			7.00			7.00		7.00		7				7.00			7.00				
Species mobility capacity				10.00			10.00			10.00			10.00		10				10.00			10.00			10		10.00		10				10.00			10.00				
Site Context Score				38			39								41				38			38			44				39.5				44			44				
MAX Site Context Score				*56*			*56*								*56*				*56*			*56*			*56*				*56*				*56*			*56*				
Site Context Score - out of 3				**2.04**			**2.09**								**2.20**				**2.04**			**2.04**			**2.36**				**2.12**				**2.36**			**2.36**				

Species Stocking Rate (SSR)						AU1	AU2	AU3	AU4	AU5	AU6	AU7	AU8	AU9	AU10	AU11	AU12	AU13	AU14
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	Score				10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
		No	Yes - adjacent		Yes - on site														
Species usage of the site (habitat type & evidenced usage)	Score	0	5	10	15	10	10	10	10	10	15	15	10	10	10	15	10	15	10
		Not habitat	Dispersal	Foraging	Breeding														
Approximate density (per ha)	Score	0	10	20	30	0	0	0	0	0	10	10	0	0	0	30	20	30	20
Role/importance of species population on site*	Score (*Total from supplementary table below*)	0				0	0	0	0	0	5	5	0	0	0	5	0	5	0
		0	5 - 15	20 - 35	40 - 45														
Total SRR score (out of 70)						20	20	20	20	20	40	40	20	20	20	60	40	60	40
SRR Score (out of 4)						**1.14285714**	**1.14285714**	**1.14285714**	**1.14285714**	**1.14285714**	**2.28571429**	**2.28571429**	**1.142857143**	**1.142857143**	**1.142857143**	**3.428571429**	**2.28571429**	**3.428571429**	**2.28571429**

***SSR Supplementary Table**			
*Key source population for breeding	Score	0	
		No	Yes/ Possibly
*Key source population for dispersal	Score	0	
		No	Yes/ Possibly
*Necessary for maintaining genetic diversity	Score	0	
		No	Yes/ Possibly
*Near the limit of the species range	Score	0	
		No	Yes

Proposed offset area (April 2026)

Final habitat quality score (weighted)	**AU1**	**AU2**	**AU3**	**AU4**	**AU5**	**AU6**	**AU7**	**AU8**	**AU9**	**AU10**	**AU11**	**AU12**	**AU13**	**AU14**	**Average/Final**
Site Condition score (out of 3)	1.32	1.15	0.89	1.31	1.28	1.64	1.42	1.64	1.61	1.07	1.84	1.43	1.38	2.52	1.46
Site Context Score (out of 3)	2.20	2.12	2.42	2.36	2.36	2.17	2.22	2.36	2.36	2.46	2.20	2.14	2.41	2.36	2.29
Species Stocking Rate Score (out of 4)	1.14	1.14	1.14	1.14	1.14	2.29	2.29	1.14	1.14	1.14	3.43	2.29	3.43	2.29	1.80
Habitat Quality score (out of 10)	*4.66*	*4.41*	*4.46*	*4.81*	*4.78*	*6.10*	*5.93*	*5.14*	*5.11*	*4.67*	*7.46*	*5.85*	*7.22*	*7.16*	5.55
Assessment Unit area (ha)	221.95	177.86	275.45	50.08	16.95	33.20	29.38	45.87	1.56	1.31	75.54	3.41	35.96	3.29	**971.83**
Total offset area (ha) for this MNES	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83
Size Weighting	0.23	0.18	0.28	0.05	0.02	0.03	0.03	0.05	0.00	0.00	0.08	0.00	0.04	0.00	**1.00**
Weighted Habitat Quality Score	***1.06***	***0.81***	***1.26***	***0.25***	***0.08***	***0.21***	***0.18***	***0.24***	***0.01***	***0.01***	***0.58***	***0.02***	***0.27***	***0.02***	***5.00***

Proposed offset area Stage 1 (April 2026)

Final habitat quality score (weighted)	**AU1**	**AU2**	**AU3**	**AU4**	**AU5**	**AU6**	**AU7**	**AU8**	**AU9**	**AU10**	**AU11**	**AU12**	**AU13**	**AU14**	**Average/Final**
Site Condition score (out of 3)	1.32	1.15	0.89	1.31	1.28	1.64	1.42	1.64	1.61	1.07	1.84	1.43	1.38	2.52	1.46
Site Context Score (out of 3)	2.20	2.12	2.42	2.36	2.36	2.17	2.22	2.36	2.36	2.46	2.20	2.14	2.41	2.36	2.29
Species Stocking Rate Score (out of 4)	1.14	1.14	1.14	1.14	1.14	2.29	2.29	1.14	1.14	1.14	3.43	2.29	3.43	2.29	1.80
Habitat Quality score (out of 10)	4.66	4.41	4.46	4.81	4.78	6.10	5.93	5.14	5.11	4.67	7.46	5.85	7.22	7.16	5.55
Assessment Unit area (ha)	143.32	90.24	37.71	0.00	1.74	22.80	22.97	0.00	0.00	0.00	70.78	0.33	11.30	0.00	**401.19**
Total offset area (ha) for this MNES	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19
Size Weighting	0.36	0.22	0.09	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.18	0.00	0.03	0.00	**1.00**
Weighted Habitat Quality Score	***1.66***	***0.99***	***0.42***	***0.00***	***0.02***	***0.35***	***0.34***	***0.00***	***0.00***	***0.00***	***1.32***	***0.00***	***0.20***	***0.00***	***5.30***

Proposed offset area - Stage 2 (April 2026)

Final habitat quality score (weighted)	**AU1**	**AU2**	**AU3**	**AU4**	**AU5**	**AU6**	**AU7**	**AU8**	**AU9**	**AU10**	**AU11**	**AU12**	**AU13**	**AU14**	**Average/Final**
Site Condition score (out of 3)	1.32	1.15	0.89	1.31	1.28	1.64	1.42	1.64	1.61	1.07	1.84	1.43	1.38	2.52	1.46
Site Context Score (out of 3)	2.20	2.12	2.42	2.36	2.36	2.17	2.22	2.36	2.36	2.46	2.20	2.14	2.41	2.36	2.29
Species Stocking Rate Score (out of 4)	1.14	1.14	1.14	1.14	1.14	2.29	2.29	1.14	1.14	1.14	3.43	2.29	3.43	2.29	1.80
Habitat Quality score (out of 10)	4.66	4.41	4.46	4.81	4.78	6.10	5.93	5.14	5.11	4.67	7.46	5.85	7.22	7.16	5.55
Assessment Unit area (ha)	78.64	87.62	237.74	50.08	15.20	10.40	6.42	45.86	1.56	1.30	4.76	3.09	24.66	3.29	**570.63**
Total offset area (ha) for this MNES	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63
Size Weighting	0.14	0.15	0.42	0.09	0.03	0.02	0.01	0.08	0.00	0.00	0.01	0.01	0.04	0.01	**1.00**
Weighted Habitat Quality Score	***0.64***	***0.68***	***1.86***	***0.42***	***0.13***	***0.11***	***0.07***	***0.41***	***0.01***	***0.01***	***0.06***	***0.03***	***0.31***	***0.04***	***4.79***

						AU4 Non-remnant 12.9-10.7									AU5 Non-remnant 12.3.7									AU6 Regrowth 12.12.15b									AU7 Regrowth 12.12.12									AU8 Regrowth 12.9-10.17a								
	BC32			%	Average	Benchmar	BC06			BC07			%	Average	Benchmar	BC04			BC08			%	Average	Benchmark	BC13			BC15			%	Average	Benchmark	BC02			BC11			%	Average	Benchmark	BC26			BC31			%	Average
Score	Data	% Bm	Score	benchma	Score	RE 12.9-10	Data	% Bm	Score	Data	% Bm	Score	benchma	Score	RE 12.3.7	Data	% Bm	Score	Data	% Bm	Score	benchma	Score	RE12.12.15b	Data	% Bm	Score	Data	% Bm	Score	benchma	Score	RE 12.12.12	Data	% Bm	Score	Data	% Bm	Score	benchma	Score	RE 12.9-10.17a	Data	% Bm	Score	Data	% Bm	Score	benchma	Score
5	100	100	5	100	5	100	100	100	5	100	100	5	100	5	100	100	100	5	100	100	5	100	5	100	100	100	5	100	100	100	5	100	5	100	100	100	5	100	100	100	5	100	100	100	5	100	100	100	5	100	5
0	1	13	0	22	1	3	1	33	2.5	3	100	5	67	3.75	6	2	33	2.5	4	67	2.5	50	2.5	12	5	42	2.5	6	50	2.5	46	2.5	4	6	150	5	6	150	5	150	5	13	5	38	2.5	8	62	2.5	50	2.5
2.5	5	38	2.5	37	2	5	9	180	5	2	40	2.5	110	3.75	8	5	63	2.5	5	63	2.5	63	2.5	17	6	35	2.5	9	53	2.5	44	2.5	3	6	200	5	6	200	5	200	5	13	8	62	2.5	5	38	2.5	50	2.5
2.5	5	56	2.5	58	3	8	8	100	5	6	75	2.5	88	3.75	6	6	100	5	3	50	2.5	75	3.75	5	4	80	2.5	7	140	5	110	3.75	9	11	122	5	7	78	2.5	100	3.75	5	6	120	5	7	140	5	130	5
2.5	9	53	2.5	68	3	26	11	42	2.5	12	46	2.5	44	2.5	17	10	59	2.5	7	41	2.5	50	2.5	21	20	95	5	22	105	5	100	5	28	15	54	2.5	24	86	2.5	70	2.5	31	19	61	2.5	20	65	2.5	63	2.5
3	16	62	3			21	21.0	100	5	18	86	5			22	25.0	114	5	21	95	5			28	20.0	71	5	18	64	3			22	12.0	55	3	18	82	5			27	20.0	74	5	20	74	5		
0	0	0	0			10	9.0	90	5	9	90	5			12	9.0	75	5	13	108	5			11	12.0	109	5	8	73	5			11	9.0	82	5	10	91	5			13	8.0	62	3	11	85	5		
1.5			1.5	0	2				5			5	0	5				5			5	0	5				5			4	0	4.5				4			5	0	4.5				4			5	0	4.5
0	3	5	0			40	0.0	0	0	2.5	6	0			31	8.2	26	2	17.9	58	5			78	19.9	26	2	28.6	37	2			31		0	0	51.9	167	5			85	46.9	55	5	45.5	54	5		
0	0	0	0			8	0.0	0	0	0	0	0			23	3.0	13	2	6.6	29	2			10	42.9	429	3	14.4	144	5			12		0	0	18.3	153	5			27	21.1	78	5	36.5	135	5		
0			0	0	0				0			0	0	0				2			3.5	0	2.75				2.5			3.5	0	3				5			5	0	2.5				5			5	0	5
0	0	0	0	0	0	3	1.5	50	5	0	0	0	25	2.5	22	1.5	7	0	1.2	5	0	6	0	6	0.0	0	0	1.8	30	3	15	1.5	5	0	0	0	1.4	28	3	14	1.5	12	8.1	68	5	6	50	5	59	5
5	11	48	1	110	4	61	46.0	75	3	61.6	101	5	88	4	8	53.0	663	5	6.2	78	3	370	4	18	44.6	248	5	33.4	186	5	217	5	40	0	0	0	17.6	44	1	22	0.5	11	27.0	245	5	11	100	5	173	5
3	6	13	3	17	3	20	7.0	35	3	5.6	28	3	32	3	27	3.4	13	3	0	0	0	6	1.5	57	15.4	27	3	41.4	73	5	50	4	35	0	0	0	47.4	135	5	68	2.5	45	18.0	40	3	6	13	3	27	3
	0					18		0		2					20	8	40		4					54	6	11		8					60	0	0		8					37	4	11		8				
	0					0	#DIV/0!			0					40	0	0		12					5	0	0		0					0	0	#DIV/0!		0					0	0	#DIV/0!		0				
0	0	0	0	0	0	18	0	0	0	2	11	5	6	2.5	60	8	13	5	16	27	5	20	5	60	6	10	5	8	13	5	12	5	60	0	0	0	8	13	5	7	2.5	37	4	11	5	8	22	5	16	5
5	0	0	0	121	2	272	22.6	8	0	580	213	2	111	1	667	68	10	2	0	0	0	5	1	859	900	105	5	110	13	2	59	3.5	500	0	0	0	590	118	5	59	2.5	553	120	22	2	520	94	5	58	3.5
5	15.0		5	0	4	0	10.0		5	20.0		5	0	5	0	40.0		3	50.0		3	0	3	0	10.2		5	1.1		10	0	7.5	0	10		5	3.6		10	0	7.5	0	25.0		3	9.0		5	0	4
1			1		1				1			1		1				1			1		1				1			1		1				1			1				1			1		1		1
1			1		1				1			1		1				1			5		3				1			1		1				1			1				1			1		1		1
34			25		29.625				43			44.5		43.75				44.5			40.5		42.5				50			59.5		54.75				61			47.25				51.5			57.5			54.5	
100			*100*		*100*				*100*			*100*		*100*				*100*			*100*		*100*				*100*			*100*		*100*				*100*			*100*				*100*			*100*			*100*	
1.02			**0.75**		**0.89**				**1.29**			**1.34**		**1.31**				**1.34**			**1.22**		**1.28**				**1.50**			**1.79**		**1.64**				**1.01**			**1.83**		**1.42**				**1.55**			**1.73**			**1.64**	
10.00			10.00		10				10.00			10.00		10				10.00			10.00		10				10.00			10.00		10				10.00			10.00		10				10.00			10.00			10	
4			5		3				2			2		2				2			2		2				4			4		4				2			2		2				2			2			2	
5			5		5				5			5		5				5			5		5				5			5		5				5			5		5				5			5			5	
6			6		6				6			6		6				6			6		6				0			0		0				6			0		3				6			6			6	
4			4		4				4			4		4				4			4		4				4			5		4.5				4			5		4.5				4			4			4	
7.00			7.00		7				7.00			7.00		7				7.00			7.00		7				7.00			7.00		7				7.00			7.00		7				7.00			7.00			7	
10.00			10.00		10				10.00			10.00		10				10.00			10.00		10				10.00			10.00		10				10.00			10.00		10				10.00			10.00			10	
					45.25				44			44		44				44			44		44				40			41		40.5				44			39		41.5				44			44			44	
					56				*56*			*56*		*56*				*56*			*56*		*56*				*56*			*56*		*56*				*56*			*56*		*56*				*56*			*56*			*56*	
					2.42				**2.36**			**2.36**		**2.36**				**2.36**			**2.36**		**2.36**				**2.14**			**2.20**		**2.17**				**2.36**			**2.09**		**2.22**				**2.36**			**2.36**			**2.36**	

AU9 Regrowth 12.9-10.7						AU10 Regrowth 12.3.7						AU11 Remnant 12.12.15b							AU12 Remnant 12.12.12						AU13 Remnant 12.9-10.17a														AU14 Remnant 12.9-10.7						
Benchmar	BC28			%	Average	Benchmar	BC24			%	Average	Benchmark	BC16			BC18		%	Average	Benchmar	BC22			%	Average	Benchmar	BC19			BC23			BC25			BC29			%	Average	Benchmar	BC27			%	Average
RE 12.9-10	Data	% Bm	Score	benchma	Score	RE 12.3.7	Data	% Bm	Score	benchma	Score	RE12.12.15b	Data	% Bm	Score	Data	% Bm	Score	benchma	Score	RE 12.12.1	Data	% Bm	Score	benchma	Score	RE 12.9-10	Data	% Bm	Score	Data	% Bm	Score	Data	% Bm	Score	Data	% Bm	Score	benchma	Score	RE 12.9-10	Data	% Bm	Score	benchma	Score
100	100	100	5	100	5	100	100	100	5	100	5	100	100	100	5	100	100	5	100	5	100	100	100	5	100	5	100	100	100	5	100	100	5	100	100	5	100	100	5	100	5	100	100	100	5	100	5
3	6	200	5	200	5	6	7	117	5	117	5	12	3	25	2.5	5	42	2.5	33	2.5	4	5	125	5	125	5	13	5	38	2.5	5	38	2.5	3	23	0	6	46	2.5	37	2	3	8	267	5	267	5
5	10	200	5	200	5	8	9	113	5	113	5	17	11	65	2.5	12	71	2.5	68	2.5	3	9	300	5	300	5	13	10	77	2.5	7	54	2.5	4	31	2.5	8	62	2.5	56	3	5	8	160	5	160	5
8	9	113	5	113	5	6	2	33	2.5	33	3	5	7	140	5	8	160	5	150	5	9	7	78	2.5	78	3	5	4	80	2.5	3	60	2.5	6	120	5	4	80	2.5	85	3	8	5	63	2.5	63	3
26	13	50	2.5	50	3	17	16	94	5	94	5	21	23	110	5	23	110	5	110	5	28	14	50	2.5	50	3	31	20	65	2.5	21	68	2.5	16	52	2.5	8	26	2.5	52	3	26	19	73	2.5	73	3
21	24.0	114	5			22	20.0	91	5			28	24.0	86	5	24	86	5			22	24.0	109	5			27	23.0	85	5	20	74	5	22	81	5	19	70	5			21	21.0	100	5		
10	7.0	70	5			12	8.0	67	3			11	13.0	118	5	13	118	5			11	12.0	109	5			13	17.0	131	5	9	69	3	10	77	5	10	77	5			10	11.0	110	5		
			5	0	5				4	0	4				5			5	0	5				5	0	5				5			4			5			5	0	5				5	0	5
40	12.7	32	2			31	5.3	17	2			78	31.0	40	2	27.7	36	2			31	16.4	53	5			85	37.5	44	2	27	32	2	21	25	2	0	0	0			40	26.5	66	5		
8	0.0	0	0			23	4.3	19	2			10	0.0	0	0	11.9	119	5			12	0.0	0	0			27	12.5	46	2	2	7	0	8	30	2	21.2	79	5			8	23.5	294	3		
			1	0	1				2	0	2				1			3.5	0	2.25				2.5	0	3				2			1			2			2.5	0	2				4	0	4
3	1.1	37	3	37	3	22	1.4	6	0	6	0	6	5.6	93	5	5	83	5	88	5	5	1.0	20	3	20	3	12	20.1	168	5	5.6	47	3	2	17	3	2.3	19	3	63	4	3	2.7	90	5	90	5
61	70.0	115	5	115	5	8	0.0	0	0	0	0	18	47.0	261	5	41	228	5	244	5	40	58.6	147	5	147	5	11	59.0	536	5	35	318	5	82	745	5	56.4	513	5	528	5	61	63.4	104	5	104	5
20	10.0	50	5	50	5	27	2.0	7	0	7	0	57	45.0	79	5	48.6	85	5	82	5	35	20.4	58	5	58	5	45	23.6	52	5	6.6	15	3	0	0	0	3.8	8	0	19	2	20	11.4	57	5	57	5
18	0	0				20	0	0				54		0		3					60	0	0				37	12	32		14			14			4					18	18	100			
0	0	#DIV/0!				40	0	0				5		0		0					0		#DIV/0!				0	0	#DIV/0!		0			0			0					0	0	#DIV/0!			
18	0	0	0	0	0	60	0	0	0	0	0	60	0	0	0	30	50	10	25	5	60	0	0	0	0	0	37	12	32	5	14	38	5	14	38	5	4	11	5	30	5	18	18	100	15	100	15
272	440	162	5	162	5	667	390	58	5	58	5	859	190	22	2	1010	118	5	70	3.5	500	290	52	5	223	40	2	158	29	2	440	80	5	50	4	272	160	59	5	59	5
0	10.0		5	0	5	0	70.0		0	0	0	0	1.0		10	30.0		3	0	6.5	0	10.0		5	0	5	0	10.0		5	60.0		0	20.0		5	30.0		3	0	3	0	10.0		5	0	5
			1		1				1		1				1			1		1				1		1				1			1			1			1					5		5
			1		1				1		1				1			5		3				1		1				1			1			1			1					10		10
			53.5		53.5				35.5		35.5				55			67.5		61.25				47.5		47.5				54			40			44			45.5		45.875				84		84
			100		*100*				*100*		*100*				*100*			*100*		*100*				*100*		*100*				*100*			*100*			*100*			*100*		*100*				*100*		*100*
			1.61		**1.61**				**1.07**		**1.07**				**1.65**			**2.03**		**1.84**				**1.43**		**1.43**				**1.62**			**1.20**			**1.32**			**1.37**		**1.38**				**2.52**		**2.52**
			10.00		10				10.00		10				10.00			10.00		10				10.00		10				10.00			10.00			10.00			10.00		10				10.00		10
			2		2				4		4				2			2		2				4		4				5			2			5			4		3				2		2
			5		5				5		5				5			5		5				5		5				5			5			5			5		5				5		5
			6		6				6		6				6			0		3				0		0				6			6			6			6		6				6		6
			4		4				4		4				4			4		4				4		4				4			4			4			4		4				4		4
			7.00		7				7.00		7				7.00			7.00		7				7.00		7				7.00			7.00			7.00			7.00		7				7.00		7
			10.00		10				10.00		10				10.00			10.00		10				10.00		10				10.00			10.00			10.00			10.00		10				10.00		10
			44		44				46		46				44			38		41				40		40				46			44								45						
			56		*56*				*56*		*56*				*56*			*56*		*56*				*56*		*56*				*56*			*56*								*56*						
			2.36		**2.36**				**2.46**		**2.46**				**2.36**			**2.04**		**2.20**				**2.14**		**2.14**				**2.46**			**2.36**								**2.41**						

OFFSET - Fauna Species: Grey-headed Flying-fox

Assessment Unit - Regional Ecosystem	AU1 Non-remnant 12.12.15																AU2 No-remnant 12.12.12																				AU3 Non-remnant 12.9-10.17											
Site Reference	Benchmark	BC12			BC14			BC17			BC20			Average % benchmark	Average Score	Benchmark	BC10			BC09			BC01			BC21			%	Score	Benchmark	BC03			BC05			BC30										
	RE12.12.15	Data	% Bm	Score	Data	% Bm	Score	Data	% Bm	Score	Data	% Bm	Score			RE 12.12.12	Data	% Bm	Score	Data	% Bm	Score	Data	% Bm	Score	Data	% Bm	Score			RE 12.9-10.17d	Data	% Bm	Score	Data	% Bm	Score	Data	% Bm	Score								
Recruitment of woody perennial species in EDL	100	100	100	5	100	100	5	100	100	5	100	100	5	100	5	100	100	100	5	100	100	5	100	100	5	100	100	5	100	5	100	100	100	5	100	100	5	100	100	5							
Native plant species richness - trees	8	5	63	2.5	6	75	2.5	4	50	2.5	4	50	2.5	59	3	4	2	50	2.5	3	75	2.5	1	25	2.5	4	100	5	63	3	8	5	63	2.5	1	13	0	0	0	0							
Native plant species richness - shrubs	6	10	167	5	10	167	5	5	83	2.5	9	150	5	142	4	3	5	167	5	3	100	5	1	33	2.5	5	167	5	117	4	13	4	31	2.5	1	8	0	9	69	2.5							
Native plant species richness - grasses	5	9	180	5	8	160	5	6	120	5	4	80	2.5	135	4	9	9	100	5	6	67	2.5	3	33	2.5	4	44	2.5	61	3	9	5	56	2.5	5	56	2.5	6	67	2.5							
Native plant species richness - forbes	17	18	106	5	20	118	5	10	59	2.5	7	41	2.5	81	4	28	16	57	2.5	15	54	2.5	6	21	0	7	25	2.5	39	2	17	18	106	5	10	59	2.5	9	53	2.5							
Tree canopy height (m)	24	10.0	42	3	16	67	3	0.0	0	0	24	100	5			22	12.0	55	3	16	73	5	0	0	0	12.0	55	3			26	10.0	38	3	0	0	0	16.0	62	3							
Tree subcanopy height (m)	10	6.0	60	3	6	60	3	5.0	50	3	4.5	45	3			11	4.0	36	3	9	82	5	0	0	0	6.0	55	3			10	5.0	50	3	0	0	0	0.0	0	0							
Tree canopy height (average of emergent, canopy, sub-canopy)				3			3			1.5			4	0	3				3			5			0		3	0	3				3			0			1.5							
Tree canopy cover (%)	82	20.0	24	2	13.9	17	2	0.0	0	0	10.9	13	2			31	5.6	18	2	17.9	58	5	0	0	0	0.0	0	0			65	3.0	5	0	0	0	0	5.0	8	0							
Tree subcanopy cover (%)	55	11.3	21	2	4	7	0	2.0	4	0	0	0	0			12	1.6	13	2	13	108	5	0	0	0	2.0	17	2			13	2.5	19	2	0	0	0	0.0	0	0							
Tree canopy cover (average of emergent, canopy, sub-canopy)				2			1			0			1	0	1				2			5			0		1	0	2				1			0			0							
Shrub canopy cover	5	3.4	68	5	1.8	36	3	0.0	0	0	0.9	18	3	31	3	5	1	20	3	7	140	5	0	0	0	3.0	60	5	55	3	5	0.0	0	0	0	0	0	0.0	0	0							
Native grass cover	23	25.0	109	5	16.4	71	3	58.0	252	5	21	91	5	131	5	40	61.4	154	5	51	128	5	0	0	0	30.0	75	3	89	3	23	24.0	104	5	18	78	3	48.4	210	5							
Organic litter	65	28.0	43	3	20	31	3	0.0	0	0	3.2	5	0	20	2	35	22	63	5	8.4	24	3	0	0	0	3.2	9	0	24	2	46	15.0	33	3	4.6	10	3	6.0	13	3							
Large eucalypts per hectare	47	0	0		2			0			2					60	0	0		0			0			0					45	0	0		0			0							
Large non-eucalypts per hectare	10	10	100		0			0			0					0	0	#DIV/0!		0			0			0					0	0	#DIV/0!		0			0							
Large trees (euc plus non-euc)	57	10	18	5	2	4	5	0	0	0	2	4	5	6	4	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	45	0	0	0	0	0	0	0	0	0							
Coarse woody debris	613	150	24	2	49	8	0	200	33	2	330	54	5	30	2	500	0	0	0	950	190	5	0	0	0	180	36	2	57	2	439	1730	394	2	80	18	2	310	71	5							
Non-native plant cover	0	10.0		5	10.0		5	80.0		0	30.0		3	0	3	0	10.0		5	1.0	10	80.0		0	80.0		0		4	0	47.5		3	40		3	10.0		5							
Quality and availability of food and foraging habitat				1			1			1			1		1				1			5			1			2					1			1			1							
Quality and availability of shelter				1			1			1			1		1				1			1			1			1					1			1			1							
Site Condition Score				54.5			47.5			28			45.5		43.875				45			61.5			14.5			36		39.25				36.5			23			34							
MAX Site Condition Score				*100*			*100*			*100*			*100*		*100*				*100*			*100*			*100*			*100*		*100*				*100*			*100*			*100*							
Site Condition Score - out of 3				**1.64**			**1.43**			**0.84**			**1.37**		**1.32**				**1.35**			**1.85**			**0.44**			**1.08**		**1.18**				**1.10**			**0.69**			**1.02**							
Site Context																																																
Size of patch				0.00			0.00			0.00			0.00		0				0.00			0.00			0.00			0.00		0				0.00			0.00			0.00							
Connectedness				2			2			2			2		2				2			2			2			2		2				2			2			2							
Context				4			4			4			4		4				4			4			4			4		4				4			4			4							
Ecological Corridors				0			0			6			0		2				0			0			6			0		2				6			6			6							
Role of site location to species overall population in the state				1			1			1			1		1				1			4			1			1		2				1			1			1							
Threats to the species				1			1			1			1		1				1			1			1			1		1				1			1			1							
Species mobility capacity				10.00			10.00			10.00			10.00		10				10.00			10.00			10			10.00		10				10.00			10.00			10.00							
Site Context Score				18			18								19.5				18			21			24					20.25				24			24										
MAX Site Context Score				*56*			*56*								*56*				*56*			*56*			*56*					*56*				*56*			*56*										
Site Context Score - out of 3				**0.96**			**0.96**								**1.04**				**0.96**			**1.13**			**1.29**					**1.08**				**1.29**			**1.29**										

Species Stocking Rate (SSR)							AU1	AU2	AU3	AU4	AU5	AU6	AU7	AU8	AU9	AU10	AU11	AU12	AU13	AU14
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	Score					10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
		No	Yes - adjacent		Yes - on site															
Species usage of the site (habitat type & evidenced usage)	Score	0	5	10		15	10	10	10	10	10	10	10	10	10	10	10	10	10	10
		Not habitat	Dispersal	Foraging	Breeding															
Approximate density (per ha)	Score	0	10	20		30	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Role/importance of species population on site*	Score (*Total from supplementary table below*)	0					0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	5 - 15	20 - 35	40 - 45															
Total SRR score (out of 70)							30	30	30	30	30	30	30	30	30	30	30	30	30	30
SRR Score (out of 4)							**1.71428571**	**1.71428571**	**1.71428571**	**1.71428571**	**1.71428571**	**1.71428571**	**1.71428571**	**1.714285714**	**1.714286**	**1.714285714**	**1.714285714**	**1.71429**	**1.714286**	**1.714286**

***SSR Supplementary Table**			
*Key source population for breeding	Score	0	
		No	Yes/ Possibly
*Key source population for dispersal	Score	0	
		No	Yes/ Possibly
*Necessary for maintaining genetic diversity	Score	0	
		No	Yes/ Possibly
*Near the limit of the species range	Score	0	
		No	Yes

Proposed offset area (April 2026)

Final habitat quality score (weighted)	AU1	AU2	AU3	AU4	AU5	AU6	AU7	AU8	AU9	AU10	AU11	AU12	AU13	AU14	verage/Final
Site Condition score (out of 3)	1.32	1.18	0.89	1.31	1.28	1.64	1.55	1.64	1.61	1.07	1.78	1.55	1.38	2.52	1.48
Site Context Score (out of 3)	1.04	1.08	1.29	1.29	1.37	1.82	2.12	2.14	2.04	2.14	2.14	1.98	2.44	2.63	1.82
Species Stocking Rate Score (out of 4)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
Habitat Quality score (out of 10)	*4.08*	*3.98*	*3.89*	*4.31*	*4.36*	*5.18*	*5.38*	*5.49*	*5.36*	*4.92*	*5.63*	*5.24*	*5.53*	*6.86*	5.01
Assessment Unit area (ha)	221.95	177.86	275.45	50.08	16.95	33.20	29.38	45.87	1.56	1.31	75.54	3.41	35.96	3.29	**971.83**
Total offset area (ha) for this MNES	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83
Size Weighting	0.23	0.18	0.28	0.05	0.02	0.03	0.03	0.05	0.00	0.00	0.08	0.00	0.04	0.00	**1.00**
Weighted Habitat Quality Score	***0.93***	***0.73***	***1.10***	***0.22***	***0.08***	***0.18***	***0.16***	***0.26***	***0.01***	***0.01***	***0.44***	***0.02***	***0.20***	***0.02***	***4.36***

Proposed offset area Stage 1 (April 2026)

Final habitat quality score (weighted)	AU1	AU2	AU3	AU4	AU5	AU6	AU7	AU8	AU9	AU10	AU11	AU12	AU13	AU14	verage/Final
Site Condition score (out of 3)	1.32	1.18	0.89	1.31	1.28	1.64	1.55	1.64	1.61	1.07	1.78	1.55	1.38	2.52	1.48
Site Context Score (out of 3)	1.04	1.08	1.29	1.29	1.37	1.82	2.12	2.14	2.04	2.14	2.14	1.98	2.44	2.63	1.82
Species Stocking Rate Score (out of 4)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
Habitat Quality score (out of 10)	4.08	3.98	3.89	4.31	4.36	5.18	5.38	5.49	5.36	4.92	5.63	5.24	5.53	6.86	5.01
Assessment Unit area (ha)	143.32	90.24	37.71	0.00	1.74	22.80	22.97	0.00	0.00	0.00	70.78	0.33	11.30	0.00	**401.19**
Total offset area (ha) for this MNES	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19
Size Weighting	0.36	0.22	0.09	0.00	0.00	0.06	0.06	0.00	0.00	0.00	0.18	0.00	0.03	0.00	**1.00**
Weighted Habitat Quality Score	***1.46***	***0.89***	***0.37***	***0.00***	***0.02***	***0.29***	***0.31***	***0.00***	***0.00***	***0.00***	***0.99***	***0.00***	***0.16***	***0.00***	***4.49***

Proposed offset area - Stage 2 (April 2026)

Final habitat quality score (weighted)	AU1	AU2	AU3	AU4	AU5	AU6	AU7	AU8	AU9	AU10	AU11	AU12	AU13	AU14	verage/Final
Site Condition score (out of 3)	1.32	1.18	0.89	1.31	1.28	1.64	1.55	1.64	1.61	1.07	1.78	1.55	1.38	2.52	1.48
Site Context Score (out of 3)	1.04	1.08	1.29	1.29	1.37	1.82	2.12	2.14	2.04	2.14	2.14	1.98	2.44	2.63	1.82
Species Stocking Rate Score (out of 4)	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
Habitat Quality score (out of 10)	4.08	3.98	3.89	4.31	4.36	5.18	5.38	5.49	5.36	4.92	5.63	5.24	5.53	6.86	5.01
Assessment Unit area (ha)	78.64	87.62	237.74	50.08	15.20	10.40	6.42	45.86	1.56	1.30	4.76	3.09	24.66	3.29	**570.63**
Total offset area (ha) for this MNES	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63
Size Weighting	0.14	0.15	0.42	0.09	0.03	0.02	0.01	0.08	0.00	0.00	0.01	0.01	0.04	0.01	**1.00**
Weighted Habitat Quality Score	***0.56***	***0.61***	***1.62***	***0.38***	***0.12***	***0.09***	***0.06***	***0.44***	***0.01***	***0.01***	***0.05***	***0.03***	***0.24***	***0.04***	***4.26***

BC32			%	Average
Data	% Bm	Score	benchma	Score
100	100	5	100	5
1	13	0	22	1
5	38	2.5	37	2
5	56	2.5	58	3
9	53	2.5	68	3
16	62	3		
0	0	0		
		1.5	0	2
3	5	0		
0	0	0		
		0	0	0
0	0	0	0	0
11	48	1	110	4
6	13	3	17	3
0				
0				
0	0	0	0	0
0	0	0	121	2
15.0		5	0	4
		1		1
		1		1
		25		29.625
		100		*100*
		0.75		**0.89**
		0.00		0
		2		2
		4		4
		6		6
		1		1
		1		1
		10.00		10
				24
				56
				1.29

AU4 Non-remnant 12.9-10.7										
Benchmar	BC06			BC07			%	Average		
RE 12.9-10	Data	% Bm	Score	Data	% Bm	Score	benchma	Score		
100	100	100	5	100	100	5	100	5		
3	1	33	2.5	3	100	5	67	3.75		
5	9	180	5	2	40	2.5	110	3.75		
8	8	100	5	6	75	2.5	88	3.75		
26	11	42	2.5	12	46	2.5	44	2.5		
21	21.0	100	5	18	86	5				
10	9.0	90	5	9	90	5				
			5			5	0	5		
40	0.0	0	0	2.5	6	0				
8	0.0	0	0	0	0	0				
			0			0	0	0		
3	1.5	50	5	0	0	0	25	2.5		
61	46.0	75	3	61.6	101	5	88	4		
20	7.0	35	3	5.6	28	3	32	3		
18		0		2						
0	#DIV/0!			0						
18	0	0	0	2	11	5	6	2.5		
272	22.6	8	0	580	213	2	111	1		
0	10.0		5	20.0		5	0	5		
			1			1		1		
			1			1		1		
			43			44.5		43.75		
			100			*100*		*100*		
			1.29			**1.34**		**1.31**		
			0.00			0.00		0		
			2			2		2		
			4			4		4		
			6			6		6		
			1			1		1		
			1			1		1		
			10.00			10.00		10		
			24			24		24		
			56			*56*		*56*		
			1.29			**1.29**		**1.29**		

AU5 Non-remnant 12.3.7										
Benchmar	BC04			BC08			%	Average		
RE 12.3.7	Data	% Bm	Score	Data	% Bm	Score	benchma	Score		
100	100	100	5	100	100	5	100	5		
6	2	33	2.5	4	67	2.5	50	2.5		
8	5	63	2.5	5	63	2.5	63	2.5		
6	6	100	5	3	50	2.5	75	3.75		
17	10	59	2.5	7	41	2.5	50	2.5		
22	25.0	114	5	21	95	5				
12	9.0	75	5	13	108	5				
			5			5	0	5		
31	8.2	26	2	17.9	58	5				
23	3.0	13	2	6.6	29	2				
			2			3.5	0	2.75		
22	1.5	7	0	1.2	5	0	6	0		
8	53.0	663	5	6.2	78	3	370	4		
27	3.4	13	3	0	0	0	6	1.5		
20	8	40		4						
40	0	0		12						
60	8	13	5	16	27	5	20	5		
667	68	10	2	0	0	0	5	1		
0	40.0		3	50.0		3	0	3		
			1			5		3		
			1			1		1		
			44.5			40.5		42.5		
			100			*100*		*100*		
			1.34			**1.22**		**1.28**		
			0.00			0.00		0		
			2			2		2		
			4			4		4		
			6			6		6		
			1			4		2.5		
			1			1		1		
			10.00			10.00		10		
			24			27		25.5		
			56			*56*		*56*		
			1.29			**1.45**		**1.37**		

AU6 Regrowth 12.12.15b										
Benchmark	BC13			BC15			%	Average		
RE12.12.15b	Data	% Bm	Score	Data	% Bm	Score	benchma	Score		
100	100	100	5	100	100	5	100	5		
12	5	42	2.5	6	50	2.5	46	2.5		
17	6	35	2.5	9	53	2.5	44	2.5		
5	4	80	2.5	7	140	5	110	3.75		
21	20	95	5	22	105	5	100	5		
28	20.0	71	5	18	64	3				
11	12.0	109	5	8	73	5				
			5			4	0	4.5		
78	19.9	26	2	28.6	37	2				
10	42.9	429	3	14.4	144	5				
			2.5			3.5	0	3		
6	0.0	0	0	1.8	30	3	15	1.5		
18	44.6	248	5	33.4	186	5	217	5		
57	15.4	27	3	41.4	73	5	50	4		
54	6	11		8						
5	0	0		0						
60	6	10	5	8	13	5	12	5		
859	900	105	5	110	13	2	59	3.5		
0	10.2		5	1.1		10	0	7.5		
			1			1		1		
			1			1		1		
			50			59.5		54.75		
			100			*100*		*100*		
			1.50			**1.79**		**1.64**		
			2.00			2.00		2		
			2			2		2		
			4			4		4		
			0			0		0		
			1			1		1		
			15.00			15.00		15		
			10.00			10.00		10		
			34			34		34		
			56			*56*		*56*		
			1.82			**1.82**		**1.82**		

AU7 Regrowth 12.12.12										
Benchmark	BC02			BC11			%	Average		
RE 12.12.12	Data	% Bm	Score	Data	% Bm	Score	benchma	Score		
100	100	100	5	100	100	5	100	5		
4	6	150	5	6	150	5	150	5		
3	6	200	5	6	200	5	200	5		
9	11	122	5	7	78	2.5	100	3.75		
28	15	54	2.5	24	86	2.5	70	2.5		
22	12.0	55	3	18	82	5				
11	9.0	82	5	10	91	5				
			4			5	0	4.5		
31		0	0	51.9	167	5				
12		0	0	18.3	153	5				
			0			5	0	2.5		
5	0	0	0	1.4	28	3	14	1.5		
40	0	0	0	17.6	44	1	22	0.5		
35	0	0	0	47.4	135	5	68	2.5		
60	0	0		8						
0	0	#DIV/0!		0						
60	0	0	0	8	13	5	7	2.5		
500	0	0	0	590	118	5	59	2.5		
0	10		5	3.6		10	0	7.5		
			1			10		5.5		
			1			1		1		
			33.5			70		51.75		
			100			*100*		*100*		
			1.01			**2.10**		**1.55**		
			5.00			0.00		2.5		
			2			2		2		
			4			4		4		
			6			0		3		
			1			5		3		
			15.00			15.00		15		
			10.00			10.00		10		
			43			36		39.5		
			56			*56*		*56*		
			2.30			**1.93**		**2.12**		

AU8 Regrowth 12.9-10.17a										
Benchmark	BC26			BC31			%	Average		
RE 12.9-10.17a	Data	% Bm	Score	Data	% Bm	Score	benchma	Score		
100	100	100	5	100	100	5	100	5		
13	5	38	2.5	8	62	2.5	50	2.5		
13	8	62	2.5	5	38	2.5	50	2.5		
5	6	120	5	7	140	5	130	5		
31	19	61	2.5	20	65	2.5	63	2.5		
27	20.0	74	5	20	74	5				
13	8.0	62	3	11	85	5				
			4			5	0	4.5		
85	46.9	55	5	45.5	54	5				
27	21.1	78	5	36.5	135	5				
			5			5	0	5		
12	8.1	68	5	6	50	5	59	5		
11	27.0	245	5	11	100	5	173	5		
45	18.0	40	3	6	13	3	27	3		
37	4	11		8						
0	0	#DIV/0!		0						
37	4	11	5	8	22	5	16	5		
553	120	22	2	520	94	5	58	3.5		
0	25.0		3	9.0		5	0	4		
			1			1		1		
			1			1		1		
			51.5			57.5		54.5		
			100			*100*		*100*		
			1.55			**1.73**		**1.64**		
			2			2		2		
			2			2		2		
			4			4		4		
			6			6		6		
			1			1		1		
			15.00			15.00		15		
			10.00			10.00		10		
			40			40		40		
			56			*56*		*56*		
			2.14			**2.14**		**2.14**		

Benchmar
RE 12.9-10
100
3
5
8
26
21
10
40
8
3
61
20
18
0
18
272
0

AU9 Regrowth 12.9-10.7					AU10 Regrowth 12.3.7					AU11 Remnant 12.12.15b							AU12 Remnant 12.12.12					AU13 Remnant 12.9-10.17a												AU14 Remnant 12.9-10.7				
BC28			%	Average	Benchmar	BC24		%	Average	Benchmar	BC16			BC18		%	Average	Benchmar	BC22		%	Average	Benchmar	BC19		BC23		BC25		BC29		%	Average	Benchmar	BC27		%	Average
Data	% Bm	Score	benchma	Score	RE 12.3.7	Data	% Bm	Score	benchma	Score	RE12.12.1	Data	% Bm	Score	Data	% Bm	Score	benchma	Score	RE 12.12.1	Data	% Bm	Score	benchma	Score	RE 12.9-10	Data	% Bm	Score	Data	% Bm	Score	Data	% Bm	Score	benchma	Score	RE 12.9-10	Data	% Bm	Score	benchma	Score
100	100	5	100	5	100	100	100	5	100	5	100	100	100	5	100	100	5	100	5	100	100	100	5	100	5	100	100	5	100	100	5	100	5	100	100	5	100	5	100	100	100	5	100	5
6	200	5	200	5	6	7	117	5	117	5	12	3	25	2.5	5	42	2.5	33	2.5	4	5	125	5	125	5	13	5	38	2.5	5	38	2.5	3	23	0	6	46	2.5	37	2	3	8	267	5	267	5
10	200	5	200	5	8	9	113	5	113	5	17	11	65	2.5	12	71	2.5	68	2.5	3	9	300	5	300	5	13	10	77	2.5	7	54	2.5	4	31	2.5	8	62	2.5	56	3	5	8	160	5	160	5
9	113	5	113	5	6	2	33	2.5	33	3	5	7	140	5	8	160	5	150	5	9	7	78	2.5	78	3	5	4	80	2.5	3	60	2.5	6	120	5	4	80	2.5	85	3	8	5	63	2.5	63	3
13	50	2.5	50	3	17	16	94	5	94	5	21	23	110	5	23	110	5	110	5	28	14	50	2.5	50	3	31	20	65	2.5	21	68	2.5	16	52	2.5	8	26	2.5	52	3	26	19	73	2.5	73	3
24.0	114	5			22	20.0	91	5			28	24.0	86	5	24	86	5			22	24.0	109	5			27	23.0	85	5	20	74	5	22	81	5	19	70	5			21	21.0	100	5		
7.0	70	5			12	8.0	67	3			11	13.0	118	5	13	118	5			11	12.0	109	5			13	17.0	131	5	9	69	3	10	77	5	10	77	5			10	11.0	110	5		
		5	0	5				4	0	4				5			5	0	5				5	0	5				4			5			5						5	0	5
12.7	32	2			31	5.3	17	2			78	31.0	40	2	27.7	36	2			31	16.4	53	5			85	37.5	44	2	27	32	2	21	25	2	0	0	0			40	26.5	66	5		
0.0	0	0			23	4.3	19	2			10	0.0	0	0	11.9	119	5			12	0.0	0	0			27	12.5	46	2	2	7	0	8	30	2	21.2	79	5			8	23.5	294	3		
		1	0	1				2	0	2				1			3.5	0	2.25				2.5	0	3				2			1			2			2.5	0	2			4	0	4
1.1	37	3	37	3	22	1.4	6	0	6	0	6	5.6	93	5	5	83	5	88	5	5	1.0	20	3	20	3	12	20.1	168	5	5.6	47	3	2	17	3	2.3	19	3	63	4	3	2.7	90	5	90	5
70.0	115	5	115	5	8	0.0	0	0	0	0	18	47.0	261	5	41	228	5	244	5	40	58.6	147	5	147	5	11	59.0	536	5	35	318	5	82	745	5	56.4	513	5	528	5	61	63.4	104	5	104	5
10.0	50	5	50	5	27	2.0	7	0	7	0	57	45.0	79	5	48.6	85	5	82	5	35	20.4	58	5	58	5	45	23.6	52	5	6.6	15	3	0	0	0	3.8	8	0	19	2	20	11.4	57	5	57	5
0	0				20	0	0				54		0		3					60	0	0				37	12	32		14			14			4				18	18	100			
0	#DIV/0!				40	0	0				5		0		0					0	#DIV/0!					0	0	#DIV/0!		0			0			0			0	0	#DIV/0!			
0	0	0	0	0	60	0	0	0	0	0	60	0	0	0	30	50	10	25	5	60	0	0	0	0	0	37	12	32	5	14	38	5	14	38	5	4	11	5	30	5	18	18	100	15	100	15
440	162	5	162	5	667	390	58	5	58	5	859	190	22	2	1010	118	5	70	3.5	500		0	0	0	0	553	290	52	5	223	40	2	158	29	2	440	80	5	50	4	272	160	59	5	59	5
10.0		5	0	5	0	70.0		0	0	0	0	1.0		10	30.0		3	0	6.5	0	10.0		5	0	5	0	10.0		5	60.0		0	20.0		5	30.0		3	0	3	0	10.0		5	0	5
		1		1				1		1				1			1		1				5		5				1			1			1			1			10		10	
		1		1				1		1				1			1		1				1		1				1			1			1			1			5		5	
		53.5		53.5			35.5		35.5				55			63.5		59.25				51.5		51.5			54			40			44			45.5			45.875			84		84	
		100		*100*			*100*		*100*				*100*			*100*		*100*				*100*		*100*			*100*			*100*			*100*			*100*			*100*			*100*		*100*	
		1.61		**1.61**			**1.07**		**1.07**				**1.65**			**1.91**		**1.78**				**1.55**		**1.55**			**1.62**			**1.20**			**1.32**			**1.37**			**1.38**			**2.52**		**2.52**	
		0		0			2		2				5			5		5				2		2			5			10			10			5			8			7		7	
		2		2			2		2				2			2		2				2		2			2			2			2			2			2			2		2	
		4		4			4		4				4			4		4				4		4			4			4			4			4			4			4		4	
		6		6			6		6				6			0		3				0		0			6			6			6			6			6			6		6	
		1		1			1		1				1			1		1				4		4			1			1			1			1			1			5		5	
		15.00		15			15.00		15				15.00			15.00		15				15.00		15			15.00			15.00			15.00			15.00			15			15.00		15	
		10.00		10			10.00		10				10.00			10.00		10				10.00		10			10.00			10.00			10.00			10.00			10			10.00		10	
		38		38			40		40				43			37		40				37		37			43			48									45.5			49		49	
		56		*56*			*56*		*56*				*56*			*56*		*56*				*56*		*56*			*56*												*56*			*56*		*56*	
		2.04		**2.04**			**2.14**		**2.14**				**2.30**			**1.98**		**2.14**				**1.98**		**1.98**			**2.30**			**2.57**									**2.44**			**2.63**		**2.63**	

APPENDIX 5

Predicted Habitat Quality Score Tables

OFFSET - Fauna Species: Koala

Assessment Unit - Regional Ecosystem	AU1 Non-remnant 12.12.15					AU2 Non-remnant 12.12.12					AU3 Non-remnant 12.9-10.1			
Timeframe	Current	Year 5	Year 10	Year 15	Year 20	Current	Year 5	Year 10	Year 15	Year 20	Current	Year 5	Year 10	Year 15
Recruitment of woody perennial species in EDL	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Native plant species richness - trees	3	4	5	5	5	3	4	5	5	5	1	3	4	5
Native plant species richness - shrubs	4	4	4	5	5	4	4	4	5	5	2	2	3	4
Native plant species richness - grasses	4	4	4	4	4	3	3	3	3	3	3	3	3	3
Native plant species richness - forbes	4	4	4	4	4	2	2	2	2	2	3	3	3	3
Tree canopy height (m)														
Tree subcanopy height (m)														
Tree canopy height (average of emergent, canopy, sub-canopy)	3	3	3	4	5	3	3	3	4	5	2	2	3	3
Tree canopy cover (%)														
Tree subcanopy cover (%)														
Tree canopy cover (average of emergent, canopy, sub-canopy)	1	1	2	3	4	2	2	2	3	4	0	0	1	1
Shrub canopy cover	3	3	3	4	5	3	3	3	4	5	0	0	1	2
Native grass cover	5	5	5	5	5	3	3	3	3	3	4	4	4	4
Organic litter	2	2	2	2	2	2	2	2	2	2	3	3	3	3
Large eucalypts per hectare														
Large non-eucalypts per hectare														
Large trees (euc plus non-euc)	4	4	4	4	4	0	0	0	0	0	0	0	0	0
Coarse woody debris	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Non-native plant cover	3	4	5	6	7	4	5	6	7	7	4	5	6	7
Quality and availability of food and foraging habitat	1	1	1	2	2	1	1	1	2	3	1	1	1	1
Quality and availability of shelter	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Site Condition Score	43.875	46.5	49.5	55.5	57.875	38.25	40	42	48	50.375	30.25	34	40	44
MAX Site Condition Score	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*
Site Condition Score - out of 3	**1.32**	**1.40**	**1.49**	**1.67**	**1.74**	**1.15**	**1.20**	**1.26**	**1.44**	**1.51**	**0.91**	**1.02**	**1.20**	**1.32**
Site Context														
Size of patch	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Connectedness	3	3	3	4	5	2	2	3	4	5	3	3	3	4
Context	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Ecological Corridors	2	2	2	2	2	2	2	2	2	2	6	6	6	6
Role of site location to species overall population in the state	4	4	4	5	5	4	4	4	5	5	4	4	4	5
Threats to the species	7	7	7	7	7	7	7	7	7	7	7	7	7	7
Species mobility capacity	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Site Context Score	41	40.5	40.5	42.5	43	39.5	39.5	40.5	42.5	43	45.25	45	45	47
MAX Site Context Score	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*
Site Context Score - out of 3	**2.20**	**2.17**	**2.17**	**2.28**	**2.30**	**2.12**	**2.12**	**2.17**	**2.28**	**2.30**	**2.42**	**2.41**	**2.41**	**2.52**

Species Stocking Rate (SSR)						AU1					AU2					AU3			
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	Score				10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
		No	Yes - adjacent		Yes - on site														
Species usage of the site (habitat type & evidenced usage)	Score	0	5	10	15	10	10	10	15	15	10	10	10	15	15	10	10	10	15
		Not habitat	Dispersal	Foraging	Breeding														
Approximate density (per ha)	Score	0	10	20	30	0	0	0	10	10	0	0	0	10	10	0	0	0	10
Role/importance of species population on site*	Score	0				0	0	0	5	5	0	0	0	5	5	0	0	0	5
	(Total from table below)	0	5 - 15	20 - 35	40 - 45														
Total SRR score (out of 70)						20	20	20	40	40	20	20	20	40	40	20	20	20	40
SRR Score (out of 4)						**1.14**	**1.14**	**1.14**	**2.29**	**2.29**	**1.14**	**1.14**	**1.14**	**2.29**	**2.29**	**1.14**	**1.14**	**1.14**	**2.29**

***SSR Supplementary Table**			
*Key source population for breeding	Score	0	
		No	Yes/ Possibly
*Key source population for dispersal	Score	0	
		No	Yes/ Possibly
*Necessary for maintaining genetic diversity	Score	0	
		No	Yes/ Possibly
*Near the limit of the species range	Score	0	
		No	Yes

Proposed offset area (April 2026)

Final habitat quality score (weighted)	AU1					AU2					AU3			
Site Condition score (out of 3)	1.32	1.40	1.49	1.67	1.74	1.15	1.20	1.26	1.44	1.51	0.91	1.02	1.20	1.32
Site Context Score (out of 3)	2.20	2.17	2.17	2.28	2.30	2.12	2.12	2.17	2.28	2.30	2.42	2.41	2.41	2.52
Species Stocking Rate Score (out of 4)	1.14	1.14	1.14	2.29	2.29	1.14	1.14	1.14	2.29	2.29	1.14	1.14	1.14	2.29
Habitat Quality score (out of 10)	*4.66*	*4.71*	*4.80*	*6.23*	*6.33*	*4.41*	*4.46*	*4.57*	*6.00*	*6.10*	*4.47*	*4.57*	*4.75*	*6.12*
Assessment Unit area (ha)	221.95	221.95	221.95	221.95	221.95	177.86	177.86	177.86	177.86	177.86	275.45	275.45	275.45	275.45
Total offset area (ha) for this MNES	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83
Size Weighting	0.23	0.23	0.23	0.23	0.23	0.18	0.18	0.18	0.18	0.18	0.28	0.28	0.28	0.28
Weighted Habitat Quality Score	***1.06***	***1.08***	***1.10***	***1.42***	***1.44***	***0.81***	***0.82***	***0.84***	***1.10***	***1.12***	***1.27***	***1.30***	***1.35***	***1.74***

Proposed offset area Stage 1 (April 2026)

Final habitat quality score (weighted)	AU1					AU2					AU3			
Site Condition score (out of 3)	1.32	1.40	1.49	1.67	1.74	1.15	1.20	1.26	1.44	1.51	0.91	1.02	1.20	1.32
Site Context Score (out of 3)	2.20	2.17	2.17	2.28	2.30	2.12	2.12	2.17	2.28	2.30	2.42	2.41	2.41	2.52
Species Stocking Rate Score (out of 4)	1.14	1.14	1.14	2.29	2.29	1.14	1.14	1.14	2.29	2.29	1.14	1.14	1.14	2.29
Habitat Quality score (out of 10)	4.66	4.71	4.80	6.23	6.33	4.41	4.46	4.57	6.00	6.10	4.47	4.57	4.75	6.12
Assessment Unit area (ha)	143.32	143.32	143.32	143.32	143.32	90.24	90.24	90.24	90.24	90.24	37.71	37.71	37.71	37.71
Total offset area (ha) for this MNES	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19
Size Weighting	0.36	0.36	0.36	0.36	0.36	0.22	0.22	0.22	0.22	0.22	0.09	0.09	0.09	0.09
Weighted Habitat Quality Score	***1.66***	***1.68***	***1.71***	***2.22***	***2.26***	***0.99***	***1.00***	***1.03***	***1.35***	***1.37***	***0.42***	***0.43***	***0.45***	***0.58***

Proposed offset area - Stage 2 (April 2026)

Final habitat quality score (weighted)	AU1					AU2					AU3			
Site Condition score (out of 3)	1.32	1.40	1.49	1.67	1.74	1.15	1.20	1.26	1.44	1.51	0.91	1.02	1.20	1.32
Site Context Score (out of 3)	2.20	2.17	2.17	2.28	2.30	2.12	2.12	2.17	2.28	2.30	2.42	2.41	2.41	2.52
Species Stocking Rate Score (out of 4)	1.14	1.14	1.14	2.29	2.29	1.14	1.14	1.14	2.29	2.29	1.14	1.14	1.14	2.29
Habitat Quality score (out of 10)	4.66	4.71	4.80	6.23	6.33	4.41	4.46	4.57	6.00	6.10	4.47	4.57	4.75	6.12
Assessment Unit area (ha)	78.64	78.64	78.64	78.64	78.64	87.62	87.62	87.62	87.62	87.62	237.74	237.74	237.74	237.74
Total offset area (ha) for this MNES	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63
Size Weighting	0.14	0.14	0.14	0.14	0.14	0.15	0.15	0.15	0.15	0.15	0.42	0.42	0.42	0.42
Weighted Habitat Quality Score	***0.64***	***0.65***	***0.66***	***0.86***	***0.87***	***0.68***	***0.68***	***0.70***	***0.92***	***0.94***	***1.86***	***1.91***	***1.98***	***2.55***

7	AU4 Non-remnant 12.9-10.7					AU5 Non-remnant 12.3.7					AU6 Regrowth 12.12.15b					AU7 Regrowth 12.12.12					AU8 Regrowth 12.9-10.17a			
Year 20	Current	Year 5	Year 10	Year 15	Year 20	Current	Year 5	Year 10	Year 15	Year 20	Current	Year 5	Year 10	Year 15	Year 20	Current	Year 5	Year 10	Year 15	Year 20	Current	Year 5	Year 10	Year 15
5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
5	4	4	5	5	5	3	4	5	5	5	3	4	5	5	5	5	5	5	5	5	3	4	5	5
5	4	4	4	5	5	3	3	4	5	5	3	3	4	5	5	5	5	5	5	5	3	3	4	5
3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	5	5	5	5
3	3	3	3	3	3	3	3	3	3	3	5	5	5	5	5	3	3	3	3	3	3	3	3	3
4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
2	0	0	1	1	2	3	3	3	4	5	3	3	3	4	5	3	3	3	4	4	5	5	5	5
3	3	3	3	4	4	0	0	1	2	3	2	2	2	3	4	2	2	2	3	4	5	5	5	5
4	4	4	4	4	4	4	4	4	4	4	5	5	5	5	5	1	1	1	1	1	5	5	5	5
3	3	3	3	3	3	2	2	2	2	2	4	4	4	4	4	3	3	3	3	3	3	3	3	3
0	3	3	3	3	3	5	5	5	5	5	5	5	5	5	5	3	3	3	3	3	5	5	5	5
2	1	1	1	1	1	1	1	1	1	1	4	4	4	4	4	3	3	3	3	3	4	4	4	4
8	5	6	7	9	10	3	3	4	4	4	8	8	9	9	10	8	8	9	9	10	4	5	6	7
1	1	1	1	1	1	1	1	1	3	5	1	1	1	2	3	1	1	1	2	3	1	2	3	4
1	1	1	1	1	1	3	3	3	5	6	1	1	1	1	1	1	1	1	1	1	1	1	1	1
48.25	43.75	45.75	48.75	52.75	54.75	42.5	44.75	48.75	55.75	60.25	54.75	58.25	61.25	65.25	68.75	47.25	49.25	50.25	53.25	55.75	54.5	59	63	66
100	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*
1.45	**1.31**	**1.37**	**1.46**	**1.58**	**1.64**	**1.28**	**1.34**	**1.46**	**1.67**	**1.81**	**1.64**	**1.75**	**1.84**	**1.96**	**2.06**	**1.42**	**1.48**	**1.51**	**1.60**	**1.67**	**1.64**	**1.77**	**1.89**	**1.98**
10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
5	2	2	3	4	5	2	2	3	4	5	4	4	4	5	5	2	2	3	4	5	2	2	3	4
5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	0	0	0	0	0	3	3	3	3	3	6	6	6	6
5	4	4	4	5	5	4	4	4	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	5
7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
48	44	44	45	47	48	44	44	45	47	48	40.5	40.5	40.5	41.5	41.5	41.5	41.5	42.5	43.5	45	44	44	45	47
56	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*
2.57	**2.36**	**2.36**	**2.41**	**2.52**	**2.57**	**2.36**	**2.36**	**2.41**	**2.52**	**2.57**	**2.17**	**2.17**	**2.17**	**2.22**	**2.22**	**2.22**	**2.22**	**2.28**	**2.33**	**2.41**	**2.36**	**2.36**	**2.41**	**2.52**

	AU4					AU5					AU6					AU7					AU8			
10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
15	10	10	10	15	15	10	10	10	15	15	15	15	15	15	15	15	15	15	15	15	10	10	10	15
10	0	0	0	10	10	0	0	0	10	10	10	10	20	30	30	10	10	20	30	30	0	10	20	30
5	0	0	0	5	5	0	0	0	5	5	5	5	5	5	5	5	5	5	5	5	0	0	0	5
40	20	20	20	40	40	20	20	20	40	40	40	40	50	60	60	40	40	50	60	60	20	30	40	60
2.29	**1.14**	**1.14**	**1.14**	**2.29**	**2.29**	**1.14**	**1.14**	**1.14**	**2.29**	**2.29**	**2.29**	**2.29**	**2.86**	**3.43**	**3.43**	**2.29**	**2.29**	**2.86**	**3.43**	**3.43**	**1.14**	**1.71**	**2.29**	**3.43**

	AU4					AU5					AU6					AU7					AU8			
1.45	1.31	1.37	1.46	1.58	1.64	1.28	1.34	1.46	1.67	1.81	1.64	1.75	1.84	1.96	2.06	1.42	1.48	1.51	1.60	1.67	1.64	1.77	1.89	1.98
2.57	2.36	2.36	2.41	2.52	2.57	2.36	2.36	2.41	2.52	2.57	2.17	2.17	2.17	2.22	2.22	2.22	2.22	2.28	2.33	2.41	2.36	2.36	2.41	2.52
2.29	1.14	1.14	1.14	2.29	2.29	1.14	1.14	1.14	2.29	2.29	2.29	2.29	2.86	3.43	3.43	2.29	2.29	2.86	3.43	3.43	1.14	1.71	2.29	3.43
6.30	*4.81*	*4.87*	*5.02*	*6.39*	*6.50*	*4.78*	*4.84*	*5.02*	*6.48*	*6.66*	*6.10*	*6.20*	*6.86*	*7.61*	*7.71*	*5.93*	*5.99*	*6.64*	*7.36*	*7.51*	*5.14*	*5.84*	*6.59*	*7.93*
275.45	50.08	50.08	50.08	50.08	50.08	16.95	16.95	16.95	16.95	16.95	33.20	33.20	33.20	33.20	33.20	29.38	29.38	29.38	29.38	29.38	45.87	45.87	45.87	45.87
971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83
0.28	0.05	0.05	0.05	0.05	0.05	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.05	0.05	0.05	0.05
1.79	***0.25***	***0.25***	***0.26***	***0.33***	***0.33***	***0.08***	***0.08***	***0.09***	***0.11***	***0.12***	***0.21***	***0.21***	***0.23***	***0.26***	***0.26***	***0.18***	***0.18***	***0.20***	***0.22***	***0.23***	***0.24***	***0.28***	***0.31***	***0.37***

	AU4					AU5					AU6					AU7					AU8			
1.45	1.31	1.37	1.46	1.58	1.64	1.28	1.34	1.46	1.67	1.81	1.64	1.75	1.84	1.96	2.06	1.42	1.48	1.51	1.60	1.67	1.64	1.77	1.89	1.98
2.57	2.36	2.36	2.41	2.52	2.57	2.36	2.36	2.41	2.52	2.57	2.17	2.17	2.17	2.22	2.22	2.22	2.22	2.28	2.33	2.41	2.36	2.36	2.41	2.52
2.29	1.14	1.14	1.14	2.29	2.29	1.14	1.14	1.14	2.29	2.29	2.29	2.29	2.86	3.43	3.43	2.29	2.29	2.86	3.43	3.43	1.14	1.71	2.29	3.43
6.30	4.81	4.87	5.02	6.39	6.50	4.78	4.84	5.02	6.48	6.66	6.10	6.20	6.86	7.61	7.71	5.93	5.99	6.64	7.36	7.51	5.14	5.84	6.59	7.93
37.71	0.00	0.00	0.00	0.00	0.00	1.74	1.74	1.74	1.74	1.74	22.80	22.80	22.80	22.80	22.80	22.97	22.97	22.97	22.97	22.97	0.00	0.00	0.00	0.00
401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19
0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.00	0.00	0.00	0.00
0.59	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.02***	***0.02***	***0.02***	***0.03***	***0.03***	***0.35***	***0.35***	***0.39***	***0.43***	***0.44***	***0.34***	***0.34***	***0.38***	***0.42***	***0.43***	***0.00***	***0.00***	***0.00***	***0.00***

	AU4					AU5					AU6					AU7					AU8			
1.45	1.31	1.37	1.46	1.58	1.64	1.28	1.34	1.46	1.67	1.81	1.64	1.75	1.84	1.96	2.06	1.42	1.48	1.51	1.60	1.67	1.64	1.77	1.89	1.98
2.57	2.36	2.36	2.41	2.52	2.57	2.36	2.36	2.41	2.52	2.57	2.17	2.17	2.17	2.22	2.22	2.22	2.22	2.28	2.33	2.41	2.36	2.36	2.41	2.52
2.29	1.14	1.14	1.14	2.29	2.29	1.14	1.14	1.14	2.29	2.29	2.29	2.29	2.86	3.43	3.43	2.29	2.29	2.86	3.43	3.43	1.14	1.71	2.29	3.43
6.30	4.81	4.87	5.02	6.39	6.50	4.78	4.84	5.02	6.48	6.66	6.10	6.20	6.86	7.61	7.71	5.93	5.99	6.64	7.36	7.51	5.14	5.84	6.59	7.93
237.74	50.08	50.08	50.08	50.08	50.08	15.20	15.20	15.20	15.20	15.20	10.40	10.40	10.40	10.40	10.40	6.42	6.42	6.42	6.42	6.42	45.86	45.86	45.86	45.86
570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63
0.42	0.09	0.09	0.09	0.09	0.09	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.08	0.08	0.08	0.08
2.63	***0.42***	***0.43***	***0.44***	***0.56***	***0.57***	***0.13***	***0.13***	***0.13***	***0.17***	***0.18***	***0.11***	***0.11***	***0.13***	***0.14***	***0.14***	***0.07***	***0.07***	***0.07***	***0.08***	***0.08***	***0.41***	***0.47***	***0.53***	***0.64***

	AU9 Regrowth 12.9-10.7					AU10 Regrowth 12.3.7					AU11 Remnant 12.12.15b					AU12 Remnant 12.12.12					AU13 Remnant 12.9-10.17a				
Year 20	Current	Year 5	Year 10	Year 15	Year 20	Current	Year 5	Year 10	Year 15	Year 20	Current	Year 5	Year 10	Year 15	Year 20	Current	Year 5	Year 10	Year 15	Year 20	Current	Year 5	Year 10	Year 15	Year 20
5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
5	5	5	5	5	5	5	5	5	5	5	3	4	5	5	5	5	5	5	5	5	2	4	5	5	5
5	5	5	5	5	5	5	5	5	5	5	3	3	4	5	5	5	5	5	5	5	3	3	4	5	5
5	5	5	5	5	5	3	3	3	3	3	5	5	5	5	5	3	3	3	3	3	3	3	3	3	3
3	3	3	3	3	3	5	5	5	5	5	5	5	5	5	5	3	3	3	3	3	3	3	3	3	3
5	5	5	5	5	5	4	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
5	1	1	2	3	4	2	2	3	4	5	2	2	3	4	4	3	3	4	4	4	2	2	3	4	4
5	3	3	4	4	5	0	0	1	2	3	5	5	5	5	5	3	3	4	4	5	4	4	4	5	5
5	5	5	5	5	5	0	0	0	0	0	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
3	5	5	5	5	5	0	0	0	0	0	5	5	5	5	5	5	5	5	5	5	2	2	2	2	2
5	0	0	0	0	0	0	0	0	0	0	5	5	5	5	5	0	0	0	0	0	5	5	5	5	5
4	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	0	0	0	0	0	4	4	4	4	4
8	5	6	7	9	10	0	1	2	3	3	7	7	8	8	8	5	6	7	9	10	3	4	5	6	7
5	1	1	1	1	1	1	1	3	4	5	1	1	2	3	3	1	1	1	1	1	1	1	2	3	3
1	1	1	1	1	1	1	1	1	1	1	3	3	3	5	6	1	1	1	1	1	1	2	3	5	6
67	53.5	54.5	57.5	60.5	63	35.5	36.5	42.5	46.5	49.5	61.25	63.5	68.5	73.5	73.75	47.5	49	52	54	55.5	45.25	50.5	56.5	63.5	65.25
100	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*
2.01	**1.61**	**1.64**	**1.73**	**1.82**	**1.89**	**1.07**	**1.10**	**1.28**	**1.40**	**1.49**	**1.84**	**1.91**	**2.06**	**2.21**	**2.21**	**1.43**	**1.47**	**1.56**	**1.62**	**1.67**	**1.36**	**1.52**	**1.70**	**1.91**	**1.96**
10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
5	2	2	3	4	5	4	4	4	5	5	2	2	3	4	5	4	4	4	5	5	3	3	4	5	5
5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6	6	3	3	3	3	3	0	0	0	0	0	6	6	6	6	6
5	4	4	4	5	5	4	4	4	5	5	4	4	4	5	5	4	4	4	5	5	4	4	4	5	5
7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
48	44	44	45	47	48	46	46	46	48	48	41	41	42	44	45	40	40	40	42	42	45	45	46	48	48
56	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*
2.57	**2.36**	**2.36**	**2.41**	**2.52**	**2.57**	**2.46**	**2.46**	**2.46**	**2.57**	**2.57**	**2.20**	**2.20**	**2.25**	**2.36**	**2.41**	**2.14**	**2.14**	**2.14**	**2.25**	**2.25**	**2.41**	**2.41**	**2.46**	**2.57**	**2.57**

	AU9					AU10					AU11					AU12					AU13				
10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
15	10	10	10	15	15	10	10	10	15	15	15	15	15	15	15	10	10	10	15	15	15	15	15	15	15
30	0	10	20	30	30	0	10	20	30	30	30	30	30	30	30	20	20	30	30	30	30	30	30	30	30
5	0	0	0	5	5	0	0	0	5	5	5	5	5	5	5	0	0	5	5	5	5	5	5	5	5
60	20	30	40	60	60	20	30	40	60	60	60	60	60	60	60	40	40	55	60	60	60	60	60	60	60
3.43	**1.14**	**1.71**	**2.29**	**3.43**	**3.43**	**1.14**	**1.71**	**2.29**	**3.43**	**3.43**	**3.43**	**3.43**	**3.43**	**3.43**	**3.43**	**2.29**	**2.29**	**3.14**	**3.43**	**3.43**	**3.43**	**3.43**	**3.43**	**3.43**	**3.43**

	AU9					AU10					AU11					AU12					AU13				
2.01	1.61	1.64	1.73	1.82	1.89	1.07	1.10	1.28	1.40	1.49	1.84	1.91	2.06	2.21	2.21	1.43	1.47	1.56	1.62	1.67	1.36	1.52	1.70	1.91	1.96
2.57	2.36	2.36	2.41	2.52	2.57	2.46	2.46	2.46	2.57	2.57	2.20	2.20	2.25	2.36	2.41	2.14	2.14	2.14	2.25	2.25	2.41	2.41	2.46	2.57	2.57
3.43	1.14	1.71	2.29	3.43	3.43	1.14	1.71	2.29	3.43	3.43	3.43	3.43	3.43	3.43	3.43	2.29	2.29	3.14	3.43	3.43	3.43	3.43	3.43	3.43	3.43
8.01	*5.11*	*5.71*	*6.42*	*7.76*	*7.89*	*4.67*	*5.27*	*6.03*	*7.40*	*7.49*	*7.46*	*7.53*	*7.73*	*7.99*	*8.05*	*5.85*	*5.90*	*6.85*	*7.30*	*7.34*	*7.20*	*7.35*	*7.59*	*7.91*	*7.96*
45.87	1.56	1.56	1.56	1.56	1.56	1.31	1.31	1.31	1.31	1.31	75.54	75.54	75.54	75.54	75.54	3.41	3.41	3.41	3.41	3.41	35.96	35.96	35.96	35.96	35.96
971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83
0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.08	0.08	0.08	0.08	0.00	0.00	0.00	0.00	0.00	0.04	0.04	0.04	0.04	0.04
0.38	***0.01***	***0.01***	***0.01***	***0.01***	***0.01***	***0.01***	***0.01***	***0.01***	***0.01***	***0.01***	***0.58***	***0.59***	***0.60***	***0.62***	***0.63***	***0.02***	***0.02***	***0.02***	***0.03***	***0.03***	***0.27***	***0.27***	***0.28***	***0.29***	***0.29***

	AU9					AU10					AU11					AU12					AU13				
2.01	1.61	1.64	1.73	1.82	1.89	1.07	1.10	1.28	1.40	1.49	1.84	1.91	2.06	2.21	2.21	1.43	1.47	1.56	1.62	1.67	1.36	1.52	1.70	1.91	1.96
2.57	2.36	2.36	2.41	2.52	2.57	2.46	2.46	2.46	2.57	2.57	2.20	2.20	2.25	2.36	2.41	2.14	2.14	2.14	2.25	2.25	2.41	2.41	2.46	2.57	2.57
3.43	1.14	1.71	2.29	3.43	3.43	1.14	1.71	2.29	3.43	3.43	3.43	3.43	3.43	3.43	3.43	2.29	2.29	3.14	3.43	3.43	3.43	3.43	3.43	3.43	3.43
8.01	5.11	5.71	6.42	7.76	7.89	4.67	5.27	6.03	7.40	7.49	7.46	7.53	7.73	7.99	8.05	5.85	5.90	6.85	7.30	7.34	7.20	7.35	7.59	7.91	7.96
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70.78	70.78	70.78	70.78	70.78	0.33	0.33	0.33	0.33	0.33	11.30	11.30	11.30	11.30	11.30
401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.18	0.18	0.18	0.18	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.03	0.03
0.00	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***1.32***	***1.33***	***1.36***	***1.41***	***1.42***	***0.00***	***0.00***	***0.01***	***0.01***	***0.01***	***0.20***	***0.21***	***0.21***	***0.22***	***0.22***

	AU9					AU10					AU11					AU12					AU13				
2.01	1.61	1.64	1.73	1.82	1.89	1.07	1.10	1.28	1.40	1.49	1.84	1.91	2.06	2.21	2.21	1.43	1.47	1.56	1.62	1.67	1.36	1.52	1.70	1.91	1.96
2.57	2.36	2.36	2.41	2.52	2.57	2.46	2.46	2.46	2.57	2.57	2.20	2.20	2.25	2.36	2.41	2.14	2.14	2.14	2.25	2.25	2.41	2.41	2.46	2.57	2.57
3.43	1.14	1.71	2.29	3.43	3.43	1.14	1.71	2.29	3.43	3.43	3.43	3.43	3.43	3.43	3.43	2.29	2.29	3.14	3.43	3.43	3.43	3.43	3.43	3.43	3.43
8.01	5.11	5.71	6.42	7.76	7.89	4.67	5.27	6.03	7.40	7.49	7.46	7.53	7.73	7.99	8.05	5.85	5.90	6.85	7.30	7.34	7.20	7.35	7.59	7.91	7.96
45.86	1.56	1.56	1.56	1.56	1.56	1.30	1.30	1.30	1.30	1.30	4.76	4.76	4.76	4.76	4.76	3.09	3.09	3.09	3.09	3.09	24.66	24.66	24.66	24.66	24.66
570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63
0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.04	0.04	0.04	0.04	0.04
0.64	***0.01***	***0.02***	***0.02***	***0.02***	***0.02***	***0.01***	***0.01***	***0.01***	***0.02***	***0.02***	***0.06***	***0.06***	***0.06***	***0.07***	***0.07***	***0.03***	***0.03***	***0.04***	***0.04***	***0.04***	***0.31***	***0.32***	***0.33***	***0.34***	***0.34***

AU14 Remnant 12.9-10.7				
Current	Year 5	Year 10	Year 15	Year 20
5	5	5	5	5
5	5	5	5	5
5	5	5	5	5
3	3	3	3	3
3	3	3	3	3
5	5	5	5	5
4	4	4	4	4
5	5	5	5	5
5	5	5	5	5
5	5	5	5	5
15	15	15	15	15
5	5	5	5	5
5	6	7	9	10
5	5	5	5	5
10	10	10	10	10
84	85	86	88	89
100	*100*	*100*	*100*	*100*
2.52	**2.55**	**2.58**	**2.64**	**2.67**
10	10	10	10	10
2	2	3	4	5
5	5	5	5	5
6	6	6	6	6
4	4	4	5	5
7	7	7	7	7
10	10	10	10	10
44	44	45	47	48
56	*56*	*56*	*56*	*56*
2.36	**2.36**	**2.41**	**2.52**	**2.57**

AU14				
10	10	10	10	10
10	10	10	15	15
20	20	30	30	30
0	0	5	5	5
40	40	55	60	60
2.29	**2.29**	**3.14**	**3.43**	**3.43**

AU14					Average/Final				
2.52	2.55	2.58	2.64	2.67	1.46	1.54	1.64	1.77	1.84
2.36	2.36	2.41	2.52	2.57	2.29	2.29	2.33	2.43	2.46
2.29	2.29	3.14	3.43	3.43	1.80	1.92	2.24	3.02	3.02
7.16	*7.19*	*8.13*	*8.59*	*8.67*	5.55	5.75	6.21	7.22	7.32
3.29	3.29	3.29	3.29	3.29	**971.83**	**971.83**	**971.83**	**971.83**	**971.83**
971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83
0.00	0.00	0.00	0.00	0.00	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
0.02	***0.02***	***0.03***	***0.03***	***0.03***	***5.00***	***5.11***	***5.32***	***6.55***	***6.67***

AU14					Average/Final				
2.52	2.55	2.58	2.64	2.67	1.46	1.54	1.64	1.77	1.84
2.36	2.36	2.41	2.52	2.57	2.29	2.29	2.33	2.43	2.46
2.29	2.29	3.14	3.43	3.43	1.80	1.92	2.24	3.02	3.02
7.16	7.19	8.13	8.59	8.67	5.55	5.75	6.21	7.22	7.32
0.00	0.00	0.00	0.00	0.00	**401.19**	**401.19**	**401.19**	**401.19**	**401.19**
401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19
0.00	0.00	0.00	0.00	0.00	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
0.00	***0.00***	***0.00***	***0.00***	***0.00***	***5.31***	***5.37***	***5.56***	***6.67***	***6.77***

AU14					Average/Final				
2.52	2.55	2.58	2.64	2.67	1.46	1.54	1.64	1.77	1.84
2.36	2.36	2.41	2.52	2.57	2.29	2.29	2.33	2.43	2.46
2.29	2.29	3.14	3.43	3.43	1.80	1.92	2.24	3.02	3.02
7.16	7.19	8.13	8.59	8.67	5.55	5.75	6.21	7.22	7.32
3.29	3.29	3.29	3.29	3.29	**570.63**	**570.63**	**570.63**	**570.63**	**570.63**
570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63
0.01	0.01	0.01	0.01	0.01	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
0.04	***0.04***	***0.05***	***0.05***	***0.05***	***4.79***	***4.93***	***5.15***	***6.46***	***6.59***

OFFSET - Fauna Species: Grey-headed Flying-fox

Assessment Unit - Regional Ecosystem	AU1 Non-remnant 12.12.15					AU2 Non	
Timeframe	Current	Year 5	Year 10	Year 15	Year 20	Current	Year 5
Recruitment of woody perennial species in EDL	5	5	5	5	5	5	5
Native plant species richness - trees	3	4	5	5	5	3	4
Native plant species richness - shrubs	4	4	4	5	5	4	4
Native plant species richness - grasses	4	4	4	4	4	3	3
Native plant species richness - forbes	4	4	4	4	4	2	2
Tree canopy height (m)							
Tree subcanopy height (m)							
Tree canopy height (average of emergent, canopy, sub-canopy)	3	3	3	4	5	3	3
Tree canopy cover (%)							
Tree subcanopy cover (%)							
Tree canopy cover (average of emergent, canopy, sub-canopy)	1	1	2	3	4	2	2
Shrub canopy cover	3	3	3	4	5	3	3
Native grass cover	5	5	5	5	5	3	3
Organic litter	2	2	2	2	2	2	2
Large eucalypts per hectare							
Large non-eucalypts per hectare							
Large trees (euc plus non-euc)	4	4	4	4	4	0	0
Coarse woody debris	2	2	2	2	2	2	2
Non-native plant cover	3	4	5	6	7	4	5
Quality and availability of food and foraging habitat	1	1	1	2	2	2	2
Quality and availability of shelter	1	1	1	1	1	1	1
Site Condition Score	43.875	46.5	49.5	55.5	57.875	39.25	41
MAX Site Condition Score	*100*	*100*	*100*	*100*	*100*	*100*	*100*
Site Condition Score - out of 3	**1.32**	**1.40**	**1.49**	**1.67**	**1.74**	**1.18**	**1.23**
Site Context							
Size of patch	0	2	5	7	10	0	2
Connectedness	2	2	2	2	2	2	2
Context	4	4	4	4	4	4	4
Ecological Corridors	2	2	2	2	2	2	2
Role of site location to species overall population in the state	1	1	1	1	1	2	2
Threats to the species	1	1	7	15	15	1	7
Species mobility capacity	10	10	10	10	10	10	10
Site Context Score	19.5	21.5	30.5	40.5	43.5	20.25	28.25
MAX Site Context Score	*56*	*56*	*56*	*56*	*56*	*56*	*56*
Site Context Score - out of 3	**1.04**	**1.15**	**1.63**	**2.17**	**2.33**	**1.08**	**1.51**

Species Stocking Rate (SSR)						AU1						
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	Score				10	10	10	10	10	10	10	10
		No	Yes - adjacent		Yes - on site							
Species usage of the site (habitat type & evidenced usage)	Score	0	5	10	15	10	10	10	10	10	10	10
		Not habitat	Dispersal	Foraging	Breeding							
Approximate density (per ha)	Score	0	10	20	30	10	10	10	10	10	10	10
Role/importance of species population on site*	Score (*Total from supplementary table below*)	0				0	0	0	0	0	0	0
		0	5 - 15	20 - 35	40 - 45							
Total SRR score (out of 70)						30	30	30	30	30	30	30
SRR Score (out of 4)						**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**

***SSR Supplementary Table**			
*Key source population for breeding	Score	0	
		No	Yes/ Possibly
*Key source population for dispersal	Score	0	
		No	Yes/ Possibly
*Necessary for maintaining genetic diversity	Score	0	
		No	Yes/ Possibly
*Near the limit of the species range	Score	0	
		No	Yes

Proposed offset area (April 2026)

Final habitat quality score (weighted)	AU1						
Site Condition score (out of 3)	1.32	1.40	1.49	1.67	1.74	1.18	1.23
Site Context Score (out of 3)	1.04	1.15	1.63	2.17	2.33	1.08	1.51
Species Stocking Rate Score (out of 4)	1.71	1.71	1.71	1.71	1.71	1.71	1.71
Habitat Quality score (out of 10)	*4.08*	*4.26*	*4.83*	*5.55*	*5.78*	*3.98*	*4.46*
Assessment Unit area (ha)	221.95	221.95	221.95	221.95	221.95	177.86	177.86
Total offset area (ha) for this MNES	971.83	971.83	971.83	971.83	971.83	971.83	971.83
Size Weighting	0.23	0.23	0.23	0.23	0.23	0.18	0.18
Weighted Habitat Quality Score	***0.93***	***0.97***	***1.10***	***1.27***	***1.32***	***0.73***	***0.82***

Proposed offset area Stage 1 (April 2026)

Final habitat quality score (weighted)	AU1						
Site Condition score (out of 3)	1.32	1.40	1.49	1.67	1.74	1.18	1.23
Site Context Score (out of 3)	1.04	1.15	1.63	2.17	2.33	1.08	1.51
Species Stocking Rate Score (out of 4)	1.71	1.71	1.71	1.71	1.71	1.71	1.71
Habitat Quality score (out of 10)	4.08	4.26	4.83	5.55	5.78	3.98	4.46
Assessment Unit area (ha)	143.32	143.32	143.32	143.32	143.32	90.24	90.24
Total offset area (ha) for this MNES	401.19	401.19	401.19	401.19	401.19	401.19	401.19
Size Weighting	0.36	0.36	0.36	0.36	0.36	0.22	0.22
Weighted Habitat Quality Score	***1.46***	***1.52***	***1.73***	***1.98***	***2.07***	***0.89***	***1.00***

Proposed offset area - Stage 2 (April 2026)

Final habitat quality score (weighted)	AU1						
Site Condition score (out of 3)	1.32	1.40	1.49	1.67	1.74	1.18	1.23
Site Context Score (out of 3)	1.04	1.15	1.63	2.17	2.33	1.08	1.51
Species Stocking Rate Score (out of 4)	1.71	1.71	1.71	1.71	1.71	1.71	1.71
Habitat Quality score (out of 10)	4.08	4.26	4.83	5.55	5.78	3.98	4.46
Assessment Unit area (ha)	78.64	78.64	78.64	78.64	78.64	87.62	87.62
Total offset area (ha) for this MNES	570.63	570.63	570.63	570.63	570.63	570.63	570.63
Size Weighting	0.14	0.14	0.14	0.14	0.14	0.15	0.15
Weighted Habitat Quality Score	***0.56***	***0.59***	***0.67***	***0.76***	***0.80***	***0.61***	***0.68***

-remnant 12.12.12			AU3 Non-remnant 12.9-10.17					AU4 Non-remnant 12.9-10.7					AU5 Non-remnant 12.3.7					AU6 Regrowth 12.12.15b					AU7 Re	
Year 10	Year 15	Year 20	Current	Year 5	Year 10	Year 15	Year 20	Current	Year 5	Year 10	Year 15	Year 20	Current	Year 5	Year 10	Year 15	Year 20	Current	Year 5	Year 10	Year 15	Year 20	Current	Year 5
5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
5	5	5	1	3	4	5	5	4	4	5	5	5	3	4	5	5	5	3	4	5	5	5	5	5
4	5	5	2	2	3	4	5	4	4	4	5	5	3	3	4	5	5	3	3	4	5	5	5	5
3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5	5	5	5	5	3	3
3	4	5	2	2	3	3	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
2	3	4	0	0	1	1	2	0	0	1	1	2	3	3	3	4	5	3	3	3	4	5	3	3
3	4	5	0	0	1	2	3	3	3	3	4	4	0	0	1	2	3	2	2	2	3	4	2	2
3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	5	5	5	5	5	1	1
2	2	2	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	4	4	4	4	4	3	3
0	0	0	0	0	0	0	0	3	3	3	3	3	5	5	5	5	5	5	5	5	5	5	3	3
2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	4	4	4	4	4	3	3
6	7	7	4	5	6	7	8	5	6	7	9	10	3	3	4	4	4	8	8	9	9	10	8	8
2	3	4	1	1	1	1	1	1	1	1	1	1	3	3	3	4	5	1	1	1	3	5	6	6
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	10	1	1	1	1	1	1	1
43	49	51.375	30.25	34	40	44	48.25	43.75	45.75	48.75	52.75	54.75	42.5	44.75	48.75	56.75	64.75	54.75	58.25	61.25	66.25	70.75	52.25	54.25
100	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*
1.29	**1.47**	**1.54**	**0.91**	**1.02**	**1.20**	**1.32**	**1.45**	**1.31**	**1.37**	**1.46**	**1.58**	**1.64**	**1.28**	**1.34**	**1.46**	**1.70**	**1.94**	**1.64**	**1.75**	**1.84**	**1.99**	**2.12**	**1.57**	**1.63**
5	7	10	0	2	5	7	10	0	2	5	7	10	0	2	5	7	10	2	2	5	7	10	3	3
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
2	2	2	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	0	0	0	0	0	3	3
2	2	2	1	1	1	1	1	1	1	1	1	1	3	3	3	4	5	1	1	1	1	1	3	3
15	15	15	1	1	7	15	15	1	1	7	15	15	1	1	7	15	15	15	15	15	15	15	15	15
10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
39.25	41.25	44.25	24	26	35	45	48	24	26	35	45	48	25.5	28	37	48	51.5	34	34	37	39	42	39.5	40
56	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*
2.10	**2.21**	**2.37**	**1.29**	**1.39**	**1.88**	**2.41**	**2.57**	**1.29**	**1.39**	**1.88**	**2.41**	**2.57**	**1.37**	**1.50**	**1.98**	**2.57**	**2.76**	**1.82**	**1.82**	**1.98**	**2.09**	**2.25**	**2.12**	**2.14**

AU2			AU3					AU4					AU5					AU6						
10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
1.71	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**

AU2			AU3					AU4					AU5					AU6						
1.29	1.47	1.54	0.91	1.02	1.20	1.32	1.45	1.31	1.37	1.46	1.58	1.64	1.28	1.34	1.46	1.70	1.94	1.64	1.75	1.84	1.99	2.12	1.57	1.63
2.10	2.21	2.37	1.29	1.39	1.88	2.41	2.57	1.29	1.39	1.88	2.41	2.57	1.37	1.50	1.98	2.57	2.76	1.82	1.82	1.98	2.09	2.25	2.12	2.14
1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
5.11	*5.39*	*5.63*	*3.91*	*4.13*	*4.79*	*5.45*	*5.73*	*4.31*	*4.48*	*5.05*	*5.71*	*5.93*	*4.36*	*4.56*	*5.16*	*5.99*	*6.42*	*5.18*	*5.28*	*5.53*	*5.79*	*6.09*	*5.40*	*5.48*
177.86	177.86	177.86	275.45	275.45	275.45	275.45	275.45	50.08	50.08	50.08	50.08	50.08	16.95	16.95	16.95	16.95	16.95	33.20	33.20	33.20	33.20	33.20	29.38	29.38
971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83
0.18	0.18	0.18	0.28	0.28	0.28	0.28	0.28	0.05	0.05	0.05	0.05	0.05	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03
0.93	***0.99***	***1.03***	***1.11***	***1.17***	***1.36***	***1.54***	***1.62***	***0.22***	***0.23***	***0.26***	***0.29***	***0.31***	***0.08***	***0.08***	***0.09***	***0.10***	***0.11***	***0.18***	***0.18***	***0.19***	***0.20***	***0.21***	***0.16***	***0.17***

AU2			AU3					AU4					AU5					AU6						
1.29	1.47	1.54	0.91	1.02	1.20	1.32	1.45	1.31	1.37	1.46	1.58	1.64	1.28	1.34	1.46	1.70	1.94	1.64	1.75	1.84	1.99	2.12	1.57	1.63
2.10	2.21	2.37	1.29	1.39	1.88	2.41	2.57	1.29	1.39	1.88	2.41	2.57	1.37	1.50	1.98	2.57	2.76	1.82	1.82	1.98	2.09	2.25	2.12	2.14
1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
5.11	5.39	5.63	3.91	4.13	4.79	5.45	5.73	4.31	4.48	5.05	5.71	5.93	4.36	4.56	5.16	5.99	6.42	5.18	5.28	5.53	5.79	6.09	5.40	5.48
90.24	90.24	90.24	37.71	37.71	37.71	37.71	37.71	0.00	0.00	0.00	0.00	0.00	1.74	1.74	1.74	1.74	1.74	22.80	22.80	22.80	22.80	22.80	22.97	22.97
401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19
0.22	0.22	0.22	0.09	0.09	0.09	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.06	0.06	0.06	0.06	0.06
1.15	***1.21***	***1.27***	***0.37***	***0.39***	***0.45***	***0.51***	***0.54***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.02***	***0.02***	***0.02***	***0.03***	***0.03***	***0.29***	***0.30***	***0.31***	***0.33***	***0.35***	***0.31***	***0.31***

AU2			AU3					AU4					AU5					AU6						
1.29	1.47	1.54	0.91	1.02	1.20	1.32	1.45	1.31	1.37	1.46	1.58	1.64	1.28	1.34	1.46	1.70	1.94	1.64	1.75	1.84	1.99	2.12	1.57	1.63
2.10	2.21	2.37	1.29	1.39	1.88	2.41	2.57	1.29	1.39	1.88	2.41	2.57	1.37	1.50	1.98	2.57	2.76	1.82	1.82	1.98	2.09	2.25	2.12	2.14
1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
5.11	5.39	5.63	3.91	4.13	4.79	5.45	5.73	4.31	4.48	5.05	5.71	5.93	4.36	4.56	5.16	5.99	6.42	5.18	5.28	5.53	5.79	6.09	5.40	5.48
87.62	87.62	87.62	237.74	237.74	237.74	237.74	237.74	50.08	50.08	50.08	50.08	50.08	15.20	15.20	15.20	15.20	15.20	10.40	10.40	10.40	10.40	10.40	6.42	6.42
570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63
0.15	0.15	0.15	0.42	0.42	0.42	0.42	0.42	0.09	0.09	0.09	0.09	0.09	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.01	0.01
0.78	***0.83***	***0.86***	***1.63***	***1.72***	***2.00***	***2.27***	***2.39***	***0.38***	***0.39***	***0.44***	***0.50***	***0.52***	***0.12***	***0.12***	***0.14***	***0.16***	***0.17***	***0.09***	***0.10***	***0.10***	***0.11***	***0.11***	***0.06***	***0.06***

growth 12.12.12			AU8 Regrowth 12.9-10.17a					AU9 Regrowth 12.9-10.7					AU10 Regrowth 12.3.7					AU11 Remnant 12.12.15b					AU12 R	
Year 10	Year 15	Year 20	Current	Year 5	Year 10	Year 15	Year 20	Current	Year 5	Year 10	Year 15	Year 20	Current	Year 5	Year 10	Year 15	Year 20	Current	Year 5	Year 10	Year 15	Year 20	Current	Year 5
5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
5	5	5	3	4	5	5	5	5	5	5	5	5	5	5	5	5	5	3	4	5	5	5	5	5
5	5	5	3	3	4	5	5	5	5	5	5	5	5	5	5	5	5	3	3	4	5	5	5	5
4	4	4	5	5	5	5	5	5	5	5	5	5	3	3	3	3	3	5	5	5	5	5	3	3
3	3	3	3	3	3	3	3	3	3	3	3	3	5	5	5	5	5	5	5	5	5	5	3	3
5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	5	5	5	5	5	5	5	5	5	5
3	4	4	5	5	5	5	5	1	1	2	3	4	2	2	3	4	5	2	2	3	4	4	3	3
2	3	4	5	5	5	5	5	3	3	4	4	5	0	0	1	2	3	5	5	5	5	5	3	3
1	1	1	5	5	5	5	5	5	5	5	5	5	0	0	0	0	0	5	5	5	5	5	5	5
3	3	3	3	3	3	3	3	5	5	5	5	5	0	0	0	0	0	5	5	5	5	5	5	5
3	3	3	5	5	5	5	5	0	0	0	0	0	0	0	0	0	0	5	5	5	5	5	0	0
3	3	3	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	0	0
9	9	10	4	5	6	7	8	5	6	7	9	10	0	1	2	3	3	7	7	8	8	8	5	6
6	6	6	1	3	5	8	10	1	1	1	1	1	1	1	3	4	5	1	1	2	3	3	5	5
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	10	1	1	1	1	1	1	1
55.25	57.25	58.75	54.5	60	65	70	72	53.5	54.5	57.5	60.5	63	35.5	36.5	42.5	50.5	58.5	59.25	61.5	66.5	69.5	69.25	51.5	53
100	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*
1.66	**1.72**	**1.76**	**1.64**	**1.80**	**1.95**	**2.10**	**2.16**	**1.61**	**1.64**	**1.73**	**1.82**	**1.89**	**1.07**	**1.10**	**1.28**	**1.52**	**1.76**	**1.78**	**1.85**	**2.00**	**2.09**	**2.08**	**1.55**	**1.59**
5	7	10	2	2	5	7	10	0	2	5	7	10	2	2	5	7	10	5	5	5	7	10	2	2
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
3	3	3	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	3	3	3	3	3	0	0
3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	2	3	4	1	1	1	1	1	4	4
15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
42	44	47	40	40	43	45	48	38	40	43	45	48	40	40	44	47	51	40	40	40	42	45	37	37
56	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*
2.25	**2.36**	**2.52**	**2.14**	**2.14**	**2.30**	**2.41**	**2.57**	**2.04**	**2.14**	**2.30**	**2.41**	**2.57**	**2.14**	**2.14**	**2.36**	**2.52**	**2.73**	**2.14**	**2.14**	**2.14**	**2.25**	**2.41**	**1.98**	**1.98**

AU7			AU8					AU9					AU10					AU11						
10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
1.71	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**

AU7			AU8					AU9					AU10					AU11						
1.66	1.72	1.76	1.64	1.80	1.95	2.10	2.16	1.61	1.64	1.73	1.82	1.89	1.07	1.10	1.28	1.52	1.76	1.78	1.85	2.00	2.09	2.08	1.55	1.59
2.25	2.36	2.52	2.14	2.14	2.30	2.41	2.57	2.04	2.14	2.30	2.41	2.57	2.14	2.14	2.36	2.52	2.73	2.14	2.14	2.14	2.25	2.41	1.98	1.98
1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
5.62	*5.79*	*5.99*	*5.49*	*5.66*	*5.97*	*6.23*	*6.45*	*5.36*	*5.49*	*5.74*	*5.94*	*6.18*	*4.92*	*4.95*	*5.35*	*5.75*	*6.20*	*5.63*	*5.70*	*5.85*	*6.05*	*6.20*	*5.24*	*5.29*
29.38	29.38	29.38	45.87	45.87	45.87	45.87	45.87	1.56	1.56	1.56	1.56	1.56	1.31	1.31	1.31	1.31	1.31	75.54	75.54	75.54	75.54	75.54	3.41	3.41
971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83
0.03	0.03	0.03	0.05	0.05	0.05	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.08	0.08	0.08	0.08	0.00	0.00
0.17	***0.18***	***0.18***	***0.26***	***0.27***	***0.28***	***0.29***	***0.30***	***0.01***	***0.01***	***0.01***	***0.01***	***0.01***	***0.01***	***0.01***	***0.01***	***0.01***	***0.01***	***0.44***	***0.44***	***0.45***	***0.47***	***0.48***	***0.02***	***0.02***

AU7			AU8					AU9					AU10					AU11						
1.66	1.72	1.76	1.64	1.80	1.95	2.10	2.16	1.61	1.64	1.73	1.82	1.89	1.07	1.10	1.28	1.52	1.76	1.78	1.85	2.00	2.09	2.08	1.55	1.59
2.25	2.36	2.52	2.14	2.14	2.30	2.41	2.57	2.04	2.14	2.30	2.41	2.57	2.14	2.14	2.36	2.52	2.73	2.14	2.14	2.14	2.25	2.41	1.98	1.98
1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
5.62	5.79	5.99	5.49	5.66	5.97	6.23	6.45	5.36	5.49	5.74	5.94	6.18	4.92	4.95	5.35	5.75	6.20	5.63	5.70	5.85	6.05	6.20	5.24	5.29
22.97	22.97	22.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70.78	70.78	70.78	70.78	70.78	0.33	0.33
401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19
0.06	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.18	0.18	0.18	0.18	0.00	0.00
0.32	***0.33***	***0.34***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.99***	***1.01***	***1.03***	***1.07***	***1.09***	***0.00***	***0.00***

AU7			AU8					AU9					AU10					AU11						
1.66	1.72	1.76	1.64	1.80	1.95	2.10	2.16	1.61	1.64	1.73	1.82	1.89	1.07	1.10	1.28	1.52	1.76	1.78	1.85	2.00	2.09	2.08	1.55	1.59
2.25	2.36	2.52	2.14	2.14	2.30	2.41	2.57	2.04	2.14	2.30	2.41	2.57	2.14	2.14	2.36	2.52	2.73	2.14	2.14	2.14	2.25	2.41	1.98	1.98
1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
5.62	5.79	5.99	5.49	5.66	5.97	6.23	6.45	5.36	5.49	5.74	5.94	6.18	4.92	4.95	5.35	5.75	6.20	5.63	5.70	5.85	6.05	6.20	5.24	5.29
6.42	6.42	6.42	45.86	45.86	45.86	45.86	45.86	1.56	1.56	1.56	1.56	1.56	1.30	1.30	1.30	1.30	1.30	4.76	4.76	4.76	4.76	4.76	3.09	3.09
570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63
0.01	0.01	0.01	0.08	0.08	0.08	0.08	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0.06	***0.07***	***0.07***	***0.44***	***0.45***	***0.48***	***0.50***	***0.52***	***0.01***	***0.02***	***0.02***	***0.02***	***0.02***	***0.01***	***0.01***	***0.01***	***0.01***	***0.01***	***0.05***	***0.05***	***0.05***	***0.05***	***0.05***	***0.03***	***0.03***

emnant 12.12.12			AU13 Remnant 12.9-10.17a					AU14 Remnant 12.9-10.7				
Year 10	Year 15	Year 20	Current	Year 5	Year 10	Year 15	Year 20	Current	Year 5	Year 10	Year 15	Year 20
5	5	5	5	5	5	5	5	5	5	5	5	5
5	5	5	2	4	5	5	5	5	5	5	5	5
5	5	5	3	3	4	5	5	5	5	5	5	5
3	3	3	3	3	3	3	3	3	3	3	3	3
3	3	3	3	3	3	3	3	3	3	3	3	3
5	5	5	5	5	5	5	5	5	5	5	5	5
4	4	4	2	2	3	4	4	4	4	4	4	4
4	4	5	4	4	4	5	5	5	5	5	5	5
5	5	5	5	5	5	5	5	5	5	5	5	5
5	5	5	2	2	2	2	2	5	5	5	5	5
0	0	0	5	5	5	5	5	15	15	15	15	15
0	0	0	4	4	4	4	4	5	5	5	5	5
7	9	10	3	4	5	6	7	5	6	7	9	10
5	5	5	1	1	1	2	2	10	10	10	10	10
1	1	1	1	1	1	1	1	5	5	5	5	5
56	58	59.5	45.25	49.5	53.5	58.5	59.75	84	85	86	88	89
100	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*
1.68	**1.74**	**1.79**	**1.36**	**1.49**	**1.61**	**1.76**	**1.79**	**2.52**	**2.55**	**2.58**	**2.64**	**2.67**
5	7	10	8	8	8	10	10	7	7	7	10	10
2	2	2	2	2	2	2	2	2	2	2	2	2
4	4	4	4	4	4	4	4	4	4	4	4	4
0	0	0	6	6	6	6	6	6	6	6	6	6
4	5	5	1	1	1	1	1	5	5	5	5	5
15	15	15	15	15	15	15	15	15	15	15	15	15
10	10	10	10	10	10	10	10	10	10	10	10	10
40	43	46	45.5	46	46	48	48	49	49	49	52	52
56	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*	*56*
2.14	**2.30**	**2.46**	**2.44**	**2.46**	**2.46**	**2.57**	**2.57**	**2.63**	**2.63**	**2.63**	**2.79**	**2.79**

AU12			AU13					AU14				
10	10	10	10	10	10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10	10	10	10	10	10
10	10	10	10	10	10	10	10	10	10	10	10	10
0	0	0	0	0	0	0	0	0	0	0	0	0
30	30	30	30	30	30	30	30	30	30	30	30	30
1.71	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**

AU12			AU13					AU14					Average/Final				
1.68	1.74	1.79	1.36	1.49	1.61	1.76	1.79	2.52	2.55	2.58	2.64	2.67	1.48	1.55	1.66	1.79	1.88
2.14	2.30	2.46	2.44	2.46	2.46	2.57	2.57	2.63	2.63	2.63	2.79	2.79	1.82	1.90	2.15	2.39	2.53
1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
5.54	*5.76*	*5.96*	*5.51*	*5.66*	*5.78*	*6.04*	*6.08*	*6.86*	*6.89*	*6.92*	*7.14*	*7.17*	5.02	5.16	5.52	5.90	6.13
3.41	3.41	3.41	35.96	35.96	35.96	35.96	35.96	3.29	3.29	3.29	3.29	3.29	**971.83**	**971.83**	**971.83**	**971.83**	**971.83**
971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83	971.83
0.00	0.00	0.00	0.04	0.04	0.04	0.04	0.04	0.00	0.00	0.00	0.00	0.00	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
0.02	***0.02***	***0.02***	***0.20***	***0.21***	***0.21***	***0.22***	***0.22***	***0.02***	***0.02***	***0.02***	***0.02***	***0.02***	***4.36***	***4.59***	***5.12***	***5.62***	***5.86***

AU12			AU13					AU14					Average/Final				
1.68	1.74	1.79	1.36	1.49	1.61	1.76	1.79	2.52	2.55	2.58	2.64	2.67	1.48	1.55	1.66	1.79	1.88
2.14	2.30	2.46	2.44	2.46	2.46	2.57	2.57	2.63	2.63	2.63	2.79	2.79	1.82	1.90	2.15	2.39	2.53
1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
5.54	5.76	5.96	5.51	5.66	5.78	6.04	6.08	6.86	6.89	6.92	7.14	7.17	5.02	5.16	5.52	5.90	6.13
0.33	0.33	0.33	11.30	11.30	11.30	11.30	11.30	0.00	0.00	0.00	0.00	0.00	**401.19**	**401.19**	**401.19**	**401.19**	**401.19**
401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19	401.19
0.00	0.00	0.00	0.03	0.03	0.03	0.03	0.03	0.00	0.00	0.00	0.00	0.00	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
0.00	***0.00***	***0.00***	***0.16***	***0.16***	***0.16***	***0.17***	***0.17***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***4.49***	***4.72***	***5.18***	***5.64***	***5.86***

AU12			AU13					AU14					Average/Final				
1.68	1.74	1.79	1.36	1.49	1.61	1.76	1.79	2.52	2.55	2.58	2.64	2.67	1.48	1.55	1.66	1.79	1.88
2.14	2.30	2.46	2.44	2.46	2.46	2.57	2.57	2.63	2.63	2.63	2.79	2.79	1.82	1.90	2.15	2.39	2.53
1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71	1.71
5.54	5.76	5.96	5.51	5.66	5.78	6.04	6.08	6.86	6.89	6.92	7.14	7.17	5.02	5.16	5.52	5.90	6.13
3.09	3.09	3.09	24.66	24.66	24.66	24.66	24.66	3.29	3.29	3.29	3.29	3.29	**570.63**	**570.63**	**570.63**	**570.63**	**570.63**
570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63	570.63
0.01	0.01	0.01	0.04	0.04	0.04	0.04	0.04	0.01	0.01	0.01	0.01	0.01	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
0.03	***0.03***	***0.03***	***0.24***	***0.24***	***0.25***	***0.26***	***0.26***	***0.04***	***0.04***	***0.04***	***0.04***	***0.04***	***4.27***	***4.51***	***5.07***	***5.61***	***5.86***

APPENDIX 6

OAG Calculation Score Sheets

Offsets Assessment Guide

For use in determining offsets under the Environment Protection and Biodiversity Conservation Act 1999
2 October 2012

Matter of National Environmental Significance	
Name	Koala
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	0.2%

Impact calculator

Ecological communities

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of community	No		Area *(Hectares)*		
			Quality *(Scale 0-10)*		
		Total quantum of impact *(Adjusted Hectares)*			

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of habitat	Yes		Area *(Hectares)*	258.1	BAAM report
			Quality *(Scale 0-10)*	**6**	
		Total quantum of impact *(Adjusted Hectares)*		154.86	

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
Number of features e.g. Nest hollows, habitat trees	No			
Condition of habitat Change in habitat condition, but no change in extent	No			

Threatened species

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
Birth rate e.g. Change in nest success	No			
Mortality rate e.g Change in number of road kills per year	No			
Number of individuals e.g. Individual plants/animals	No			

Offset calculator

Ecological Communities

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*	Information source
Area of community	No			Risk-related time horizon *(max. 20 years)*		Start area *(hectares)*		Risk of loss without offset *(%)*		Risk of loss with offset *(%)*		0.00		0.00	0.00	Overall net present value	0.00		
				Time until ecological benefit		Start quality *(scale of 0-10)*		Future quality without offset *(scale of 0-10)*		Future quality with offset *(scale of 0-10)*		0.00		0.00	0.00	% of impact offset	0.00%		
								Future area without offset	0.0	Future area with offset	0.0			Minimum (90%) direct offset requirement met?			FALSE		

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*	Information source
Area of habitat	Yes	154.86	Colorado Property (total	Risk-related time horizon *(max. 20 years)*	20	Start area *(hectares)*	971.83	Risk of loss without offset *(%)*	0%	Risk of loss with offset *(%)*	0%	0.00	90%	0.00	0.00	Overall net present value	158.74		
				Time until ecological benefit	20	Start quality *(scale of 0-10)*	**5**	Future quality without offset *(scale of 0-10)*	**5**	Future quality with offset *(scale of 0-10)*	**7**	2.00	85%	1.70	1.63	% of impact offset	102.51%	207 ha	
								Future area without offset	971.8	Future area with offset	971.8			Minimum (90%) direct offset requirement met?			TRUE		

Protected matter attributes	Attribute relevant to case?	Quantum of impact	Proposed offset	Time horizon *(years)*	Start Value	Future value without offset	Future value with offset	Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value	% of impact offset	Minimum (90%) direct offset requirement met?	Cost *($ total)*	Information source
Number of features e.g. Nest hollows, habitat trees	No							0.00		0.00	0.00	0.00%	FALSE		
Condition of habitat Change in habitat condition, but no change in extent	No							0.00		0.00	0.00	0.00%	FALSE		

Threatened species

Protected matter attributes	Attribute relevant to case?	Quantum of impact	Proposed offset	Time horizon *(years)*	Start Value	Future value without offset	Future value with offset	Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value	% of impact offset	Minimum (90%) direct offset requirement met?	Cost *($ total)*	Information source
Birth rate e.g. Change in nest success	No							0.00		0.00	0.00	0.00%	FALSE		
Mortality rate e.g Change in number of road kills per year	No							0.00		0.00	0.00	0.00%	FALSE		
Number of individuals e.g. Individual plants/animals	Yes							0.00		0.00	0.00	0.00%	FALSE		

Summary

					Cost ($)		
Protected matter attributes	**Quantum of impact**	**Net present value**	**% of impact offset**	**Direct offset adequate?**	**Direct offset**	**Other compensatory measures**	**Total**
Birth rate	0.00	0.00	0.00	FALSE	0.00	N/A	0.00
Mortality rate	0.00	0.00	0.00	FALSE	0.00	N/A	0.00
Number of individuals	0.00	0.00	0.00	FALSE	0.00	N/A	0.00
Number of features	0.00	0.00	0.00	FALSE	0.00	N/A	0.00
Condition of habitat	0.00	0.00	0.00	FALSE	0.00	N/A	0.00
Area of habitat	154.86	158.74	1.03	TRUE	0.00	N/A	0.00
Area of community		0.00	0.00	FALSE	0.00	N/A	0.00
					$0.00	**$0.00**	**$0.00**

Offsets Assessment Guide

For use in determining offsets under the Environment Protection and Biodiversity Conservation Act 1999
2 October 2012

Matter of National Environmental Significance	
Name	Koala
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	0.2%

Impact calculator

Ecological communities

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of community	No		Area *(Hectares)*		
			Quality *(Scale 0-10)*		
		Total quantum of impact *(Adjusted Hectares)*			

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of habitat	Yes		Area *(Hectares)*	258.1	BAAM report
			Quality *(Scale 0-10)*	**6**	
		Total quantum of impact *(Adjusted Hectares)*		154.86	

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
Number of features e.g. Nest hollows, habitat trees	No			
Condition of habitat Change in habitat condition, but no change in extent	No			

Threatened species

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
Birth rate e.g. Change in nest success	No			
Mortality rate e.g Change in number of road kills per year	No			
Number of individuals e.g. Individual plants/animals	No			

Offset calculator

Ecological Communities

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality **without** offset *(adjusted hectares)*		Future area and quality **with** offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*	Information source
Area of community	No			Risk-related time horizon *(max. 20 years)*		Start area *(hectares)*		Risk of loss **without** offset *(%)*		Risk of loss **with** offset *(%)*		0.00		0.00	0.00	Overall net present value	0.00		
				Time until ecological benefit		Start quality *(scale of 0-10)*		Future quality **without** offset *(scale of 0-10)*		Future quality **with** offset *(scale of 0-10)*		0.00		0.00	0.00	% of impact offset	0.00%		
								Future area **without** offset	0.0	Future area **with** offset	0.0			Minimum (90%) direct offset requirement met?			FALSE		

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality **without** offset *(adjusted hectares)*		Future area and quality **with** offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*	Information source
Area of habitat	Yes	154.86	Colorado (Stage 1)	Risk-related time horizon *(max. 20 years)*	20	Start area *(hectares)*	401.19	Risk of loss **without** offset *(%)*	0%	Risk of loss **with** offset *(%)*	0%	0.00	90%	0.00	0.00	Overall net present value	65.53		
				Time until ecological benefit	20	Start quality *(scale of 0-10)*	**5**	Future quality **without** offset *(scale of 0-10)*	**5**	Future quality **with** offset *(scale of 0-10)*	7	2.00	85%	1.70	1.63	% of impact offset	42.32%	207 ha	
								Future area **without** offset	401.2	Future area **with** offset	401.2			Minimum (90%) direct offset requirement met?			FALSE		

Protected matter attributes	Attribute relevant to case?	Quantum of impact	Proposed offset	Time horizon *(years)*	Start Value	Future value without offset	Future value with offset	Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value	% of impact offset	Minimum (90%) direct offset requirement met?	Cost *($ total)*	Information source
Number of features e.g. Nest hollows, habitat trees	No							0.00		0.00	0.00	0.00%	FALSE		
Condition of habitat Change in habitat condition, but no change in extent	No							0.00		0.00	0.00	0.00%	FALSE		

Threatened species

Protected matter attributes	Attribute relevant to case?	Quantum of impact	Proposed offset	Time horizon *(years)*	Start Value	Future value without offset	Future value with offset	Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value	% of impact offset	Minimum (90%) direct offset requirement met?	Cost *($ total)*	Information source
Birth rate e.g. Change in nest success	No							0.00		0.00	0.00	0.00%	FALSE		
Mortality rate e.g Change in number of road kills per year	No							0.00		0.00	0.00	0.00%	FALSE		
Number of individuals e.g. Individual plants/animals	Yes							0.00		0.00	0.00	0.00%	FALSE		

Summary

					Cost ($)		
Protected matter attributes	Quantum of impact	Net present value	% of impact offset	Direct offset adequate?	Direct offset	Other compensatory measures	Total
Birth rate	0.00	0.00	0.00	FALSE	0.00	N/A	0.00
Mortality rate	0.00	0.00	0.00	FALSE	0.00	N/A	0.00
Number of individuals	0.00	0.00	0.00	FALSE	0.00	N/A	0.00
Number of features	0.00	0.00	0.00	FALSE	0.00	N/A	0.00
Condition of habitat	0.00	0.00	0.00	FALSE	0.00	N/A	0.00
Area of habitat	154.86	65.53	0.42	FALSE	0.00	#DIV/0!	#DIV/0!
Area of community		0.00	0.00	FALSE	0.00	N/A	0.00
					$0.00	**#DIV/0!**	**#DIV/0!**

Offsets Assessment Guide

For use in determining offsets under the Environment Protection and Biodiversity Conservation Act 1999
2 October 2012

Matter of National Environmental Significance	
Name	GHFF
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	0.2%

Impact calculator

Ecological communities

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of community	No		Area *(Hectares)*		
			Quality *(Scale 0-10)*		
		Total quantum of impact *(Adjusted Hectares)*			

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of habitat	Yes		Area *(Hectares)*	198.51	BAAM report
			Quality *(Scale 0-10)*	**5**	
		Total quantum of impact *(Adjusted Hectares)*		99.26	

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
Number of features e.g. Nest hollows, habitat trees	No			
Condition of habitat Change in habitat condition, but no change in extent	No			

Threatened species

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
Birth rate e.g. Change in nest success	No			
Mortality rate e.g Change in number of road kills per year	No			
Number of individuals e.g. Individual plants/animals	No			

Offset calculator

Ecological Communities

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*	Information source
Area of community	No			Risk-related time horizon *(max. 20 years)*		Start area *(hectares)*		Risk of loss without offset *(%)*		Risk of loss with offset *(%)*		0.00		0.00	0.00	Overall net present value	0.00		
				Time until ecological benefit		Start quality *(scale of 0-10)*		Future quality without offset *(scale of 0-10)*		Future quality with offset *(scale of 0-10)*		0.00		0.00	0.00	% of impact offset	0.00%		
								Future area without offset	0.0	Future area with offset	0.0			Minimum (90%) direct offset requirement met?			FALSE		

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*	Information source
Area of habitat	Yes	99.26	Colorado property (total a	Risk-related time horizon *(max. 20 years)*	20	Start area *(hectares)*	971.83	Risk of loss without offset *(%)*	0%	Risk of loss with offset *(%)*	0%	0.00	90%	0.00	0.00	Overall net present value	158.74		
				Time until ecological benefit	20	Start quality *(scale of 0-10)*	**4**	Future quality without offset *(scale of 0-10)*	**4**	Future quality with offset *(scale of 0-10)*	**6**	2.00	85%	1.70	1.63	% of impact offset	159.93%	207 ha	
								Future area without offset	971.8	Future area with offset	971.8			Minimum (90%) direct offset requirement met?			TRUE		

Protected matter attributes	Attribute relevant to case?	Quantum of impact	Proposed offset	Time horizon *(years)*	Start Value	Future value without offset	Future value with offset	Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value	% of impact offset	Minimum (90%) direct offset requirement met?	Cost *($ total)*	Information source
Number of features e.g. Nest hollows, habitat trees	No							0.00		0.00	0.00	0.00%	FALSE		
Condition of habitat Change in habitat condition, but no change in extent	No							0.00		0.00	0.00	0.00%	FALSE		

Threatened species

Protected matter attributes	Attribute relevant to case?	Quantum of impact	Proposed offset	Time horizon *(years)*	Start Value	Future value without offset	Future value with offset	Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value	% of impact offset	Minimum (90%) direct offset requirement met?	Cost *($ total)*	Information source
Birth rate e.g. Change in nest success	No							0.00		0.00	0.00	0.00%	FALSE		
Mortality rate e.g Change in number of road kills per year	No							0.00		0.00	0.00	0.00%	FALSE		
Number of individuals e.g. Individual plants/animals	Yes							0.00		0.00	0.00	0.00%	FALSE		

Summary

Protected matter attributes	Quantum of impact	Net present value	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset	Other compensatory measures	Total
Birth rate	0.00	0.00	0.00	FALSE	0.00	N/A	0.00
Mortality rate	0.00	0.00	0.00	FALSE	0.00	N/A	0.00
Number of individuals	0.00	0.00	0.00	FALSE	0.00	N/A	0.00
Number of features	0.00	0.00	0.00	FALSE	0.00	N/A	0.00
Condition of habitat	0.00	0.00	0.00	FALSE	0.00	N/A	0.00
Area of habitat	99.26	158.74	1.60	TRUE	0.00	N/A	0.00
Area of community		0.00	0.00	FALSE	0.00	N/A	0.00
					$0.00	**$0.00**	**$0.00**

Offsets Assessment Guide

For use in determining offsets under the Environment Protection and Biodiversity Conservation Act 1999
2 October 2012

Matter of National Environmental Significance	
Name	GHFF
EPBC Act status	Vulnerable
Annual probability of extinction Based on IUCN category definitions	0.2%

Impact calculator

Ecological communities

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of community	No		Area *(Hectares)*		
			Quality *(Scale 0-10)*		
		Total quantum of impact *(Adjusted Hectares)*			

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Information source
Area of habitat	Yes		Area *(Hectares)*	198.51	BAAM report
			Quality *(Scale 0-10)*	**5**	
		Total quantum of impact *(Adjusted Hectares)*		99.26	

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
Number of features e.g. Nest hollows, habitat trees	No			
Condition of habitat Change in habitat condition, but no change in extent	No			

Threatened species

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact	Information source
Birth rate e.g. Change in nest success	No			
Mortality rate e.g Change in number of road kills per year	No			
Number of individuals e.g. Individual plants/animals	No			

Offset calculator

Ecological Communities

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*	Information source
Area of community	No			Risk-related time horizon *(max. 20 years)*		Start area *(hectares)*		Risk of loss without offset *(%)*		Risk of loss with offset *(%)*		0.00		0.00	0.00	Overall net present value	0.00		
				Time until ecological benefit		Start quality *(scale of 0-10)*		Future quality without offset *(scale of 0-10)*		Future quality with offset *(scale of 0-10)*		0.00		0.00	0.00	% of impact offset	0.00%		
								Future area without offset	0.0	Future area with offset	0.0			Minimum (90%) direct offset requirement met?			FALSE		

Threatened species habitat

Protected matter attributes	Attribute relevant to case?	Total quantum of impact *(Adjusted Hectares)*	Proposed offset	Time Horizon *(Years)*		Start area and quality		Future area and quality without offset *(adjusted hectares)*		Future area and quality with offset *(adjusted hectares)*		Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value *(adjusted hectares)*	Offset Result		Cost *($ total)*	Information source
Area of habitat	Yes	99.26	Colorado (Stage 1)	Risk-related time horizon *(max. 20 years)*	20	Start area *(hectares)*	401.19	Risk of loss without offset *(%)*	0%	Risk of loss with offset *(%)*	0%	0.00	90%	0.00	0.00	Overall net present value	65.53		
				Time until ecological benefit	20	Start quality *(scale of 0-10)*	**4**	Future quality without offset *(scale of 0-10)*	**4**	Future quality with offset *(scale of 0-10)*	**6**	2.00	85%	1.70	1.63	% of impact offset	66.02%	207 ha	
								Future area without offset	401.2	Future area with offset	401.2			Minimum (90%) direct offset requirement met?			FALSE		

Protected matter attributes	Attribute relevant to case?	Quantum of impact	Proposed offset	Time horizon *(years)*	Start Value	Future value without offset	Future value with offset	Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value	% of impact offset	Minimum (90%) direct offset requirement met?	Cost *($ total)*	Information source
Number of features e.g. Nest hollows, habitat trees	No							0.00		0.00	0.00	0.00%	FALSE		
Condition of habitat Change in habitat condition, but no change in extent	No							0.00		0.00	0.00	0.00%	FALSE		

Threatened species

Protected matter attributes	Attribute relevant to case?	Quantum of impact	Proposed offset	Time horizon *(years)*	Start Value	Future value without offset	Future value with offset	Raw gain	Confidence in result *(%)*	Adjusted gain	Net present value	% of impact offset	Minimum (90%) direct offset requirement met?	Cost *($ total)*	Information source
Birth rate e.g. Change in nest success	No							0.00		0.00	0.00	0.00%	FALSE		
Mortality rate e.g Change in number of road kills per year	No							0.00		0.00	0.00	0.00%	FALSE		
Number of individuals e.g. Individual plants/animals	Yes							0.00		0.00	0.00	0.00%	FALSE		

Summary

					Cost ($)		
Protected matter attributes	Quantum of impact	Net present value	% of impact offset	Direct offset adequate?	Direct offset	Other compensatory measures	Total
Birth rate	0.00	0.00	0.00	FALSE	0.00	N/A	0.00
Mortality rate	0.00	0.00	0.00	FALSE	0.00	N/A	0.00
Number of individuals	0.00	0.00	0.00	FALSE	0.00	N/A	0.00
Number of features	0.00	0.00	0.00	FALSE	0.00	N/A	0.00
Condition of habitat	0.00	0.00	0.00	FALSE	0.00	N/A	0.00
Area of habitat	99.26	65.53	0.66	FALSE	0.00	#DIV/0!	#DIV/0!
Area of community		0.00	0.00	FALSE	0.00	N/A	0.00
					$0.00	**#DIV/0!**	**#DIV/0!**

APPENDIX 12

Cultural Heritage Assessment and Management Plan Documentation

Proposed Warrill View Quarry

Cultural Heritage Assessment

Neilsens Quality Gravels P/L

October 2018







converge
heritage + community

Converge Heritage + Community

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Revision	Date	Nature of revision	Prepared by	Authorised by
1	24/10/2018	Draft report	PH	
2	30/10/2018	Consultation Draft	PH	NF
3	16/11/2018	Final	PH	

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1 Introduction

Neilsens Quality Gravels Pty Ltd (Neilsens) are investigating the potential to develop a new extractive industry operation (primarily hard rock) on land at 299 Hayes Road, Silverdale QLD (Figure 1). The project is referred to as the Warrill View Quarry. The proposal includes an east quarry pit and west quarry pit on the site, which are divided by Warroolaba Creek (Figure 3). Project works will include clearing of vegetation, stripping of topsoil and overburden material, construction of roads and ancillary infrastructure and hard rock quarrying and processing. Approximately four (4) km of new road will need to be constructed to connect the site to the Cunningham Highway (not part of this assessment).

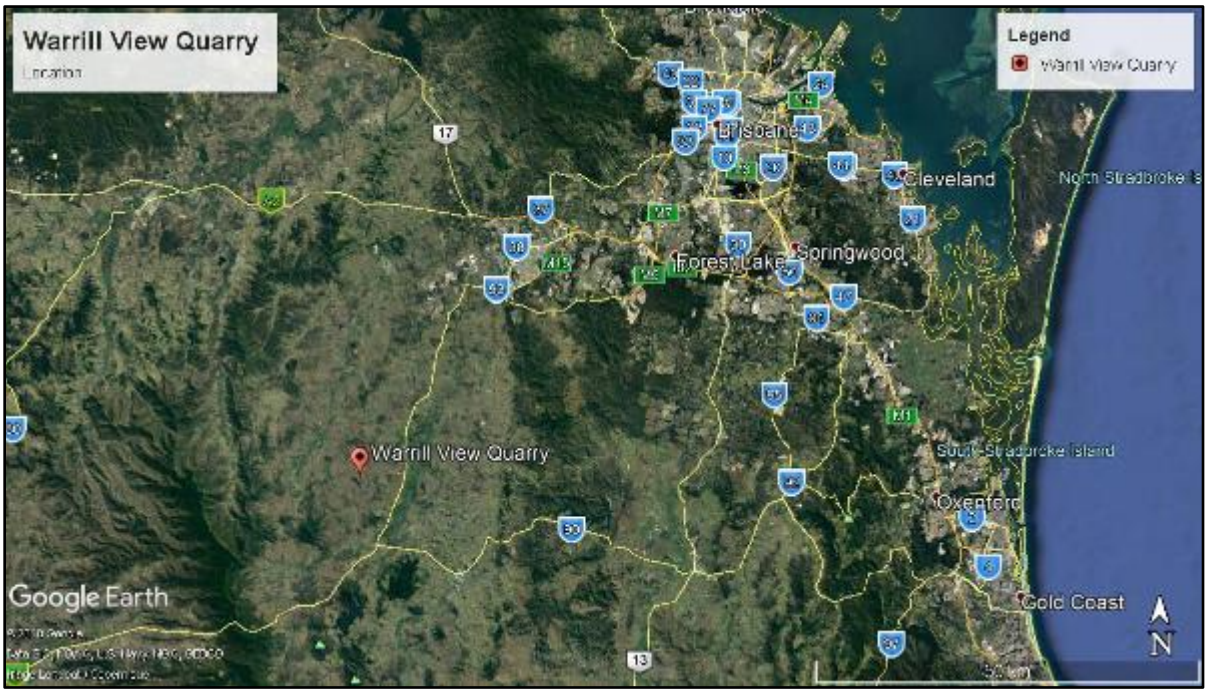


Figure 1: Location of Project Area (base map Google Earth Pro 2018).

1.1 Location of Study Area

The proposed site is located off the Cunningham Highway at Silverdale and is bordered at its southern end by Hayes Road. The Project Area incorporates six (6) lots, which are properly described as Lot 1 on Registered Plan 51909 and Lots 2, 7, 8, 10 and 18 on Registered Plan 50377 (Figure 2). The site is approximately 439 hectares in area.

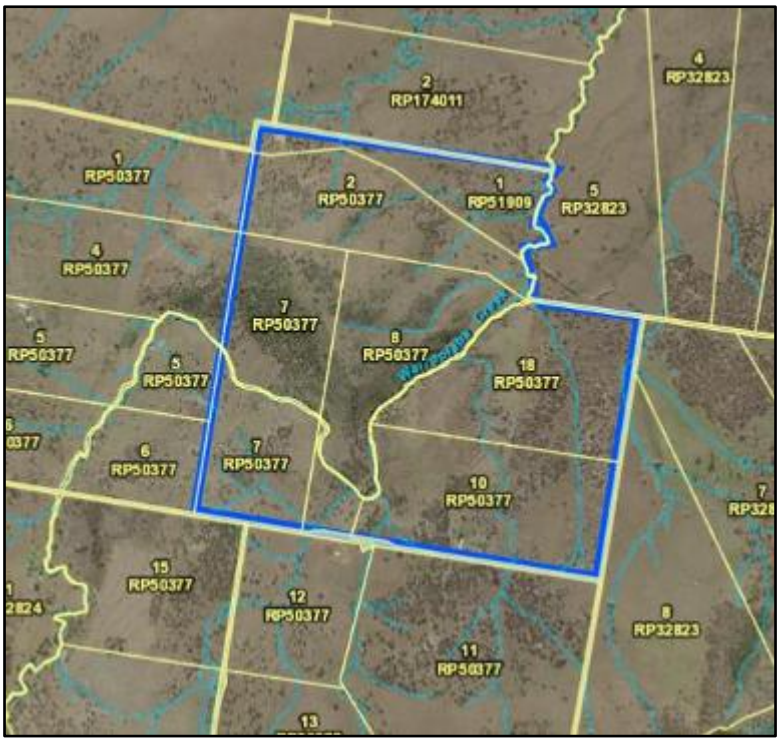


Figure 2: Proposed quarry area (map sourced from Qld Globe 2018).

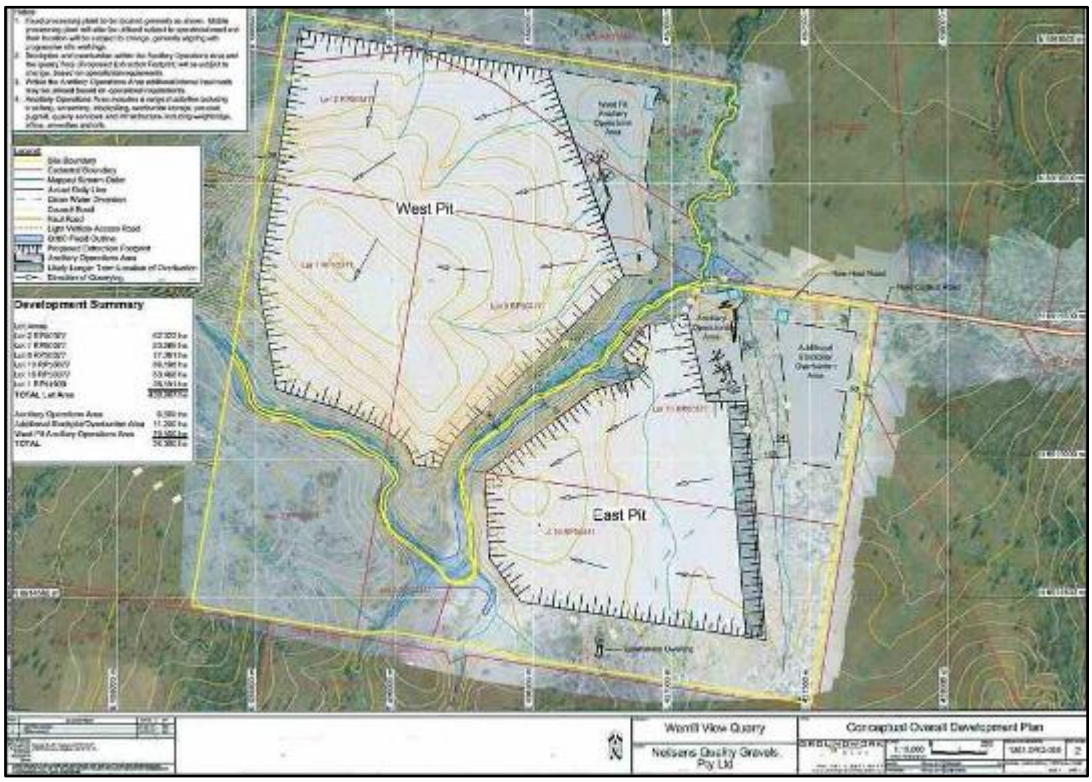


Figure 3: Proposed quarry layout (Image provided by Neilsens 2018).

1.2 Scope of Study

The purpose of this assessment is to complete a Cultural Heritage Due Diligence Assessment pursuant to the *Aboriginal Cultural Heritage Act 2003* for the proposed Warrill View Quarry. The assessment is to provide guidance into the potential impacts and mitigation measures that may be required in managing cultural heritage issues on site. A field inspection of the proposed expansion area was undertaken to assist in this determination. This report presents the results of the assessment and includes:

- The results of a register and database search.
- The results of the field inspection.
- The nature of any Aboriginal cultural heritage within the project area.
- Specific management recommendations for the protection of Aboriginal cultural heritage during the development of the quarry.

1.3 Overview of Findings

The key findings of the assessment are:

- There are no registered Aboriginal heritage places located within at least 6km of the project area.
- The majority of the proposed quarry area comprises two steep hills with Warroolaba Creek separating them. The sides of these hills generally descend quite steeply except to the north.
- The majority of the project area is covered by grass pasture, although there is some regrowth vegetation.
- There is a small area of mapped Category B remnant vegetation on the top of the western hill.
- Impacts on the landscape around the project area have mostly been vegetation clearance and farming, resulting in significant ground disturbance.
- No items of Aboriginal cultural heritage were identified in the project area during the field assessment – stone artefacts, grinding grooves or scarred trees - but this was not a systematic survey of the entire project area.
- The majority of the project area is best described as Category 4 – an area which has previously been subject to significant ground disturbance (clearing of vegetation in the past and farming activities).
- The Cultural Heritage Duty of Care Guidelines specify that where an activity is proposed in an area which has previously been subject to significant ground disturbance, that activity can proceed without further cultural heritage assessment as it is generally unlikely that the activity will harm Aboriginal cultural heritage.
- Category 4 acknowledges that an area that has previously been subject to significant ground disturbance may preserve certain features that retain residual Aboriginal cultural heritage significance. Warroolaba Creek with its small gorge and steep rocky walls may be landscape features that retain residual Aboriginal cultural heritage significance.
- An area of mapped Category B remnant vegetation is best classified as Category 5 under the Cultural Heritage Duty of Care Guidelines as it may not have been impacted by significant ground disturbance in the past. Category 5 makes the assumption that there is generally a high risk that the activity could harm Aboriginal cultural heritage. In these circumstances, the activity should not proceed without cultural heritage assessment and management.
- Due to the nature of the landscape and the extent of previous disturbance, some locations within the project area have a higher potential for undocumented Aboriginal cultural heritage item/sites to be present, especially adjacent to Warroolaba Creek.
- Neilsens should initiate consultation with the current Native Title applicants, the Yuggera Ugarapul People, on the management of cultural heritage values/sites of the project area (see Table 1 for contact details).

- Due to the nature of the development (quarry) it is suggested that Neilsens develop a Cultural Heritage Management Agreement (CHMA) with the Aboriginal Party (see section 23(3)(a)(iii) of the Act).
- As there remains potential for undocumented cultural material to be present within the project area, albeit low for most of the site, Neilsens should develop and implement an agreed procedure for incidental finds of cultural heritage during project activities and also include a cultural heritage component within project inductions.

1.4 Personnel

Dr Phillip Habgood (Senior Archaeologist) undertook the assessment.

1.5 Limitations

The current assessment was a preliminary cultural heritage assessment undertaken for Neilsens to ensure it meets its Duty of Care for Aboriginal cultural heritage as defined under the *Aboriginal Cultural Heritage Act 2003* for the proposed project. The field survey involved a broad landscape assessment of the area using the Cultural Heritage Duty of Care Guidelines. It was not a systematic survey of the proposed site.

2 Contextual Background

As a full history of the study area was outside the scope of this report, the following discussion is only intended to provide high level contextual background.

2.1 Environment

This report uses Sattler and Williams (1999) as the basis for descriptions of geomorphological and biogeographical context. Using the environmental framework set out in Sattler and Williams (1999) landscapes can be described in terms of 'bioregions' based on the dominant geological features found within a region. These bioregions are subdivided into 'provinces' that display characteristic patterns of landforms and associated vegetation. From a biogeographic perspective, the project area lies within the Moreton Basin Province of the Southeast Queensland biogeographic zone. The Moreton Basin province is predominantly Jurassic and Triassic-Jurassic sandstones. Major vegetation types include eucalypt woodlands and open forests, brigalow (*Acacia harpophylla*) open forests and semi-evergreen vine thicket (Sattler and Williams 1999).

With respect to the particular project area, the site is dominated by Tertiary volcanics, consisting mainly of trachytic and basaltic lava flows with some flows and intrusive plugs of trachyte. Warroolaba Creek traverses and separates two (2) relatively steep hills. The site has an elevation ranging from 72 metres to 250 metres Australian Height Datum (Figure 4). There are a number of other ephemeral creeks that drain from these hills (Figure 4).



Figure 4: Contours and creeks (map sourced from Qld Globe 2018).

Significant timber clearing has occurred previously across the site, however the site incorporates an area mapped as Category B remnant vegetation (Figure 5). There is one main vegetation community within the project area and another adjacent to it (Figure 4, REDD 2018):

- *Eucalyptus melanophloia* (silver-leaved Ironbark), *E. crebra* (narrow-leaved ironbark), *E. tereticornis* (flooded gum), *Corymbia tessellaris* (blackbutt) and *Angophora subvelutina* (broad-leaved apple) grassy woodland on Cainozoic igneous rocks (12.8.17).
- *Eucalyptus crebra* (narrow-leaved ironbark), *E. tereticornis* (flooded gum), *Corymbia tessellaris* (blackbutt), *E. melanophloia* (silver-leaved Ironbark) and *Angophora* spp. woodland on sedimentary rocks (12.9-10.7).

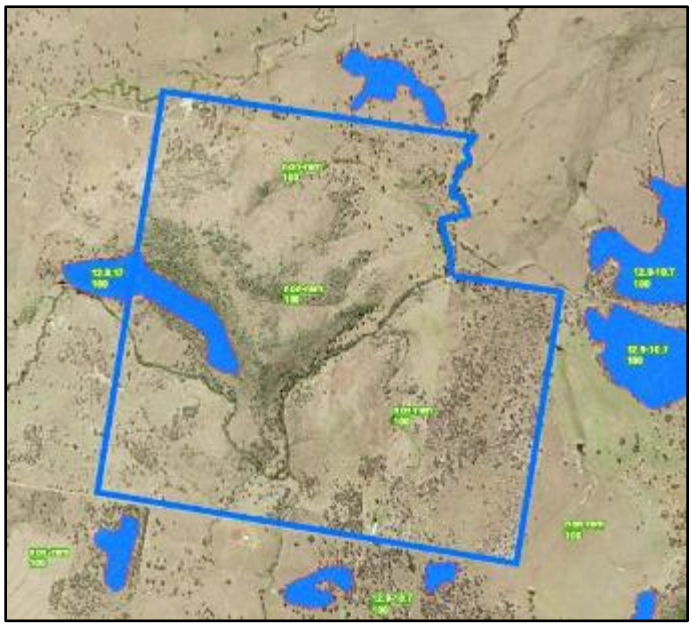


Figure 5: Mapped Category B Remnant Vegetation (map sourced from Qld Globe 2018).

2.2 Aerial Photographs

An examination of historic aerial photographs demonstrates that by 1944 most of the project area had been cleared of trees (Figure 7). By 1951 trees had regrown over the top of the western hill on Lot 7RP50377 (Figure 8), which is incorporated within the area of mapped Category B remnant vegetation (Figure 5). There is no major change in tree growth evident on a 1959 image (Figure 8) and this situation has continued (Figure 6). In all of these photographs the eastern hill is essentially clear of trees (compare Figures 6-9). There may also be thicker regrowth on the eastern side of the project area (Figure 6).



Figure 6: Current Landscape within Project Area (base map Google Earth Pro 2018).

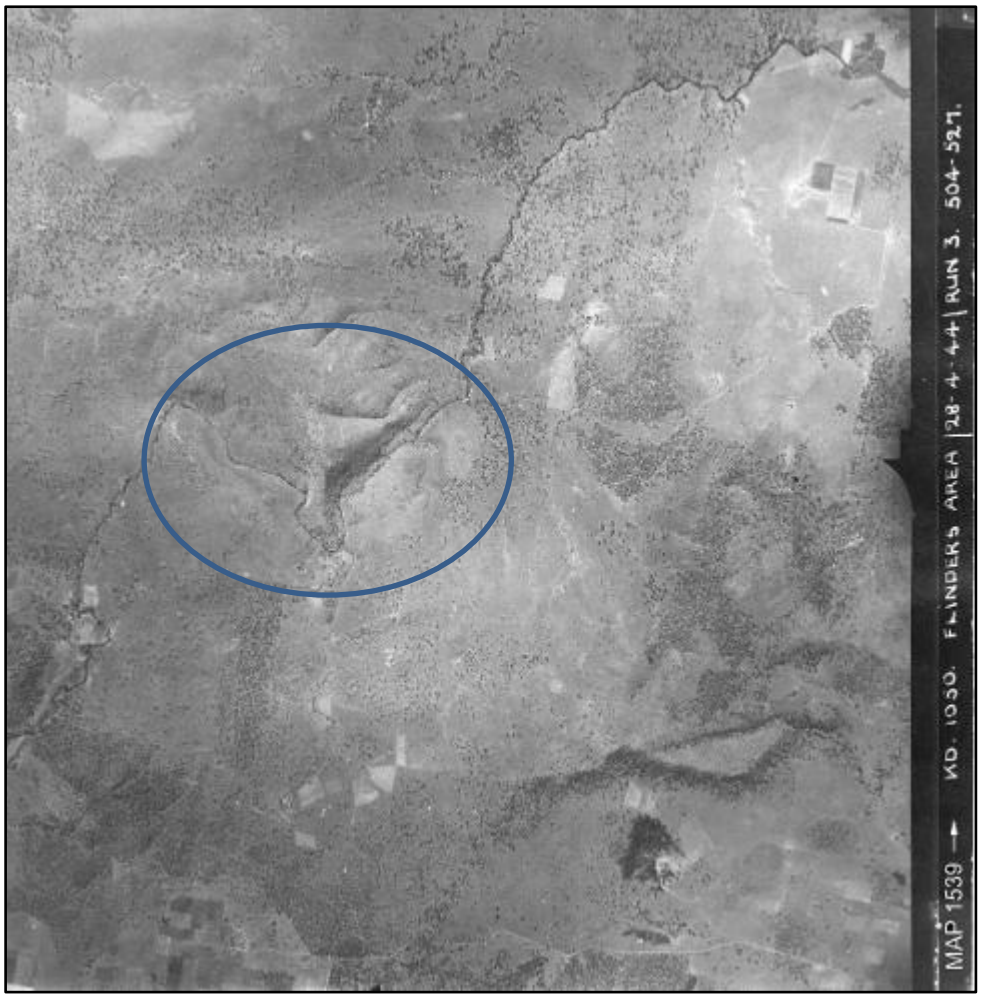


Figure 7: Aerial photograph taken 28/4/1944 (image sourced from Qld Images MAP1539523).



Figure 8: Aerial photograph taken 18/7/1951 (image sourced from Qld Images QAP0161109).



Figure 9: Aerial photograph taken 31/5/1959 (image sourced from Qld Images QAP0890153).

Warroolaba Creek and the ephemeral creeks that drain from the hills are clear on these images (Figures 7-9).

2.3 Register Searches

A search was conducted of the Aboriginal Cultural Heritage Database and Register maintained by the Queensland Department of Aboriginal and Torres Strait Islander Partnerships (DATSIP) on the 24th October 2018 (Ref # 44445). The search revealed that there were no registered Aboriginal cultural heritage sites in the project area or within 6km of the location (Appendix B). It is possible that the absence of recorded Aboriginal cultural heritage sites reflects a lack of previous cultural heritage surveys of the area.

Table 1 details the current cultural heritage party for the area. There is no cultural heritage body for the area.

Table 1: Cultural Heritage Party for the area.

NNTT Ref Number	QUD Ref Number	Party Name	Contact Details
QC2017/005	QUD213/2017	Yuggera Ugarapul People	Trevor Hauff, Trevor Hauff Lawyers PO Box 311 PORT DOUGLAS QLD 4877 Phone: (07) 4098 5270 Email: trevor@trevorhaufflawyers.com.au

All significant Aboriginal cultural heritage in Queensland is protected under the *Aboriginal Cultural Heritage Act 2003*, and penalty provisions apply for any unauthorized harm. Under the legislation a person carrying out an activity must take all reasonable and practical measures to ensure the activity does not harm Aboriginal cultural heritage. This applies whether or not such places are recorded in an official register and whether or not they are located in, on or under private land. Therefore, Aboriginal cultural heritage which may occur on the project area is protected under the terms of the *Aboriginal Cultural Heritage Act 2003* even if DATSIP has no records relating to it.

2.4 Aboriginal Cultural Context for the Study Area

Aboriginal groups inhabited a rich symbolic and ceremonial world. The project area is part of this extensive cultural landscape that contains local landscape features having stories and cultural significance attached to them, sacred sites and creation and dreaming locations, ceremonial grounds, Bora rings, campsites, scarred trees, traditional pathways and resource areas.

Steele (1984) has documented known sites in the Fassifern district (Figure 10). The prominent peaks in the area have Aboriginal names and many are associated with traditional stories (see Steele 1984). Mt Castle, 20km to the southwest of the project area, is associated with the dreamtime hero Butcha (Budjah) whose recumbent figure is discernible in the profile of the Dividing Range in this area (Steele 1984:148). There are known Corrobboree grounds, Bora rings, burial caves and traditional pathways in the broader Fassifern district (see Figure 10, Steele 1984). There was an important camp near Dugandan, southeast of the project area (Steele 1984:147). There are also recorded "wallaby drives" and corroborees near Kent's Pocket and Dugandan during the 1880s-1890s (see Steele 1984:146-7). Brigalow spears from around this area were widely traded, with examples recorded from the Bellingen River, mid-North Coast of NSW.

Aboriginal sites that may be present within the broader landscape around the project area include stone artefacts as isolates and within scatters, larger camp sites especially on the alluvial flats associated with creeks, scarred trees in areas of remnant vegetation, axe-grinding grooves on sandstone outcrops along creek lines, traditional pathways, and bora rings/ceremonial areas.

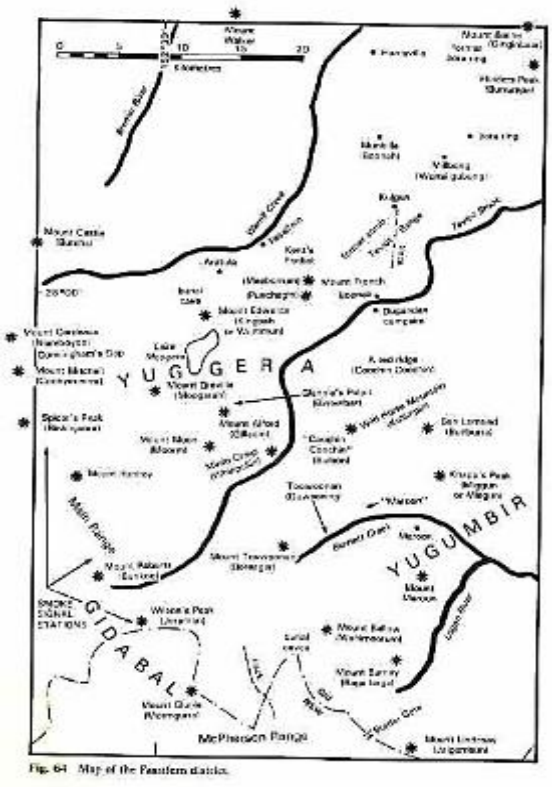


Figure 10: Map of sites in the Fassifern district (Steele 1984: Fig. 67).

3 Aboriginal Cultural Heritage Duty of Care Guidelines

The *Aboriginal Cultural Heritage Act 2003* requires that a person who carries out an activity must take all reasonable and practical measures to ensure the activity does not harm Aboriginal cultural heritage (the "cultural heritage duty of care").

The Cultural Heritage Duty of Care Guidelines (Section 28(2)[4]) identify reasonable and practicable measures for ensuring activities are managed to avoid or minimise harm to Aboriginal cultural heritage. The salient points on which compliance is judged are:

- The nature of the activity, and the likelihood of its causing harm to Aboriginal cultural heritage.
- The nature of the Aboriginal cultural heritage likely to be harmed by the activity.
- The extent to which the person consulted with Aboriginal parties about the carrying out of the activity, and the results of the consultation.
- Whether the person carried out a study or survey, of any type, of the area affected by the activity to find out the location and extent of the Aboriginal cultural heritage, and the extent of the study or survey.
- Whether the person searched the database and register for information about the area affected by the activity.
- The extent to which the person complied with the Cultural Heritage Duty of Care Guidelines.
- The nature and extent of past uses in the area affected by the activity.

The Duty of Care Guidelines divide activities and the effects they may have on Aboriginal cultural heritage into five categories.

Category 1 - Activities involving No Surface Disturbance

Where an activity involves no Surface Disturbance of an area it is generally unlikely that the activity will harm Aboriginal cultural heritage and the activity will comply with the Duty of Care Guidelines. Examples of activities that may proceed under Category 1 include walking, driving along existing roads and tracks, navigating through water and geological surveys using methods that do not cause surface disturbance. Such activities can proceed without further cultural heritage assessment.

Category 2 – Activities causing No Further Surface Disturbance

Where an activity will cause No Further Surface Disturbance to an area it is generally unlikely that the activity will harm Aboriginal cultural heritage or could cause additional harm to Aboriginal cultural heritage to that which has already occurred, and the activity will comply with the Duty of Care Guidelines. Examples of activities that may proceed under Category 2 include cultivation of an area which is currently subject to cultivation, grazing cattle on an area where cattle are currently grazing, tourism and visitation activities on an area where such activities are already taking place, and use and maintenance of existing roads, tracks and services and utilities such as electricity, water and sewerage infrastructure. Such activities can proceed without further cultural heritage assessment.

Category 3 – Developed Areas

Where an activity is proposed in a developed area it is generally unlikely that the activity will harm Aboriginal cultural heritage, and the activity will comply with the Cultural Heritage Duty of Care Guidelines. Developed Area means that the area is developed or maintained for a particular purpose such as use as a park, garden, railway, road or other access route, navigation channel, municipal facility or infrastructure facility, such as powerlines, telecommunication lines or electricity infrastructure. Examples of activities that may proceed under Category 3 include use and maintenance of existing roads, tracks, powerlines and services and utilities such as electricity, water

and sewerage infrastructure. Such activities can generally proceed without further cultural heritage assessment.

Category 4 – Areas previously subject to Significant Ground Disturbance

Where an activity is proposed in an area which has previously been subject to Significant Ground Disturbance, it is generally unlikely that the activity will harm Aboriginal cultural heritage, and the activity will comply with the Cultural Heritage Duty of Care Guidelines. Activities can generally proceed in an area previously subject to Significant Ground Disturbance without further cultural heritage assessment.

"Significant Ground Disturbance" means:

i. Disturbance by machinery of the topsoil or surface rock layer of the ground, such as by ploughing, drilling or dredging.
ii. The removal of native vegetation by disturbing root systems and exposing underlying soil.

Category 5 – Activities causing additional surface disturbance

Category 5 encompasses any activity that does not fall into any of the preceding categories. This category makes the assumption that there is generally a high risk that the activity could harm Aboriginal cultural heritage.

In these circumstances, the activity should not proceed without cultural heritage assessment and management. This may be achieved through the development of a Cultural Heritage Management Plan (CHMP) (part 7 of the Act), Cultural Heritage Study (Part 6 of the Act) or by a cultural heritage agreement (section 23(3)(a)(iii) of the Act).

4 Results of Assessment

4.1 Brief Description of the Project Area

The proposed site is approximately 439 hectares in area and is dominated by two (2) relatively steep hills separated by Warroolaba Creek. There are also a number of ephemeral creeks that drain from these hills. Due to these ephemeral creeks the landscape around the two (2) hills is undulating. The northern extent of the site is relatively flat, but the ground then begins to rise to the south. The central portion of the site is dominated by the two (2) hills, the western one the largest and highest. The hills descend sharply to the south and west, where the landscape is gently undulating. Warroolaba Creek is deeply etched into the ground between these hills forming a small gorge in places. Rocky platforms are evident in sections of Warroolaba Creek and some of the other ephemeral creeks. Much of the project area is covered in pasture as the site is currently used for cattle. There is an area of regrowth at the eastern extent of the site, with small patches elsewhere across the site. The eastern hill is essentially cleared and covered in grass. The western hill has an area of regrowth and remnant vegetation along its central ridge There is a narrow riparian corridor along Warroolaba Creek, especially where there is a flat flood plain. On the hills and undulating landscape, the red soil is generally shallow and the ground is often covered in rocks.

See Figures 11-23 for illustrations of the landscape, topography and vegetation.



Figure 11: Looking south from northern end of the project area (Converge 2018).



Figure 12: Looking north from southern end of the project area (Converge 2018).



Figure 13: Area of regrowth vegetation (Converge 2018).



Figure 14: Undulating landscape with cleared pasture (Converge 2018).



Figure 15: Rocky outcrop within an ephemeral creek (Converge 2018).



Figure 16: Looking down a hill across flat grassed expanse at the northern extent of the project area (Converge 2018).



Figure 17: Rocky hill slope (Converge 2018).



Figure 18: Looking west across Warroolaba Creek (Converge 2018).



Figure 19: Looking east across Warroolaba Creek to the steep side of the western hill (Converge 2018).



Figure 20: Warroolaba Creek and exposed rocks on the steep side of the western hill (Converge 2018).



Figure 21: Old Eucalypt tree within the riparian corridor along Warroolaba Creek (Converge 2018).

4.2 Assessment Outcomes

A field assessment of the project area was undertaken on the 25th October 2018, which involved a broad landscape assessment using the Cultural Heritage Duty of Care Guidelines. The assessment examined the project area with the aim of determining the extent of any potential Aboriginal cultural heritage that may exist in the project area. The site visit was not a systematic survey of the entire project area.

Ground surface visibility (GSV) over much of the area was fair due to the short and sometimes sparse grass cover, whereas Ground Surface Integrity (GI – degree of ground disturbance) was moderate due to past land clearing and farming activities. The removal of native vegetation in the past probably involved both hand and machine clearing which would have resulted in significant ground disturbance.

The key findings of the assessment are:

- There are no registered Aboriginal heritage places located within at least 6km of the project area.
- The majority of the proposed quarry area comprises two steep hills with Warroolaba Creek separating them. The sides of these hills generally descend quite steeply except to the north.
- The majority of the project area is covered by grass pasture, although there is some regrowth vegetation.
- There is a small area of mapped Category B remnant vegetation on the top of the western hill.
- Impacts on the landscape around the project area have mostly been vegetation clearance and farming, resulting in significant ground disturbance.
- No items of Aboriginal cultural heritage were identified in the project area during the field assessment – stone artefacts, grinding grooves or scarred trees - but again this was not a systematic survey of the entire project area.

4.3 Aboriginal Cultural Heritage Duty of Care Assessment

Under the Cultural Heritage Duty of Care Guidelines, the majority of the project area is best described as being Category 4 – an area which has previously been subject to significant ground disturbance (clearing of vegetation in the past and farming activities).

The Cultural Heritage Duty of Care Guidelines specify that where an activity is proposed in an area which has previously been subject to significant ground disturbance, that activity can proceed without further cultural heritage assessment as it is generally unlikely that the activity will harm Aboriginal cultural heritage. However, Category 4 acknowledges that an area that has previously been subject to significant ground disturbance may preserve certain features that retain residual Aboriginal cultural heritage significance. Landscape features which may have cultural heritage significance include (see section 6 of the Guidelines):

- Rock outcrops.
- Caves.
- Foreshores and coastal dunes.
- Sand hills.
- Areas of biogeographical significance such as natural wetlands.
- Permanent and semi-permanent waterholes and natural springs.
- Particular types of native vegetation.
- Some hill and mound formations.

As noted earlier, many of the prominent peaks in the broader area are associated with traditional stories (see Steele 1984). Whilst the project area does not include a prominent peak, it does have a landscape feature that may have cultural significance to the Traditional Custodians of the area. Warroolaba Creek is deeply etched into the ground between the two hills, forming a small gorge with steep rocky walls (Figures 19, 22). This may be a landscape feature that retain residual Aboriginal cultural heritage significance.



Figure 22: Looking across the gorge between the two hills (Converge 2018).



Figure 23: Warroolaba Creek (Converge 2018).

The area mapped as Category B remnant vegetation would best be classified as Category 5 under the Cultural Heritage Duty of Care Guidelines as it may not have been impacted by significant ground disturbance in the past. Category 5 makes the assumption that there is generally a high risk that the

activity could harm Aboriginal cultural heritage. In these circumstances, the activity should not proceed without cultural heritage assessment and management.

4.4 Areas of Higher Potential for Aboriginal Cultural Heritage

The potential for undocumented Aboriginal cultural heritage item/sites to be present in the project area is considered to range from low to moderate depending on the nature of the landscape and the extent of previous disturbance. Large sections of the project area have been cleared in the past and so the potential for Aboriginal cultural heritage to be present is assessed as low due to previous significant ground disturbance (Figure 24). The two (2) hills are also quite steep, especially the western hill, which would reduce the potential for the presence of Aboriginal cultural heritage.

The following areas/landscapes have moderate potential for Aboriginal cultural heritage:

- There is a flat flood zone along parts of Warroolaba Creek. Flat areas, especially slightly raised terraces adjacent to rivers/creeks are an ideal location for camp sites.
- There are rock platforms within Warroolaba Creek and some of the ephemeral creeks within the project area that could contain axe grinding grooves – note that none were observed on the rock platforms examined during the field visit, but not all were assessed (Figures 15, 20).
- There is a narrow riparian corridor along Warroolaba Creek which could contain older growth trees with cultural scars – note that none of the older trees examined during the field visit had cultural scars, but not all such trees were assessed.
- As the area of mapped Category B remnant vegetation on the top of the western hill may not have been impacted by significant ground disturbance in the past it has higher potential for undetected Aboriginal cultural heritage to be present.



Figure 24: Category 4 areas (pale green) with low potential for cultural heritage (base map Google Earth Pro 2018).

5 Recommendations

As noted in Section 4.3, the majority of the project area is best described as Category 4 under the Cultural Heritage Duty of Care Guidelines – an area which has previously been subject to significant ground disturbance. The Guidelines specify that where an activity is proposed in such an area, the activity can proceed without further cultural heritage assessment as it is generally unlikely that it will harm Aboriginal cultural heritage. However, these areas may preserve landscape features that retain residual Aboriginal cultural heritage significance. Warroolaba Creek has a small gorge with steep rocky walls that may have cultural significance for the Traditional Owners of the area.

Also, there is a small area mapped as Category B remnant vegetation - Category 5 under the Cultural Heritage Duty of Care Guidelines - as it may not have been impacted by significant ground disturbance in the past. Category 5 makes the assumption that there is generally a high risk that Aboriginal cultural heritage could be harmed by the proposed activity.

As the project area may have residual Aboriginal cultural heritage significance, contains a Category 5 area and there is potential for undocumented cultural material to be present within sections of the area, Neilsens should ensure that appropriate management strategies are implemented to fully meet its duty of care under the *Aboriginal Cultural Heritage Act 2003*.

5.1 Recommendation 1: Consultation with the Aboriginal Party

An effective way to manage the cultural heritage process is through consultation between the proponent and the Aboriginal Party. It is understood that contact had been made with the Jagera People, the previous Native Title claimants, through Jagera Daran Pty Ltd. Neilsens should initiate consultation with the current Native Title applicants, the Yuggera Ugarapul People, on the management of cultural heritage values/sites of the project area (see Table 1 for contact details).

Due to the nature of the development (quarry) it is further suggested that Neilsens develop a Cultural Heritage Management Agreement (CHMA) with the Aboriginal Party (see section 23(3)(a)(iii) of the Act).

5.2 Recommendation 2: New Find Measures and Cultural Heritage Inductions

As there remains potential for undocumented cultural material to be present within the project area, albeit low for most of the site, Neilsens should develop and implement an agreed procedure for incidental finds of cultural heritage during project activities and also include a cultural heritage component within project inductions.

As a guide, if potential Aboriginal cultural heritage material is identified during project works, all activities at that location should stop immediately and an exclusion zone of at least 10m radius be established. The Aboriginal Party should be notified as soon as practicable after the identification of potential Aboriginal cultural heritage. Any potential Aboriginal cultural heritage material identified should be recorded and assessed *in situ* by an appropriately qualified cultural heritage practitioner and management strategies developed in consultation with the Aboriginal Party. Work can continue elsewhere as long as it does not impact on the potential cultural heritage. Work at that particular location where the potential cultural heritage was identified should not recommence until written advice/approval has been provided by the Aboriginal Party. See also Appendix A.

References Cited

Queensland Herbarium 2018, Regional Ecosystem Description Database (REDD).

Sattler, P and R. Williams (eds). 1999. *The conservation status of Queensland's bioregional ecosystems*. Environmental Protection Agency: Brisbane.

Steele, J.G. 1984, *Aboriginal Pathways, in Southeast Queensland and the Richmond River*. The University of Queensland Press, St Lucia, Queensland.

Appendix A – New Find Procedures

<table>
<tr><th colspan="2">PROCEDURE FOR THE DISCOVERY OF A FIND OF POTENTIAL CULTURAL HERITAGE SIGNIFICANCE</th></tr>
<tr><td colspan="2">STOP WORK
If suspected cultural heritage is found, all work at that location should stop and a minimum 10m buffer zone around the outer extent of the find should be established. No project activities should occur within the buffer zone. The potential cultural heritage should not be removed or disturbed any further (barriers or temporary fences may be erected as a buffer around the find if required). Work can continue elsewhere within the broad area if these activities will not affect the potential cultural heritage.</td></tr>
<tr><td colspan="2">↓</td></tr>
<tr><td colspan="2">INITIAL CONTACT
Contact the Site Supervisor immediately and notify them of the suspected cultural heritage item and its location.</td></tr>
<tr><td colspan="2">↓</td></tr>
<tr><td colspan="2">NOTIFICATION TO HERITAGE CONSULTANT
The Site Supervisor is to contact a Heritage Consultant, providing details of the nature and location of the suspected cultural heritage item (include photographs where possible).</td></tr>
<tr><td colspan="2">↓</td></tr>
<tr><td colspan="2">ASSESS SIGNIFICANCE
The Heritage Consultant will make an initial assessment of the find and attend the site where deemed necessary in order to assess the nature and significance of the suspected cultural heritage item and recommend a course of action.</td></tr>
<tr><td>↓</td><td>↓</td></tr>
<tr><td>ABORIGINAL CULTURAL HERITAGE
Should the find be shown to be Aboriginal cultural heritage then representatives of the relevant Aboriginal Party must be contacted as soon as possible to develop appropriate management strategies. The Heritage Consultant can facilitate this process. A site visit and other mitigation strategies (e.g. site survey, collection and relocation of artefacts) may be requested by representatives of the relevant Aboriginal Party. A request for a site survey could impact on the project's work program, but this should be discussed with representatives of the relevant Aboriginal Party.</td><td>HISTORICAL HERITAGE
If the item is historical heritage, the management options might include:
i. record and remove;
ii. protect and avoid;
iii. investigate and preserve; or
iv. no action if the item is deemed to have no significance.
These options may require preparation of a work method statement in consultation with the Department of Environment and Science (DES) Cultural Heritage Branch prior to any action commencing.</td></tr>
<tr><td>↓</td><td>↓</td></tr>
<tr><td>WORK RECOMMENCES
Following discussions and agreement and implementation of any required mitigation strategies, the Aboriginal Party will advise when works can recommence at the location and provide sign-off that works can recommence.</td><td rowspan="3">GO TO NEXT PAGE</td></tr>
<tr><td>↓</td></tr>
<tr><td>FURTHER FINDS
Continue to follow the Procedure for Discovery of a Find of Potential Cultural Heritage Significance.</td></tr>
<tr><td colspan="2">(Converge 2018)</td></tr>
</table>

FURTHER PROCEDURE FOR DISCOVERY OF A FIND OF HISTORIC HERITAGE SIGNIFICANCE	
IS ITEM DISCOVERED SIGNIFICANT?	
Yes ↓	↓ NO
REPORT FIND TO EHP CULTURAL HERITAGE Heritage Consultant will report the find to EHP Cultural Heritage Branch as is required by law. Depending on the nature of the find, the Heritage Consultant and EHP will negotiate requirements of find.	RECORDING Items deemed to have no significance will require recording as evidence. A photographic recording of the item, including a description of why it is not of significance, will be completed by the Heritage Consultant and forwarded to the Project Manager.
↓	↓
COMPLETE RECORDING/FIELD WORK Complete the remedial works in accordance with the consent permit or agreed course of action. Advise Site Manager when assessment is complete.	ADVICE Advise Site Manager when assessment is complete. Confirm advice with DES Cultural Heritage Branch if required.
↓	↓
WORK RECOMMENCES The Heritage Consultant will advise the Project Manager when works can re-commence in the original or changed form. A Work Method Statement may be devised to ensure suitable management is in place by the project (if required).	
↓	
SUBMIT REPORT The Heritage Consultant will complete reporting in accordance with the appropriate guidelines and conditions. A copy of the report will be provided to the Project Manager and relevant Government Authorities.	
↓	
FURTHER FINDS Continue to follow the Procedure for Discovery of a Find of Potential Cultural Heritage Significance.	
(Converge 2018)	

Appendix B – DATSIP Search Results

Cultural Heritage Management Plan

Warrill View Quarry

The Yuggera Ugarapul People

AND

Neilsens Quality Gravels Pty Ltd

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This Cultural Heritage Management Plan

is dated 2023

Parties

The Yuggera Ugarapul People Registered Native Title Claimant being, at the Commencement Date, Margaret McCarthy, John Anderson, Narrella Simpson, Lynda Maybanks, Samantha Carr, Faye Carr, Wade Thompson, Sonya Coghill and David Conlon (**Yuggera Ugarapul Endorsed Party**)

AND

Neilsens Quality Gravels Pty Ltd ABN 19 010 620 916 (**Neilsens**)

Background

A This Agreement comes out of consultation between Neilsens and the Yuggera Ugarapul Endorsed Party about Neilsen's Project, being a proposed quarry within the CHMP Area.

B The Yuggera Ugarapul People Registered Native Title Claimant is the Native Title Party for the CHMP Area under section 34(1)(a) of the ACHA and the Aboriginal Party for the CHMP Area under sections 35(1)-(3) of the ACHA.

C Neilsens acknowledges that some of its Project Activities have the potential to cause Harm to Aboriginal Cultural Heritage.

D Neilsens notified the Yuggera Ugarapul People Registered Native Title Claimant of its intention to develop a cultural heritage management plan for the Project and endorsed the Yuggera Ugarapul Endorsed Party to assist in developing this Agreement for the purposes of section 91 of the ACHA.

E In relation to the Project Activities which Neilsens proposes to undertake in the CHMP Area, the Yuggera Ugarapul Endorsed Party has agreed to work with Neilsens to maximise the protection of and prevention of Harm to Aboriginal Cultural Heritage.

F The Parties acknowledge that:

(i) Aboriginal Cultural Heritage should be conserved and protected and that the responsibility for conserving and protecting any Aboriginal Cultural Heritage which may exist within the CHMP Area is primarily the responsibility of the Yuggera Ugarapul Endorsed Party; and

(ii) they must comply with the Cultural Heritage Duty of Care.

G The Parties have developed and entered into this Agreement in accordance with Part 7 of the ACHA to ensure that any Aboriginal Cultural Heritage within the CHMP Area is identified, protected, and managed in accordance with the ACHA and with a view to sustaining a relationship of cooperation between the Parties.

H The Parties acknowledge and agree that consultation and participation are integral components of free, prior, and informed consent. The Parties agree that these consultations

were undertaken in good faith and allowed the Parties to establish dialogue in an atmosphere of respect and openness.

I Neilsens acknowledges that the Yuggera Ugarapul People have a deep spiritual connection with Country and continuing cultural responsibilities, both to Country and to future generations of Yuggera Ugarapul People. The Parties acknowledge that the Yuggera Ugarapul People would prefer undeveloped land to be managed in accordance with traditional methods of land care and for the conservation of Aboriginal cultural heritage, but that if it is not possible, then the Yuggera Ugarapul People should have a voice on how their Aboriginal Cultural Heritage will be affected.

J This Agreement enables the Yuggera Ugarapul People to participate in decision-making in matters which affect their rights, through representatives chosen by themselves in accordance with their own procedures in accordance with Article 18 of the *United Nations Declaration on the Rights of Indigenous Peoples*, which position is reflected in this Agreement. For clarification, in this CHMP the words "Indigenous People" means the Yuggera Ugarapul People.

K In relation the CHMP Area, the Parties intend this Agreement to be an approved CHMP for the purposes of section 23(3)(a)(ii) of the ACHA and an agreement for the purposes of meeting Neilsens' Cultural Heritage Duty of Care, such that Project Activities undertaken by or on behalf of Neilsens in the CHMP Area in accordance with this Agreement (whether approved by the Chief Executive under section 107 of the ACHA or not) are taken to have complied with the Cultural Heritage Duty of Care and otherwise be compliant with the ACHA.

1. Definitions

Certain words and phrases used in this Agreement have the meanings contained in Schedule 1.

2. Interpretation

In this Agreement:

(a) a singular word includes the plural and vice versa;

(b) a reference to a clause, schedule, annexure, or party is a reference to a clause of, and a schedule, annexure or party to, this document and references to this Agreement include any schedules or annexures;

(c) a reference to a party to this Agreement or any other document or agreement includes the party's employees, contractors, agents, successors, permitted substitutes and permitted assigns;

(d) if a word or phrase is defined, its other grammatical forms have a corresponding meaning;

(e) a word or expression defined in the ACHA or the NTA that is not otherwise defined in this Agreement has the meaning given to it in the relevant legislation;

(f) a reference to a document or agreement (including a reference to this document) is to that document or agreement as amended, supplemented, varied, or replaced;

(g) a reference to legislation or to a provision of legislation (including subordinate legislation) is to that legislation as amended, re-enacted, or replaced, and includes any subordinate legislation issued under it;

(h) if any day on or by which a person must do something under this document is not a Business Day, then the person must do it on or by the next Business Day;

(i) a reference to a person includes a corporation, trust, partnership, unincorporated body, government and local authority or agency, or other entity; and

(j) a reference to 'including' means 'including but not limited to'.

3. Term

(a) The Agreement applies to all Aboriginal Cultural Heritage in the CHMP Area.

(b) The Agreement commences on the Commencement Date and, subject to clause 3(c), continues until all Project Activities are completed and Neilsens gives written notice of such completion to the Yuggera Ugarapul Endorsed Party.

(c) The Agreement operates until:

(i) the Parties agree in writing that this Agreement should be terminated;

(ii) the Yuggera Ugarapul Endorsed Party is no longer the Aboriginal Party for any part of the CHMP Area and Neilsens gives five (5) Business Days written notice to the Yuggera Ugarapul Endorsed Party that it is electing to terminate this Agreement; or

(iii) a Terminating Event occurs, and Neilsens gives five (5) Business Days' written notice to the Yuggera Ugarapul Endorsed Party that it is electing to terminate this Agreement. For clarification, the appointment and authorisation of a PBC for any proposed Determination in relation to any part (or all) of the CHMP Area does not constitute a Terminating Event.

(d) The rights and obligations of the Parties under this Agreement which have accrued at the date of the termination of this Agreement pursuant to clause 3(b) or 3(c) will continue beyond such date of termination until the particular obligations is fulfilled, and the provisions of this Agreement dealing with procedural matters will continue to apply until the fulfilment of such obligations.

(e) Except as specified in this Agreement, no breach of this Agreement by any Party will give the other Party a right to elect to terminate this Agreement, but that Party may exercise any right or remedy otherwise available to it in respect of such a breach.

4. Authority

4.1 Yuggera Ugarapul Endorsed Party

The Yuggera Ugarapul Endorsed Party represents and warrants that:

(a) the Yuggera Ugarapul People Registered Native Title Claimant is the sole Aboriginal Party required to be notified under sections 91 to 93 of the ACHA for the CHMP Area;

(b) the Yuggera Ugarapul People are the primary guardians, keepers, and knowledge holders of Aboriginal Cultural Heritage within the CHMP Area and the Yuggera Ugarapul Endorsed Party, as the representative of the Yuggera Ugarapul People, permit the Project Activities to be undertaken only in accordance with this Agreement; and

(c) they are authorised to enter into this Agreement on behalf of the Yuggera Ugarapul People and will use their best endeavours to procure that the Yuggera Ugarapul People comply with the terms of this Agreement as if they were also parties to this Agreement.

4.2 The Sponsor

Neilsens represents and warrants that:

(a) it has full power and authority to enter into this Agreement; and

(b) it has taken all necessary action to authorise the execution, delivery, and performance of this Agreement in accordance with its terms.

5. Aims

(a) The objectives of this Agreement are to establish measures to manage the risk of Harm to Aboriginal Cultural Heritage caused by Project Activities undertaken by or on behalf of Neilsens in the CHMP Area in the following ways:

(i) ensuring Neilsens complies with the Cultural Heritage Duty of Care;

(ii) providing guidance to Neilsens to identify, protect and manage Aboriginal Cultural Heritage during Project Activities;

(iii) outlining clear and agreed processes for Neilsens and the Yuggera Ugarapul Endorsed Party to manage Project Activities that could cause Harm to Aboriginal Cultural Heritage including previously undiscovered Aboriginal Cultural Heritage;

(iv) outlining processes for effective communication between Neilsens and the Yuggera Ugarapul Endorsed Party in relation to Project Activities;

(v) providing the necessary information and requirements to help with the recognition of Aboriginal Cultural Heritage and respect for Yuggera Ugarapul People's knowledge, culture, and traditions on the part of persons undertaking relevant Project Activities;

(vi) recognising that the Yuggera Ugarapul People have the right under section 28 of the *Human Rights Act 2019* (Qld) to maintain, control and protect their cultural heritage, including their traditional knowledge, this Agreement provides the Yuggera Ugarapul People with an acceptable level of comfort that, with regard to Neilsens' Project Activities within the CHMP Area, Aboriginal Cultural Heritage will be managed according to their requirements; and

(vii) recognising the Yuggera Ugarapul People as the primary guardians, keepers, and knowledge holders of Aboriginal Cultural Heritage in the CHMP Area.

(b) The Agreement also seeks to ensure that Project Activities proposed by or on behalf of Neilsens in the CHMP Area can proceed with minimum delay and impediment.

6. Statements for the purposes of the ACHA

6.1 Development of this Agreement

The Parties acknowledge and agree that:

(a) they have consulted and negotiated about how the Project Activities are to be managed:

(i) to avoid Harm to Aboriginal Cultural Heritage; and

(ii) to the extent that Harm cannot reasonably be avoided, to minimise Harm to Aboriginal Cultural Heritage;

(b) the processes set out in this Agreement provide for reasonable and effective protection and conservation of Aboriginal Cultural Heritage.

6.2 Satisfaction of ACHA Duty of Care

The Parties acknowledge and agree that:

(a) they intend this Agreement to be an approved CHMP for the purposes of section 23(3)(a)(ii) of the ACHA and an agreement for the purposes of meeting Neilsens' Cultural Heritage Duty of Care; and

(b) Project Activities undertaken by or on behalf of Neilsens in the CHMP Area in accordance with this Agreement (whether approved by the Chief Executive under section 107 of the ACHA or not) are taken to have complied with the Cultural Heritage Duty of Care and are otherwise compliant with the ACHA.

7. Principles for the Protection and Management of Aboriginal Cultural Heritage

The Parties agree that the principles for the management of the risk of Harm occurring to Aboriginal Cultural Heritage in the CHMP Area as a result of the Project Activities are:

(a) compliance with the provisions of section 5 of the ACHA;

(b) respect for Aboriginal knowledge, culture, and traditional practices;

(c) Project Activities will only be undertaken in the CHMP Area in accordance with this Agreement;

(d) acknowledgement of the Yuggera Ugarapul People as the primary guardians, keepers, and knowledge holders of Aboriginal Cultural Heritage;

(e) all cultural and intellectual property rights associated with Aboriginal Cultural Heritage remain the property of the Yuggera Ugarapul People to the extent permitted by law;

(f) respect, preservation and maintenance of knowledge, innovations and practices of Aboriginal communities and the promotion of understanding of Aboriginal Cultural Heritage; and

(g) acknowledgement that activities involved in recognition, protection and conservation of Aboriginal Cultural Heritage are important because they allow Aboriginal people to reaffirm their obligations to 'law and country'.

8. Cultural Heritage Management Plan

8.1 Approved CHMP for the CHMP Area

(a) Neilsens requires an Approved CHMP for the Project for the purposes of Division 2 of Part 7 of the ACHA, and the Parties agree that this Agreement will form the CHMP and will take all reasonable steps and do all things that may reasonably be required for this Agreement to be approved by the Chief Executive as an Approved CHMP.

(b) The Parties acknowledge and agree that Neilsens may give this Agreement to the Chief Executive.

(c) The Parties agree that, following the Commencement Date, but prior to the approval of this Agreement or in the event that it is not an Approved CHMP, this Agreement constitutes 'another agreement' for the purposes of sections 23(3)(a)(iii), 24(2)(a)(iii), 25(2)(a)(iii) and 26(2)(a)(iii) of the ACHA.

9. Confidentiality

(a) Each Party undertakes not to disclose Confidential Information of the other Party without the prior written consent of the other Party unless:

(i) required by law;

(ii) it is or becomes public knowledge (other than in breach of this clause);

(iii) it was received from another person having the unrestricted legal right to disclose the information;

(iv) it is disclosed to the Party's accountants, financiers, financial institutions, legal advisers, or employees on their undertaking to keep the information confidential in accordance with this Agreement;

(v) in the case of Neilsens, to a Related Body Corporate or to a bona fide potential assignee;

(vi) to the extent that a Party may, at any time after another Party has failed to observe or perform any of its obligations under this Agreement, consider necessary or desirable to preserve or enforce its interests or rights; or

(vii) it is disclosed to other Aboriginal persons whom the Yuggera Ugarapul Endorsed Party consider it culturally appropriate to consult for the purpose of securing their agreement to this Agreement or a course of action countenanced in this Agreement.

(b) Ownership of Neilsens' Confidential Information remains with Neilsens and the Parties acknowledge that such Confidential Information is both commercial in nature and central to the success of the Project.

(c) The Parties agree that Culturally Sensitive Information about Aboriginal Cultural Heritage is Confidential Information and that Neilsens does not require it to meet its statutory or regulatory requirements or in relation to meeting the Cultural Heritage Duty of Care.

10. Intellectual Property

10.1 Ownership of intellectual property

Ownership of any intellectual property in information pertaining to Aboriginal Cultural Heritage in the CHMP Area or to YUP's Confidential Information or Culturally Sensitive

Information that may already be in existence prior to this Agreement, or which may be generated in the course of this Agreement shall be vested in the YUP.

10.2 Use of intellectual property

(a) The YUP will grant Neilsens a non-exclusive, irrevocable, worldwide and royalty-free licence to make such limited use of the YUP's Confidential Information and intellectual property in such a form as is reasonably necessary to enable Neilsens to meet its statutory and regulatory obligations and to undertake any of the Project Activities in the CHMP Area.

(b) In giving effect to clause 10.2(a), Neilsens accepts that it does not require any primary information about Aboriginal Cultural Heritage to meet its statutory or regulatory requirements in relation to meeting its duty of care under the ACHA.

11. GST

11.1 GST exclusive

Except under this clause, the consideration for a Supply made under or in connection with this document does not include GST.

11.2 Taxable Supply

If a Supply made under or in connection with this document is a Taxable Supply, then at or before the time the consideration for the Supply is payable:

(a) the Recipient must pay the Supplier an amount equal to the GST for the Supply (in addition to the consideration otherwise payable under this document for that Supply); and

(b) the Supplier must give the Recipient a Tax Invoice for the Supply.

11.3 Reimbursement or indemnity

If either Party has the right under this document to be reimbursed or indemnified by another Party for a cost reasonably incurred in connection with this document, that reimbursement or indemnity excludes any GST component of that cost for which an Input Tax Credit may be claimed by the party being reimbursed or indemnified, or by its Representative Member, Joint Venture Operator or other similar person entitled to the Input Tax Credit (if any).

12. Variations to the Agreement

The Parties may agree to variations to this Agreement. Any variations to this Agreement must be in writing and signed by both Parties.

13. Assignment

(a) Persons entitled to the benefit of this Agreement include Neilsens, Related Bodies Corporate of Neilsens (including any future Related Bodies Corporate), and any persons with whom Neilsens (or its Related Bodies Corporate) associate within joint venture arrangements in relation to the Project and any future assignees. The Parties acknowledge that this Agreement may be enforced by the third party beneficiaries listed in this clause 13(a) in accordance with section 55 of the *Property Law Act 1974* (Qld).

(b) Neilsens (**Assignor**) may assign the whole or any part of its interest in the Project and its rights under this Agreement without restriction, and the Assignor must provide the Yuggera Ugarapul Endorsed Party with a deed of assumption signed by the assignee within 15 Business Days of the date of the deed of assumption, whereby the assignee covenants to observe, perform, comply with and be bound by the terms of this Agreement as if expressly named in this Agreement as the Sponsor.

(c) Neilsens agrees to meet the reasonable and agreed legal costs of the Yuggera Ugarapul Endorsed Party to review any deed of assumption given in accordance with clause 13(b).

(d) On and from the date of the delivery of the deed of assumption signed by the assignee to the Yuggera Ugarapul Endorsed Party, the Assignor is wholly and unconditionally released from all claims and liabilities arising from this Agreement in respect of the assumed obligations.

(e) At any time after the appointment and authorisation of a PBC for any proposed Determination in relation to any part (or all) of the CHMP Area, Neilsens may invite the applicable PBC to (as soon as practicable after becoming a Registered Native Title Body Corporate) become a Party to this Agreement by executing an appropriate deed.

14. Governing law and jurisdiction

(a) This Agreement is governed by the laws of Queensland.

(b) Each Party irrevocably submits to the exclusive jurisdiction of the Courts of Queensland.

15. Force Majeure

15.1 Notice and suspension of obligations

If a Party is affected, or is likely to be affected, by a Force Majeure Event:

(a) the Party must immediately give the other Party prompt notice of the particulars of the Force Majeure Event including:

(i) an estimate of its likely duration;

(ii) the obligations affected by it and the extent of its effect on those obligations; and

(iii) the steps taken to rectify it; and

(b) the Party's obligations under this Agreement are suspended to the extent they are affected by the Force Majeure Event for as long as the Force Majeure Event continues.

15.2 Effort to overcome

A Party claiming a Force Majeure Event must use its best endeavours to remove, overcome or minimise the effects of that Force Majeure Event as quickly as possible but this does not require a Party to settle any industrial dispute on terms contrary to the wishes of the Party.

16. Cultural Protocols and Bereavement

16.1 Cultural Protocols

Neilsens acknowledges that the Yuggera Ugarapul People have cultural protocols (for example, for bereavement (sorry business) for a member of the Yuggera Ugarapul People) which may require them to temporarily suspend the performance of their tasks under this Agreement (**Cultural Event**).

16.2 Minimise impacts

The Yuggera Ugarapul Endorsed Party will use their reasonable endeavours to minimise impacts and delays that a Cultural Event may cause to Project Activities, for example by temporarily replacing a representative affected by a Cultural Event with a person who is not so affected. Neilsens acknowledges that, in some circumstances, this may not be possible.

16.3 Notification and recommencement

If there has been a Cultural Event, and this will affect the performance by the Yuggera Ugarapul Endorsed Party or their representatives of their obligations under this Agreement, then the Yuggera Ugarapul Endorsed Party will notify Neilsens and:

(a) provide information to Neilsens about the nature of the Cultural Event (to the extent it is appropriate to do so);

(b) provide a timeframe within which they will be able to recommence performance of their obligations under this Agreement;

(c) if the Cultural Event is likely to prevent performance of their obligations under this Agreement for more than three (3) Business Days, consult with Neilsens about alternative mechanisms by which those obligations may be met so as to not present a delay to Project Activities (for example, replacing any highly affected person with another person);

(d) if the Cultural Event prevents performance of their obligations under this Agreement for more than three (3) Business Days and alternative mechanisms have not been put in place, clause 18.1 will apply;

(e) Neilsens agrees that the Yuggera Ugarapul Endorsed Party may, at the earliest available opportunity, inspect the part of the CHMP Area or Work Area where Project Activities were undertaken in accordance with this clause 16.3, subject to the Parties reaching agreement on a budget calculated in accordance with Schedule 6;

(f) following the inspection by the Yuggera Ugarapul Endorsed Party, the Yuggera Ugarapul Endorsed Party may, in consultation with the Technical Advisor, propose a reasonable course of action to remediate any impact on Aboriginal Cultural Heritage caused by any Project Activities undertaken in accordance with this clause 16.3 for agreement between the Parties; and

(g) if Neilsens and Yuggera Ugarapul Endorsed Party agree to the remediation works, Neilsens agrees to undertake the remediation works in a timely manner.

17. Corrective Actions

17.1 Survey

(a) Prior to undertaking any Project Activities that involve Significant Ground Disturbance, Neilsens must undertake a Survey in accordance with Schedule 4.

(b) Neilsens may only undertake Project Activities that involve Significant Ground Disturbance once a Mitigation Plan is in place.

17.2 Implementation

(a) The roles of the Parties and their key representatives in the implementation of this Agreement are set out in Schedule 3.

(b) Neilsens will pay the costs of the Yuggera Ugarapul Endorsed Party to perform its obligations under this Agreement in accordance with the rates, financial arrangements and other details set out in Schedule 6, subject to the Parties reaching agreement on a budget prior to any costs or expenditure being incurred.

(c) Disputes which arise between the Parties which relate to the Agreed Recommendations, the Mitigation Plan, or otherwise relating to the implementation of this Agreement will be resolved in accordance with the Dispute Resolution Procedure.

(d) At least once per calendar year, the Parties will meet to discuss compliance with the Mitigation Plan and the implementation of this Agreement. A meeting under this clause 17.2(d):

(i) may be held between Neilsens and the Yuggera Ugarapul Coordinators; or

(ii) may form part of the responsibilities of the Reference Group to be established under the Relationship Agreement.

17.3 Unauthorised Harm

(a) Neilsens acknowledges that Unauthorised Harm may cause irreversible Harm to and/or loss of Aboriginal Cultural Heritage, and that such Harm and/or loss may cause the Yuggera Ugarapul People to suffer deep spiritual loss, genuine offence, anxiety, anguish, distress and affront.

(b) With this in mind, Neilsens will procure that all site personnel are informed of the obligations under this Agreement, and will ensure that:

(i) all its employees and contractors comply with the procedures set out in this Agreement; and

(ii) relevant employees and contractors undertake a Cultural Heritage Awareness Induction as required by Schedule 8.

(c) If Neilsens becomes aware that it, or any of its employees, contractors or agents, have caused Unauthorised Harm to any Aboriginal Cultural Heritage within the CHMP Area, Neilsens must immediately:

(i) cease work within the immediate vicinity of the Unauthorised Harm; and

(ii) provide to the Yuggera Ugarapul Coordinators a completed Alleged Breach Form (in the form of Schedule 11).

(d) Within twenty-four (24) hours of receipt by the Yuggera Ugarapul Coordinators of the Alleged Breach Form, the Sponsor's Representative will convene a meeting with the Yuggera Ugarapul Coordinators and Technical Advisor to discuss, and visit the site of, the alleged breach.

17.4 Compliance Audit and Resolution

(a) At (or as soon as practicable after) the meeting referred to in clause 17.3(d), the Yuggera Ugarapul Coordinators and the Sponsor's Representative will seek to agree on a budget for a Compliance Audit to be undertaken.

(b) Within twenty-four (24) hours of the budget being approved under clause 17.4(a), the Yuggera Ugarapul Coordinators and Technical Advisor will undertake a Compliance Audit as follows:

(i) review the operation, effectiveness and level of compliance with this Agreement; and

(ii) review the operation, effectiveness, and level of compliance and implementation the Mitigation Plan at the location in question; and

(iii) interview the relevant contractors, sub-contractors or other personnel and their employees (as the case may be) to determine where possible if any person has any knowledge of the incident, including how it occurred, when it occurred and who was responsible; and

(iv) determine if the relevant contractors, sub-contractors or other personnel and their employees (as the case may be) responsible had completed the Cultural Heritage Awareness Induction; and

(v) determine if the relevant contractors, sub-contractors or other personnel and their employees (as the case may be) and have been appropriately briefed as to any management measures required by the Mitigation Plan for the location.

(c) The Yuggera Ugarapul Coordinators and Technical Advisor will provide the Sponsor's Representative with the results of the Compliance Audit within twenty-four (24) hours of its completion.

17.5 Finding of No Unauthorised Harm

(a) Where the Parties agree that there has not been any Unauthorised Harm, they will determine:

(i) if any additional measures are nevertheless required to appropriately manage any Aboriginal Cultural Heritage in the location; and

(ii) what those additional measures should include;

(iii) how those additional measures are implemented; and

(iv) that any Project Activities that have ceased in the relevant area can resume.

(b) The Parties may also agree to amend this Agreement and/or any existing measures, practices and procedures to reflect the results of the Compliance Audit.

17.6 Finding of Unauthorised Harm

(a) If the Compliance Audit finds that Unauthorised Harm has occurred, within twenty-four (24) hours after receipt of the results of the Compliance Audit, Neilsens will convene a further meeting with the Yuggera Ugarapul Coordinators and Technical

Advisor to develop and agree remedial actions to address the impacts of the Unauthorised Harm.

(b) If

(i) Harm is caused to Aboriginal Cultural Heritage as a result of Project Activities and that Harm is not authorised by:

(A) this Agreement;

(B) a Survey Report;

(C) Mitigation Plan; or

(D) any other arrangement recorded in writing between the YUP and Neilsens; and

(ii) as a result Neilsens is convicted of an offence under section 24 of the ACHA; and

(iii) is not ordered to pay the costs of repair and restoration of the Aboriginal Cultural Heritage under section 27 of the ACHA,

Neilsens must allow YUP to undertake, if possible, the repair or restoration of the Aboriginal Cultural Heritage and agrees pay the reasonable costs relating to that repair or restoration on a full indemnity basis.

18. Failure to comply

18.1 Failure by the Yuggera Ugarapul People

(a) In the event the Yuggera Ugarapul Endorsed Party fails to comply with any of their obligations under this Agreement (other than in relation to Monitoring, which shall be dealt with under Schedule 4 clause 22) and:

(i) the failure is not due to a breach of this Agreement by Neilsens;

(ii) the failure is not a result of a Force Majeure Event; or

(iii) the failure is not due to a Cultural Event (or the failure is due to a Cultural Event, and the time period stated in clause 16.3(d) has elapsed);

Neilsens will notify in writing the Yuggera Ugarapul Endorsed Party of the failure to comply with the relevant obligations and provide the Yuggera Ugarapul Endorsed Party with five (5) Business Days to rectify that failure.

(b) Where no response is provided by the Yuggera Ugarapul Endorsed Party within five (5) Business Days of the receipt of the notice in clause 18(a) the Yuggera Ugarapul Endorsed Party has otherwise not taken the necessary steps to rectify the failure to comply, Neilsens must comply with the following process:

(i) provide a further written notice to the Yuggera Ugarapul Endorsed Party requesting that it rectify that failure within a further five (5) Business Days;

(ii) Neilsens will advise the Yuggera Ugarapul Endorsed Party of its willingness to meet and discuss any concerns or issues that the Yuggera Ugarapul Endorsed Party may have in relation to the failure to comply;

(iii) if at the end of the further five (5) Business Days (or such further period as the Parties may agree) following the receipt of the further written notice in clause 18(b)(ii), the Yuggera Ugarapul Endorsed Party has not taken the necessary steps to rectify the failure to comply, Neilsens may proceed to take such steps (including, but not limited to, undertaking a Survey or such investigations of the Work Area, developing and implementing any Mitigation Plan arising from such Survey or investigations) as Neilsens deems necessary and may otherwise proceed to undertake the Project Activities in the Work Area;

(iv) notwithstanding any failure to comply, Neilsens agrees that the Yuggera Ugarapul Endorsed Party may, at the earliest available opportunity, inspect the part of the Work Area where Project Activities were undertaken in accordance with the terms of clause **Error! Reference source not found.** (**Notification and recommencement**); and

(v) Following the inspection by the Yuggera Ugarapul Endorsed Party, in consultation with the Technical Advisor, propose a reasonable course of action to remediate any impact on Aboriginal Cultural Heritage caused by the Project Activities undertaken in accordance with clause **Error! Reference source not found.** for agreement between the Parties.

18.2 Failure by Neilsens

(a) In the event that Neilsens fails to comply with any of their obligations under this Agreement and the failure is not due to a breach of this Agreement by the Yuggera Ugarapul Endorsed Party, the Yuggera Ugarapul Endorsed Party:

(i) will notify Neilsens in writing of its failure to comply with the relevant obligations and provide Neilsens with ten (10) Business Days to rectify that failure (**Rectification Period**);

(ii) at the end of the Rectification Period, may stop undertaking any work on the Project in accordance with this Agreement until such time as the failure is rectified by Neilsens, unless Neilsens has issued a Dispute Notice under the Dispute Resolution Procedure within the Rectification Period; and

(iii) will otherwise refer the matter for resolution as a Dispute under the Dispute Resolution Procedure where the failure is not rectified by Neilsens within ten (10) Business Days of the end of the Rectification Period.

19. General

(a) Each Party must do all things and execute all further documents necessary to give full effect to this Agreement and refrain from doing anything that might hinder the performance of this Agreement.

(b) This Agreement constitutes the entire Agreement of the Parties as to its subject matter and supersedes and cancels all prior arrangements, understandings, and negotiations in connection with it. Any statement made in negotiations for this Agreement which is not set out in this Agreement does not form part of the Agreement between the Parties.

(c) The failure of a Party at any time to require full or partial performance of any provision of this Agreement does not affect in any way the full right of that Party to require that performance subsequently.

(d) The waiver by any Party of a breach of a provision of this Agreement is not deemed a waiver of all or part of that provision or of any other provision or of the right of that Party to avail itself of its rights subsequently.

(e) Any waiver of a breach of this Agreement must be in writing signed by the Party granting the waiver and is effective only to the extent specifically set out in that waiver.

(f) Words used in the schedules have the same meaning as in the body of the Agreement.

(g) This Agreement may consist of a number of counterparts which, taken together, constitute one and the same instrument.

(h) If part or all of any provision of this Agreement is illegal or unenforceable, that part may be severed from this Agreement and the remaining provisions of this Agreement continue in force.

(i) If a part of this Agreement is severed the Parties shall attempt to renegotiate, in good faith, that part and seek to achieve a result as near as reasonably practicable as is consistent with the intention of the severed component.

(j) Neilsens and the Yuggera Ugarapul Endorsed Party each acknowledge that it has had an opportunity to seek independent legal advice with respect to all aspects of this Agreement.

(k) Nothing contained in this Agreement is to be construed as creating the relationship between the Parties of partnership, principal and agent or joint venture.

(l) This Agreement is binding on and ensures to the benefit of the Parties and their Related Bodies Corporate, administrators, executors, and successors.

(m) The confidentiality, warranty and indemnity provisions in this Agreement are each a continuing obligation, separate and independent from the other obligations of the Parties and survive termination of this Agreement.

(n) The Parties acknowledge that, for the purposes of any Survey or services delivered under Mitigation Plans carried out under this Agreement, the Yuggera Ugarapul People are a contracting party independent from Neilsens and nothing in this Agreement shall be construed as creating any other legal relationship as between the Yuggera Ugarapul People and Neilsens.

20. Notice

(a) A notice, nomination, appointment, consent, or any other communication required under this Agreement is only effective if it is:

(i) in writing, signed by or on behalf of the Party giving the notice unless it is an email which need not be signed;

(ii) addressed to the person to whom it is to be given; and

(iii) given as follows:

(A) delivered by hand to that person's address.

(B) sent by prepaid mail (and by prepaid airmail if the person is overseas) to that person's address;

(C) sent by email to that person's email address, then on the date the email is sent.

(b) A notice, nomination, appointment, consent, or any other communication delivered under clause 20(a) is given and received:

(i) if it is hand delivered:

(A) by 5.00pm (local time in the place of receipt) on a Business Day – on that day; or

(B) after 5.00pm (local time in the place of receipt) on a Business Day, or at any time on a day that is not a Business Day – on the next Business Day; and

(ii) if it is sent by post:

(A) within Australia – six (6) Business Days after posting; or

(B) to or from a place outside Australia – ten (10) Business Days after posting.

(iii) if it is sent by email, then the date the email was received.

(c) The Parties' addresses, fax and email are those set out below and for the Sponsor's Representative, the Yuggera Ugarapul Coordinators and the Liaison Committee members as set out in Schedule 9, or as the Party advises by later notice:

(i) **The Yuggera Ugarapul Endorsed Party**

c/- Parallax Legal
PO Box 461
MORNINGSIDE QLD 4170

cassie.lang@parallaxlegal.com.au

(ii) **The Service Provider**

Cultural Heritage Solutions Pty Ltd.

Phone: 0431 078 109

Email: adam@chsolutions.com.au

PO Box 6045, Fairfield, QLD, 4103

(iii) **Neilsens Quality Gravels Pty Ltd**

PO Box 5319

BRENDALE QLD 4500

Phone: 1300 266 273

Mobile: 0437 985 225

Email: steve.pyne@neilsens.com.au

Schedule 1 Definitions

In this Agreement:

Term	Definition
Aboriginal Cultural Heritage	has the same meaning as in the ACHA.
ACHA	means the *Aboriginal Cultural Heritage Act 2003* (Qld).
Agreement	means this Agreement, all its schedules and annexures.
Agreed Recommendations	means specific recommendations to avoid or minimise Harm to Aboriginal Cultural Heritage within the CHMP Area as agreed by the Parties in accordance with Schedule 4 clause 16(b) or 16(c) or otherwise determined by Expert Determination.
Approved CHMP	means a Cultural Heritage Management Plan approved in accordance with Part 7 of the ACHA.
Business Day	means a day that is not a Saturday, Sunday, NAIDOC day or public holiday in the place where an act is to be performed, notice received or a payment is to be made.
Chief Executive	means the chief executive referred to in Part 7 of the ACHA.
Country	describes the land and waters to which the Yuggera Ugarapul People are connected, and encapsulates the connection between people, place and all living things.
CHU	means the Cultural Heritage Unit within DSDSATSIP or any other department or agency that assumes its responsibilities.
CHMP Area	means the area shown on the map in Schedule 2, which comprises: (a) Lot 1 RP51909; (b) Lot 2 RP50377; (c) Lot 7 RP50377; (d) Lot 8 RP50377; (e) Lot 10 RP50377; (f) Lot 18 RP50377; and (g) The 20 metre wide road reservation adjoining the northern boundary of Lot 1 RP123361, lot 35 on CH3141, lot 6 on RP32823 and Lot 7 on RP32823.
Commencement Date	means the date on which this Agreement is signed by the last of: (h) Neilsens; and (i) a majority of the persons comprising the Yuggera Ugarapul Endorsed Party.

Term	Definition
Compliance Audit	means the investigation of suspected or alleged Unauthorised Harm in accordance with clause 17.3.
Confidential Information	means any information (in any form) which is disclosed or made available by or on behalf of a Party to another Party during or in connection with the negotiation or performance of this Agreement Surveys, Draft Reports and Final Reports, information in relation to the Project Activities and the location and nature of Finds that is: (a) expressly provided or made available on a confidential basis; or (b) could reasonably be expected to have been provided or made available on a confidential basis; (c) but excluding information which is in the public domain, other than due to a breach of confidentiality or lawfully obtained by the receiving Party from a different source in circumstances which do not impose a duty of confidence.
Cultural Heritage Awareness Induction	means a cultural heritage awareness induction presented in accordance with Schedule 8.
Cultural Heritage Duty of Care	has the meaning given to that term in section 23 of the ACHA.
Cultural Heritage Find	means suspected Aboriginal Cultural Heritage.
Cultural Heritage Officer	means Yuggera Ugarapul People nominated by the Yuggera Ugarapul Endorsed Party to perform the role assigned to them under this Agreement as set out in Schedule 3.
Culturally Sensitive Information	means information that is the subject of restrictions, including non-disclosure, under the traditional laws and customs of the Yuggera Ugarapul People.
DSDSATSIP	means the Queensland Department of Seniors, Disability Services and Aboriginal and Torres Strait Islander Partnerships.
Determination	means an Approved Determination of Native Title, which: (a) is made in relation to the Yuggera Ugarapul People Claim; and (b) includes a determination that: (i) Native Title exists in relation to some or all of, as the case may be, the Yuggera Ugarapul People Claim area; and (ii) The common or group rights comprising such Native Title are held by the Yuggera Ugarapul People.
Dispute	means any dispute or claim arising out of, or in relation to, this Agreement.

Term	Definition
Dispute Notice	means a notice of Dispute issued under this Agreement.
Dispute Resolution Procedure	means the process for the resolution of Disputes in Schedule 7.
Elder	means a Yuggera Ugarapul person who has gained recognition from the Yuggera Ugarapul People as a custodian of knowledge and lore who the Yuggera Ugarapul Endorsed Party nominate to perform the duties required under this Agreement.
Expert	means a suitably qualified and experienced archaeologist and/or anthropologist.
Expert Determination	means the process for the determination of Disputes by an Expert in Schedule 7.
Force Majeure Event	means any occurrence or omission as a direct or indirect result of which a Party is prevented from or delayed in performing any of its obligations under this Agreement and which is beyond the reasonable control of that Party including forces of nature, industrial action, action, or inaction by a Government Agency.
GST	has the meaning given to that term in the GST Act.
GST Act	means *A New Tax System (Goods and Services Tax) Act 1999* (Cth).
Harm	has the same meaning as in the ACHA.
Heritage Information	means any Aboriginal Cultural Heritage information provided by the Yuggera Ugarapul People during Surveys and recorded in Survey Reports.
Human Remains Guidelines	means the guidelines gazetted under the ACHA from time to time which, at the Commencement Date, are contained in Schedule 5.
Input Tax Credit	has the meaning given to that term in the GST Act.
Joint Venture Operator	has the meaning given to that term in the GST Act.
Liaison Committee	means the committee formed in accordance with clause 4 of Schedule 7.
Mitigation Plan	means an impact mitigation plan for Project Activities developed in accordance with Schedule 4.
Monitoring	means supervision by a maximum of two (2) Cultural Heritage Officers per piece of machinery and, in the event of more than one (1) piece of machinery being operated at the same time, the monitoring team shall include a roving

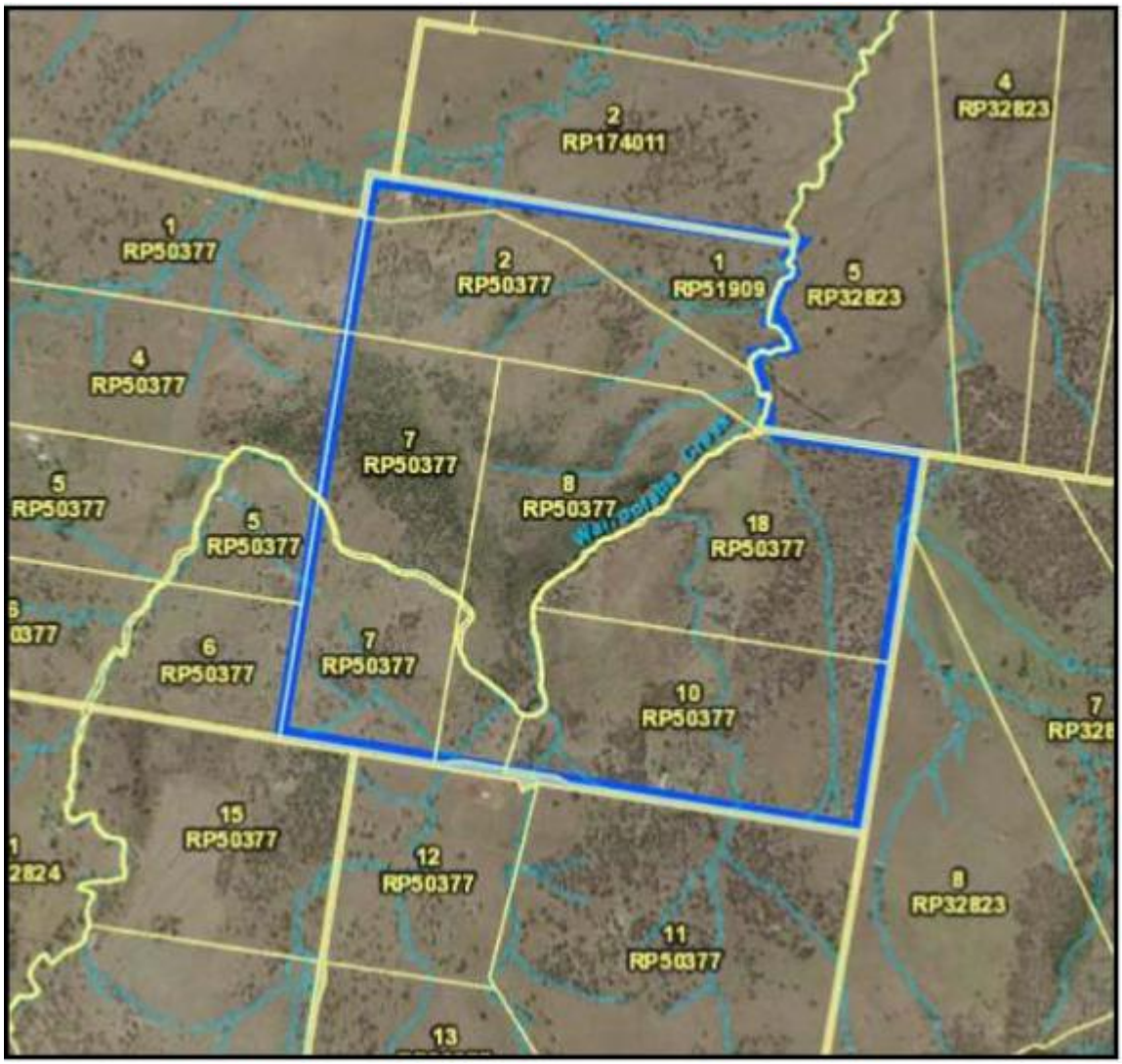
Term	Definition
	Senior Cultural Heritage Officer in that part of the CHMP Area where Monitoring is an Agreed Recommendation.
NTA	means the *Native Title Act 1993* (Cth).
Party or Parties	means either or both Neilsens and the Yuggera Ugarapul Endorsed Party.
PBC	means Prescribed Body Corporate.
Project	means the proposed development of a quarry to be undertaken on the CHMP Area.
Project Activities	means anything done in relation to land or waters by or on behalf of Neilsens necessary for or incidental to the Project.
Reference Group	means the Reference Group established under the Relationship Agreement.
Related Bodies Corporate	has the same meaning as in the *Corporations Act 2001* (Cth).
Relationship Agreement	means the agreement between Neilsens and the Yuggera Ugarapul Endorsed Party entitled Relationship Agreement dated on or about the date of this Agreement.
Resolution Institute	means Resolution Institute (ACN 008 651 232), or any successor organisation or another similar organisation if agreed to in writing by the Parties.
Senior Cultural Heritage Officer	means Yuggera Ugarapul People nominated by the Yuggera Ugarapul Endorsed Party with enough knowledge, skill and experience to perform the role assigned to them under this Agreement as set out in Schedule 3.
Service Provider	means a company nominated by the Yuggera Ugarapul Endorsed Party to carry out all the administrative tasks assigned to it under this Agreement.
Significant Ground Disturbance	means: (a) disturbance of the topsoil or surface of the ground, such as by moving large machinery over the site, placing equipment on the site that will involve disturbance to topsoil, and/or the scraping, digging, grading, drilling, or dredging of topsoil by machinery; and (b) the removal of vegetation by disturbing root systems and exposing underlying soil.
Sponsor	means Neilsens Quality Gravels Pty Ltd.
Sponsor's Representative	means a person appointed by Neilsens pursuant to Schedule 3, clause 7(c).

Term	Definition
Survey Report	means a written report (including maps) produced following a Survey, prepared in accordance with the requirements in Schedule 4.
Survey or Surveys	means a systematic field assessment conducted in accordance with archaeological best practice of that part of the CHMP Area described in a Work Program and undertaken in accordance with Schedule 4.
Survey Team	means the personnel nominated under Schedule 4.
Technical Advisor	means a suitably qualified and experienced archaeologist or anthropologist appointed pursuant to Schedule 3 from time to time.
Terminating Event	means a Force Majeure Event that continues for more than six (6) months.
Test Pitting	means the excavation of a series of test pits of approximately one (1) metre x one (1) metre, or of such other dimensions as agreed by the Parties, to until culturally sterile soils are conclusively encountered (anticipated to be approximately 200 – 1000mm in most areas) for the Parties to determine the existence, extent and/or significance of sub-surface Aboriginal Cultural Heritage within the CHMP Area.
Unauthorised Harm	means Harm that is not authorised by: (a) this Agreement; (b) a Survey Report; (c) the Mitigation Plan; or (d) any other arrangement recorded in writing between the YUP and Neilsens.
Work Area	means that part of the CHMP Area which is the subject of a Work Program.
Work Program	means those Project Activities which Neilsens intends to undertake in a Work Area that are notified to the Yuggera Ugarapul Endorsed Party in accordance with this Agreement.
Yuggera Ugarapul People Claim	means the Yuggera Ugarapul People Claimant Application lodged with the Federal Court of Australia under file reference QUD213/2017.
Yuggera Ugarapul Endorsed Party	means the Yuggera Ugarapul People Registered Native Title Claimant at the time of the notice under Part 7 of the ACHA and who were endorsed by Neilsens.

Term	Definition
Yuggera Ugarapul Coordinators	means the persons appointed by the Yuggera Ugarapul Endorsed Party, being one (1) person representing Yuggera and one (1) person representing Ugarapul, from time to time, to perform that role under this Agreement.
Yuggera Ugarapul People	means persons who, from time to time, are members of the native title claim group described in the Yuggera Ugarapul People Claim.
Yuggera Ugarapul People Registered Native Title Claimant	means the persons comprising the Applicant to the Yuggera Ugarapul People Claim from time to time, but only while the Yuggera Ugarapul People Claim remains registered on the Register of Native Title Claims.

Schedule 2 CHMP Area

CHMP Area



Schedule 3 Roles and Responsibilities

1. Overview

(a) The Parties to this Agreement agree to follow the procedures detailed in this Schedule as a means of meeting the aims of this Agreement, while expediting Project Activities wherever reasonable and practicable.

(b) For clarification, where a member of the Yuggera Ugarapul People performs more than one (1) role simultaneously as provided for under this Agreement, they will only be resourced for their time at the rate set out in Schedule 6 for the role they have performed for the most amount of time.

2. Yuggera Ugarapul Endorsed Party

Under this Agreement the Yuggera Ugarapul Endorsed Party will:

(a) conduct all activities that are reasonable and practicable in compliance with this Agreement;

(b) nominate:

(i) one (1) Yuggera Coordinator and one (1) Ugarapul Coordinator;

(ii) Senior Cultural Heritage Officers;

(iii) Cultural Heritage Officers; and

(iv) two (2) Elders reasonably required to give effect to this Agreement;

(c) subject to compliance by Neilsens of its obligations under this Agreement, ensure the completion of Surveys, salvages and actions necessary to give effect to Mitigation Plans;

(d) subject to Neilsens supplying the proper safety equipment (excluding long sleeve high visibility shirt, long pants, and steel capped safety boots) for access to the CHMP Area, ensure that all Cultural Heritage Officers are organised, managed and equipped to undertake Surveys and any other activities to assist with the implementation of Mitigation Plans;

(e) subject to compliance by Neilsens of its obligations under this Agreement, ensure that any schedules, deadlines, and timetables for commencing and completing Surveys, Survey Reports, meetings and any other actions arising under this Agreement are met; and

(f) provide Neilsens with the assistance and information reasonably necessary for the effective and timely implementation of this Agreement.

3. Yuggera Ugarapul Coordinators

The Yuggera Ugarapul Coordinators are required to:

(a) be the main point of contact between Neilsens and the Yuggera Ugarapul Endorsed Party;

(b) plan for Surveys, Test Pitting, and any other activities to assist with the implementation of Mitigation Plans;

(c) provide management and coordination for Surveys where necessary and ensuring attendance of Senior Cultural Heritage Officers and Cultural Heritage Officers whenever they are required under this Agreement;

(d) ensure that one (1) Yuggera Ugarapul Coordinator is present on-site during Surveys, Test Pitting and any Monitoring, and provide direction and advice to the Cultural Heritage Officers where necessary;

(e) adhere to all site workplace health and safety requirements and directions of the Sponsor's Representative;

(f) adhere to schedules, timeframes, procedures, and reporting requirements under this Agreement, unless otherwise agreed by the Parties;

(g) receive and respond to notices from Neilsens;

(h) work collaboratively with the Sponsor's Representative to:

(i) collate the Heritage Information;

(ii) work out a daily plan, where necessary, for Surveys, Test Pitting and Monitoring;

(iii) determine where necessary and assist with the implementation of Mitigation Plans; and

(iv) sign Survey forms where appropriate; and

(i) make decisions regarding the management of Cultural Heritage Finds.

4. Cultural Heritage Officers

(a) The Senior Cultural Heritage Officers are members of the Yuggera Ugarapul People with the knowledge, expertise, and authority to make decisions regarding the proper identification and management of Aboriginal Cultural Heritage.

(b) Senior Cultural Heritage Officers and Cultural Heritage Officers will be required to:

(i) be of suitable fitness and health to perform their role as required to give effect to this Agreement;

(ii) adhere to all site workplace health and safety requirements and directions of the Sponsor's Representative;

(iii) adhere to work schedules and timeframes and conduct themselves in an appropriate manner;

(iv) always operate within their designated work areas and under the direction of the Yuggera Ugarapul Coordinators;

(v) follow the procedures and the reporting requirements outlined within this Agreement, unless otherwise agreed by the Parties;

(vi) identify and record Cultural Heritage Finds; and

(vii) conduct any salvage and relocation of Cultural Heritage Finds.

5. Technical Advisor

The responsibilities of the Technical Advisor are to:

(a) adhere to all site workplace health and safety requirements and directions of the Sponsor's Representative;

(b) support the Yuggera Ugarapul Endorsed Party and adhere to reasonable requests and follow the reasonable directions of the Yuggera Ugarapul Coordinators;

(c) assist with the conduct of Surveys, Test Pitting, and the implementation of Mitigation Plans to the extent required;

(d) be readily available to help and be able to visit the CHMP Area where required under this Agreement (e.g. where skeletal remains are identified which are thought to be of Aboriginal people);

(e) prepare and distribute reports on Surveys, Test Pitting, Monitoring and other remedial activities and collections/relocations as required; and

(f) provide expert advice to the Yuggera Ugarapul Endorsed Party in relation to the protection, preservation, and management of Aboriginal Cultural Heritage within the CHMP Area.

6. Service Provider

(a) The Yuggera Ugarapul Endorsed Party has appointed the entity whose details appear in clause 20(c)(ii) to be the Service Provider for the purposes of this Agreement.

(b) The Yuggera Ugarapul Endorsed Party may from time to time replace the Service Provider (either temporarily or permanently) with another service provider acceptable to Neilsens acting reasonably.

7. The Sponsor

Neilsens will be responsible for:

(a) providing the Yuggera Ugarapul Endorsed Party with notices and information in accordance with this Agreement, and ensure the Yuggera Ugarapul Endorsed Party receives as much notification as is reasonable of any Project Activities or Work Program;

(b) following the procedures for the management and protection of Aboriginal Cultural Heritage provided under this Agreement;

(c) nominating a person to be the Sponsor's Representative;

(d) paying all monies to the Service Provider in accordance with this Agreement and by the due dates;

(e) arranging access to the CHMP Area for relevant Yuggera Ugarapul Endorsed Party representatives to undertake Surveys, Test Pitting and the implementation of Mitigation Plans;

(f) ensuring that all its employees and contractors working on the Project are aware of and comply with the terms of this Agreement in respect of the protection and management of Aboriginal Cultural Heritage;

(g) provide relevant personal protection equipment and workplace health and safety equipment as outlined in Schedule 4; and

(h) ensuring employees and contractors working on site undertake a Cultural Heritage Awareness Induction as provided for in Schedule 8.

8. The Sponsor's Representative

The Sponsor's Representative will be responsible for:

(a) liaising with the Yuggera Ugarapul Coordinators and Cultural Heritage Officers to facilitate Surveys, and to carry out any of the roles and/or discharge the responsibilities of Neilsens in relation to them;

(b) meeting with the Yuggera Ugarapul Coordinators, if required, to determine Mitigation Plans;

(c) notifying and working cooperatively with the Yuggera Ugarapul Coordinators to determine how to deal with any Cultural Heritage Finds; and

(d) generally acting as Neilsens' counterpart to the Yuggera Ugarapul Coordinators in respect of daily tasks, planning and other practical arrangements necessary to implement this Agreement.

9. Liaison Committee

The Liaison Committee will be responsible for the resolution of any Disputes under this Agreement in accordance with Schedule 7 where such Disputes could not be resolved first between the Yuggera Ugarapul Coordinators and the Sponsor's Representative.

10. Overriding obligations of the parties

When performing their respective obligations under this Agreement, the Parties will:

(a) complete their respective obligations as promptly as possible;

(b) ensure to respond to any notice, program, or information in relation to implementing this Agreement as soon as practicable so as not to cause any delay or prejudice to the other Party; and

(c) subject to the Cultural Heritage Duty of Care, seek to balance the need to manage and protect Aboriginal Cultural Heritage with the need to ensure that the development of the Project proceeds in a timely and economically efficient manner.

Schedule 4 Surveys

1. Prior to commencing Project Activities that involve Significant Ground Disturbance in any part of the CHMP Area, Neilsens must issue a Work Program to the Yuggera Ugarapul Coordinators.

2. For the avoidance of doubt, Neilsens may provide a Work Program for, either, or in Neilsens' sole discretion:

(a) a particular stage of the Project; or

(b) the entire Project.

3. The Work Program must include:

(a) aerial photography (if any is held by Neilsens) and topographic maps showing where Neilsens wishes to conduct Significant Ground Disturbance (being the Work Area);

(b) the nature, scope, objectives, and estimated time of the proposed Significant Ground Disturbance;

(c) the techniques and types of equipment and vehicles to be used;

(d) the approximate number of personnel involved;

(e) the details of any applicable procedures and policies; and

(f) any and all information that is reasonably necessary for the YUP Endorsed Party to understand the nature and extent of the Work Program activities.

4. Unless otherwise agreed by the Parties:

(a) within ten (10) Business Days of receiving a Work Program, the Yuggera Ugarapul Coordinators, in conjunction with the Technical Advisor (if appointed) and the Service Provider, will complete all necessary scoping for the Survey and provide a draft budget (**Survey Budget**) to Neilsens for approval prior to the conduct of the Survey; and

(b) within five (5) Business Days of receiving a Survey Budget, Neilsens must either approve the Survey Budget or, if the Survey Budget is not acceptable to Neilsens (acting reasonably), engage with the Yuggera Ugarapul Coordinators and the Technical Advisor (if appointed) and the Service Provider to agree on a budget for the Survey (**Revised Budget**);

(c) within five (5) Business Days after Neilsens notifies the Yuggera Ugarapul Coordinators that the Survey Budget or the Revised Budget is approved, the Yuggera Ugarapul Coordinators will complete the planning and make arrangements for the conduct of the Survey;

(d) within ten (10) Business Days after Neilsens notifies the Yuggera Ugarapul Coordinators that the Survey Budget or the Revised Budget is approved, the Survey Team must commence the fieldwork component of the Survey.

5. Unless otherwise decided by the Yuggera Ugarapul Coordinators, a Survey will require the Survey Team to walk over, inspect, identify, and record any Aboriginal Cultural Heritage

within the Work Area. The Survey may include a reasonable provision for Test Pitting within the Work Area where it is agreed to by the Parties prior to commencement of the Survey.

6. Unless otherwise agreed by the Parties, the Survey Team for any Survey will be comprised of:

(a) two (2) of the Yuggera Ugarapul Coordinators (one (1) from the Yuggera People and one (1) from the Ugarapul People), for a period necessary to fulfil their role;

(b) no more than two (2) Senior Cultural Heritage Officers (one (1) from the Yuggera People and one (1) from the Ugarapul People);

(c) no more than two (2) Cultural Heritage Officers (one (1) from the Yuggera People and one (1) from the Ugarapul People);

(d) the Sponsor's Representative and any other representatives appointed by Neilsens to accompany the Survey Team, noting that a Senior Cultural Heritage Officer may request that the Sponsor's Representative/s not accompany them during certain parts of the Survey; and

(e) if reasonably required, having regard to the nature and extent of the Survey, a Technical Advisor.

7. The Yuggera Ugarapul Coordinators will be the principal point of contact for the Sponsor's Representative in the field.

8. The Survey Team shall, acting reasonably, use their best endeavours to complete the fieldwork component of the Survey as quickly and efficiently as possible and in accordance with the budget and arrangements developed and agreed in accordance with Schedule 6, having due regard to:

(a) the nature of the terrain to be walked and vegetation faced in the Work Area;

(b) the expected weather at the time of the conduct of the Survey;

(c) the impact of any Cultural Events that occur immediately before or during the Survey; and

(d) the number, density and significance of any Aboriginal Cultural Heritage located by the Survey Team during the Survey.

9. For the avoidance of doubt, the Survey Team will not be acting unreasonably in refusing to continue with or undertake a Survey in circumstances where:

(a) the vegetation in the Work Area is of such a height or density that visibility is reduced to the point where it is not possible to conduct a Cultural Heritage Survey in accordance with archaeological best practice;

(b) the weather at the time is such that it is unsafe to work due to excessive heat or there is continuous rain such that the atmospheric or ground conditions of the Work Area are unsafe;

(c) it would otherwise be unsafe to conduct the Survey in accordance with Neilsens' own workplace health and safety policies and procedures; or

(d) if a Technical Advisor is not a member of the Survey Team at the start of the Survey and due to the number, density, cultural sensitivity and/or significance of any

Aboriginal Cultural Heritage the Survey Team locates during the Survey, they reasonably require the services of a Technical Advisor to complete the Survey.

10. In the event that the Survey Team (acting reasonably) believes that it is unable to continue with or undertake the Survey for any of the reasons identified in clause 9, the Yuggera Ugarapul Coordinators will first meet and discuss the concerns of the Survey Team with the Sponsor's Representative to determine whether and, if so, on what basis, the Survey should be reduced in area, suspended, postponed, or cancelled.

11. The Sponsor's Representative will provide the Survey Team with appropriate safety equipment where reasonably required (and any training to use such equipment), for instance:

(a) hard hats (only where it is a site requirement);

(b) safety glasses;

(c) dust masks;

(d) gloves;

(e) hearing protection;

(f) safety illumination high visibility vests;

(g) Sunscreen;

(h) two-way radio (if applicable, due to the nature of the terrain);

(i) personal global positioning device (if applicable, due to the nature of the terrain);

(j) first aid kit;

(k) water;

(l) snake bite kit;

(m) toilets; and

(n) shade facilities where necessary.

12. The Yuggera Ugarapul Coordinators must use reasonable endeavours to ensure that all members of the Survey Team are responsible for ensuring they are equipped with any of the following which are reasonably required:

(a) sturdy enclosed walking shoes or if required steel capped safety boots;

(b) a broad brimmed hat;

(c) long pants; and

(d) long sleeved shirts (high visibility shirt preferable).

13. At the end of each day of the Survey, one of the Yuggera Ugarapul Coordinators will complete and sign a daily report attached as schedule 10 indicating:

(a) whether or not any Aboriginal Cultural Heritage was found during that day of the Survey; and

(b) if so, stating either that:

(i) the Cultural Heritage Officers relocated the Aboriginal Cultural Heritage in accordance with this Agreement; or

(ii) the Cultural Heritage Officers did not relocate the Aboriginal Cultural Heritage.

14. For the sake of clarity, there will be no expectation or obligation upon the Survey Team except as agreed between the Parties to:

(a) move (except for the purposes of recording) any Aboriginal Cultural Heritage;

(b) otherwise deal with any Aboriginal Cultural Heritage; or

(c) flag areas for further discussion;

unless the Survey Team choose to do so during the fieldwork component of the Survey.

15. Provision of draft Survey Report upon completion of the fieldwork component of the Survey

(a) The Yuggera Ugarapul Coordinators will use their best endeavours to provide Neilsens with the draft Survey Report within fifteen (15) Business Days of the completion of the fieldwork component of the Survey. Without limiting its scope, the Survey Report shall contain:

(i) ***General:*** An introduction and summary overview of the circumstances of the Survey including but not limited to:

(A) any relevant information on the conduct of the Survey;

(B) details of the Survey Team;

(C) any traditional responsibilities of the Survey Team;

(D) a description of the daily work program including Survey dates;

(E) the methodology of the Survey; and

(F) any management recommendations.

(ii) ***Cultural Heritage Findings***: The Survey Report shall:

(A) identify those parts of the Work Area which have been surveyed;

(B) identify those parts of the Work Area in which it is unlikely that Project Activities will Harm Aboriginal Cultural Heritage and where a clearance is given that the Project Activities may proceed;

(C) provide details of any Aboriginal Cultural Heritage that have been identified within or in the vicinity of the Work Area including:

(1) specifying the location and extent of any Aboriginal Cultural Heritage identified (expressed in GPS coordinates);

(2) state, in general terms, the significance of any Aboriginal Cultural Heritage identified; and

(3) provide a description of the physical features that constitute the Aboriginal Cultural Heritage (including photographs as appropriate); and

(D) provide a description of areas where sub-surface Aboriginal Cultural Heritage has been located or is likely;

(E) provide a description of areas where, having regard to the outcomes of the Survey, Monitoring is recommended; and

(F) provide details of any Aboriginal Cultural Heritage relocated during the Survey.

(iii) ***Recommendations:*** The Survey Report shall specify recommendations on measures to avoid Harm to Aboriginal Cultural Heritage within the Work Area. This includes but is not limited to:

(A) specifying any conditions upon which the Survey Team has provided a clearance for Project Activities and management and protection measures, including Test Pitting, to avoid or minimise Harm to Aboriginal Cultural Heritage;

(B) identifying those parts of the Work Area where no Project Activities should occur because the area contains significant Aboriginal Cultural Heritage (**Exclusion Zone(s)**);

(C) identifying any suggested alternative nominated areas where Neilsens may conduct its Project Activities (in order to avoid significant Aboriginal Cultural Heritage) for which clearance is given;

(D) providing suggestions and recommendations for amendments to the Work Program in order to minimise Harm to Aboriginal Cultural Heritage and provide for the effective protection and conservation of any Aboriginal Cultural Heritage including a program for Monitoring of Significant Ground Disturbance, especially digging, and scraping by machinery; and

(E) any other recommendations, including Test Pitting, salvage and relocation, post clearing surveys and/or Monitoring for the avoidance of and the proper management, protection, and conservation of any Aboriginal Cultural Heritage.

16. The Sponsor's response to the draft Survey Report

(a) Within five (5) business days of receipt of a draft Survey Report (**Review Period**), Neilsens must consider the Recommendations in the draft Survey Report and will advise the Yuggera Ugarapul Coordinators of any comments that they have on the draft Survey Report.

(b) If Neilsens accepts the Recommendations in full, Neilsens will develop a draft Mitigation Plan in accordance with Schedule 4 clause 18.

(c) If Neilsens wishes to discuss the Recommendations and negotiate the outcomes to be adopted in the Mitigation Plan, then during the Review Period Neilsens must request a meeting with the Yuggera Ugarapul Endorsed Party. The meeting must be held within 20 business days from the receipt of a draft Survey Report.

17. Discussion of Survey Report Recommendations

(a) If a meeting is to be held in accordance with Schedule 4 clause 16(c), the Parties will meet to discuss the Recommendations contained in the Survey Report and negotiate in good faith to reach agreement on the Recommendations or other measures that will be implemented.

(b) If the Parties cannot reach agreement on the Recommendations or other measures, Neilsens may refer the matter for Dispute Resolution.

18. Mitigation Plan

(a) Following either:

(i) Neilsens' acceptance of the Recommendations of the Survey Report in full in accordance with Schedule 4 clause 16(b); or

(ii) the Parties reaching agreement on the Agreed Recommendations after a meeting held in accordance with Schedule 4 clause 16(c),

the Sponsor's Representative will develop a draft Mitigation Plan based on the Recommendations or the Agreed Recommendations and provide it to the Yuggera Ugarapul Coordinators and the Technical Advisor for their consideration and feedback.

(b) Within fifteen (15) business days of the Sponsor's Representative providing the draft Mitigation Plan, the Yuggera Ugarapul Coordinators, Technical Advisor and Sponsors Representative will meet with a view to finalising a Mitigation Plan for the Project Activities to avoid, protect, manage, and mitigate any Harm to Aboriginal Cultural Heritage identified in the Work Area. The Yuggera Ugarapul Coordinators will be paid for their time in participating in this meeting in accordance with the rates set out in Schedule 6.

(c) A Mitigation Plan shall:

(i) detail the actions, procedures, and strategies to be adopted before or during the implementation of the Project Activities in the Work Area to provide for the appropriate avoidance, protection, conservation, management and mitigation of Harm to Aboriginal Cultural Heritage; and

(ii) detail the actions, procedures, and strategies to identify, record, avoid, protect, conserve, manage and mitigate Harm to any Cultural Finds found during the course of Project Activities.

(d) A Mitigation Plan must have regard to appropriate professional archaeological standards and research methods.

(e) A Mitigation Plan must be approved in writing by the Sponsor's Representative and the Yuggera Ugarapul Coordinators.

(f) If a Mitigation Plan has not been finalised and approved within one (1) month of Neilsens receiving the draft Survey Report, the Dispute is to be resolved in accordance with the Dispute Resolution Procedure.

19. Cultural Heritage Finds During Project Activities

(a) Unless otherwise agreed in a Mitigation Plan, if suspected Aboriginal Cultural Heritage is located by or on behalf of Neilsens during Project Activities, any Project Activities that may have the potential to impact on the Cultural Heritage Find will cease and Neilsens will give notice of the Cultural Heritage Find to the Yuggera Ugarapul Coordinators (**Cultural Heritage Find Notice**).

(b) Within two (2) Business Days of the receipt of the Cultural Heritage Find Notice, a Senior Cultural Heritage Officer, or the Yuggera Ugarapul Coordinators and, if reasonably requested by either Party, the Technical Advisor, must assess the Cultural Heritage Find.

(c) If the Cultural Heritage Find is Aboriginal Cultural Heritage, Yuggera Ugarapul Coordinators and their Technical Advisor must meet with the Sponsor's Representative within 24 hours and make reasonable attempts to reach agreement as to a mutually acceptable way of dealing with the Aboriginal Cultural Heritage.

(d) If the Cultural Heritage Find it is not Aboriginal Cultural Heritage, the Yuggera Ugarapul Coordinators will provide written notice to Neilsens confirming that it is not Aboriginal Cultural Heritage and Project Activities that have ceased in the area can resume.

(e) If agreement is not reached under clause 19(c) within five (5) Business Days of the receipt of the Cultural Heritage Find Notice (or such later date as the Parties agree), either Party may refer the dispute to Expert Determination.

20. Salvage and Storage of items of Aboriginal Cultural Heritage

(a) Any items of Aboriginal Cultural Heritage that are nominated for salvage and relocation by the Yuggera Ugarapul People will be collected and relocated to an agreed location on the CHMP Area or such other location away from the CHMP Area as may be determined by the Yuggera Ugarapul People in consultation with the Technical Advisor.

(b) The Yuggera Ugarapul Coordinators will provide the Sponsor’s Representative with written confirmation of any Aboriginal Cultural Heritage that is salvaged and relocated away from the CHMP Area.

(c) The Yuggera Ugarapul Endorsed Party and Elders will be responsible for all items of Aboriginal Cultural Heritage that are salvaged and relocated.

(d) The storage of items of Aboriginal Cultural Heritage will be in accordance with a Mitigation Plan or otherwise at the Yuggera Ugarapul Coordinators’ discretion and may involve relocation ‘on country’ in an undisturbed area or at a Yuggera Ugarapul storage facility if deemed appropriate.

(e) Where items of Aboriginal Cultural Heritage need to be salvaged and stored, the Yuggera Ugarapul Coordinators and the Sponsor’s Representative will discuss and make reasonable attempts to reach agreement on appropriate storage options.

21. Skeletal Material

(a) If suspected human remains are located during the course of any Project Activities, all Project Activities within the vicinity of the area will cease immediately and the Sponsor's Representative will immediately notify the Yuggera Ugarapul Coordinators.

(b) The area around the suspected human remains will be clearly demarcated to ensure that no work is conducted in the area until the appropriate evaluations have been conducted and a management strategy has been implemented.

(c) Should there be a possibility that the remains are human, the Parties will comply with the requirements of the *Coroners Act 2003* (Qld), the ACHA and all other applicable laws including, but not limited to, the Human Remains Guidelines contained in Schedule 5 of this Agreement.

(d) If the remains prove not to be human, Neilsens can resume Project Activities in the area.

22. Failure to Comply - Monitoring

(a) If Neilsens has given a notice in writing to the Yuggera Ugarapul Endorsed Party confirming the date(s) and time(s) that Senior Cultural Heritage Officers are required to attend the Work Area for Monitoring, and a Senior Cultural Heritage Officer fails to attend the Work Area for Monitoring on the dates and at the times specified and the failure is not due to a breach of this Agreement by Neilsens, then:

(i) the Sponsor's Representative will, after allowing for a period of one (1) hour, call a Yuggera Ugarapul Coordinator to find out why the Cultural Heritage Officer has not attended and request that a Cultural Heritage Officer attend; and

(ii) if the Yuggera Ugarapul Coordinator cannot be contacted or if no Cultural Heritage Officer attends the Work Area within two (2) hours of the time when the Project Activities were scheduled to begin, provided Neilsens has otherwise complied with this Agreement, the Project Activities may be undertaken within the Work Area without Monitoring.

(b) For the avoidance of doubt, Neilsens may proceed with the Project Activities where only one (1) Cultural Heritage Officer attends at the Work Area to undertake Monitoring.

(c) Notwithstanding any failure to attend a Work Area for Monitoring, Neilsens agrees that the Yuggera Ugarapul Endorsed Party may, at the earliest available opportunity, inspect the part of the Work Area where Project Activities were undertaken in accordance with the terms of this clause 22(b).

(d) Following the inspection by the Yuggera Ugarapul Endorsed Party, in consultation with the Technical Advisor, propose a reasonable course of action to remediate any impact on Aboriginal Cultural Heritage caused by the Project Activities undertaken in accordance with this clause 22 for agreement between the Parties.

23. Appointment of Technical Advisor

23.1 Engagement of Technical Advisor

(a) A Technical Advisor may be engaged for the purposes of:

(i) assisting with the conduct of any Survey as a member of the Survey Team;

(ii) preparing Survey Reports together with the Yuggera Ugarapul Coordinators and the Yuggera Ugarapul Endorsed Party;

(iii) assisting with the settling of Mitigation Plans;

(iv) assisting with the implementation of this Agreement; and

(v) advising on issues arising out of this Agreement.

(b) The Yuggera Ugarapul Endorsed Party to will decide if a Technical Advisor is required.

(c) If a Technical Advisor is required, they will be engaged by the Service Provider on behalf of the Yuggera Ugarapul Endorsed Party.

(d) The Yuggera Ugarapul Coordinators will notify the Sponsor's Representative of the Yuggera Ugarapul Endorsed Party's decision to use the Technical Advisor for any of the matters referred to in clause 23.1(a).

(e) The terms of the engagement of the Technical Advisor will otherwise be on terms and conditions as agreed between the Technical Advisor and the Service Provider.

23.2 Choosing a Technical Advisor

(a) If the Yuggera Ugarapul Endorsed Party requires a Technical Advisor to assist with the Survey, the Parties will use their best endeavour to agree on a suitably qualified and experienced archaeologist or anthropologist for engagement as the Technical Advisor.

(b) In the event that the Yuggera Ugarapul Endorsed Party wants to change its Technical Advisor, the Yuggera Ugarapul Endorsed Party will provide to Neilsens the name (and all relevant documentation, including curricula vitae) of its replacement Technical Advisor for Neilsens' consideration.

(c) If the Parties cannot agree on a person to be engaged as the Technical Advisor, the Parties will request the President of the Australian Archaeological Association to appoint a suitably qualified and experienced archaeologist to perform the role of the Technical Advisor.

Schedule 5 Human Remains Guidelines

Guidelines for the discovery, handling and management of human remains

This guideline has been developed under the provisions of the *Aboriginal Cultural Heritage Act 2003* and the *Torres Strait Islander Cultural Heritage Act 2003* (the Acts).

If you find bones and suspect they are human, it is essential that you do not disturb them. You must report the findings to the Queensland Police Service. The Police will determine if the remains represent a crime scene.

If it is established that the remains are not a crime scene and the Coroner is satisfied that the remains are ancestral Aboriginal or Torres Strait Islander remains, the procedures in this guideline will apply.

Guiding principle

Aboriginal or Torres Strait Islander people who have traditional or familial links with ancestral human remains are the owners of those remains.

Desired outcomes

This guideline has a number of desired outcomes: -

- While natural or human processes can inadvertently expose Aboriginal or Torres Strait Islander human remains, all attempts will be made to limit further disturbance.
- If further investigation and disturbance is required, procedures are in place for the proper handling of such remains.
- All such procedures are sensitive to the wishes of the Aboriginal or Torres Strait Islander owners of the remains.

Legislative framework

Criminal Code Act 1899

Under the *Criminal Code Act 1899*, it is an offence to improperly or indecently interfere with a human body or human remains, whether buried or not. An offence under this provision can result in imprisonment for up to two years.

Coroners Act 2003

The *Coroners Act 2003* provides that when human remains are located, it is the duty of the person finding the remains to report the findings to a police officer or Coroner.

The Coroner must stop investigating a death if the Coroner's investigation shows that the body is Aboriginal or Torres Strait Islander traditional burial remains.

Where this occurs, and the remains have been removed from the area where they were found, the Coroner will authorise the release of the remains to the Minister responsible for administering the Acts.

Aboriginal Cultural Heritage Act 2003 and *Torres Strait Islander Cultural Heritage Act 2003*

Under the Acts, Aboriginal or Torres Strait Islander people who have a traditional or familial link with Aboriginal or Torres Strait Islander human remains are the owners of those remains, regardless of who may have owned them before commencement of the Acts.

Department of Aboriginal and
Torres Strait Islander Partnerships

Queensland Government

The Acts provide that where Aboriginal or Torres Strait Islander remains are in the custody of the State, the owners of the remains may at any time ask the State to continue to be the custodian of those remains or return the remains to them.

If a person, other than the State, has in their possession Aboriginal or Torres Strait Islander human remains to which they do not have traditional or familial links, then the person must take all reasonable steps to ensure that the human remains are taken into the custody of the chief executive administering the Acts as soon as practicable. Penalties apply if a person fails to do this.

If a person knows of the existence and location of Aboriginal human remains and is not the owner of those remains, the person must as soon as practicable (and after advising the Police or Coroner) advise the chief executive of the remains. Penalties apply if a person fails to do this.

Procedures for dealing with the discovery of Aboriginal and Torres Strait Islander human remains

In all cases when human remains are located it is important to remember:

- the discovery of any human remains must as soon as possible be reported to the police.
- it is an offence to interfere with human remains, whether buried or not.

The Police or Coroner must be advised of the presence of any human remains. An appropriate officer will then establish the area as a potential crime scene.

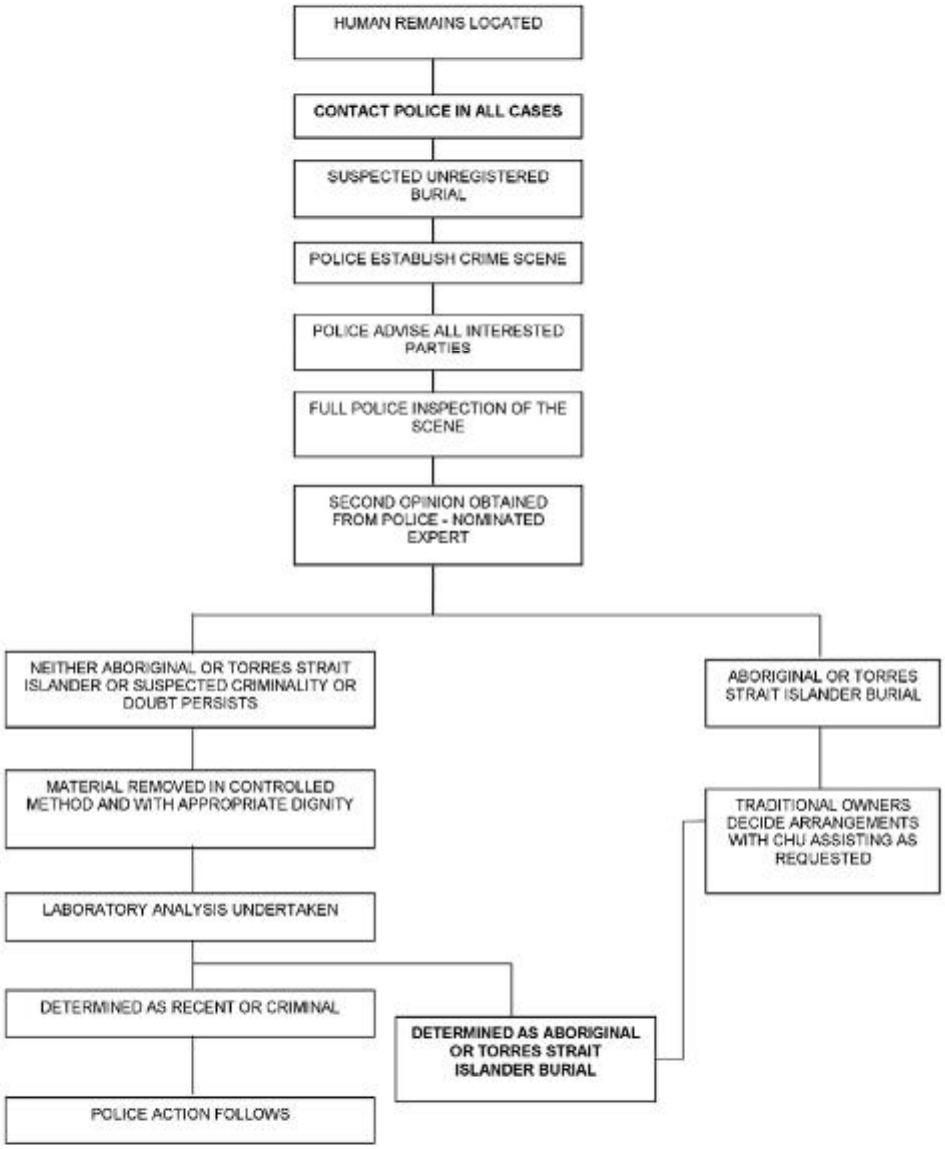
Police will undertake appropriate scientific or other procedures to assist the Coroner in making an appropriate determination about the remains.

If the remains are thought to be neither Aboriginal nor Torres Strait Islander, related to criminal activity or are of doubtful determination, the Police may remove the remains for further analysis.

If however the remains are determined to be ancestral remains without the need for removal, the relevant Traditional Owners of the remains will be responsible for their management

In cases where remains are removed by Police and subsequently determined by the Coroner to be of Aboriginal or Torres Strait Islander origin, the remains will be released to the Minister responsible for administering the Acts.

The Department of Aboriginal and Torres Strait Islander Partnerships is then responsible for coordinating the return of the remains to the relevant Traditional Owners.


HUMAN REMAINS LOCATED
CONTACT POLICE IN ALL CASES
SUSPECTED UNREGISTERED BURIAL
POLICE ESTABLISH CRIME SCENE
POLICE ADVISE ALL INTERESTED PARTIES
FULL POLICE INSPECTION OF THE SCENE
SECOND OPINION OBTAINED FROM POLICE - NOMINATED EXPERT
NEITHER ABORIGINAL OR TORRES STRAIT ISLANDER OR SUSPECTED CRIMINALITY OR DOUBT PERSISTS
ABORIGINAL OR TORRES STRAIT ISLANDER BURIAL
MATERIAL REMOVED IN CONTROLLED METHOD AND WITH APPROPRIATE DIGNITY
TRADITIONAL OWNERS DECIDE ARRANGEMENTS WITH CHU ASSISTING AS REQUESTED
LABORATORY ANALYSIS UNDERTAKEN
DETERMINED AS RECENT OR CRIMINAL
DETERMINED AS ABORIGINAL OR TORRES STRAIT ISLANDER BURIAL
POLICE ACTION FOLLOWS

Explanation of procedures

Police Officers maintain authority and responsibility for a potential crime scene at all times.

Police are responsible for forensic analysis and may seek advice from suitably qualified experts. Digital images may be sent to the relevant experts for an opinion to avoid the removal of the remains.

Advice on handling may be sought from appropriate sources.

Further information

For further information on this guideline, contact the Site Registrar.

Cultural Heritage Unit
Level 9
1 William Street
PO Box 15397 City East
Queensland 4002

Phone: 1300 378 401

Email: cultural.heritage@datsip.qld.gov.au

Visit the DATSIP website www.datsip.qld.gov.au/ch

Schedule 6 Fees

1. Engagement of Yuggera Ugarapul personnel

(a) The Service Provider (and not Neilsens) will engage the Yuggera Ugarapul personnel to undertake the activities set out in the CHMP.

(b) The Parties acknowledge that the Service Provider is not an agent, partner or employee of Neilsens.

(c) The Service Provider is solely responsible for all usual incidents of the engagement of the Yuggera Ugarapul personnel, including all elements of remuneration, leave (including annual, personal, community service, long service, sick or parental leave), payments during time-off, bonus or incentive payments, termination payments, and/or remedies, PAYG tax, insurance premiums of any nature, superannuation, workers' compensation insurance, and all payments and other benefits required by legislation or industrial instrument.

(d) Neither the Service Provider nor any of its employees:

(i) is entitled to any benefit from Neilsens to which an employee is usually entitled;

(ii) has the authority to bind Neilsens or to act on its behalf; or

(iii) may or will hold themselves out to be an employee, agent or partner of Neilsens.

(e) The Yuggera Ugarapul Endorsed Party must procure the Service Provider to act in accordance with any law that applies to the duties or work carried out by it and that any service provided by it is carried out professionally and with the care skill and diligence expected of a person fulfilling its role.

2. Payments to the Service Provider

Item	Rate (costs are gross and exclusive of GST)
Cultural Heritage Survey and Monitoring	Cultural Heritage Field Officers: $750.00 per business day, $1,000.00 per non-business day.
	Senior Cultural Heritage Field Officers / Yuggera Ugarapul onsite coordinators / Yuggera Ugarapul People applicants / Elders: $1,000.00 per business day, $1,500.00 per non-business day.
	Yuggera Ugarapul offsite coordinators: $100.00 per hour (business day), $150.00 per hour (non-business day).* *Work for Yuggera Ugarapul offsite coordinators is capped at four (4) hours maximum per day of field work.
	Technical Advisor $1,500.00 maximum amount payable per business day, $2,000.00 per non-business day.

Item	Rate (costs are gross and exclusive of GST)
	Mobilisation cost for representatives on the Inspection Team from place of residence to the Project Area when accommodation is required: $500 per day.
	Travel, accommodation, incidentals, mileage and meal expenses – at ATO rate (TD2019/11 or current equivalent)
Administration fee	Admin fee of 20% of total budget paid to Service Provider on all invoices.
Additional work	Work exceeding eight (8) hours will be charged at: Cultural Heritage Field Officers: $75/hour on business days and $100/hour on non-business days. Senior Cultural Heritage Field Officers / Yuggera Ugarapul Onsite Coordinators / Yuggera Ugarapul People Applicants / Elders: $125/hour on business days and $150/hour on non-business days. Yuggera Ugarapul Offsite Coordinators: work exceeding four (4) hours per day is not available. Technical Advisor: $150/hour on business days and $200/hour on non-business days.
CPI	Payments made under this Schedule 5 (excluding the ATO rates) must be adjusted annually to reflect any increase in the All Groups Consumer Price Index applicable to Brisbane for the quarter ending 31 December of the previous year.
GST / Superannuation	The above payments are gross payments and include any costs for tax and superannuation payable.

2. Ordinary working hours

(a) Unless reasonably required to complete any Monitoring during Project Activities, Senior Cultural Heritage Officers and Cultural Heritage Officers must not work for longer than the ordinary eight (8) hours in any given day, without Neilsens' authorisation.

(b) The ordinary eight (8) hour day is inclusive of:

(i) One (1) lunch break of no more than forty (40) minutes in duration; and

(ii) One (1) morning and one (1) afternoon break, each of ten (10) minutes in duration.

3. Insurance and Workers' Compensation

(a) The Service Provider must affect and maintain (at its own expense) at all times during which it is required to assist with activities under this Agreement, the following insurance:

(i) comprehensive general liability insurance/public liability insurance covering all liabilities in respect of any injury to, death of, any person or any loss, damage or destruction to any property however caused. Such insurance must provide cover in respect of each claim to an amount of not less than $20,000,000; and

(ii) workers' compensation insurance covering all liabilities, whether arising under statute or common law in relation to the death of, injury to any person engaged as an employee (including a person who is a worker for the purposes of the *Workers'' Compensation and Rehabilitation Act 2003* (Qld)) of the Service Provider for the purposes of this Agreement.

(b) If requested from time to time by Neilsens, the Servicer Provider will provide Neilsens with copies of the certificates of currency for public liability and workers' compensation insurance.

4. Provision of budget estimates

(a) Where the Yuggera Ugarapul Endorsed Party responds to:

(i) a Work Program;

(ii) a notice to assist with the implementation of any Mitigation Plan;

(iii) a notice for a meeting of the Liaison Committee; or

(iv) a request for the provision of a Cultural Heritage Awareness Induction;

the Service Provider must include in the response an itemised budget in relation to the costs associated with the relevant activity, the rates in any such budget to be in accordance with this Schedule.

(b) If Neilsens accepts the draft budget, Neilsens or the Sponsor's Representative, as appropriate, will notify the Service Provider, within five (5) Business Days of receiving the draft budget and the budget will be an approved budget.

(c) If Neilsens does not accept the draft budget, then the Dispute will be resolved in accordance with the Dispute Resolution Procedure.

(d) If the Parties reach agreement on the draft budget through one of these processes, the draft budget will be an approved budget.

(e) Any approval of a variation to an approved budget for an activity will be sought in accordance with the procedure set out in this clause 4 of Schedule 6.

(f) In respect of an approved budget required under this Agreement, upon presentation by the Service Provider of a correctly rendered tax invoice, Neilsens will pay that tax invoice within fourteen (14) Business Days of the receipt of the tax invoice.

5. Delay provision

If activities rostered to occur under this Agreement are cancelled by Neilsens due to unforeseen reasons (e.g. severe weather) and Neilsens directs the Cultural Heritage Officers to depart the CHMP Area until such time as those activities may recommence:

(a) if a Yuggera Ugarapul Coordinator or the Service Provider is notified of the cancellation of the rostered activities:

(i) on the cancelled day, the rostered Cultural Heritage Officers will be entitled to be paid the full daily rate in addition to the direct costs already reasonably incurred for travel and accommodation (if any) in accordance with the rates set out in Schedule 6; and

(ii) after 4pm on the day prior to the cancelled day, the rostered Cultural Heritage Officers will be entitled to be paid the equivalent of one half of the daily rate in addition to the direct costs already reasonably incurred for travel and accommodation (if any) in accordance with the rates set out in Schedule 6; and

(b) in any such circumstances, the Yuggera Ugarapul Coordinators will procure the Service Provider to take all reasonable steps to ensure that Cultural Heritage Officers are available to return to the CHMP Area as soon as activities under this Agreement are able to recommence.

Schedule 7 Dispute Resolution

1. Dispute Resolution Procedures

(a) Subject to clause 1(i) of this Schedule 7 to this Agreement, where a Dispute arises, the Parties will use the Dispute Resolution Procedure.

(b) The Parties agree to use their best endeavours to ensure all Disputes are resolved as quickly as possible.

(c) Where possible and appropriate, the resolution of Disputes will include the personnel directly involved in the Dispute.

(d) The Parties involved in the Dispute will adopt resolution methods that are fair, reasonable, economical and timely to resolve the Dispute and avoid delays to any Project Activities.

(e) The Parties agree that the resolution of any Dispute under this Agreement (including by Expert Determination) must be consistent with the aims in clause 5 and the principles in clause 6 of this Agreement.

(f) Each Party will continue to perform their respective obligations under this Agreement despite the existence of a Dispute, other than in relation to the matter the subject of the Dispute.

(g) If a Dispute relates to circumstances involving Harm, or a serious risk of Harm, to Aboriginal Cultural Heritage, then Neilsens will take all reasonable steps to prevent the risk of any similar or further Harm, and cease work involving Significant Ground Disturbance in the immediate vicinity of the Aboriginal Cultural Heritage until the Dispute is resolved.

(h) The Parties are obliged to always act in good faith with respect to the matters agreed in this Agreement and avoid unnecessary disputation wherever practicable.

(i) A Party may not commence court proceedings in relation to any Dispute until it has complied with the Dispute Resolution Procedures, unless the Party seeks appropriate injunctive or other interlocutory relief to preserve property or rights or to avoid losses that are not compensable in damages.

(j) Neilsens will provide reasonable (and pre-approved) resourcing to the Yuggera Ugarapul Endorsed Party and their legal representative or technical advisor to facilitate their participation in the Dispute Resolution Process.

2. Dispute Notice

(a) The Party alleging the Dispute must provide a Dispute Notice to the other Party containing particulars of the matters in dispute or in respect of which there is a difference and proposing details of the date and time for a meeting as required under clause 3.

(b) The Party receiving the Dispute Notice provided under clause 2(a) must respond within two (2) Business Days to the Dispute Notice setting out their response about each of the issues identified in the Dispute Notice and confirm availability to attend the meeting required under clause 3.

3. Meeting of Yuggera Ugarapul Coordinators and Sponsor's Representative

(a) A meeting (including by telephone) will be held between the Yuggera Ugarapul Coordinators and the Sponsor's Representative within four (4) Business Days of receipt of the Dispute Notice to attempt to resolve the Dispute.

(b) If the Yuggera Ugarapul Coordinators and Sponsor's Representative are unable to resolve the Dispute within four (4) Business Days of their meeting then the process in clauses 4 and 5 of this Schedule must be followed.

4. Referral to a Liaison Committee meeting

If Yuggera Ugarapul Coordinators and the Sponsor's Representative cannot resolve the Dispute, the Parties have agreed to establish a Liaison Committee which will meet to attempt to resolve the Dispute.

4.1 Establishment of Liaison Committee

(a) The Liaison Committee is constituted by the following members:

(i) the Sponsor's Representative;

(ii) two (2) other nominees of Neilsens;

(iii) both the Yuggera Ugarapul Coordinators; and

(iv) the two (2) Elders identified in Schedule 9 or advised in writing by the Yuggera Ugarapul Endorsed Party.

(b) A quorum for a meeting of the Liaison Committee is two (2) representatives of both Neilsens and the Yuggera Ugarapul Endorsed Party.

(c) All decisions of the Liaison Committee will be made by majority.

(d) Meetings may be conducted by telephone, if agreed.

(e) Neilsens will provide reasonable resourcing (that has been pre-approved) to the Yuggera Ugarapul Endorsed Party to facilitate the holding of Liaison Committee meetings.

(f) The Parties agree that meetings of the Liaison Committee will initially be conducted without legal representation or Technical Advisor except where the Parties agree or in circumstances where the Dispute would benefit from the legal representatives or Technical Advisor assisting with facilitating discussions to resolve any issues relating to the Dispute.

4.2 Holding of meetings of the Liaison Committee

A meeting of the Liaison Committee will be held within the earlier of:

(a) 48 hours after it becomes apparent that the Yuggera Ugarapul Coordinators and the Sponsor's Representative will be unable to resolve the Dispute; and

(b) ten (10) Business Days after receipt of the Dispute Notice pursuant to clause 2.

4.3 Role of the Liaison Committee with respect to Disputes

(a) The role of the Liaison Committee is to consider and make decisions on behalf of the Parties with respect to any Disputes.

(b) If the Liaison Committee cannot agree to a resolution of the Dispute, either party can refer the Dispute to Expert Determination under clause 5 of this Schedule.

5. Expert Determination

(a) Any unresolved issues in relation to the Dispute shall be finally settled by Expert Determination conducted in accordance with the Expert Determination rules published by the Resolution Institute, except to the extent that there are inconsistent provisions in this Agreement.

(b) The Parties will seek to agree upon the appointment of an appropriate person to hear and resolve the Dispute.

(c) The Expert must be an independent person with appropriate qualifications and experience relevant to the subject matter of the Dispute.

(d) In the event that the Parties cannot agree on an Expert within five (5) Business Days from the date of the referral of the Dispute to Expert Determination, the Expert will be appointed in accordance with the Expert Determination rules published by the Resolution Institute.

(e) The Expert:

(i) must act as an expert and not as an arbitrator;

(ii) may proceed in any manner the Expert thinks fit;

(iii) may require the Parties to provide, or refer to, any documents, information, or material relevant to the determination of the Dispute; and

(iv) must give a written decision, including reasons, within ten (10) Business Days of his or her appointment.

(f) The determination of the Expert will be final and binding on the Parties unless the Parties agree that the Expert's decision is manifestly erroneous.

(g) Neilsens will pay the costs of the Expert but, subject to clause 5(h), each Party must bear their own costs in the preparation of submissions to the Expert and any advice sought in relation to the Expert Determination.

(h) Neilsens will meet the reasonable and agreed costs of the Yuggera Ugarapul Endorsed Party to engage their own legal representation or seek technical advice to provide advice or participate in any Expert determinations up to a maximum of $5,000.00 during any financial year.

(i) Despite any referral of a Dispute to Expert Determination, the Parties may continue to attempt to resolve any issues relating to the Dispute by any means they consider appropriate provided the outcome is consistent with the aims in clause 5 and the principles in clause 6 of this Agreement.

Schedule 8 Cultural Heritage Awareness Induction

1. Before the commencement of the first Significant Ground Disturbance work in the CHMP Area, Neilsens must ensure that:

(a) Employees or contractors of Neilsens undertaking the following roles are given a Cultural Heritage Awareness Induction through the delivery of a presentation of approximately 1 - 2 hours by two (2) representatives of the Yuggera Ugarapul Endorsed Party who will be remunerated by Neilsens at the rate for a Senior Cultural Heritage Officer given in Schedule 6:

(i) the quarry manager;

(ii) the project manager (if any); and

(iii) the Sponsor's Representative.

(b) Its employees and contractors managing and undertaking Project Activities that involve Significant Ground Disturbance undergo the Cultural Heritage Awareness Induction, the content and nature of which must be developed in consultation with the Yuggera Ugarapul Endorsed Party and which may be delivered by the online cultural heritage awareness tool developed by the Yuggera Ugarapul Endorsed Party in accordance with clause 3 or, if at any time the online tool is not available, by PowerPoint presentation, and presented by a person or persons who have been given a Cultural Heritage Awareness Induction under clause 1(a) of this Schedule.

2. If the Cultural Heritage Awareness Induction required by clause 1(a) has not occurred:

(a) The Parties will schedule a Cultural Heritage Awareness Induction to be held at or about the commencement of the first Significant Ground Disturbance work on site and will use reasonable endeavours to procure that all employees and contractors directly managing or undertaking Project Activities which will result in the first Significant Ground Disturbance, including the clearing of vegetation, participate in a Cultural Heritage Awareness Induction of the type referred to in clause 1(a) of this Schedule.

(b) Upon at least ten (10) Business Days prior written notice given by Neilsens the Yuggera Ugarapul Endorsed Party must make its representatives and materials available for the provision of the Cultural Heritage Awareness Induction. If the Yuggera Ugarapul Endorsed Party representatives and materials are not available within such timeframe, Neilsens may proceed with the Project Activities which will result in Significant Ground Disturbance provided Neilsens conducts a Cultural Heritage Awareness Induction of its own design for all employees and contractors directly managing or undertaking such Project Activities.

(c) If at any other time a Cultural Heritage Awareness Induction of the type referred to in this Schedule is to be delivered on site at the CHMP Area, then where it is mutually convenient to Neilsens and the Yuggera Ugarapul Endorsed Party and those parties agree, they will use reasonable endeavours to have those employees and contractors referred to in clause 1(a) of this Schedule who have not already received a Cultural Heritage Awareness Induction presented by the Yuggera Ugarapul Endorsed Party's representatives also participate in that Cultural Heritage Awareness Induction.

Schedule 9 Notification Details

Sponsor's Representative

Name: Steve Pyne

Email: steve.pyne@neilsens.com.au

Telephone: 0437 985 225 / 1300 266 273

Yuggera Ugarapul Coordinator

Name: To be advised (TBA) by the Yuggera Ugarapul Endorsed Party upon nomination at the time of the survey

Email: TBA

Telephone: TBA

Yuggera Ugarapul Coordinator

Name: To be advised (TBA) by the Yuggera Ugarapul Endorsed Party upon nomination at the time of the survey

Email: TBA

Telephone: TBA

Yuggera Ugarapul Elder/ Liaison Committee Member

Name: To be advised (TBA) by the Yuggera Ugarapul Endorsed Party upon nomination at the time of the survey

Email: TBA

Telephone: TBA

Yuggera Ugarapul Elder / Liaison Committee Member

Name: To be advised (TBA) by the Yuggera Ugarapul Endorsed Party upon nomination at the time of the survey

Email: TBA

Telephone: TBA

Schedule 10 Daily Form

YUGGERA UGARAPUL PEOPLE (YUP) & NEILSENS
WARRILL VIEW QUARRY PROJECT CHMP
DAILY REPORT

Part A to be completed by the Site Supervisor and checked by the Yuggera Ugarapul Coordinator

A. Survey Details		
Project Name		
Location Description (Work Area)		
Coordinates Lat/Long (centre)		
Survey Team	Yuggera Coordinator	
	Ugarapul Coordinator	
	Senior Cultural Heritage Officer	
	Senior Cultural Heritage Officer	
	Cultural Heritage Officer	
	Cultural Heritage Officer	

	Technical Advisor	
Site Supervisor		
Works Date		

Part B to be completed by the Yuggera Ugarapul Coordinator

B. Landscape Features			
Topography	□ Hilly (Gentle) □ Hilly (Steep) □ Flat □ Other……..	Ground disturbance	□ Cultivated □ Blade ploughed/grazed □ Undisturbed (natural state) □ Existing road/track □ Other……..
Vegetation type	□ Grassland □ Wetland □ Forest □ Barren □ Other……..	Soil type	□ Shallow rocky □ Blacksoil □ Sandy □ Claypan □ Other……..
Prominent Landscape Features	□ Hill formations □ Water body/ water holes	Ground surface visibility	……..%

	□ Escarpment □ Rock outcrops □ Other……..		

Part C to be completed by the Yuggera Ugarapul Coordinator

C. Was Aboriginal Cultural Heritage identified in the Work Area?	
In this Part C, please circle either "YES" or "NO" in the left hand column below	
NO:	**If you circle NO, this means that:** **(i) no Aboriginal Cultural Heritage was found in the Work Area; and** **(ii) unless the draft Survey Report otherwise provides, Project Activities can proceed in the area after the Report has been provided to Neilsens.**
YES :	**If you circle YES, this means that Aboriginal Cultural Heritage has been found in the Work Area, or may be found in the Work Area when Project Activities are done, and:** **(i) there are conditions that the YUP want to place on any Project Activities in order to protect the Aboriginal Cultural Heritage from Harm; and** **(ii) Neilsens may do the works or activities if it complies with those conditions.** **If you circled YES, you must complete Part D and the table in Part E.**

Part D to be completed by the Site Supervisor and agreed with the Yuggera Ugarapul Coordinator

D. If you circled "YES" in the left hand column of Part C, can the location of the Project Activities be changed to avoid any of the identified Aboriginal Cultural Heritage? Please circle either "YES" or "NO" in the left hand column below, and then complete the relevant details in the right hand column below	
YES:	New Work Area Location *(Lat/Long)*

	Will a buffer zone around the location of the identified Aboriginal Cultural Heritage be marked out? *YES / NO* If you circled YES, what is the radius of the buffer zone (in metres)?
	Site Supervisor to sign below acknowledging that no Project Activities will occur in the area in which Aboriginal Cultural Heritage was identified (or in the buffer zone, if marked) ……
NO:	Comments explaining why changing the location of the Project Activities to avoid the buffer zone is not an option.

Part E to be completed by the Yuggera Ugarapul Coordinators and agreed with the Site Supervisor

E. Brief description of Aboriginal Cultural Heritage identified in the Work Area (use and attach extra sheet if necessary)				
Type of Aboriginal Cultural Heritage	Original location coordinates (if picture taken, picture identification details)	New location coordinates (if artefacts Relocated)	Other recommended management measure, or additional comments in relation to historic, social and spiritual, aesthetic or scientific values of the area	Initials
1.				
2.				

3.				
4.				

F. Sign-off		
Yuggera Coordinator	Name:	Signature:
Ugarapul Coordinator	Name:	Signature:
Senior Cultural Heritage Officers	Name:	Signature:
	Name:	Signature:
Cultural Heritage Officers	Name:	Signature:
	Name:	Signature:
Technical Advisor	Name:	Signature:
Site Supervisor	Name:	Signature:

Schedule 11 Alleged Breach Form

Execution

EXECUTED as an Agreement

Signed by the Yuggera Ugarapul Endorsed Party

Margaret McCarthy
Signature of Margaret McCarthy

Signature of Witness
Cassandra Lang
Name of Witness

Signature of John Anderson

Signature of Witness

Name of Witness

Signature of Narrella Simpson

Signature of Witness
Cassandra Lang
Name of Witness

Signature of Lynda Maybanks

Signature of Witness

Name of Witness

Signature of Samantha Carr

Signature of Witness
Cassandra Lang
Name of Witness

Faye Carr
Signature of Faye Carr

Signature of Witness
Cassandra Lang
Name of Witness

Signature of Wade Thompson

Signature of Witness

Name of Witness

Signature of Sonya Coghill

Signature of Witness

Name of Witness

Signature of David Conlon

Signature of Witness

Name of Witness

SIGNED by Neilsens Quality Gravels Pty Ltd
ABN 19 010 620 916

Signature of Director

Signature of Director/Company Secretary

Full name (print)

Full name (print)

Date

Date

Execution

EXECUTED as an Agreement

Signed by the Yuggera Ugarapul Endorsed Party

_____
Signature of Margaret McCarthy

_____
Signature of Witness

_____
Name of Witness

_____
Signature of John Anderson

_____
Signature of Witness

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Name of Witness

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Signature of Narrella Simpson

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Signature of Witness

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Name of Witness

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Signature of Lynda Maybanks

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Signature of Witness

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Name of Witness

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Signature of Samantha Carr

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Signature of Witness

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Name of Witness

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Signature of Faye Carr

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Signature of Witness

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Name of Witness



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Signature of Wade Thompson



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Signature of Witness

Nancy Francois

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Name of Witness

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Signature of Sonya Coghill

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Signature of Witness

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Name of Witness

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Signature of David Conlon

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Signature of Witness

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Name of Witness

SIGNED by Neilsens Quality Gravels Pty Ltd
ABN 19 010 620 916

Signature of Director	Signature of Director/Company Secretary
Full name (print)	Full name (print)
Date	Date

Queensland Government

Department of Treaty, Aboriginal and Torres Strait Islander Partnerships, Communities and the Arts

CLH 21-005

23 October 2023

Neilsens Quality Gravels Pty Ltd
c/- Molly Shelton
Solicitor
Carter Newell Lawyers

By email only

mshelton@carternewell.com

Dear Ms Shelton

Approval of Cultural Heritage Management Plan (CHMP) for the Warrill View Quarry project executed between Neilsens Quality Gravels Pty Ltd and the Yuggera Ugarapul People

Thank you for submitting the proposed Warrill View Quarry project Cultural Heritage Management Plan (CHMP) for approval under Part 7 of the *Aboriginal Cultural Heritage Act 2003* (ACHA) on 30 August 2023.

I am pleased to advise that I have approved the CHMP pursuant to section 107 of the ACHA and my delegated authority. Accordingly, all the relevant details will be included on the Cultural Heritage Register maintained by this office.

Should you have any further queries, please do not hesitate to contact me on 0460 441 571.

Yours sincerely

Craig Trindall
Acting Director
Cultural Heritage Unit

Level 13,
111 George Street, Brisbane

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Queensland 4002 Australia

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