Vegetation Management Plan Ocean Drive, Kew (EPBC 2018/8296)

Jojeni Investments Pty Ltd c/o Jojeni Investment Trust No. 1

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DOCUMENT TRACKING

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ACKNOWLEDGEMENTS

This document has been prepared by Eco Logical Australia Pty Ltd with support from Gem Planning.

Template 2.8.1

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Abbreviations

Abbreviation	Description
Bios Act	*Biosecurity Act 2015*
DAWE	Commonwealth Department of Agriculture, Water and the Environment
ELA	Ecological Australia Pty Ltd
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
VMP	Vegetation Management Plan
VPA	Voluntary Planning Agreement
WoNS	Weeds of National Significance

Declaration of accuracy

EPBC Requirement	Project specific detail
EPBC Number	2018 / 8296
Project name	Residential Development Ocean Drive, Kew EPBC 2018 / 8296
Proponent and ABN	Proponent: The Trustee for Jojeni Investment Trust No. 1 ABN: 56 704 220 260
Approved action	To construct a residential development of approximately 417 lots and associated infrastructure on Lot 33 DP754405 and Lot 12 DP1091444 in Kew, NSW [See EPBC Act referral 2018/8296].
Location of the action	Lot 33 DP754405 and Lot 12 DP1091444 in Kew, NSW
Date of preparation	24 February 2021. Subsequently revised on 12 July 2021, 22 September 2021, 20 October 2021, 2 November 2021 and 15 November 2021.

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

Alexandra Gorey

Senior Ecologist, Eco Logical Australia Pty Ltd

15 November 2021

1. Introduction

This Vegetation Management Plan (VMP) has been prepared by Eco Logical Australia Pty Ltd (ELA) on behalf of Jojeni Investment Trust No 1 for the proposed residential subdivision at 168B & 201 Ocean Drive, Kew (Lot 12 DP1091444 and Lot 33 DP754405).

1.1 Background

The subject site encompasses 168B and 201 Ocean Drive (Lot 12 DP1091444 and Lot 33 DP754405) in the suburb of Kew (Figure 1). The lots are to be subdivided, creating approximately 417 lots and associated infrastructure. The study area is 65.83 ha in size, of which 21.9 ha of land will be managed as part of the Vegetation Management Plan. The remaining 43.70 ha is proposed for development and ancillary infrastructure

1.1.1 EPBC Act approval

The proposed action was referred to the Commonwealth Department of Agriculture, Water and the Environment (DAWE) for significant impacts to *Phascolarctos cinereus* (Koala) and was determined to be a Controlled Action under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act). Conditions 6 and 7 of the conditions of approval state that a Vegetation Management Plan must be prepared and submitted to the Department for approval prior to the commencement of the action. Condition 8 of the approval outlines the requirements of the VMP (EPBC 2018/8296).

1.1.2 Voluntary Planning Agreements

The vegetation to be retained in the site is zoned E2 and E3 under the PMHC Local Environmental Plan and the VPA. The E2 and E3 land forms part of a corridor of conserved land throughout the landscape, which forms part of the Urban Investigation Area 15 (Figure 2). The VMP lands would be subject to management through the implementation of a Vegetation Management Plan (VMP) which will be administered through a Voluntary Planning Agreement (VPA). A VPA is a legally binding agreement between a developer and a planning authority. In this case, the agreement was entered in to by the proponent and Port Macquarie-Hastings Council. The VPA also specifies the following, in relation to handing over the land to Council:

> *19.1 Dedication of Environmental Management Land* (EML)
>
> *The landowner is to dedicate the Environmental Management Land that is not Bushfire Management Land to the Council as a public Reserve Free of cost to the Council in accordance with the Vegetation Management Plan as approved by the Council.*

The EML (area to which the VMP applies) will be dedicated to Council after the VMP has been implemented by the proponent for the life of the EPBC Act approval (2040) to be consistent with the current approval conditions. After the VMP lands have been handed to Council, the proponent's obligations for ongoing management and reporting will cease. To accommodate the implementation of the VMP by the proponent for the life of the approval, Port Macquarie-Hastings Council has agreed in principal to modify the commitments specified in the VPA. The proponent will be fulfilling the VPA obligations as part of this VMP, and therefore the VPA will be modified such that the proponent is not

required to fund the ongoing management of the VMP lands for an additional 17 years after handover to Council (Appendix E).

The implementation of the VMP by the proponent for the life of the approval will result in:

- an effective transfer of contractual obligations under the VPA from Port Macquarie-Hastings Council to the proponent, and
- defer the transfer of the Environmental Management Land to PMHC as required by the VPA
- The proponent and PMHC have had in principle discussions to modify the contractual obligations in the VPA to reflect the VMP requirements of DAWE and recognise that the proponent will be funding works required by the VPA to be performed by Council.

1.1.3 Purpose of this document

The purpose of this VMP is to manage the 18.33 ha of Koala habitat remaining within the subject site as required under Condition 5 of the EPBC Act approval 2018/8296 (EPBC 2018/8296). This VMP area has been legally protected in perpetuity by the proponent and Port Macquarie – Hastings Council (Council) through a Voluntary Planning Agreement (VPA). This VMP will need to be submitted to DAWE for approval prior to commencement of the works.

1.2 Objectives and commitments of the Vegetation Management Plan

The overall aim of the VMP is to provide a management framework for the conservation of native vegetation and fauna habitat within the subject site. The VMP area will be managed in perpetuity, initially by the Proponent and eventually, once the initial establishment and management period has been completed, by the Port Macquarie-Hastings Council. This VMP covers this initial period, and the objectives and performance indicators outlined in this VMP to be met. The VMP is aimed at achieving key performance indicators within a five year period however it is understood the requirement to implement the VMP for the life of the EPBC Act approval. Ongoing maintenance actions are proposed in the VMP. The related objectives for and the commitments of the VMP are summarised in Table 1.

Table 1: Objectives of the VMP and table of commitments

Commitment	Objectives	Approach	Section in this report
Ensure the implementation of the VMP improves and maintains the condition of existing Koala habitat across the VMP area, consistent with the condition scores outlined in the Preliminary Documentation (ELA 2020).	Improve and maintain the condition of 18.33 ha of existing Koala habitat in the lands zoned E2 and E3 marked for retention in lot 12 DP1091444 and Lot 33 DP754405	1. Remove priority weeds and pasture weeds to enable native midstorey and understorey regeneration 2. Protect existing native vegetation across the VMP area during construction and post construction through the installation of fencing, signage and sediment and erosion control measures consistent with Section 4	Section 4.5 Section 3.1, 3.2 and 5
Ensure the implementation of the VMP improves the condition of Koala habitat within the VMP area consistent with the condition scores outlined in	Improve the condition of Koala habitat in lot 33 DP754405 through revegetation and assisted regeneration	1. Replanting of Koala food trees 2. Remove priority weeds and pasture weeds to enable native midstorey and understorey regeneration	Sections 4.3 and 5

Commitment	Objectives	Approach	Section in this report
the Preliminary Documentation (ELA 2020).		3. Supplementary planting of native midstorey and understorey species where required, consistent with Section 4	
Ensure the VMP establishes Koala habitat within the VMP area, consistent with the condition scores outlined in the Preliminary Documentation (ELA 2020).	Revegetate Koala habitat in lot 33 DP754405	1. Replanting of Koala food trees 2. Revegetation with relevant midstory and understory species, consistent with Section 4	Sections 4.4 and 5
Ensure that the indirect impacts are consistently managed throughout the life of approval such that the threat to Koalas is minimised.	Minimise indirect impacts and potential threatening process to the Koala where possible	1. Provide Koala bridges 2. Provide for Koala signage along the VMP boundary 3. Include provisions for fencing along the VMP boundary	Sections 3 and 6

Table 2: VMP requirements under Condition 8 of EPBC 2018/8296

Consent Condition 8 requirement	Where addressed in this VMP
a) A description and map (including providing the shapefiles) to clearly define the location and boundaries of the proposed offset area(s), accompanied by the offset attributes, to compensate for impacts to 28.47 ha of Koala habitat;	Section 2.1, Figure 1
b) details and a qualitative analysis of the baseline vegetation condition and habitat quality in the proposed offset area prior to implementing the management proposed in the VMP;	Section 2.3 and 2.4
c) the VMP environmental objectives, relevant EPBC Act protected matter/s and a reference to EPBC Act approval conditions to which the VMP refers;	Section 1.1, Table 1, Figure 3
d) a table of commitments made in the VMP to achieve the objectives, and a reference to where the commitments are detailed in the VMP;	Table 1.1
e) reporting and review mechanisms, and documentation standards to demonstrate compliance with the VMP;	Section 7.4
f) an assessment of risks to achieving VMP environmental objectives and risk management strategies that will be applied;	Section 7.6
g) a description of the management measures (including timing, frequency and duration) that will be implemented in the offset area to improve and maintain the quality of Koala habitat in the offset area for at least the duration of this approval;	Section 4.2 – 4.4, 5.1, 5.2
h) a discussion of how proposed management measures take into account any relevant Conservation Advices, Threat Abatement Plans and Recovery Plans;	Section 2.5
I) a program to monitor and report on and review the effectiveness of the VMP, including: *i. measurable performance indicators;* *ii. the timing and frequency of monitoring to detect changes in the performance indicators;* *iii. trigger values for corrective actions; and iv. proposed corrective actions, if trigger values are reached.*	Table 5, Table 9, Section 6
J) provide any links to other plans or conditions of approval (including State approval conditions);	
k) provisions for signage stating the area is Koala habitat and that dogs must be kept on leads, subject to Port Macquarie-Hastings Council approval;	Section 3.4
l) provisions for speed limits on roads for the purpose of reducing potential for collisions with Koalas, subject to Port Macquarie-Hastings Council approval.	Section 3.4

1.3 Key Terms

For the purpose of this VMP, the following terminology has been adopted:

Development footprint - the area of the site to be developed. This area is outside the scope of the VMP.

VMP area - the proportion of the site to be conserved and managed by this VMP (including 18.33 ha of Koala habitat) **(Figure 1).**

Subject site - The extent of 168B & 201 Ocean Drive Kew (Lot 12 DP1091444 and Lot 33 DP754405).

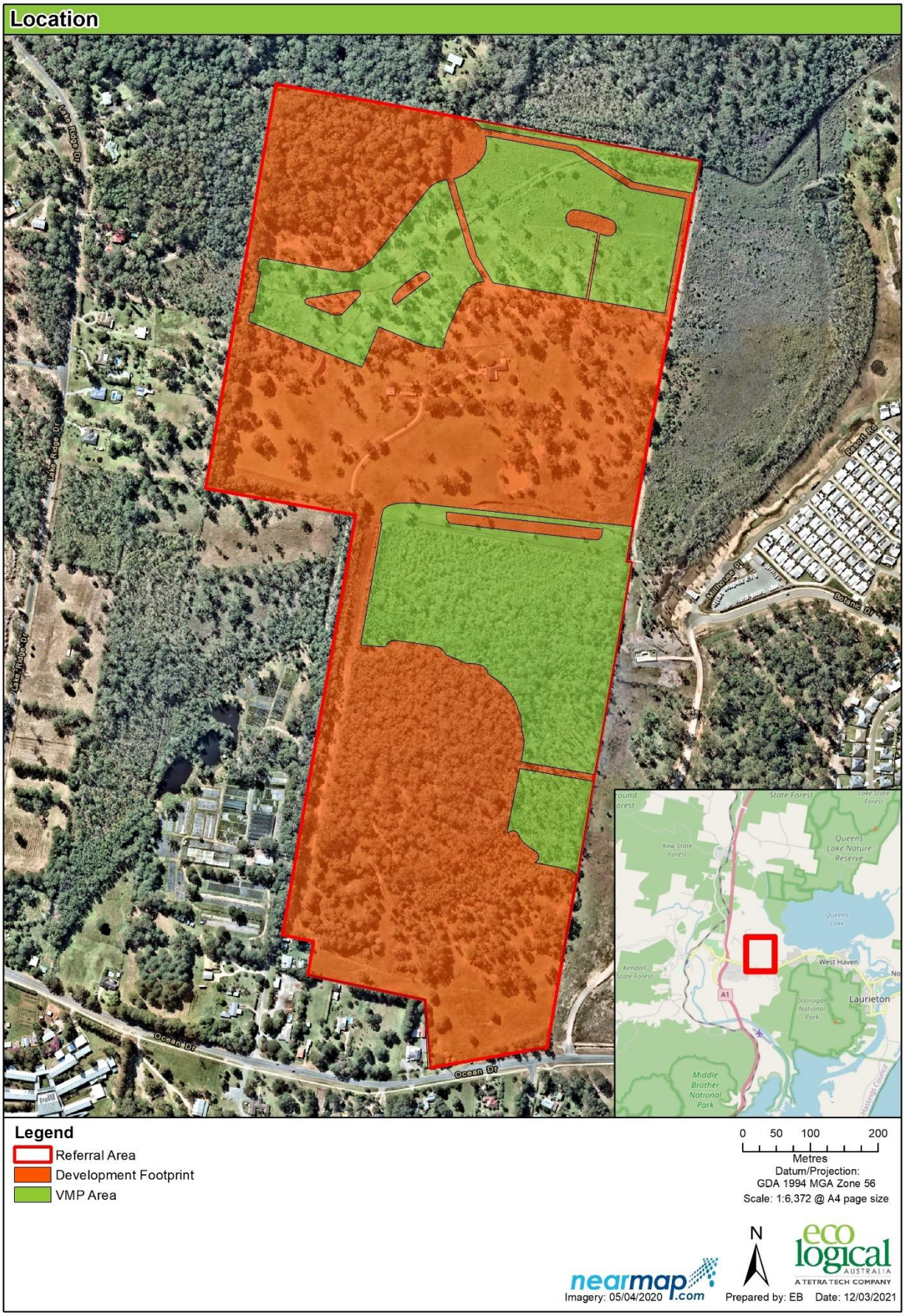

Figure 1: Site location

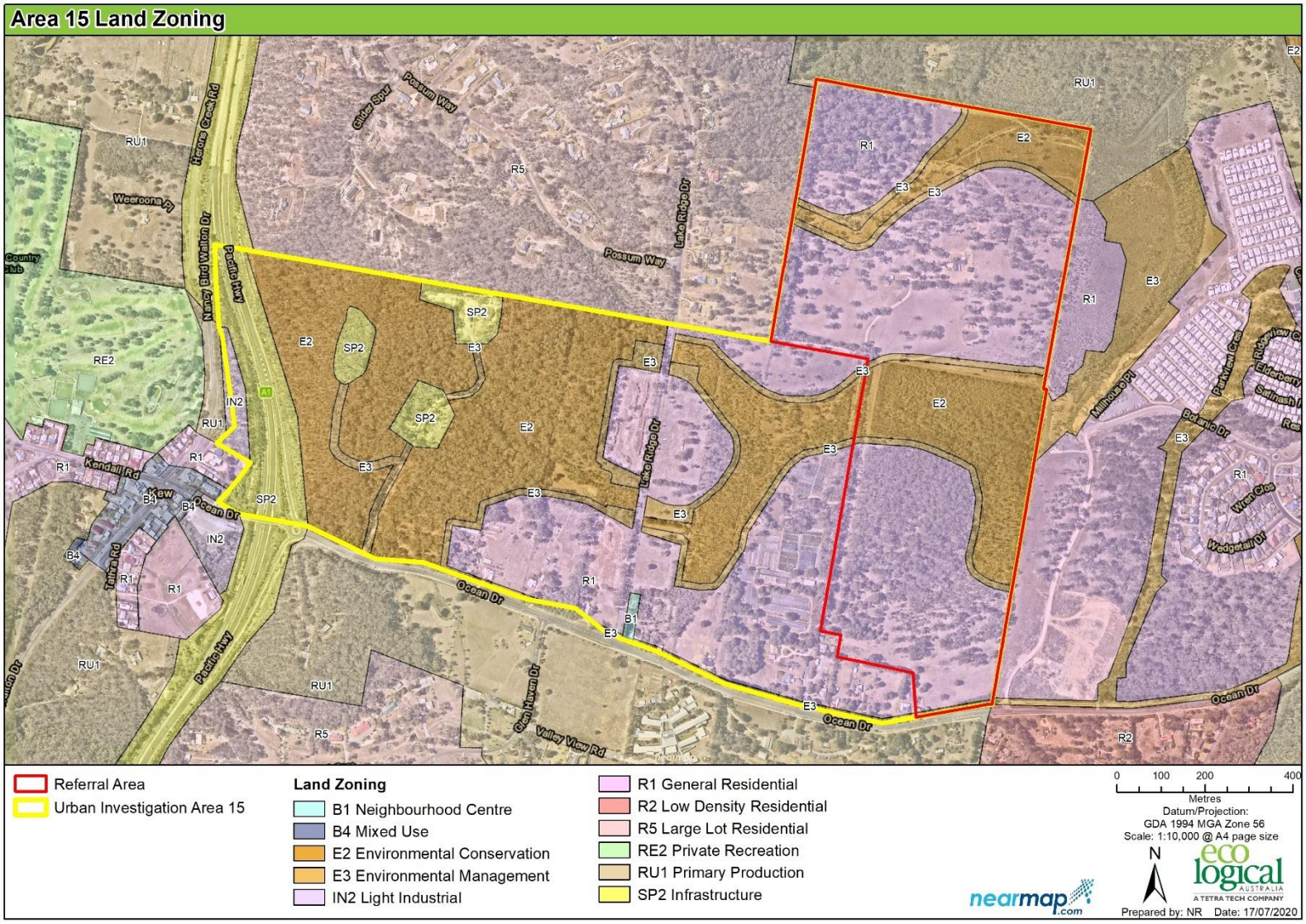

Figure 2: The VMP area in relation to the E2 and E3 zoning across Urban Investigation Area 15

2. Description of the existing environment

2.1 Location

The subject site is located north of Ocean Drive, approximately 2 km east of Kew and 1.3 km east of the Pacific Highway in the Port Macquarie Hastings Local Government Area (LGA). The subject site is comprised of agricultural/grazing land, native vegetation and small scale, rural residential development.

2.2 Topography and hydrology

There are two ephemeral drainage lines within the VMP area. The northern lot (169B Ocean Drive - DP 754405) has a stream flowing west to north east towards Queens Lake. The western point of the lot where the stream passes the lot boundary has an elevation of 13 m. At the north eastern point where the stream leaves the lot boundary it has an elevation of 4 m. The southern lot (201 Ocean Drive - DP 1091444) has a network of streams flowing east to west within the VMP area. The elevation where the stream enters on the eastern lot boundary is 12 m. The elevation where the stream leaves the lot boundary is 8 m. These networks of stream link up and flow towards Queens Lake.

2.3 Field survey

Field survey was conducted by ELA in December 2020 for two person days. The field survey focused on the following:

- identification of weeds in the VMP area and their densities
- dominant native species in each structural layer
- evidence of disturbance to the VMP area (i.e. cattle grazing, rubbish dumping, unauthorised vehicle access etc)
- presence or absence of fencing
- identification of other issues requiring management as part of the VMP.

This information was gathered to determine the existing condition of the vegetation and inform the management measures required to improve the condition of the vegetation and the Koala habitat. The information gathered during the field survey was assessed in conjunction with all previous surveys conducted across the study area and information available for the VMP area to determine the baseline condition of Koala habitat. The baseline condition is also consistent with the condition documented in the Preliminary Documentation that was submitted to DAWE (ELA 2020; Figure 5). The baseline condition is described further below in section 2.4.

2.4 Vegetation communities and associated Koala habitat

Validation of the vegetation and previous mapping was undertaken by Biodiversity Australia and Eco Logical Australia and identified *Swamp Mahogany – Melaleuca sieberi Swamp Forest* (Swamp Forest) and *White Stringybark – Red Bloodwood Dry Open Forest* (Dry Open Forest) as the two vegetation communities making up the subject site. The *White Stringybark – Red Bloodwood Dry Open Forest* (Dry Open Forest) has been mapped as intact, this is the only condition of this community present on the subject site (Bolwarra Environmental Services 2018a). A list of flora species recorded within the site have been detailed in Table 17.

2.4.1 Swamp Mahogany – Melaleuca sieberi Swamp Forest

2.4.1.1 Community description

The Swamp Forest in this area is found on soils that are primarily derived from a fluvial / marine provenance from the Pleistocene. The canopy is comprised of trees with a mature height of approximately 25 m, which can vary between 10 – 30 m.

The dominant canopy tree species of the Swamp Forest is *Eucalyptus robusta* (Swamp Mahogany), with *Eucalyptus resinifera* subsp. *hemilampra* (Red Mahogany) and *Melaleuca quinquenervia* (Broad-leaved Paperbark) occurring less frequently. The midstory layer is dominated by *Melaleuca sieberi* with *Melaleuca linariifolia* and *Callistemon salignus* (Willow Bottlebrush) occurring less frequently. Common shrub layer species include *leptospermum polygalifolium* subsp. *polygalifolium* (Tantoon), *Melaleuca thymifolia* (Thyme Honey-myrtle) and *Banksia oblongifolia* (Fern-leaved Banksia).

The common ground layer species includes *Banksia spinulosa, Banksia robur, Gahnia clarkei* (tall Saw Sedge), *Blechnum indicum* (Swamp Water Fern) and *Xanthorrhoea fulva* (Grass Tree).

2.4.1.2 Baseline condition for Koala habitat

The Swamp Forest has been mapped into three vegetation zones;

- intact (good condition with little to no signs of disturbance)
- modified (some levels of previous disturbance)
- severely modified (high levels of previous clearing and cattle grazing).

Additional field survey conducted by Eco Logical Australia in 2020 confirmed the presence of the three previous mapped vegetation zones. A description of each vegetation zone and how each zone has been attributed to the baseline Koala habitat is provided below. When compared with the Koala Habitat Assessment tool provided in the referral guidelines, this vegetation community was consistent with the following characteristics:

- evidence of one or more Koalas within 2 km of the VMP area within the last 5 years (Figure 6)
- has forest or woodland with 2 or more known koala food tree species
- evidence of infrequent or irregular koala mortality from vehicle strike or dog attack at present in areas that score 1 or 2 for koala occurrence
- the zone contributes to connectivity throughout the landscape.

The influence of baseline condition for each zone on the proposed management actions is discussed in section 5.

Intact

The vegetation within this zone was in very good condition and contained all structural layers. Native species were dominant in each layer and where weeds were present, they were scattered in occurrence and at low densities. The intact vegetation zone contained *Eucalyptus robusta* and *Eucalyptus resinifera* subsp. *hemilampra* which would be used for feeding and browsing by the Koala. The patch also contained *Melaleuca quinquenervia, Melaleuca linariifolia* and *Melaleuca sieberi* which can provide supplementary feeding resources (TSSC 2012). *Eucalyptus robusta* is considered a primary food tree species for the north coast and *Eucalyptus resinifera* is considered a secondary species.

The baseline Koala habitat assessment for this zone determined it as 'good' with a **condition score of 8** due to the:

- presence of two Koala feed trees at moderate to high densities
- trees at varying stem class sizes
- structurally complex patch with native species in all structural layers
- presence of other midstorey and canopy species that can provide supplementary habitat
- vegetation zone in overall good condition
- connected to other vegetation throughout the landscape
- low – moderate risk of predation, rubbish dumping and indirect impacts.

This has influenced the proposed management measures required to ensure that the quality of the zone is maintained over time.

Modified

This vegetation zone was in moderate condition at the time of survey and showed signs of disturbance associated with historical agricultural practices including grazing and selective thinning. All structural layers were present, however, the midstorey was sparse and canopy trees were generally younger than the intact zone. Each structural layer was dominated by native species, however weed plumes were more frequent. The canopy contained *Eucalyptus robusta* and *Eucalyptus resinifera* subsp. *hemilampra* and a higher proportion of younger trees at sparser densities than the intact zone. The Koala is still known to utilise younger trees and will feed on their leaves. At times, younger trees can be preferred due to the lower quantities of tannin, phenolics and fibre and more moisture and nitrogen.

The baseline Koala habitat assessment for this zone determined it as 'moderate' with a **condition score of 2**, due to:

- presence of two Koala feed trees and non-eucalypt supplementary species
- lower density canopy and higher proportion of juvenile trees
- reduced structural complexity
- connected to other vegetation throughout the landscape
- moderate threat of predation.

This has influenced the proposed management measures required to ensure that the quality of the zone is increased over time.

Severely modified

This zone showed high and ongoing levels of disturbance associated with historical clearing and cattle grazing. The canopy was mostly absent, and where present at the time of survey it was juvenile and sparse. The midstorey was scattered and the groundcover was a mix of native and exotic species. The baseline Koala habitat assessment for this zone is poor with a **condition score of 2** (Figure 3, Figure 5), due to the:

- absence of canopy across most of the zone
- where canopy is present it is sparse and juvenile
- absence of midstorey

- absence of structural complexity
- can form connectivity throughout the landscape
- presence of threats, such as cattle grazing and increased likelihood of predation from feral animals.

This has influenced the proposed management measures required to ensure that the quality of the zone is increased over time.

2.4.2 White Stringybark – Red Bloodwood Dry Open Forest

2.4.2.1 Community description

This community was mapped in one vegetation zone – good. This community is an open or tall open forest occurring on Pleistocene and quaternary soils. The canopy is dominated by *Eucalyptus globoidea* (White Stringybark) and *Corymbia gummifera* (Red Bloodwood). Other tree species occurring less frequently include *Eucalyptus microcorys* (Tallowwood), *Eucalyptus resinifera* subsp. *hemilampra* (Red Mahogany), *Eucalyptus pilularis* (Blackbutt) and *Syncarpia glomulifera* (Turpentine). The shrub and ground layer include common species such as *Allocasuarina littoralis* (Black Oak), Banksia species, *Persoonia linearis*, *Dodonaea triquetra*, *Lomandra longifolia* and *Pteridium esculentum* (Bracken).

2.4.2.2 Baseline condition for Koala habitat

This community was an intact patch that was continuous with other patches of native vegetation across the VMP area. The community was in good condition at the time of survey, was structurally complex and dominated by native species in each structural layer. The canopy contained several species that are listed as Koala feed species, *Eucalyptus globoidea, Eucalyptus microcorys, Eucalyptus resinifera* subsp. *hemilampra* and *Eucalyptus pilularis*. Of these, *E. microcorys* is listed as a primary feed tree species, while *E. resinifera* is a secondary feed tree species and *E. globoidea* is a supplementary feed tree species.

The community showed very little signs of disturbance and contained trees of multiple stem class sizes and forms part of a larger, continuous area of native vegetation that extends throughout the landscape. The baseline Koala habitat assessment for this zone is good with a **condition score of 8** due to the (Figure 3, Figure 5):

- presence of one Koala feed tree at a moderate to high density
- trees at varying stem class sizes
- presence of other midstorey and canopy species that can provide secondary and supplementary habitat
- vegetation zone in overall good condition
- connected to other vegetation throughout the landscape
- low – moderate risk of predation, rubbish dumping and indirect impacts.

This has influenced the proposed management measures required to ensure that the quality of the zone is maintained over time.

Figure 3 Vegetation communities

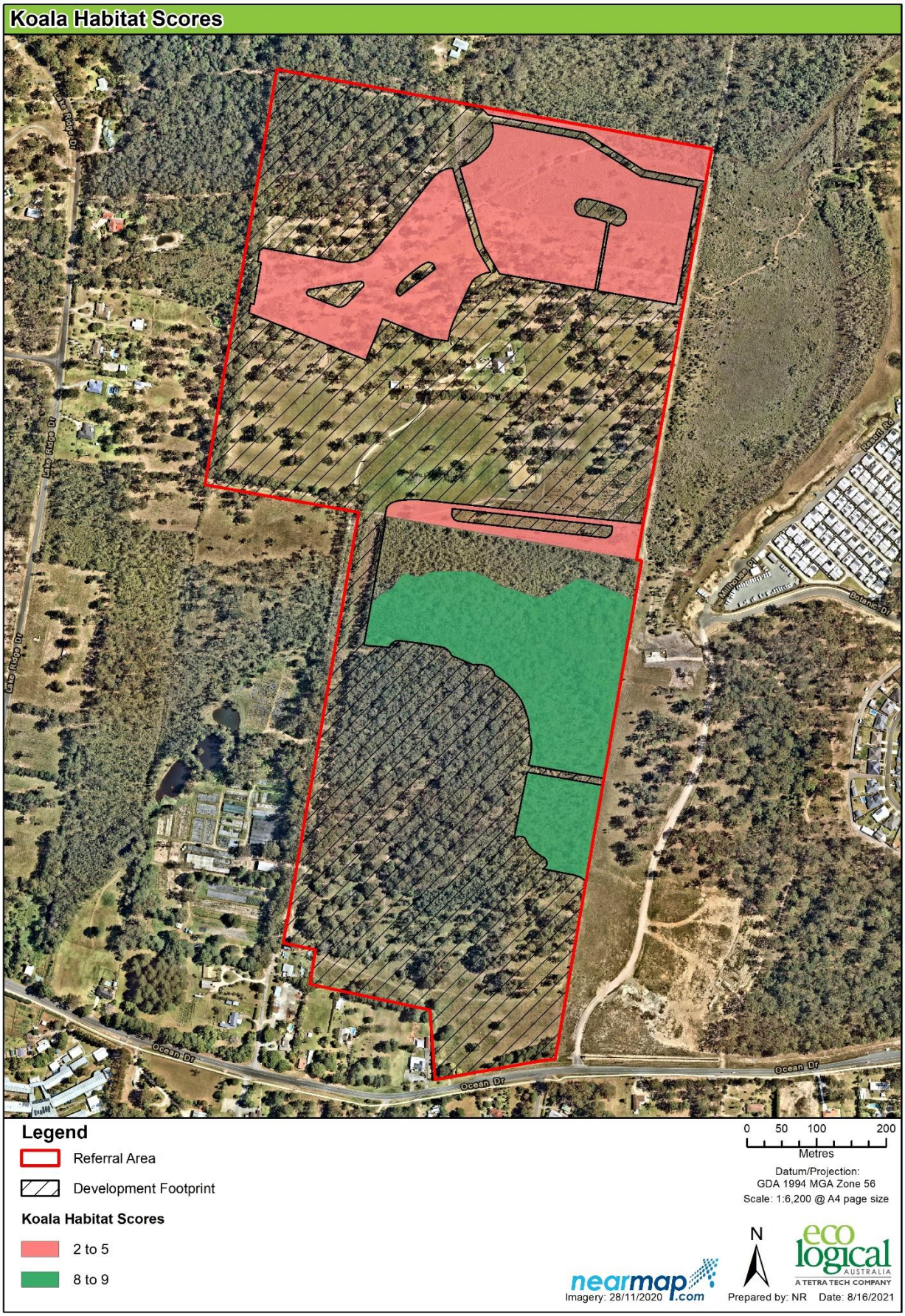

Figure 4: Koala habitat scores across the VMP area

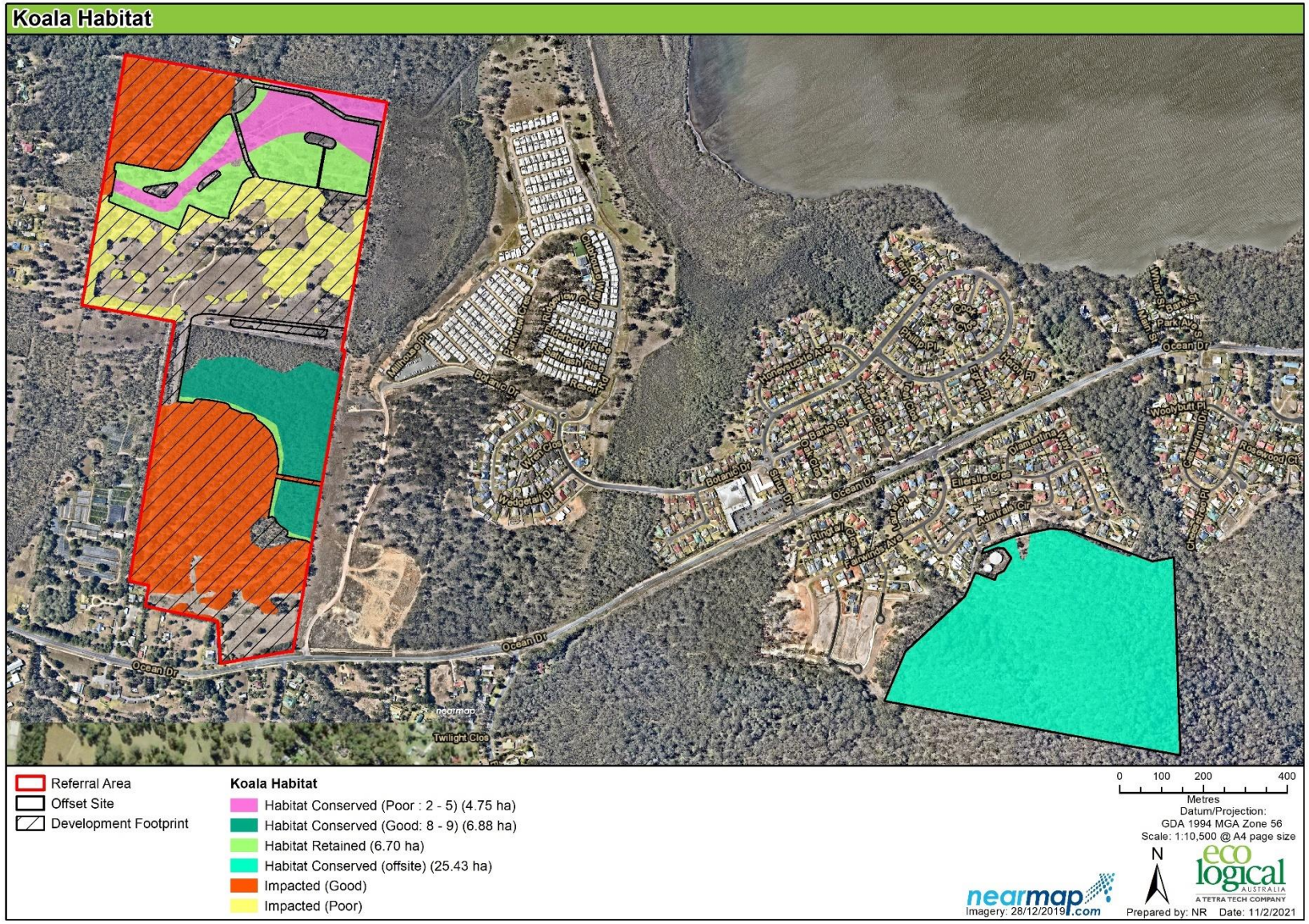

Figure 5: Koala habitat scores and area across the VMP area consistent with the offset strategy in the PD

Figure 6: Records for the Koala in the IBRA subregion (note, the species has not been previously recorded in the referral area or VMP area)

2.5 Weeds

The *Biosecurity Act 2015* (Bios Act) and regulations provide specific legal requirements for state level priority weeds (Table 3). Under the Bios Act all plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.

Specific legal requirements apply to State determined priorities under the Regional Strategic Weed Management Plan 2017-2022, while Regional priorities include outcomes to demonstrate compliance with the general biosecurity duty and strategical responses in the region to achieve relevant management objectives (North Coast Local Land Services 2017). Weeds listed as 'other weeds of regional concern' under the plan warrant resources for local control or management programs and are a priority to keep out of the region. Inclusion in this list may assist Local Control Authorities and / or land managers to prioritise action in certain circumstances where it can be demonstrated the weed poses a threat to the environment, human health, agriculture etc.

Weed species identified during the field survey for this VMP include **two** listed as State level priority weeds, and **one** listed as other weeds of regional concern. The weeds present, their priority listing under the BA Act, the associated asset / value at risk and whether they are Weeds of National Significance (WoNS), are presented in Table 3**.**

Table 3: A list of priority weeds and Weeds of National Significance Identified within the VMP

Scientific Name	Common Name	WoNS	Biosecurity Act 2015
State level priority weeds (Whole of State)			
Senecio madagascariensis	Fireweed	Yes	Asset Protection
Lantana camara	Lantana	No	Asset Protection
Regional Level priority weed (North Coast LLS			
N/A			
Other weeds of regional concern			
Pinus elliottii	Slash Pine	No	Asset Protection

2.6 Fauna

The subject site is likely to provide habitat for forest owls, birds, reptiles, arboreal mammals, microchiropteran bats (microbats) and terrestrial mammals. The creeklines may also provide potential habitat for amphibians. The subject site contains numerous hollow bearing trees which may provide roosting habitat for birds, forest owls, microbats and mammals. These will require management during construction to minimise impacts. Mitigation measures to manage potential impacts to resident fauna is addressed in the CEMP.

2.7 Consistency with EPBC Act recovery plans

The Preliminary Documentation prepared for the EPBC Act assessment of the subdivision evaluated potential impacts to four Matters of National Environmental Significance:

- *Anthochaera phrygia* (Regent Honeyeater)

- *Lathamus discolour* (Swift Parrot)
- *Phascolarctos cinereus* (Koala)
- *Pteropus poliocephalus* (Grey-headed Flying-fox).

Consistent with condition 8(h) of the EPBC Act approval, this VMP addresses the recovery objectives outlined in each species' recovery plan or conservation advice. This information is detailed in Table 4, Table 5, Table 6 and Table 7. The Regent Honeyeater, Swift Parrot and Grey-headed Flying-fox have conservation advice and a recovery plan which has been considered in the preparation of this VMP. The Grey-headed Flying-fox does not have approved conservation advice. There is no national recovery plan for the Koala, however a recovery plan has been approved by the former NSW Department of Environment and Climate Change which has been included in Table 7.

Table 4: Consistency with the Swift Parrot National recovery plan and conservation advice

Recovery and conservation objectives	Application in the VMP
National recovery plan	
To prevent further decline of the Swift Parrot population To achieve a demonstrable sustained improvement in the quality and quantity of Swift Parrot habitat to increase carrying capacity	The VMP will assist in sustained improvement with its intention to VMP will retain and manage 14.7 ha of Swift Parrot habitat which will improve connectivity of habitat throughout the landscape.
Conservation advice	
Review and update management prescriptions for swift parrots for use in the Forest Practices System and Local Government land use planning and approvals processes across the breeding and non-breeding range of swift parrots. Revise and update forestry prescriptions to reflect the most recent habitat information available in Victoria and New South Wales. Develop and implement strategies to reduce predation from sugar gliders when circumstances require Consider installing nesting boxes suitable for swift parrots in areas of low sugar glider predation to enhance swift parrot breeding success Continue to raise public awareness of the risks of collisions and how these can be minimised, targeting known high risk areas such as the greater Hobart, Melbourne and Western Sydney areas, and the central coast region of New South Wales (Wyong, Gosford, Lake Macquarie and Penrith Local Government areas).	These objectives are outside the scope of this VMP.
Encourage and support the protection, conservation management and restoration of swift parrot nesting and foraging habitat through agreements with landowners, incentive programs and community projects.	This VMP will retain and manage 14.7 ha of Swift Parrot foraging habitat.
Develop and implement a Disease Risk Assessment for swift parrots.	This objective is outside the scope of this VMP.

Table 5 Consistency with the National Recovery Plan and conservation advice for the Regent Honeyeater

Recovery objective	Application in the VMP
National recovery plan	
Reverse the long-term population trend of decline and increase the numbers of regent honeyeaters to a level where there is a viable, wild breeding population, even in poor breeding years; and to	This objective is outside the scope of this VMP.
Enhance the condition of habitat across the regent honeyeaters range to maximise survival and reproductive success and provide refugia during periods of extreme environmental fluctuation.	The VMP will retain and manage 14.7 ha of potential Regent Honeyeater habitat. The 14.7 ha will be retained and the condition of the habitat maintained.
Conservation advice	
Reverse the long-term population trend of decline and increase the numbers of regent honeyeaters to a level where there is a viable, wild breeding population, even in poor breeding years	This objective is outside the scope of this VMP.
Maintain key regent honeyeater habitat in a condition that maximises survival and reproductive success, and provides refugia during periods of extreme environmental fluctuation.	The VMP will retain and manage 14.7 ha of Swift Parrot habitat which will improve connectivity of habitat throughout the landscape which may contribute to refuge during environmental stress.

Table 6: Consistency with Draft recovery plan for the Grey-headed Flying-fox

Recovery objective	Application in the VMP
to improve the Grey-headed flying-foxes national population trend by reducing the impact of threatening processes on Grey-headed Flying-foxes through habitat identification, protection, restoration and monitoring, and	The VMP will contribute to the retention and management of Grey-headed Flying-fox habitat in the Port Macquarie – Hastings region. The VMP will manage and revegetate 14.7 ha of habitat for this species. No monitoring of GHFF individuals is proposed as part of this VMP.
to assist communities and Grey-headed flying-foxes to coexist through better education, stakeholder engagement, research, policy and continued support to fruit growers.	This objective is outside the scope of this VMP.

Table 7: Consistency with the state recovery plan (DECC 2008) for the Koala

Recovery objective	Application in the VMP
Reverse the decline of the koala in New South Wales, to ensure adequate protection, management and restoration of koala habitat, and to maintain healthy breeding populations of koalas throughout their current range.	The VMP includes provisions for the maintenance of existing Koala habitat on site, and the restoration of previously cleared land to Koala habitat. This will be achieved through planting Koala feed trees and ongoing maintenance through weeding and supplementary planting where required. The revegetation and maintenance of existing habitat will contribute to vegetated corridors throughout the landscape and allow movement to the east and west.

3. Site preparation

The following works are required to protect the ecological integrity of the VMP area and meet the Koala requirements outlined in the approval:

- fencing
- installation of Koala bridges
- installation of signage
- removal of cattle
- amendments to the existing lease to restrict grazing.

3.1 Fencing

3.1.1 Exclusion fencing

The VMP area (subject site) is to be temporarily fenced to prevent civil construction machinery from entering during subdivision development. The fencing shall be installed at the active development interfaces prior to the commencement of clearing. The temporary fences are required for the duration of vegetation clearance works. Once vegetation clearance has been completed, the fencing must be replaced with star pickets and high visibility mesh, to ensure that the boundary of the VMP area is clearly delineated from the construction footprint. If machinery access is required in the E2 lands, prior to entry, an ecologist shall be consulted.

3.1.2 Koala crossings

Koala bridge crossings or tunnel crossings must be installed to allow movement of Koalas from the subject site throughout the locality. Indicative locations of the bridge crossings or tunnels are shown in Figure 7 and some examples of bridge crossings are shown in Appendix D. The Koala crossings would be constructed over or under new roads after the roads are completed. The Koala crossings could be any of the following (https://faunacrossings.com.au/):

- Flat rope ladder crossing
- Box rope ladder crossing
- Flat mat rope ladder crossing
- Open box with inlay ladder crossing
- Tunnels
- Tunnels with logs
- Culverts with logs.

Prior to installation, Department of Agriculture, Water and Environment should be consulted (Figure 8 and Figure 7).

3.2 Signage

3.2.1 Information signage

Signage shall be installed around the subject site as needed to convey the works that are being undertaken. The exact information and location of these signs will be determined during

implementation works. At a minimum, this signage shall identify at all access points to the site that the area is being managed for conservation purposes.

3.2.2 Koala signage

Permanent signage stating the subject site is koala habitat will be installed at points along the boundary of the VMP area which will be determined during implementation works and in consultation with Council. The purpose of the signs will be to inform residents and the public that they're entering koala habitat and that dogs must always be kept on leads. Signs will be a minimum size of A3 and contain the wording: *"Koala habitat, dogs are to be kept on leads"* with a picture of a Koala and a prohibitive sign for off leash dogs.

3.3 Proposed speed limits

Koala signs and speed limit warnings will be placed along the roads in the subject site. This is to reduce the potential collisions with koalas on the roads. Speed limit warnings would be discussed with Council and is understood to be limited to ≤ 50 km / hr (Appendix D). Signage will be installed upon completion of the adjacent development. Council will be responsible for enforcing speed limits.

3.4 Removal of cattle grazing

Any cattle grazing occurring across the VMP areas will cease prior to the commencement of this VMP and be restricted to lands marked for development. In addition, the grazing rights which exist on the northern property will be restricted such that grazing cannot occur in the VMP lands.

3.5 Fauna management

Provisions for the removal of hollow bearing trees in the development footprint has been addressed in the Construction Environment Management Plan (CEMP, ELA 2021).

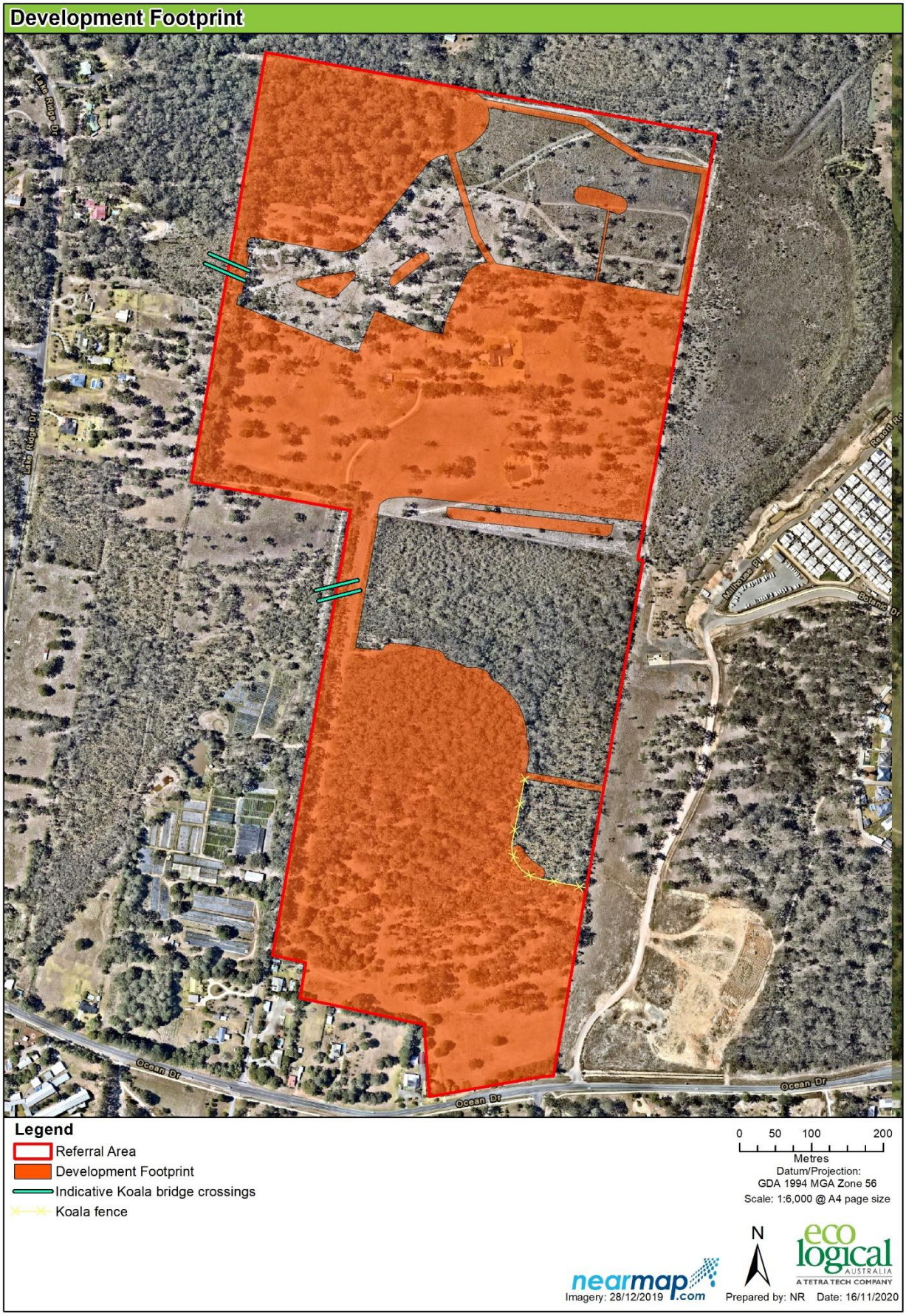

Figure 7: Indicative koala bridge crossings and location for permanent Koala fencing

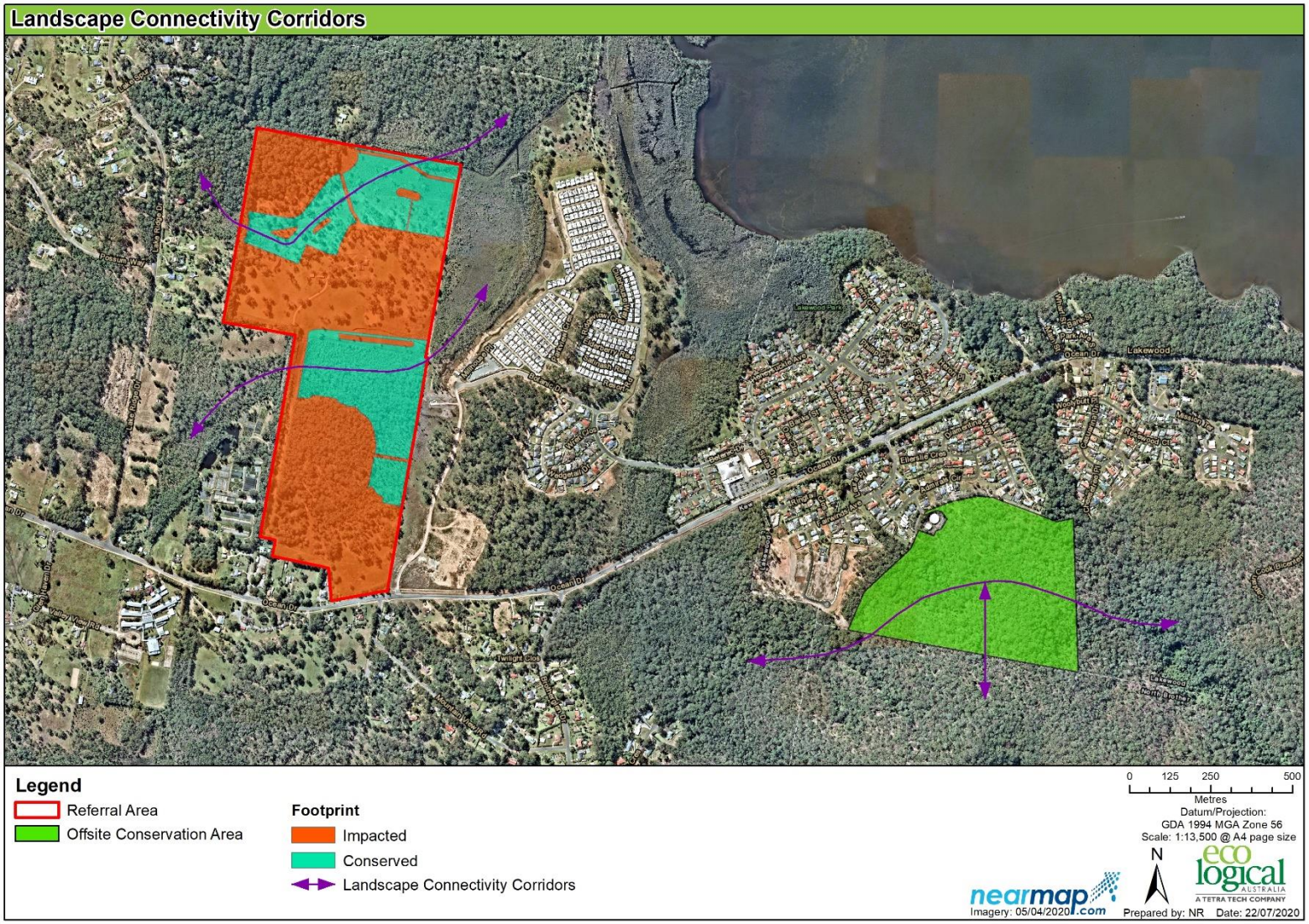

Figure 8: Contribution of the VMP area to connectivity with adjacent E2 and E3 lands

4. Vegetation management works

4.1 VMP management zones

The total VMP area is **21.9 ha** and has 3 management zones:

- Zone 1: Conservation
- Zone 2: Assisted Regeneration – modified
- Zone 3: Assisted Regeneration – severely modified.

A breakdown of each zone and how they relate to scoring of Koala habitat, both present and future, is provided below.

4.2 Zone 1: Conservation

Zone 1 encompasses approximately **13.5 ha** of vegetation in the NE area of both lots. Zone 1 is expected to achieve an increase in score from 8 to 9 in one year.

The vegetation in the southern lot (DP1091444) is intact Swamp Mahogany – *Melaleuca sieberi* Swamp Forest and White Stringybark – Red Bloodwood Dry Open Forest. This is in good condition with intact native canopy, shrubs and groundcovers. The northern section of this zone contained all structural layers in a juvenile form and was dominated by native species. The southern section of this zone also contained all structural layers and was dominated by native species, however was more mature. These zones have been grouped together due to the similarity in management actions required to maintain the and improve the current condition of the zone.

This zone will require maintenance to manage any new invasions of weeds, particularly on the edges of the zone.

4.3 Zone 2: Assisted Regeneration – modified

Zone 2 encompasses approximately **2.4 ha** of vegetation in the northern lot. Zone 2 is expected to achieve an increase in score of 2 to 5 over 15 years.

The vegetation in these areas is modified Swamp Mahogany – *Melaleuca sieberi* Swamp Forest. The vegetation consists of regeneration mid story and shrub species with an absence of canopy species. *Melaleuca sieberi*, *leptospermum polygalifolium* subsp. *polygalifolium* and *Melaleuca thymifolia* are regenerating in the area. The groundcover layer is a mix of exotic pasture weeds and native grasses and forbs.

The soil has been compacted due to grazing of livestock in this zone. Once the grazing animals have been removed from the VMP area, it is expected that further natural regeneration will continue to occur. Further colonisation by native species, in particular native sedges, rushes and grasses may occur given the amount of grazed native ground covers present onsite.

This zone will require weed removal throughout the management period to assist with natural regeneration. The exotic grasses will need to be brush cut and sprayed using a non-selective herbicide (e.g. Roundup Biactive®). This will likely require a minimum of at least two spray treatments, with follow-up required if further germination of weeds occurs.

For more information on specific weed control techniques to be applied, see **Appendix A**

It will also require revegetation of appropriate tree shrub and groundcover species over an estimated **25%** of the zone **(**Table 8**)**. Revegetation of tree and shrub species will be undertaken in Year 2, concentrating in the areas lacking canopy cover, and groundcover species in Year 6-9 of the VMP.

4.4 Zone 3: Assisted Regeneration – severely modified

Zone 3 encompasses approximately **6 ha** of vegetation in the northern lot. Zone 3 is expected to achieve an increase in score of 2 to 5 over 15 years.

The vegetation in these areas is severely modified Swamp Mahogany – *Melaleuca sieberi* Swamp Forest. The vegetation consists of a partially cleared tree layer, with sparse canopy and shrub regeneration. The groundcover layer is a mix of exotic pasture weeds and native grasses and forbs.

The soil has been compacted due to grazing of livestock in this zone. Once the grazing animals have been removed from the VMP area, it is expected that further natural regeneration will continue to occur. Further colonisation by native species, in particular native sedges, rushes and grasses may occur given the amount of grazed native ground covers present onsite.

This zone will require weed removal throughout the management period to assist with natural regeneration. The exotic grasses will need to be brush cut and sprayed using a non-selective herbicide (e.g. Roundup Biactive®). This will likely require a minimum of at least two spray treatments, with follow-up required if further germination of weeds occurs. The woody weeds in the area (eg. Slash pine) will need to be cut and painted in Year 1. This will require follow up if further germination of weeds is occurring.

It will also require revegetation of appropriate tree shrub and groundcover species over an estimated **50%** of the zone **(**Table 8**)**. Revegetation of tree and shrub species will be undertaken in Year 2, concentrating in the areas lacking canopy cover, and groundcover species in Year 6-9 of the VMP.

4.5 Weed control

4.5.1 Primary and secondary weed control

All weeds, including woody weeds, herbaceous weeds and exotic grasses in the understory will require treatment. Secondary weed control will be required following primary weed control and revegetation. During these weed control activities, care will be taken to avoid natural regeneration of native species.

Primary and secondary weed control will include woody weed, herbaceous weeds and exotic grasses, specifically the control of *Pinus elliottii* (Slash pine), *Senecio madagascariensis* (Fireweed), *Setaria sphacelata* var. *sericea* (African pigeon grass), *Paspalum dilatatum* (Dallas grass) and *Stenotaphrum secundatum* (Buffalo grass). Large *Pinus elliottii* can be treated using cut and paint method. Chemical and mechanical control techniques will be required in follow up treatments. Follow up treatments of all weed seedling growth will be required.

For more information on specific weed control techniques to be applied, see **Appendix A**

4.5.2 Maintenance

Following primary and secondary weed removal, all areas will require ongoing maintenance to control weed regrowth from the soil seed bank. Maintenance work is to be undertaken by a qualified bush regeneration contractor(s).

Maintenance will be undertaken on a regular basis in the peak growing seasons (spring and summer), with less frequent visits in cooler periods (autumn and winter). Maintenance programs will also comment on other site issues such as rabbit activity. Maintenance work will include actions to encourage native regeneration where it is not occurring naturally. These actions include techniques such as soil disturbance, niche seeding and transplanting.

4.6 Revegetation

Revegetation works are likely to be required in management zones 2 and 3.

Revegetation works in Year 2 of both Zone 2 and Zone 3 will include planting of native canopy and shrub species using tube stock and Hiko/Viro cells. Revegetation of groundcover will be commenced in Year 6 and will include planting of groundcover and grasses using tube stock and Hiko / Viro cells. Approximately 25% of groundcover is assumed to be planted each year from Year 6 to Year 9 to allow additional time for natural regeneration to take place. If this occurs then revegetation may be reduced accordingly. 20% replacement planting has been assumed to be required from Year 10 to Year 18. For the purposes of scheduling this has assumed to be required in even increments every two years but this will be adapted to the conditions and requirements on-site to meet the performance indicators.

Planting densities for the management zones are provided in Table 9. All plantings are to be sourced from suitable local provenance stock.

Table 8 Planting assumptions

Zone	Description	Total area (m²)	Reveg. Area (%)	Reveg. Area (m²)
1	Conservation	135,000	0%	-
2	Assisted Regeneration – modified	24,000	25%	6,000
3	Assisted Regeneration – Severely modified	60,000	50%	30,000
	Total	**219,000**	**-**	**36,000**

Table 9 Revegetation densities

Zone	Description	Reveg. Area (m²)	Plant densities (per m²)				Total numbers
			Tree	Shrub	Herb/Scrambler	Sedge/Grass	
1	Conservation	-	-	-	-	-	-
2	Assisted Regeneration – modified	6,000	1/50	1/20	1.00	2.00	*18,420*
3	Assisted Regeneration – severely modified	30,000	1/50	1/20	1.00	2.00	*92,100*
	Total	**36,000**	**720**	**1,800**	**36,000**	**72,000**	***110,520***

Figure 9: Vegetation management zones

5. Implementation schedule

5.1 Implementation schedule

The VMP area will be managed in perpetuity with an initial implementation period of 19 years

An indicative implementation schedule for 19 years has been provided in Table 11. Responsibilities have been identified as below:

Key:

Civil construction activities
Vegetation management works

The implementation of the VMP will be staged to coincide with the staging of construction for the development footprint. The handover of the VMP lands to Council would also be staged accordingly. It is intended that the southern portion of the VMP area would be the first stage of handover to Council, once the subdivision construction is complete, the VMP has been implemented over the initial establishment and management period (currently designated to take place over the life of the EPBC Act approval (2040) and the associated performance indicators have been met. The second handover stage would include the northern extent of the VMP area. Similarly, the handover of stage 2 VMP area would not occur until the same criteria have been met. The exact staging would be confirmed once development commences.

5.2 Relationship between the management actions and Koala habitat

The management measures and implementation schedule in Table 11 outline the measures, timing, frequency, duration, location and method of the proposed works. Table 10 describes how these measures relate to the maintenance and improvement of Koala habitat. The justification for why the management measures have been selected for each zone is described in Section 4. To determine whether the measures outlined in this VMP are meeting the expected increase in Koala habitat will be assessed through the performance indicators outlined in Section 6.2. Whether the criteria are being met will be determined through the ongoing monitoring of the VMP lands.

Table 10: VMP measures and relationship to Koala habitat

Measure	Relationship to Koala habitat	Management zone	Associated increase in Koala habitat score
Install construction fencing	Prevents unauthorised access to VMP area, therefore minimising threats to any Koalas present and increasing chance of success for newly planted or seeded native vegetation.	All zones	Contributes to security of the VMP area during construction and implementation of the VMP. This contributes to increasing the condition score of Koala habitat in good condition from an 8 to a 9. Given that the vegetation already represents good condition Koala habitat, the improvements to this habitat are through preventing indirect impacts and threatening processes and increasing connectivity. Installing fencing during construction which delineates the development footprint from the VMP area and prevents entry of humans and vehicles increases the security of the Koala habitat. These measures also contribute to the increase of poor condition Koala habitat. These measures can also easily be achieved in a year, and are scheduled for the first year in this VMP. The use of an area of habitat is also influenced by the disturbance history of the patch. The disturbance history of good patches of Koala habitat is low, and, the installation of construction fencing will ensure this continues into the future during construction and operation (DECC 2008).
Install sediment fencing	Minimises indirect impacts (runoff, weed invasion through spread of seed, sedimentation and erosion) on the VMP area.	All zones	Contributes to maintaining the present condition of good and poor condition Koala habitat, and assists in minimising impacts that could decrease the condition, such as weed invasion, sedimentation and erosion across all habitat. This decreases impacts on direct seeding or planted individuals which form part of the Koala habitat. Sediment fencing also assists in maintaining the existing condition of good quality Koala habitat across the VMP area.
Install informational signage	Assists in the prevention of unauthorised access and provides information regarding the ecological values present (namely Koala habitat) and its significance.	All zones	Increases the effectiveness of fencing by providing a visual cue that the land is undergoing vegetation management, that Koalas could be present and that unauthorised entry is prohibited.
Seed collection, cleaning, storage	This allows revegetation and planting to use plants of local provenance for revegetation.	Zone 1	This will contribute to the facilitation of planting within the VMP area and increasing the Koala habitat score from 2 to 5.
Tubestock (optional direct seeding) supply and install	Direct planting of species that form Koala habitat across all structural layers in relevant management zones. The planting densities and structural layers that require replanting are specified in Table 9. This will directly contribute to the revegetation of Koala habitat across the VMP area.	Zones 2 and 3	Planting of tubestock and optional direct seeding allows for increased density of Koala feed trees, overall increase in Koala habitat within the VMP area, increase in structural complexity and increasing connectivity throughout the landscape. This will substantially contribute to the increase in Koala habitat condition score from a 2 to a 5. There is substantial evidence which suggests Koalas prefer patches of native vegetation that are structurally complex and contain a range of tree sizes (DECC 2008).

Measure	Relationship to Koala habitat	Management zone	Associated increase in Koala habitat score
Replacement tubestock, supply and install	Replacement of tubestock has been allocated for any individuals that do not survive during the first planting event.	Zones 2 and 3	The planting has been scheduled at the first half of the VMP to allow time for the plants to establish and also allow time for supplementary planting during the VMP period in the event that some of the plants do not establish. This contributes to the increase in Koala habitat scores from 2 to 5.
Irrigation	This is a requirement to water the planted tubestock.	Zones 2 and 3	Contributes to establishment of plants and increase in score from 2 to 5.
Primary and secondary weed control	Management of weeds across the VMP area to improve the overall condition of the Koala habitat over time, and to assist with the uptake of plants that have been direct seeded.	All zones	Weed control is necessary to facilitate natural regeneration of the existing poor condition Koala habitat. The removal of weeds may allow canopy, midstorey and groundcover to regenerate from the existing soil seedbank. Managing weeds will also increase the chances of establishment of any tubestock or direct seeding that is planted throughout the VMP area. This will substantially contribute to the increase of Koala habitat score from 2to 5 and allow for the maintenance and increase in the score of good Koala habitat from 8 to 9.
Maintenance weed control	Long-term ongoing weed maintenance to ensure the long-term condition of the Koala habitat across the VMP area.	All zones	Maintenance weed control will consistently keep the proportion of weeds low across the VMP area. This will contribute to the increase in good condition habitat from 8 to 9 and poor condition habitat from 2 to 5 by assisting in the maintenance of structural complexity and dominance of native species in all structural layers. Long-term weed maintenance also contributes to the long-term uptake of tube stock and direct seeding plants in the poor condition Koala habitat. This will also allow recruitment from the seedbank over time.
Monitoring and reporting	Monitoring and reporting contributes to ensuring that the objectives of the VMP are met and contributes to the adaptive management strategy which forms part of this VMP. Management and reporting is necessary to identify progress of the VMP and towards achieving the maintenance or increases in Koala habitat.	All zones	Monitoring and reporting will identify any issues with the implementation of the VMP throughout the VMP area and allow for adaptive management and corrective actions if the increase of Koala habitat scores is not being achieved.

Table 11 Implementation schedule for the VMP area

Treatment	Years 1 - 2				Years 3-5				Years 6-10				Years 10 - 15				Years 15 - 19			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Civil works																				
Install construction fencing																				
Install sediment fencing																				
Install informational signage																				
Revegetation																				
Seed collection, cleaning, storage																				
Site Preparation																				
Tubestock planting																				
Replacement tubestock planting																				
Irrigation																				
Weed control																				
Maintenance - Year 1 - 2																				
Maintenance - Year 3 - 5																				
Maintenance - Years 6-10																				
Maintenance - Years 11-19																				
Associated works																				
Monitoring & Reporting																				

6. Monitoring and reporting

The bush regeneration contractor and the land manager will monitor the vegetation for changes over time. Information gained through the monitoring and reporting process will identify works that have and have not been successful, and the reasons for their success or failure.

The aim of monitoring is to measure the effectiveness of the control actions being undertaken to achieve the desired outcome. It will identify non-conformance and provide the land manager with the ability to implement corrective actions. Information derived from the results of monitoring will also be used in adaptive management (i.e. learning from past experience to inform future priorities and work plans). For example, as annual grass weeds are removed, herbaceous and perennial weeds may establish.

Finally, monitoring and reporting will help determine and quantify the costs related to weed management and the cost effectiveness of the VMP.

6.1 Monitoring

Monitoring will be undertaken by photo monitoring and vegetation surveys. Monitoring will need to be implemented prior to works commencing to establish a benchmark for performance, and to occur on an annual basis until the completion of the project. Monitoring results will be included in the progress report. Photo monitoring and vegetation plot monitoring will commence prior to the implementation of the VMP and be completed annually, at the anniversary of commencement. Photo and vegetation plot monitoring are appropriate representative sampling for assessment of progress of revegetation.

6.1.1 Photo monitoring

Photo monitoring points will be set-up using a permanent reference point to provide a visual reference of changes in the vegetation. Photo monitoring to include:

- set up a minimum of **eight** photo monitoring points within the VMP area distributed in the following way:
  - three photo points in Zone 1
  - two photo points in Zone 2
  - three photo points in Zone 3

Photo points will be located and directed such that they are representative of the condition of the zone they are in and likely to show representative change over the extent of the management period. If photo points become unrepresentative at any point due to any circumstances (e.g. fire, flood, vandalism, etc), then a sufficient number of additional representative photo points will be installed and included in reporting going forward.

- place two six-foot star pickets 10 m apart
- record the location (eastings and northings) of the first star picket with a GPS
- as well as the bearing to the second star picket
- take a digital photo from the first star picket looking towards the second star picket, showing the entire length of first star picket.

Label each digital image with a unique reference number that indicates where the photo was taken (i.e. the photo monitoring point) and the date it was taken (e.g. 01_210731 for a photo taken at the first photo monitoring point on 31 July 2021).

6.1.2 Vegetation surveys

Quadrat data points will also be required within the VMP area to monitor changes in the vegetation through time. The quadrat data also forms the baseline for monitoring against the performance indicators for the duration of the VMP. Floristic plot data is to be collected including species richness, cover and density/abundance in a 20x20 m quadrat. Stem class sizes will be assessed over a 20mx50m quadrat.

A minimum of **eight** vegetation quadrats will be established in the VMP area, ideally at photopoint locations. As with photo points, quadrats will be located and directed such that they are representative of the condition of the zone they are in and likely to show representative change over the extent of the management period. If quadrats become unrepresentative at any point due to any circumstances (e.g. fire, flood, vandalism, etc), then a sufficient number of additional representative photo points will be installed and included in reporting going forward.

6.1.3 Annual monitoring reports

Progress reports on the implementation of the VMP are to be provided for on an annual basis until the VMP area is handed over to Council. This reporting includes the implementation of the monitoring actions specified in **Section 6.1** and a description of the works that have been undertaken. These reports will be submitted to DAWE. Reports will include at a minimum:

- the time period the report relates to
- qualifications and experience of contractors
- certification of seed and local provenance stock
- a summary of works carried out within the period including:
    - date and time of site visits o works completed on the site at each visit
    - a table detailing total person hours for each task carried out on site
    - methods of weeding undertaken and details of herbicide use
    - numbers of tubestock planted if applicable
    - methods implemented for Assisted Natural Regeneration
- photo monitoring results to date
- a description of any problems encountered in implementing the works outlined in this VMP and how they were overcome
- any observations made, including new plant species recorded (native and weed species), comments on rates of regeneration and any problems which impact on the implementation of the VMP
- the results of the implementation works in relation to the relevant performance indicators.

It is intended that the annual reports form part of the annual compliance report requirements under the EPBC Act approval 2018/8296 (condition 15). If required, a copy of this report can be provided to Council.

6.2 Performance indicators and ongoing monitoring

The performance indicators are detailed in Table 12. The performance indicators have been designed to determine whether the objectives of the VMP are being realised.

If annual monitoring indicates that the VMP is not resulting in achievement of the objectives, the task program will be revised. Jojeni Investment Trust No. 1 and the bush regeneration contractor, in consultation with DAWE, would adapt these criteria as required in response to the success of rehabilitation works.

Failure to meet these objectives will mean that the maintenance period will be extended until they are achieved. The author of this VMP or equally qualified and experienced person must prepare a statement certifying the compliance of the performance indicators and objectives at the end of the 19-year period. It is understood that the current EPBC Act approval conditions for the subdivision require Jojeni Investment Trust No. 1 to continue to implement the VMP for the life of the approval.

The VMP areas will be handed over to Council after the 19-year implementation period has been completed, the objectives have been met and the adjacent portion of the subdivision has been completed. The objectives will be reassessed at the end of the initial five-year establishment and management period.

If the performance indicators are revised at any point it will only be to achieve a better conservation outcome for the VMP area. At minimum, the following performance indicators must be achieved in perpetuity (Table 12 and Table 13):

- Across the VMP area, <2% priority weeds cover and <5% environmental weeds cover
- No infiltration by exotic lawn species into the VMP area
- No dumped garden waste or rubbish within the VMP area
- No bare areas greater than 3m x 3m or exposed erosion
- Maintenance and improvement of species richness and cover goals to achieve the BioNet Benchmark conditions for the appropriate vegetation communities

6.3 Risk assessment and corrective actions

The main risk identified for this VMP are:

- Failure to improve and maintain the condition of Koala habitat due to weed competition on native regeneration and revegetation of Koala feed trees
- Failure to minimise indirect impacts and potential threatening processes through neglected maintenance of signage and fencing
- Failure to improve the condition of Koala habitat in Lot 33 DP754405 due to poor plant uptake or stochastic events such as unpredictable weather events, including drought, fire or floods.

There is uncertainty of the level of impact and cover from the pasture weeds that have previously been grazed upon by stock in the modified areas. The VMP includes weed control management throughout the life of the VMP. This will include increased weed control management in the first two years to stay on top of pasture weeds. If the VMP is implemented appropriately, there would be low chance for the pasture weeds to outcompete plantings and natural regeneration occurring. The chances of weed

invasion affecting the success of the VMP is considered **low** due to the good condition of large portions of the VMP area, the low proportion of weed cover during baseline surveys and the mitigation mesures outlined in the this VMP. If weed invasion were to occur, the risk to achieving the objectives of the VMP is moderate.

Possible extreme weather condition impacts from drought or flood are hard to predict and would have a **moderate** impact on the VMP area. The potential for extreme whether events to occur is incredibly difficult to determine. Appropriate management measures have been specified in the risk management table below. If extreme weather events were to occur, the risk to achieving the objectives in the VMP is moderate to high, and would depend on the frequency and severity of the events.

The Risk Assessment for the VMP area is summarised in Table 14 below.

6.4 Adaptive management

As this is a long-term project that will be implemented over several years, an adaptive management approach will be implemented that enables the successful contractor to learn from and respond to successful and unsuccessful techniques used on the site. In its simplest form this may include the substitution of species identified in the planting table or for undertaking advanced direct seeding techniques in place of manual planting techniques for revegetation.

The success of the works will be determined by meeting the performance indicators and objectives identified in Table 12 detected through the annual monitoring program (Section 6). Contractors have the flexibility to implement different techniques to those specified here providing that performance indicators are met. If the proponent wishes to revise this VMP, the revision must be completed consistent with conditions 18, 19 and 20 of EPBC 2018 / 8296.

6.5 Formal review and revision

In addition to opportunistic changes under adaptive management, every five years a formal review of the VMP will be undertaken to evaluate success and determine if changes to the approach are required to ensure the objectives of the VMP are being met. This would involve review of the previous years' monitoring results and any remedial actions or changes that have been made to the techniques in response to monitoring results. The VMP would be formally revised consistent with conditions 18, 19 and 20 of EPBC 2018 / 8296 if opportunity for improvement is identified.

Table 12: Performance indicators Years 1 to 4 (Monitoring and reporting undertaken in accordance with Section 6)

Management Zones	Related VMP objectives	Year 1	Year 2	Year 3	Year 4
All Zones	Improve and maintain the condition of 18.33 ha of existing Koala habitat in the lands zoned E2 and E3 marked for retention in lot 12 DP1091444 and Lot 33 DP754405	Establish baseline data (year 1), including % cover for all species in sample 20 x 20 quadrats, stem class size over 20 x 50 m quadrat) supported by photo monitoring Construction fencing and signage installed (pre to commencement)	No establishment of new priority species Statistically significant decrease in agricultural weeds and exotic pasture grasses between Years 1 and 4 Native species diversity and cover, including canopy cover, has not decreased by the end of Year 4		
		Priority weeds have been identified and at least one treatment for suppression undertaken across all areas which contain weeds New weed breakouts observed in Year 1 monitoring are treated within four weeks (remedial action).	No greater than 15% cover by priority weeds No greater than 20% cover by other weeds	No greater than 10% cover by priority weeds No greater than 15% cover by other weeds	No greater than 5% cover by priority weeds No greater than 10% cover by other weeds
Zone 1 (8 to 9 quality)	Improve and maintain the condition of 18.33 ha of existing Koala habitat in the lands zoned E2 and E3 marked for retention in lot 12 DP1091444 and Lot 33 DP754405	N/A	% Shrub cover maintained (estimated initially 10%) % Koala Feed Tree (KFT) cover maintained	% Shrub cover maintained % KFT cover maintained KFT stem class size maintained	% Shrub cover maintained % KFT cover maintained KFT stem class size maintained

Management Zones	Related VMP objectives	Year 1	Year 2	Year 3	Year 4
			(estimated initially 30%) Stem class size maintained		
Zones 2 and 3 (2 to 5 quality)	Improve the condition of Koala habitat in lot 33 DP754405 through revegetation and assisted regeneration Revegetate Koala habitat in lot 33 DP754405 Minimise indirect impacts and potential threatening process to the Koala where possible	N/A	85% survival rate of scheduled plantings % Shrub cover maintained (estimated initially 0%) % KFT cover maintained (estimated initially 1%) Stem class size of existing trees maintained	85% survival rate of scheduled plantings % Shrub cover maintained % KFT cover maintained KFT stem class size maintained	85% survival rate of scheduled plantings % Shrub cover maintained % KFT cover maintained KFT stem class size maintained

Table 13: Performance indicators Years 5 to 19 (Monitoring and reporting undertaken in accordance with Section 6)

Management Zones	Related VMP objectives	Year 5	Year 6-9	Year 10	Year 11-19
All Zones	Improve and maintain the condition of 18.33 ha of existing Koala habitat in the lands zoned E2 and E3 marked for retention in lot 12 DP1091444 and Lot 33 DP754405 Improve the condition of Koala habitat in lot 33 DP754405 through revegetation and assisted regeneration Revegetate Koala habitat in lot 33 DP754405 Minimise indirect impacts and potential threatening process to the Koala where possible	Commencement of all tasks outlined in the VMP or evidence of planning for their implementation Maintain or improve native species diversity and cover by the end of Year 19, compared to the baseline data Maintain or improve native canopy vegetation cover by the end of Year 19, compared to the baseline data No greater than 2% cover by priority weeds No greater than 5% cover by other weeds Control of agricultural weeds and exotic pasture grasses and suppression of all weeds during revegetation			
Zone 1 (8 to 9 quality)	Improve and maintain the condition of 18.33 ha of existing Koala habitat in the lands zoned E2 and E3 marked for retention in lot 12 DP1091444 and Lot 33 DP754405	% tree cover, % shrub cover and stem class size maintained or improved by the end of Year 19 relative to the baseline condition for the zone (estimates shown under Year 2)			
Zones 2 and 3 (2 to 5 quality)	Improve the condition of Koala habitat in lot 33 DP754405 through revegetation and assisted regeneration Revegetate Koala habitat in lot 33 DP754405 Minimise indirect impacts and potential threatening process to the Koala where possible	85% survival rate of scheduled plantings or equivalent native regeneration, replacement plantings 85% survival rate of scheduled plantings	85% survival rate of scheduled plantings % Shrub cover maintained at 3% or higher % KFT cover maintained at 3% or higher KFT stem class size maintained Total native groundcover vegetation cover is	85% survival rate of scheduled plantings % Shrub cover increased to 7% % KFT cover increased to 5% KFT stem class size maintained Native groundcover vegetation	At Year 15: % Shrub cover increased to 10% % KFT cover increased to 12% KFT stem class size maintained By Year 19: Zone should meet these benchmarks for the Plant Community Type as listed in Vegetation Information System: • Total Native groundcover vegetation cover no less than 85% of quadrat area • No patches greater than 3m x 3m without native vegetation and where appropriate • Others as deemed appropriate, .

Management Zones	Related VMP objectives	Year 5	Year 6-9	Year 10	Year 11-19
		% Shrub cover increased to 3% % KFT cover increased to 3% KFT stem class size maintained	no less than 30% of quadrat area	cover no less than 50% No patches greater than 3m x 3m without native vegetation	

Table 14 Risk assessment

Commitment	Objective	Potential Risk	Likelihood	Consequence	Risk level	Trigger	Management strategy (remedial actions)	Related Monitoring
Ensure the implementation of the VMP improves and maintains the condition of existing Koala habitat across the VMP area, consistent with the condition scores outlined in the Preliminary Documentation (ELA 2020).	Improve and maintain the condition of 18.33 ha of existing Koala habitat in the lands zoned E2 and E3 marked for retention in lot 12 DP1091444 and Lot 33 DP754405	Weeds outcompete native regeneration and revegetation	Possible	Moderate	Low	Weed cover are higher than the weed cover levels for each year and zone described in Table 12 and Table 13 recorded during monitoring visit	Increase weed control measures and visits until weeds are under the required level	Monitoring outlined in Section 6
		Low planting success due to weather impacts, grazing	Unlikely	Moderate	Low	Regeneration lower than prescribed levels for each year and zone in Table 12 and Table 13 noted during monitoring visit	Reassess timing for replacement revegetation. Wait until favourable conditions	Monitoring outlined in Section 6
		Damage to areas from public interactions	Unlikely	Moderate	Low	Noted human impact to vegetation during monitoring visit, including tyre tracks, dumped rubbish, litter, camp fires	Construct or repair permanent exclusion fence around VMP area	Monitoring outlined in Section 6
Ensure the implementation of the VMP improves the condition of Koala habitat within the VMP	Improve the condition of Koala habitat in lot 33 DP754405 through revegetation and	Planted trees fail to survive due to grazing or weather conditions	Unlikely	Moderate	Medium	Any plant deaths noted during monitoring visit	Reassess timing for replacement revegetation. Wait until favourable conditions Increased visits for watering Increase protective measures, such as tree guards	Monitoring outlined in Section 6

Commitment	Objective	Potential Risk	Likelihood	Consequence	Risk level	Trigger	Management strategy (remedial actions)	Related Monitoring
area consistent with the condition scores outlined in the Preliminary Documentation (ELA 2020) and	assisted regeneration And Revegetate Koala habitat in lot 33 DP754405							Monitoring outlined in Section 6
Ensure the VMP establishes Koala habitat within the VMP area, consistent with the condition scores outlined in the Preliminary Documentation (ELA 2020).		Planted trees fail to survive due to weed invasion	Possible	Moderate	Medium	Any plant deaths noted during monitoring visit	Increase weed control measures and focus on control around revegetation areas	
Ensure the implementation of the VMP improves the condition of Koala habitat within the VMP area consistent with the condition scores outlined in the	Improve the condition of Koala habitat in lot 33 DP754405 through revegetation and assisted regeneration And	% shrub and % KFT cover decrease or is not achieved within required timeframes as per Table 13.	Possible	Moderate	Medium	% cover lower than prescribed levels for in Table 12 noted during monitoring visit	Reassess timing for replacement revegetation. Increase density of plantings with infill tubestock plantings under favourable conditions	Monitoring outlined in Section 6

Commitment	Objective	Potential Risk	Likelihood	Consequence	Risk level	Trigger	Management strategy (remedial actions)	Related Monitoring
Preliminary Documentation (ELA 2020) and Ensure the VMP establishes Koala habitat within the VMP area, consistent with the condition scores outlined in the Preliminary Documentation (ELA 2020).	Revegetate Koala habitat in lot 33 DP754405							
Ensure that the indirect impacts and threatening processes are consistently managed throughout the life of approval such that the threat to Koalas is minimised.	Minimise indirect impacts and potential threatening process to the Koala where possible	Weeds presence increase across life of the VMP period	Possible	Moderate	Low	Weed cover are higher than the weed cover levels for each year and zone described in Table 12 and Table 13 recorded during monitoring visit	Increase weed control measures and visits until weeds are under the required level Mulch targeted areas for weed suppression	Monitoring outlined in Section 6
		Fire or human impact	Unlikely	Moderate	Low	Death of any native cover noted during monitoring visit	Replacement plantings during favourable conditions	Monitoring outlined in Section 6
		New weed outbreak	Likely	Low	Low	New weed species detected during monitoring visit	Increase edge maintenance and weed management works to suppress new weed invasion	Monitoring outlined in Section 6

7. Cost

The cost of implementation for 19-year period is approximately **$1,200,000** exclusive of GST and CPI. An indicative annual costing timeline is provided in Table 15 and Table 16. Rates and costs are based on typical commercial rates. Assumptions that have been made regarding the estimation of costs have been outlined below.

7.1 Construction and preparation works

Civil construction activities are identified in Table 11 and have not been included in Table 15.

7.2 Vegetation management works

7.2.1 Site preparation techniques

No mulch or jute matting has been allowed for. Should mulch or jute mat be required in any area within the VMP area, there will be an additional cost.

7.2.2 Revegetation treatments

Bush regeneration contractors will implement the revegetation treatments identified in this VMP. Tubestock costs have been budgeted at an estimated $3.50 per tree and shrub including, planting, water crystals, fertiliser and initial watering, and an estimated $2.50 per grass, sedge and groundcover including planting, water crystals and initial watering.

The planting density has been estimated based on site condition to achieve the performance indicators identified in **Section 6.2**. Densities are as follows:

- Trees – one tree every 50m²
- Shrubs – one shrub every 20m²
- Groundcovers – three plants every 1m²

Based on the VMP estimates, approximately **110,000 plants** would be required to achieve the densities identified in the VMP. However, if site regeneration is sufficient to achieve the performance indicators (including native plant density), then planting may be reduced.

A minimum of five (5) tree species, seven (7) shrub species and fifteen (15) sedge, grass and groundcover species for revegetation will be selected from the recommended planting list **in Appendix C**, however may be substituted with other relevant species. The total estimated cost of revegetation is approximately **$330,000** for tubestock installation, including a 20% rate for replacement plantings to be installed after initial revegetation works.

7.2.3 Weed control techniques

Bush regeneration contractors will implement the weed control treatments identified in this VMP. These works have been estimated to cost **$2,200** for a team of four bush regenerators, including a supervisor, per day. The cost of bush regeneration works includes the costs of herbicide, vehicles and equipment which are required to implement the VMP.

7.2.4 Seed collection

Budget for the collection of seed has been included as a separate task and spread over a number of years to allow for the unpredictable nature of seed collection. If further seed collection works are required due to climactic and seasonal variability, this may be an additional cost.

7.2.5 Monitoring and reporting

Bush regeneration contractors or ecologists will undertake the monitoring and reporting identified in this VMP. This includes:

- initial setup of the photo points and conducting the baseline surveys
- preparing a yearly report, including photo points and vegetation surveying until the completion of the project

7.3 Contributions under the VPA and EPBC Act approval (EPBC 2018 / 8296)

Consistent with the EPBC Act approval 2018/8296, the proponent will fund and implement the VMP for the life of the approval (2040). The commitment to fund and implement the VMP until 2040 will replace the requirement stated in clause 20.3 of the VPA. Clause 20.3 of the VPA states:

> *20.3 The Management Contribution and any interest earned on its investment is to be held and applied by the Council for a period of 17 years on and from the expiration of the Management Period towards the ongoing environmental management of the Environmental Management Land.*

The commitments made in this VMP for funding and management of the VMP lands until 2040 supersede the commitments specified in the VPA, and the VPA will be modified accordingly. It is assumed that all monetary contributions under the VPA specific to management of the VMP lands will be void.

Table 15 Indicative budget Year 1 to 10

Treatment	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Revegetation											
Seed collection, cleaning, storage	$ -	$ -	$ -	$ 4,421	$ 4,421	$ 4,421	$ 4,421	$ 4,421	$ -	$ -	*$ 22,104*
Site Preparation	$ -	$ -	$ -	$ -	$ -	$ 4,500	$ 4,500	$ 4,500	$ 4,500	$ -	*$ 18,000*
Tubestock planting	$ -	$ 8,820	$ -	$ -	$ -	$ 67,500	$ 67,500	$ 67,500	$ 67,500	$ -	*$ 278,820*
Replacement tubestock planting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,153	*$ 11,153*
Irrigation	$ -	$ 1,800	$ -	$ -	$ -	$ 10,800	$ 10,800	$ 10,800	$ 10,800	$ 1,800	*$ 46,800*
Weed control											
Maintenance - Year 1 - 2	$ 80,850	$ 66,150	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	*$ 147,000*
Maintenance - Year 3 - 5	$ -	$ -	$ 57,000	$ 48,450	$ 37,050	$ -	$ -	$ -	$ -	$ -	*$ 142,500*
Maintenance - Years 6-10	$ -	$ -	$ -	$ -	$ -	$ 36,072	$ 33,066	$ 30,060	$ 27,054	$ 24,048	*$ 150,300*
Maintenance - Years 11-19	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Associated costs											
Disbursements	$ 8,085	$ 6,615	$ 5,700	$ 4,845	$ 3,705	$ 3,607	$ 3,307	$ 3,006	$ 2,705	$ 2,405	*$ 43,980*
Monitoring & Reporting	$ 5,475	$ 2,738	$ 2,738	$ 2,738	$ 2,738	$ 2,738	$ 2,738	$ 2,738	$ 2,738	$ 2,738	*$ 30,113*
Totals	**$ 94,410**	**$ 86,122**	**$ 65,438**	**$ 60,453**	**$ 47,913**	**$ 129,638**	**$ 126,331**	**$ 123,024**	**$ 115,297**	**$ 42,143**	***$ 890,769***

Table 16: Indicative budget Year 11 to 19

Treatment	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Total	Grand total
Revegetation											
Seed collection, cleaning, storage	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	*$ -*	***$ 22,104***
Site Preparation	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	*$ -*	***$ 18,000***
Tubestock planting	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	*$ -*	***$ 278,820***
Replacement tubestock planting	$ -	$ 11,153	$ -	$ 11,153	$ -	$ 11,153	$ -	$ 11,153	$ -	*$ 44,611*	***$ 55,764***
Irrigation	$ -	$ 1,800	$ -	$ 1,800	$ -	$ 1,800	$ -	$ 1,800	$ -	*$ 7,200*	***$ 54,000***
Weed control											
Maintenance - Year 1 - 2	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	*$ -*	***$ 147,000***
Maintenance - Year 3 - 5	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	*$ -*	***$ 142,500***
Maintenance - Years 6-10	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	*$ -*	***$ 150,300***
Maintenance - Years 11-19	$ 22,167	$ 22,167	$ 22,167	$ 22,167	$ 22,167	$ 22,167	$ 22,167	$ 22,167	$ 22,167	*$ 199,500*	***$ 199,500***
Associated costs											
Disbursements	$ 2,217	$ 2,217	$ 2,217	$ 2,217	$ 2,217	$ 2,217	$ 2,217	$ 2,217	$ 2,217	*$ 19,950*	***$ 63,930***
Monitoring & Reporting	$ 2,738	$ 2,738	$ 2,738	$ 2,738	$ 2,738	$ 2,738	$ 2,738	$ 2,738	$ 2,738	*$ 24,638*	***$ 54,750***
Totals	**$ 27,121**	**$ 40,074**	**$ 27,121**	**$ 40,074**	**$ 27,121**	**$ 40,074**	**$ 27,121**	**$ 40,074**	**$ 27,121**	***$ 295,899***	***$ 1,186,668***

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Appendix A Techniques and specifications

WEED CONTROL

Weed control involves a combination of mechanical, physical and chemical techniques to remove the weeds and prevent regrowth. Weed control will be undertaken across the entire zone. A selection of the best suited weed control method within the site depends on a number of factors including:

- the species or combination of weeds being targeted
- the density of the weeds
- resources available (time, labour, equipment and finances)
- weather conditions of the day

WEED CONTROL TECHNIQUES

Detail of specific weed control techniques to be used such as cut and paint, scrape and paint, herbicide spraying and hand weeding are given in Brodie (1999). The principles of bush regeneration and techniques to trigger natural regeneration are to be in accordance with the Bradley Method and other techniques described in Buchanan (2000). Management techniques for different types of weeds are provided below.

Annual grasses

Annual grasses should be hand removed or spot sprayed where isolated or in low concentrations. Larger patches of annual grasses may be slashed/brush cut in late spring to early summer, after flowering, but prior to seed set. For most species, slashing/brush cutting prior to late spring through to early summer will promote vigorous growth and should not occur. However, some annual grasses can grow and produce seed at any time of the year dependent on climatic conditions such as high rainfall and warm temperatures. Monitoring of annual species should be undertaken and if new growth occurs, the same treatment will be applied to the new growth to prevent seed production. Individual plants should be hand removed, bagged and disposed of appropriately offsite.

Perennial grasses

Perennial grasses, such as Ehrharta erecta (Panic Veldt Grass) will be hand removed where isolated or in low concentrations. Larger patches may be slashed prior to seed production in spring or summer (depending on the growth cycle of the species) and the regrowth spot-sprayed 2-3 weeks later when it is actively growing and approximately 10 cm in length. Monitoring of these species will occur and if new seed production occurs, the same treatment will be applied again as required. However, slashing will not reduce the presence of exotic grasses on its own and must always be combined with targeted removal to reduce densities and allow for native regeneration. Individual plants should be hand removed, bagged and disposed of appropriately offsite.

Woody weeds

Follow up treatment of woody weeds, including Sida rhombifolia (Sida) and Lantana camara (Lantana) will be controlled by the cut and paint or drill and fill method using a non-selective herbicide. The most appropriate method to be used depends on the size of the individual to be removed and will be

determined by the bush regeneration contractor. Primary weed control should use techniques that will not encourage flushes of secondary weed growth. All seedlings of woody weeds will be hand pulled or spot-sprayed with a non-selective herbicide.

Creepers and climbers

The control of creepers, including Rubus fruiticosus (Blackberry), varies depending on the species. For the most part, seedlings will be hand pulled, while mature plants can be controlled by the stem-scrape method or spot spraying using a non-selective herbicide. The precise method to be used will be determined by the bush regeneration contractor depending on the species, size and reproductive status of the individual. All vegetative material removed should be bagged, removed from site and disposed of appropriately.

Herbaceous weeds

Where individual plants of herbaceous weeds, including Senecio madagascariensis (Fireweed) and Solanum sp. are found, they will be hand pulled prior to flowering. Where large swaths of these species occur, they will be sprayed using a non-selective herbicide. If high densities of mature stands occur, weeds may be slashed first using a brush cutter and any subsequent regrowth sprayed. Regular monitoring of these species will be required to prevent seed production. Cirsium vulgare (Spear Thistle) will not be hand-pulled due to its thorns and instead will be treated using cut and paint methods or spot sprayed for larger infestations using a non-selective herbicide. All vegetative material that is pulled out and has the potential to regrow if deposited on ground will be bagged and removed from site.

Management of weed waste

All weed propagules, especially priority weeds, will be bagged and disposed of as directed by legislation at facility licensed to receive green waste. All weed waste without propagules will be composted onsite in small unobtrusive piles.

Herbicide use

The use of herbicide to control weeds should be carefully considered. Herbicide must only be used for the purpose described on the product label, as per the NSW Pesticides Act 1999. Herbicide use should assess potential long-term impacts of the technique, including whether the proposed works address the source of the weed infestation. However, herbicide application forms an important and useful component of an integrated weed management approach and can be the most appropriate method for the control and eventual eradications of some weed species.

Herbicide use should occur during the active growing season for plants to encourage the chemical uptake into the plant. The selection of herbicides should also consider the type of weed and the location. Where non-selective herbicides are required for use, glyphosate is the most suitable. A glyphosate-based herbicide, formulated for use near waterways, will be used if works require herbicide application near waterways, a (e.g. Roundup Biactive®).

Broad-leaf selective herbicide may be used as per the NSW Weed Control Handbook (DPI 2018). However, this type of herbicide is extremely toxic to aquatic life and must not be used in, or adjacent to, waterways.

Registration and records must be kept in accordance with the *NSW Pesticides Regulation 2017*.

REVEGETATION WORKS

Revegetation has the dual aim of both re-establishing the original native vegetation community at the site and reducing erosion along the length of the riparian corridor, which will carry greatly increased peak flows due the increased run-off from the hard surfaces created by the associated residential development. Any plantings should consist of local provenance stock.

Planting of Hiko for trees and shrub species and Hiko or Viro cells for grasses and other groundcover species is the preferred method. Planting should be done via a low impact method such as hand digging or hand auger. The holes dug for each plant should be at least 1.5x the width and 2x the depth of the root ball. Fertiliser should be added to each hole dug as per the label specifications. Water crystals or wetting agents should be added to each plant hole. This will increase the water holding capacity of the soil and reduce watering schedules. Initial irrigation of the plantings is essential to ensure that the soil forms around the root ball and air pockets are removed. This will be required unless sufficient rainfall (approx. 10mm) occurs on the day of planting.

Seed collection

For the growth of the plants used in the revegetation works, seed must be collected from local provenance species. Groundcovers, shrubs and trees should be collected as within close proximity (i.e. <20km). However, soil type, climate and aspect of the collection site(s) should also be considered. Native grasses typically have much larger dispersal mechanisms and are to be collected from within the local area.

Where species identified in this VMP cannot be sourced, they may be substituted for other species for the relevant vegetation community as identified by the Vegetation Information System. Species must be substituted with species of a similar form, e.g. trees for tree, grasses for grasses, etc. Only wild native species are to be used. Plants are not to be substituted with horticultural varieties under any circumstances.

Record keeping of seed collection and planting locations are to follow the Florabank guidelines (Mortlock, 2000). A Section 132C licence under the NSW National Parks and Wildlife Act 1974 will be required to undertake seed collection works. The bush regeneration contractor is responsible for recording this information and providing it to THSC.

BUSH REGENERATION CONTRACTORS

All vegetation management works in the establishment phase will be undertaken by suitably qualified and experienced bush regeneration contractors who are members of the Australian Association of Bush Regenerators (AABR) or fulfil the membership criteria. Additionally, team leaders should have, as a minimum, a Certificate III in Conservation & Land Management or equivalent. The contractor will need to carry out best practice bush regeneration techniques as described by Buchanan (2009). A flexible approach to this site is recommended since techniques may need to be changed or modified to suit site conditions. This approach is consistent with adaptive management and allows the contractor to develop and build on site knowledge whilst implementing this VMP. Monitoring will assist in the development of the VMP actions in subsequent years.

HYGIENE PROTOCOLS

To avoid introducing soil pathogens / diseases in particular *Phytophthora cinnamomi* (Root rot disease) onto site a hygiene protocol should be undertaken as per the guidelines developed by the Royal Botanic Gardens in *'Best Practice Management Guidelines for Phytophthora cinnamomi with the Sydney Metropolitan Catchment Management Authority'*.

For Bush Regenerators all tools and boots should be washed down and thoroughly cleaned of soil / mud using a solution of water and disinfectants prior to undertaking works onsite. All machinery should be thoroughly cleaned of all soil / mud / debris prior to working within the VMP area.

Appendix B Existing vegetation species list

Table 17 Existing vegetation species list

Scientific Name	Wons	Common name
Banksia oblongifolia		Fern-leaved Banksia
Banksia robur		Swamp banksia
Banksia spinulosa		Hairpin Banksia
Bidens pilosa		Cobblers Pegs
Callistemon salignus		Willow Bottlebrush
Centella asiatica		Indian Pennywort
Cheilanthes sieberi		Mulga Fern
Cirsium vulgare		Scotch Thistle
Desmodium varians		Variable Tick-trefoil
Dianella caerulea		Flax Lily
Dichondra repens		Kidney Weed
Echinopogon caespitosus		Bushy Hedgehod-grass
Entolasia stricta		Wiry Panic
Eragrostis brownii		Brown's Lovegrass
Eucalyptus globoidea		White Stringybark
Eucalyptus microcorys		Tallowwood
Eucalyptus resinifera subsp. *hemilampra*		Red Mahogany
Eucalyptus robusta		Swamp Mahogany
Gahnia clarkei		Tall Saw-sedge
Glycine tabacina		Glycine
Hydrocotyle sibthorpioides		Lawn Marshpennywort
Imperata cylindrica		Blady Grass
Juncus continuus		Juncus
Lagenifera stipitata		Common Lagenophora
*Lantana camara**		Lantana
leptospermum polygalifolium subsp. *polygalifolium*		Tantoon
Leucopogon juniperinus		Prickly Beard-heath
Lobelia purpurascens		Whiteroot
Lomandra longifolia		Spiny-headed Mat-rush
Machaerina rubiginosa		Baumea
Melaleuca linariifolia		Flax-leaved Paperbark
Melaleuca sieberi		Sieber's Paperbark
Melaleuca thymifolia		Thyme Honey-myrtle

Scientific Name	Wons	Common name
Oplismenus aemulus		Basket Grass
Panicum simile		Two-colour Panic
Parsonsia straminea		Silkpod
*Paspalum dilatatum**		Dallas Grass
*Paspalum urvillei**		Vasey Grass
*Phytolacca octandra**		Inkweed
Pimelia linifolia		Slender Riceflower
*Pinus elliotii**		Slash Pine
Pomax umbellata		Pomax
Pteridium esculentum		Common Bracken
*senecio madagascariensis**	Yes	Fireweed
*Setaria sphacelata var. sericea**		African Pigeon Grass
*Sida rhombifolia**		Paddy's Lucene
*Stenotaphrum secundatum**		Buffalo Grass
Telmatoblechum indicum		Swamp Water Fern
Themeda australis		Kangaroo Grass
Trachymene incisa		Wild Parsnip
xanthorrhoea fulva		Grass Tree
Key: * = exotic species		

Appendix C Recommended planting list

Table 18 Recommended planting list

Form	Scientific Name
Trees	*Eucalyptus robusta*
	Eucalyptus globoidea
	Eucalyptus resinifera subsp. *hemilampra*
	Eucalyptus microcorys
Shrubs	*leptospermum polygalifolium* subsp. *polygalifolium*
	Banksia oblongifolia
	Melaleuca thymifolia
	Melaleuca linariifolia
	Callistemon salignus
	Banksia robur
	Banksia spinulosa
Groundcover / grasses	*Dianella caerulea*
	Lomandra longifolia
	Entolasia stricta
	Echinopogon caespitosus
	Imperata cylindrica
	Oplismenus aemulus
	Panicum simile
	Themeda australis
	Lobelia purpurascens
	Cheilanthes sieberi
	Hydrocotyle peduncularis
	Trachymene incisa
	Lagenifera stipitata
	Dichondra repens
	Pomax umbellata
	Gahnia clarkei
	Pteridium esculentum
	Juncus continuus
	Baumea rubiginosa

Appendix D Fencing, signage and bridge crossings

Example of Koala signage to be placed on boundary roads within the residential subdivision

Example of Koala crossing to be installed (source – Faunacrossings.com)

Example of temporary protective construction fencing for the boundary of the VMP area

***The following fencing examples have been sourced from: *Koala-sensitive Design Guideline, A guide to koala-sensitive design measures for planning and development activities (Queensland Government 2019*

Table 1: Guide to Koala Sensitive Design - koala friendly fencing

Design specification	Additional supporting information
Use koala-friendly fencing material *Allow koalas to easily climb through or under a fence.* Build using minimal materials such as post and rail or other fencing material with a minimum gap of 300 mm between rails. Alternately use solid fencing material that cannot be climbed by koalas but has a minimum gap of 300 mm between the ground and the lowest rail to allow koalas to move underneath the fence.  *Allow koalas to easily climb over a fence.* Use rails or slats that have spaces of at least 10 mm between vertical slats and 20 mm between horizontal rails that koalas can climb. Alternately use materials such as timber posts or chain wire that a koala can easily grip and climb  	Koalas try to go through, under and then around a structure before attempting to climb over. Fencing raised off the ground is the best option for koalas. Koalas can become trapped in fencing as they try to squeeze through palings and rails. Fence design needs to ensure that gaps in the fence are: • large enough to allow easy access to pass through • of a size (less than 10 cm) to allow koalas to climb over, but prevent koalas climbing through and getting stuck in the fence.

Incorporate koala-friendly fencing additions

Build the fence to incorporate existing vegetation or trees.

Leave vegetation on either side of the fence with canopies or trunks extending beyond the height of the fence and where canopies are connected or tree trunks are less than 1 m apart.

Install a timber post or log (of at least 125 mm in width or diameter) leaning against the top of the fence but positioned at an angle to the fence so that the log is not flush with the fence (i.e. the space between the base of the log and the bottom of the fence is at least 400 mm (Figure7))

Incorporate structures or designs in association with fencing material that provide a means for koalas to climb over fences, retaining walls or other structures.

If installing koala-friendly fencing additions they should be used at the following frequencies:

- At least once within a backyard to allow animals to exit a property.
- At least once every 50 m where the length of the impassable barrier or fencing is greater than 200 m.

Install ladders of the following dimensions and design:

- Timber ladder rungs are at least 300 mm in width, 50-100mm in height and a minimum of 20mm in depth to provide grip for koalas.
- Rungs are spaced horizontally with a 150-300mm gap between rungs for ease of climbing.
- Webbed or latticed material is attached to provide additional footholds for koalas.

Ladder rungs need to be solid and firmly attached to the structure.

Install a simple koala bridge (particularly suited to security fences) using timber logs of at least 125 mm in diameter of the following design:

- Timber logs are positioned adjacent to and within 1 m of each other on either side of the fence and extend for at least 1m above the fence.
- A cross piece of similar diameter to the logs connects the two vertical timber posts that are within 1-4m of each other on either side of the fence.

Koala exclusion fencing

Install fencing material that is unclimbable such as:

- brick, metal sheeting, perspex or timber fencing without gaps between palings.

Koala exclusion fencing stops koalas moving between areas. It reduces permeability so should only be used where there is a direct threat to koala safety. The following situations are suitable for using koala exclusion fencing:

- Domestic dog enclosures in larger properties (greater than 800 m^2). Smaller properties should use other measures to reduce dog and koala interactions.
- High speed/volume roads or train lines - fencing funnels koalas to safe crossing structures (underpasses or overpasses).
- Swimming pools where pool design is unsafe for koalas.
- Areas where construction activities may cause harm to koalas such as pits or trenches. Temporary fencing that stops koala access would be appropriate.

- chain wire fencing material with a floppy top that falls in the direction that the koala will attempt to climb the fence or that has a smooth metal or perspex sheets of at least 600 mm wide on the top of the fence

Additional requirements for koala exclusion fencing are:

- Fence bracing or supports are on the side of the fence that's away from koala access.
- The top of the unclimbable section of fencing is at least 1.5 m from the ground to prevent koalas jumping and gripping the top of the fencing.
- Fencing should extend to ground level along uneven or undulating ground.
- Vegetation beside the fence is regularly maintained to:
  - exclude trees and shrubs from within 3 m of the fence
  - keep canopies of trees trimmed to remove links to tree canopies on the other side of the fence
  - remove fallen branches and vines growing on the fence which koalas may use to climb over the fence.

Appendix E Intention to modify the existing VPA obligations

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