



Offset Management Plan

EPBC 2013/6791

Yarrabilba PDA

**Lend Lease Communities
(Yarrabilba) Pty Ltd
ABN 69 103 578 436**

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1. Background

The Yarrabilba Priority Development Area (PDA) is approximately 2,200ha, of which 2,015ha is controlled by Lend Lease Communities (Yarrabilba) Pty Ltd. It is expected that the Yarrabilba project will have a development life of approximately 30 to 35 years.

The site has been subject to numerous levels of planning and assessment to date, which have involved consideration of the impacts of urban development and required mitigation including the establishment of conservation zones and fauna corridors on site. That process has been informed by numerous ecological studies since 2002 and is reviewed in Austecology (2012a). As a result, the long-term master-planned development incorporates an extensive network of dedicated open space (in excess of 25% of the site), of which a significant component is dedicated to the conservation of habitat for Koala *Phascolarctos cinereus*.

The protection, rehabilitation and expansion of habitat for Koalas on the site is subject to an approval (with conditions) made under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* – EPBC 2013/6791 Approval dated 13 November 2014.

Conditions which are attached to the EPBC 2013/6791 Approval require the protection and management of 195ha of land to offset the impact of clearing 55 hectares of *habitat critical to the survival of the koala*.

Appendix 2 of the EPBC 2013/6791 Approval describes the location and extent of a suite of offset areas. These are described in the Approval's Appendix 2 as *Yarrabilba Offset Requirement Under the EPBC Act – 195ha*.

The suite of offset areas, as described in Appendix 2 of the EPBC 2013/6791 Approval, were determined by applying the requirements identified within both the *EPBC Act environmental offsets policy* (the policy)¹ and the supporting *Offsets assessment guide* (the guide). The offset commitment is consistent with both the policy and the guide.

The offset areas form part of a wider network of dedicated open space which is to be protected and rehabilitated in accordance with the Koala Management Plan (Austecology (2012b) and Fauna Corridor Infrastructure Master Plan (Natura 2012). Both reports formed part of the project referral required under the EPBC Act.

This report has been prepared to respond to the obligations as described by Conditions 6 and 7 of the EPBC 2013/6791 Approval.

¹ Department of Sustainability, Environment, Water, Population and Communities, 2012. Policy guiding the use of offsets under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

EPBC 2013/6791 Approval Condition 6 prescribes the following:

To offset residual significant impacts to koalas (55 ha of habitat critical to the survival of the koala), the approval holder must submit, at least 3 months prior to commencement, for the Minister's written approval, an Offset Management Plan for the protection and management of 195 ha of Fauna Corridor, Greenspace Corridor and Environmental Protection Zone provided as environmental offset as shown in Appendix 2.

EPBC 2013/6791 Approval Condition 7 prescribes the following:

The approval holder must not commence unless the Minister has approved the Offset Management Plan. The Offset Management Plan must:

- a. identify desired outcomes, benchmarks, readily measurable performance indicators and goals, timeframes for reporting and implementation, corrective actions and contingency measures;*
- b. be consistent with the Department's Environment Protection and Biodiversity Conservation Act 1999 Environmental Offset Policy (October 2012); and*
- c. include details of how the offset has been or will be legally secured within 2 years of the commencement to ensure its long-term protection.*

Consistent with the requirements of Condition 7, the approval holder will not commence the approved action until the Minister has approved the Offset Management Plan.

Management strategies proposed in this report, are to be considered in conjunction with the habitat rehabilitation commitments proposed in Natura (2015). The Natura (2015) report has been prepared to respond to the obligations as described by Conditions 4² and 5³ of the EPBC 2013/6791 Approval.

The key objectives of this management plan are to:

- a. ensure that Koala habitat quality is improved and habitat area expanded within the suite of offset areas as per the commitment made to the Department; and
- b. to ensure that those values remain protected and sustainable.

The management actions to be implemented are detailed within this management plan.

This 2nd version of the Offset Management Plan has been revised to respond to the Department's review on 23 March 2015.

² EPBC 2013/6791 Approval 4. The approval holder must prepare and submit, at least 3 months prior to commencement of the action, for the Minister's written approval, a Habitat Rehabilitation and Management Plan. The Habitat Rehabilitation and Management Plan must: a) clearly define the management measures and reflect an adaptive management approach to improve koala habitat quality within the Fauna Corridor, Greenspace Corridor and Environmental Protection Zone (as identified in Appendix 2); b) state clear and concise outcomes and performance indicators against which achievement of the outcomes identified will be measured; c) state the timeframe for implementation of the plan; d) specify a method to monitor the impact and effectiveness of the management measures described above; e) identify the contingency measures and appropriate corrective actions that will be undertaken if the performance indicators or outcomes are not being met; f) be consistent with Koala Management Plan and Fauna Corridor Infrastructure Master Plan.

³ EPBC 2013/6791 Approval 5. The approved Habitat Rehabilitation and Management Plan must be implemented by the approval holder.

1.1. Terms and Acronyms

The following terms are used throughout this Plan:

1. The **Yarrabilba Priority Development Area** (PDA) means the area of approximately 2,200ha which is governed by the Yarrabilba Urban Development Area Development Scheme under Queensland's *Economic Development Act 2012*.
2. The **Site** means the 1931ha of the Yarrabilba PDA which is under the control of by Lend Lease Communities (Yarrabilba) Pty Ltd
3. The **Development Manager** means Lend Lease (Communities) Pty Ltd.
4. The **Department** means the Australian Government Department administering the *Environment Protection and Biodiversity Conservation Act 1999*.
5. The **Minister** means the Minister administering the *Environment Protection and Biodiversity Conservation Act 1999* and includes a delegate of the Minister.
6. **Commencement** in regards to the application of this Offset Management Plan, means the date of the Minister's approval of this Offset Management Plan.
7. **Commencement** in regards to the proposed action, means the earthworks, vegetation removal of construction of any infrastructure, excluding fences and signage, associated with the proposed action.
8. The **Land Manager** means the party contracted by the Development Manager to oversee daily site operations and site management.
9. A **Contractor** means a party or company that performs construction works on site, and includes all employees of the Contractor and its sub-contractors, e.g. machinery operator.
10. A **Fauna Spotter/Catcher** means personnel employed to implement fauna welfare responsibilities associated with vegetation clearing operations. All personnel implementing this role must be licensed and working under a current Rehabilitation Permit as issued by the Department of Environment and Heritage Protection under Section 12(e) – *Nature Conservation (Administration) Regulation 2006*.
11. **Project Ecologist** means a specialist consultant employed by the Development Manager.
12. **Dedicated Open Space** means any area within either of the following: *Greenspace Corridor; Fauna Corridor; Environment Protection Zone; or Yarrabilba PDA Offset Requirement under EPBC Act* as depicted within the figures of this report.
13. **Pine** means the introduced species *Pinus radiata*.
14. **Koala habitat tree** means a) a food tree of the *Corymbia, Melaleuca, or Lophostemon* or *Eucalyptus* genera; or b) a preferred shelter species such as *Angophora* (definition consistent with current Queensland Government Koala SPRP and EPA (2006)).
15. **Non-juvenile Koala habitat tree** means as a koala habitat tree that has: a) a height of more than four metres; or b) a trunk with a circumference of more than 31.5 centimetres at 1.3 metres above the ground (definition consistent with current Queensland Government Koala SPRP and EPA (2006)).
16. **Assessable Koala Habitat** means habitat as described in Austecology (2014) and is consistent with the description provided in SEWPaC (2012) interim guidelines (i.e. habitat critical to the survival of the Koala). For the subject site, such habitat is comprises either: a) vegetation as mapped on the Queensland Government's Vegetation Management Act certified Regional Ecosystem mapping; or b) habitat which is not mapped as remnant vegetation but assessed as habitat which supports

characteristics consistent with the description provided in the SEWPaC (2012) interim guidelines.

17. **Regional Ecosystem** means a vegetation community described in the Regional Ecosystem Description Database maintained by the Queensland Herbarium.
18. **Pest management** means all activities involved in the planning, detection, control, monitoring or eradication of pests in offset areas.
19. **Pest** means any animal, plant, parasite or disease causing organism (such as bacteria, virus or fungus) capable of causing adverse impacts to environmental values, whether or not it is declared and listed in the *Land Protection (Pest and Stock Route Management) Regulation 2002*.
20. **Environmental weed** means any plant that survives in a natural area where its presence is undesirable, harmful or troublesome to native biodiversity.
21. **Declared plant** means a species declared under the Queensland *Land Protection (Pest and Stock Route Management) Regulation 2002*.
22. **Ecological restoration** means the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed (Society for Ecological Restoration International). The term embodies a wide range of land management strategies including habitat revegetation, rehabilitation, and restoration.
23. **Natural regeneration** means a land management strategy that applies to relatively intact plant communities where recovery is automatic with the removal of the cause of the damage or disturbance (e.g. following cyclonic events, bushfires, etc.) and usually where no human intervention is required.
24. **Assisted regeneration** means a land management strategy that applies to relatively intact native plant communities where limited intervention such as weed control, track closure, erection of fencing, etc. is sufficient to restore the native vegetation through natural regeneration and successional processes.
25. **Reconstruction** means a land management strategy that applies to highly disturbed, modified and degraded areas where the potential for native plant regeneration is considered to be limited, such as heavily disturbed ecosystems. In these situations, native species are unlikely to return to the site without greater intervention, such as replanting, large scale weed control, restoration of drains etc.
26. **Fabrication** means a land management strategy that applied where habitat conditions are permanently changed and better adapted local systems can be constructed to restore integrity to the landscape.
27. **Fire frequency** means the frequency of successive fires for a vegetation community in the same point of the landscape.
28. **Fire interval** means interval between successive fires for a vegetation community in the same point of the landscape. Often expressed as a range indicating a minimum and maximum number of years that an area should be left between fire events.

Acronyms used in this report are provided in Table 1-1.

Table 1-1 Report Acronyms

Acronym	Reference or Description
DAFF	Queensland Department of Agriculture, Fisheries and Forestry
DE	Commonwealth Department of the Environment
DEHP	Queensland Department of Environment and Heritage Protection
DERM	Queensland Department of Environment and Resource Management
DEWHA	Commonwealth Department of the Environment, Water, Heritage and the Arts
DNPRSR	Queensland Department of National Parks, Recreation, Sport and Racing
DSITIA	Queensland Department of Science, Information Technology, Innovation and the Arts
EPBCA	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
HRMP	Habitat Rehabilitation Management Plan (after Natura 2015)
KMP	Koala Management Plan Yarrabilba UDA (after Austecology 2012b).
LPR	Queensland <i>Land Protection (Pest and Stock Route Management) Regulation 2002</i>
MNES	Matter of National Environmental Significance (as defined under the EPBCA)
NCA	Queensland <i>Nature Conservation Act 1992</i>
OMP	Yarrabilba Offset Management Plan
QPWS	Queensland Parks and Wildlife Service
RE	Regional Ecosystem (as defined under the VMA)
REDD	Regional Ecosystem Description Database
SEWPaC	Commonwealth Department of Sustainability, Environment, Water, Population and Communities
Koala SPRP	Queensland <i>South East Queensland Koala Conservation State Planning Regulatory Provisions</i>
VMA	Queensland <i>Vegetation Management Act 1999</i>
sp.	Species (singular)
spp.	Species (plural)

1.2. Roles and Responsibilities

In accordance with the EPBC 2013/6791 Approval, the Development Manager (Lend Lease Communities (Yarrabilba) Pty Ltd is responsible for ensuring that this Offset Management Plan (OMP) is implemented. The Development Manager may appoint appropriately qualified contractors and personnel to undertake work in a manner that is consistent with this OMP and monitor their conformance with these actions. The Development Manager is also responsible for notifying the Department of any non-compliance with any of the conditions of the Approval and publishing relevant reports on their website and supplying the Department with proof of publication in accordance with the requirements of the EPBC 2013/6791 Approval.

1.3. Declaration of Accuracy

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

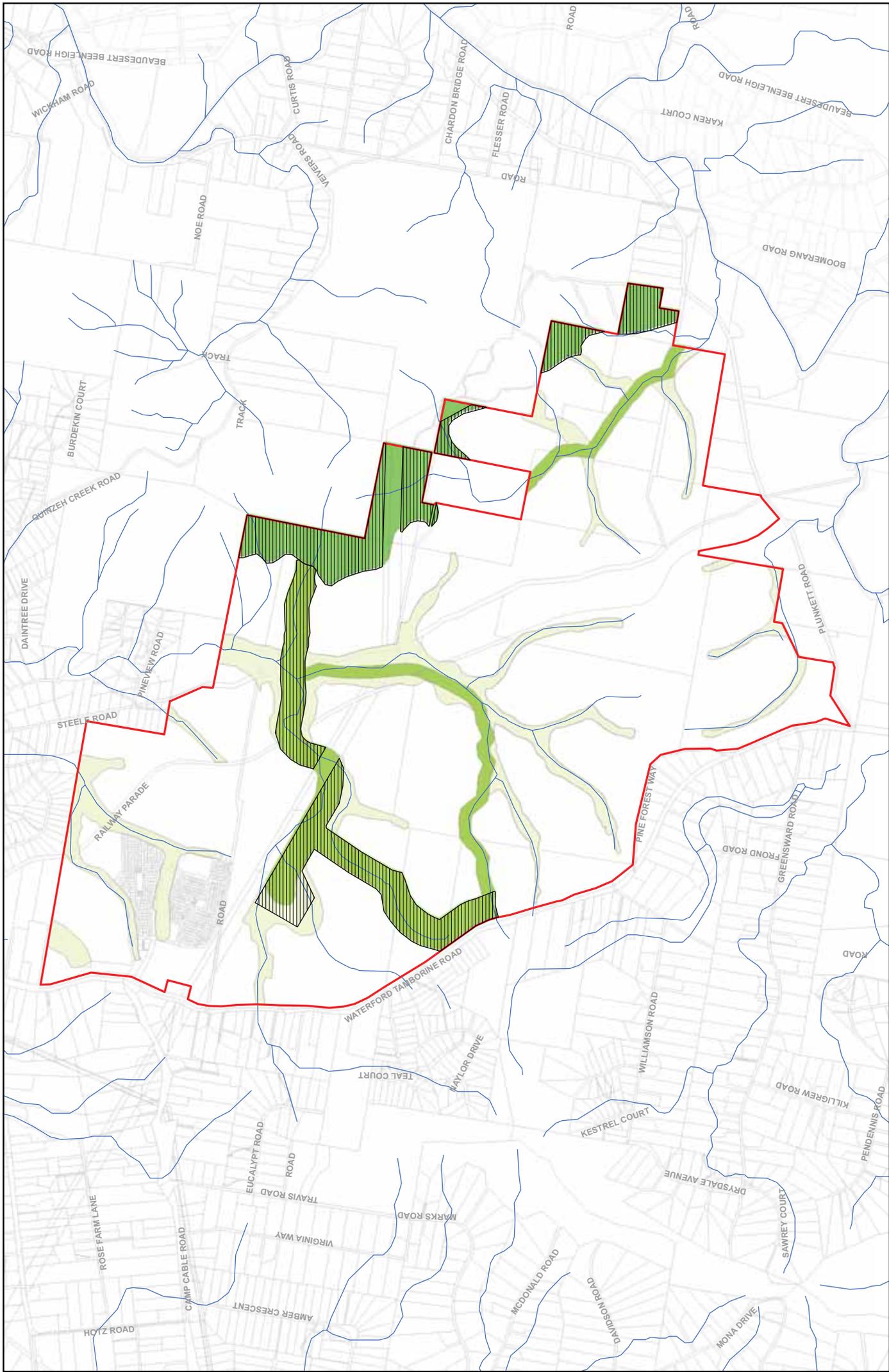
Signed

Full name (please print)

Organisation (please print)

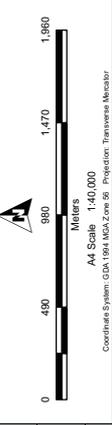
Date

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**Figure 1-1:
Offset Area Context**

- Yarrabilla Priority Development Area
- Watercourse
- Cadastral Boundary
- Yarrabilla Offset Requirement under EPBC Act - 1959a
- Greenspace Corridor
- Fauna Corridor
- Environment Protection



Source: Yarrabilla Offset Requirement Study
Report to the Department of Environment and Planning
and Heritage, 2014
Official requirement: Land Use 2014
Resources and Heritage 2014

Disclaimer: No warranty is given in relation to the data (including accuracy or reliability, completeness, currency or timeliness) of the information provided in this report. The information is provided for general information only and should not be used for any specific purpose. The user of the information is advised to verify the accuracy of the information for their own use.

File: File: Yarrabilla_Offset_Req_PDF_Fig1-OffsetAreaContext1-1920X Date: 4/22/2015

The logo for austecology, featuring a stylized bird or animal icon above the company name in a lowercase, sans-serif font.

2. Description of Offset Areas

For the purposes of this OMP, the offset obligation as described in the EPBC 2013/6791 Approval Condition 6 and accompanying Appendix 2, is described by way of seven spatial units (see Figure 2-1).

2.1. Offset Area 1

Offset Area 1 (OA1) is located on the western side of the site, bounded by a high-voltage electricity transmission easement (approximately 150m wide) along the extent of the northern boundary. OA1 extends from the high-voltage electricity transmission easement in a south-west direction where it meets the Waterford-Tamborine Road.

OA1 shares an interface with the Waterford-Tamborine Road of approximately 100m. Dedicated Open Space, being a combination of Fauna Corridor and Greenspace Corridor, will provide an alternative habitat linkage between this part of OA1 in a return to OA2 in the north (see Figure 2-1). South-eastern and north-western parts of OA1 are buffered by Dedicated Open Space (Greenspace Corridor).

OA1 includes 27.5 hectares of habitat previously mapped as assessable Koala habitat. That represents approximately 37.8% of the total area of OA1 (72.7 ha).

A seasonal watercourse drains west to east across the northern part of OA1, and small wetlands are associated with parts of this drainage, being more developed in the north-eastern part of OA1. A northerly flowing 1st order stream drains the southern section of OA1, from Waterford-Tamborine Road towards the high-voltage electricity transmission easement.

As with other Offset Areas, the introduced Radiata pine (*Pinus radiata*) is common within OA1. Whilst there are outbreaks of the environmental weed lantana (*Lantana camara*), eradication of Pine appears to be the highest priority for the initial stages of habitat rehabilitation.

The patch of assessable Koala habitat in the north-west supports comparatively higher values for Koala within OA1. Here, *Eucalyptus mollucanna* is relatively common. *Eucalyptus tereticornis* is the most common Koala habitat tree species along the margins of watercourses and areas of seasonal inundation. Other Koala habitat tree species include *Eucalyptus sideropholia* and *Corymbia intermedia*.

2.2. Offset Area 2

Offset Area 2 (OA2) extends from the northern side of the high-voltage electricity transmission easement (opposite OA1) east to connect with OA3 (see Figure 2-1). OA2 supports three watercourses, all northerly flowing, and with their confluence in the central part of OA2⁴. Within that part of OA2, there is an area of poor drainage supporting paperbarks (*Melaleuca quinquenervia*) and *Eucalyptus tereticornis*.

The eastern extent of OA2 supports a relatively narrow band of mapped remnant vegetation associated with the westerly flowing watercourse. This vegetation is mapped as Regional

⁴ OA2 supports the continuation of the watercourse which flows through OA1 to the south; a westerly flowing watercourse which emanates from OA3 to the east; and a broader, less defined northerly flowing watercourse which drains part of the dedicated open space to the south (Fauna Corridor).

Ecosystems 12.9-10.17/12.9-10.19a⁵ and 12.3.11/12.3.7⁶ (Queensland Herbarium 2014). The former is the larger mapped area of the two.

Whilst *Eucalyptus tereticornis* remains the most common Koala habitat tree species associated with the watercourses, OA2 supports a more diverse suite of Koala habitat tree species than observed in OA1. Koala habitat tree species in OA2 include *Eucalyptus tereticornis*, *E. acmenoides*, *E. major*, *E. siderophloia*, *E. fibrosa*, *Corymbia citriodora*, and *C. intermedia*.

OA2 includes 13.8 hectares of habitat previously mapped as assessable Koala habitat. That represents approximately 35.1% of the total area of OA2 (39.4 ha).

As with OA1, the introduced *Pinus radiata* is prevalent throughout the western two-thirds OA2. The environmental weeds such as Grounsel (*Baccharis halimifolia*) is more prevalent within the lower-lying and poorly-drained central part of OA2.

2.3. Offset Area 3

Offset Area 3 (OA3) is located on the eastern edge of the site, and adjoins Plunkett Regional Park⁷. OA2 adjoins the central part of the western boundary, and the southern boundary of OA3 adjoins the high-voltage electricity transmission easement (see Figure 2-1). A seasonal watercourse drains west into the adjacent OA2.

In contrast to OA1 & 2, OA3 is well vegetated and supports a more structurally complex vegetation, being open forest on fine grained sedimentary rocks (*cf.* quaternary alluvial geology of OA1 & 2). Large sandstone outcrops are common within OA3.

Koala habitat tree species which are relatively common throughout OA3 include: *Corymbia citriodora*, *Eucalyptus acmenoides*, *E. siderophloia*, and *E. fibrosa*. The majority of OA3 is mapped as remnant vegetation, i.e. being either RE 12.9-10.17 and RE 12.9-10.19 (Queensland Herbarium 2014).

Whilst the exotic pine (*Pinus radiata*) is present, it is largely restricted to the western edge of OA3. There is evidence of the impacts of hot (potentially regular) fires throughout OA3. Fire management is likely to be the highest priority for the protection of habitat values within this offset area. OA3 is entirely comprised of habitat previously mapped as assessable Koala habitat.

There are several earth tracks which transect OA3. To varying degrees, all currently require remediation and potentially on-going management (erosion and sediment control). There is evidence of unauthorised recreational access into OA3 (evidence of off-road vehicles and trail bikes) and subsequent misuse of the area (rubbish, camp fires, regularly used informal camp sites).

⁵ RE 12.9-10.17 - Open forest complex often with *Eucalyptus acmenoides*, *E. major*, *E. siderophloia* +/- *Corymbia citriodora* on sedimentary rocks. VMA class of *Least Concern*. RE 12.9-10.19 - *Eucalyptus fibrosa* subsp. *fibrosa* open forest on sedimentary rocks. VMA class of *Least Concern*.

⁶ RE 12.3.11 - *Eucalyptus siderophloia*, *E. tereticornis*, *Corymbia intermedia* open forest on alluvial plains usually near coast. VMA class of *Of Concern*. RE 12.3.7 - *Eucalyptus tereticornis*, *Callistemon viminalis*, *Casuarina cunninghamiana* fringing forest. VMA class of *Least Concern*.

⁷ Plunkett Regional Park is one of three State reserves (including Wickham National Park and Wickham Timber Reserve) which are located adjacent and to the east of the site. Together, these protected areas comprise an area of 577ha which is managed for their biodiversity values, scenic and natural features and diverse visitor opportunities, including bushwalking, horse riding and mountain bike riding in a natural environment (NPRSR 2013).

Evidence suggests that entry is gained from the west (through the site) and from the east (via tracks within the adjacent reserve). Control of illegal access into and through OA3 is likely to be a key management objective.

2.4. Offset Area 4

Offset Area 4 (OA4) is located adjacent to the high-voltage electricity transmission easement and to the near south of OA3 (see Figure 2-1). The eastern boundaries of A4 adjoin Plunkett Regional Park. Vegetation and habitat characteristics are very similar to those described for OA3, i.e. open forest on fine grained sedimentary rocks (REs 12.9-10.17 and 12.9-10.19; Queensland Herbarium (2014)).

OA4 includes 13.3 hectares of habitat previously mapped as assessable Koala habitat. That represents approximately 95.9% of the total area of OA4 (13.9 ha).

As with OA4, earth tracks traverse OA5 and there is ample evidence of requirements for track remediation and control of illegal access (and accompanying misuse of the area).

2.5. Offset Area 5

Offset Area 5 (OA5) is located to the near south-east of OA4 (see Figure 2-1). The western and northern, are coincident with those of Plunkett Regional Park (structurally complex open forest), whilst the eastern side of OA5 is bordered by the high-voltage electricity transmission easement (cleared and grassed). OA5 is largely cleared, with only a narrow band of eucalypts which occur either side of a 1st order waterway which drains south-west across this small offset area.

OA5 includes 0.5 hectares of habitat previously mapped as assessable Koala habitat. That represents approximately 9.1% of the total area of OA5 (9.1 ha).

There are tracks along both the northern and eastern perimeters of OA5 (and adjacent easement). As with OA3 & 4, there is a need to rehabilitate these tracks (erosion management and sediment control) and manage illegal access.

2.6. Offset Area 6

Offset Area 6 (OA6) is located to the near south of OA5. Wickham National Park adjoins the northern and eastern boundaries of OA6 (see Figure 2-1). OA6 includes 9.8 hectares of habitat previously mapped as assessable Koala habitat, which represents approximately 97.2% of the total area of OA6 (13.9 ha).

OA6 is largely vegetated with open forest. Whilst the southern 20% of OA6 is mapped as supporting non-remnant vegetation that open forest vegetation is consistent with the remainder of the site which is mapped as supporting remnant vegetation. The northern majority of OA6 is mapped as supporting two REs, being 12.9-10.17 and 12.11.5a/12.11.3⁸ (Queensland Herbarium 2014).

The former⁹ is very similar to open forest habitat of OA3 & 4. Within the latter, *Lophostemon confertus* is notably more abundant (mainly small understorey trees). Both communities support a variety of Koala habitat tree species.

⁸ RE 12.11.5 - Open forest complex with *Corymbia citriodora*, *Eucalyptus siderophloia*, *E. major* on metamorphics +/- interbedded volcanic. VMA class of *Least Concern*. RE 12.11.3: *Eucalyptus siderophloia*, *E. propinqua* +/- *E. microcorys*, *Lophostemon confertus*, *Corymbia intermedia*, *E. acmenoides* open forest on metamorphics +/- interbedded volcanic. VMA class of *Least Concern*.

⁹ RE 12.9-10.17 - Open forest complex often with *Eucalyptus acmenoides*, *E. major*, *E. siderophloia* +/- *Corymbia citriodora* on sedimentary rocks. VMA class of *Least Concern*.

There are two earth tracks which transect the western and northern parts of OA6. There is a need to rehabilitate these tracks (erosion management and sediment control) and manage illegal access.

2.7. Offset Area 7

Offset Area 7 (OA7) is located within the extreme south-east corner of the site. The northern boundary adjoins Wickham National Park (see Figure 2-1). A 1st order waterway which drains south through the western side of OA7.

OA7 is largely vegetated with open forest (RE 12.11.5a/12.11.3). Whilst the western fringes are not mapped as remnant vegetation, open forest within this part of OA7 is largely consistent with the remainder to the east which is mapped as remnant vegetation.

OA7 includes 11.8 hectares of habitat previously mapped as assessable Koala habitat. That represents approximately 85.8% of the total area of OA7 (13.8 ha).

There is a small clearing within the south-east part of OA7. That area is an extension of the existing clearing for a small quarry on the adjacent reserve, being Lot 40 W31919 of approximately 2.73 hectares. There are significant erosion issues within the reserve and the adjacent part of OA7.

There are several earth tracks which transect OA7. As with other offset areas, all currently require remediation and potentially on-going management (erosion and sediment control). There is also evidence of unauthorised recreational access into OA7 (horse riding, off-road vehicles and trail bikes) and subsequent misuse of the area (rubbish, camp fires, regularly used informal camp sites). It would appear that, at least in regard to trail bikes, access is commonly gained from the adjacent quarry reserve. Control of illegal access into and through OA7 is likely to be a key management objective.

2.8. Development Precinct Context

Construction of the master planned community and associated infrastructure within the site will occur over a number of years and will be staged in response to market conditions. It is expected that the Yarrabilba project will have a development life of approximately 30 to 35 years. At present, there are 17 development precincts identified. Works for Precinct 2 is scheduled (indicatively) to commence from 2015 onwards.

Table 2-1 provides a summary of those development precincts relevant to each of the seven offset areas. Figure 2-2 provides a graphical description those relationships. It is clear from that review, that OA1 is surrounded by a complex relationship with the proposed development precincts than any of the remaining Offset Areas.

Table 2-1 Development Precinct Context for Offset Areas

Development Precinct	Indicative Development Timing	Offset Area 1	Offset Area 2	Offset Area 3	Offset Area 4	Offset Area 5	Offset Area 6	Offset Area 7
2	2015 - 2020	adjacent	adjacent					
3	2016 - 2021		wholly within	wholly within				
4	2017 - 2025	partly within						
5	2018 - 2024	partly within	adjacent		wholly within			
6	2020 - 2026							
7	2012 - 2026	adjacent						
8	2022 - 2027							
9	2025 - 2030							
10	2025 - 2030							
11	2028 - 2033							
12	2025 - 2033							
13	2031 - 2036					wholly within		
14	2031 - 2036	partly within						
15	2031 - 2039	adjacent						
16	2033 - 2041							
17	2034 - 2039						wholly within	wholly within

3. Key Management Issues and Strategies

3.1. Preamble

The proposed development will be undertaken in a staged manner over approximately thirty years. Figure 2-2 depicts the spatial extent, timing and sequence of the development. Given the extended development time horizon, for many of the issues addressed in this OMP, it is not possible to, nor intended, that this OMP provide a detailed prescription of management actions in regard to each Development Precinct.

This OMP has been based on, as far as practical, the current state of knowledge of the species ecology and best practice habitat management approaches. When new facts emerge from future research, they should be immediately integrated into the plan so it remains consistent with the current state of knowledge (and best practice). That approach is consistent with adaptive management. Adaptive management refers to a way of managing natural resources where management actions are regularly reviewed and, if necessary, modified based on monitored changes in environmental condition and/or changes in base knowledge which underpins the original management approach.

The adaptive management approach has been adopted for the reasons outlined below:

- Not all the effects of the future development are accurately predictable;
- The future development presents opportunities for continuing to provide Koala habitat concurrent with progressive, staged development of the project; and
- The methods for ensuring that the permanent habitat area remains optimal for Koalas are not fully understood.

In the light of these uncertainties, an approach to management that includes flexible management responses guided by monitoring is considered necessary. This will ensure that Koalas, and native fauna, continue to use existing habitat, notwithstanding the ongoing changes occurring to their habitats and surrounds.

The following section provides for each key management issue:

1. A discussion of the issue: and
2. A management plan to address that particular issue.

3.2. Pest Management

3.2.1. Environmental Weeds

The site has been subject to a variety of land uses which have resulted in the removal of the majority the site's former native vegetation communities. Those uses have included grazing, as a military WWII training camp, and then as a pine plantation¹⁰, with extensive harvesting operations undertaken through until the early 2000's (Austecology 2012a).

The altered management practices applied to the site has resulted in the introduction, spread and persistence of a variety of environmental weeds (Austecology 2012a and Natura 2014). Whilst there have been a wide variety of environmental weeds recorded across the site, key species to be controlled on the offset areas in regard to Koala habitat values are Radiata pine *Pinus radiata*¹¹ and Lantana *Lantana camara*¹². Pest plant management is legislated by the Queensland Government under *the Land Protection (Pest and Stock Route) Management Act 2002*. Neither of these species are listed as Class 1 pests in Queensland¹³.

For both species, though particularly in regard to Lantana, it will not possible to remove the weed from the Offset Areas on a single occasion, as there will be a persistent seed bank that can remain viable for long periods of time¹⁴. Germination can occur rapidly after the parent plant has been removed due to increases in light and resource availability. It is therefore important that the Offset Areas are revisited following the initial treatment for follow-up weeding, as cleared areas containing even moderately disturbed soil are highly conducive to weed invasion.

Initially, the control program should focus on the removal of Radiata pine. This will be conducted using manual removal techniques to avoid disturbance to surrounding areas by heavy machinery. Tree removal will be achieved by cutting through the trunk about 30-50cm above the ground with a chainsaw. The results of trials conducted in 2014 on other parts of the site demonstrate that the incidence of trunk resprouting is negligible, thus the need to fell the tree and apply glyphosate herbicide to the cut stump seems unnecessary.

Stem injection with appropriate herbicides may be a required option for larger pine trees where adjacent native tree density is high. This will involve making a cut in the bark of the tree to reveal the cambium layer, and applying a measured dose of herbicide from a backpack with a hose (such as an old drench pack). Assessments of the offset areas to date, indicate that there are few circumstances where this strategy would need to be applied.

Removal trials on other parts of the Yarrabilba PDA site and at other costal lowland sites within the region indicate that stumps and trunks should degrade to a minor contribution to habitat biomass in two to three years (*pers obs.* author; *pers comm.* D.. Bruce, Yarrabilba Land Manager). Leaving pine trunks and stumps degrade insitu, will avoid collateral damage to native flora and habitat structure caused by machinery required to remove such material within the Offset Areas.

¹⁰ Commercial pine plantations were first planted between 1956 and 1971 and existed over 95% of the site (Austecology 2012b).

¹¹ Native to south-western USA (i.e. Monterey County in California) and north-western Mexico (UQ 2011).

¹² Native to Mexico, Central America, the Caribbean and tropical South America (UQ 2011).

¹³ Class 1 plants established in the State are subject to eradication. It is an offence to introduce, keep or sell Class 1 plants without a permit.

¹⁴ Lantana seed banks can remain viable for at least four years, so follow-up control to kill seedlings before they mature is vital to ensure initial management efforts to control the parent bush are not wasted (DAFF 2013).

Removal and control of Lantana should be included within the initial stages of the overall weed control program, though will require more on-going work than is likely in regards to control of Radiata pine. Lantana removal will be undertaken using a combination of physical removal and application of herbicide. The control program for these species will be compatible with approved habitat rehabilitation plans (see Natura 2015).

3.3. Feral Predators

One of the main threats to the Koala is feral or domestic dogs (DE 2015). Predation on native wildlife by the European red fox *Vulpes vulpes* and Feral Cat *Felis catus* are listed as a key threatening process under the EPBC Act, and both species are a confirmed or perceived threat to a large number of threatened species (DEWHA 2008a & b).

Evidence of all three feral predator species has been recorded within suite of offset areas (*pers. obs.* author, 2012 to present). The control of these predators should be high priority. To be effective, control programs must be undertaken throughout the local area, including adjacent Reserves managed by the Queensland Government DNPRSR, and not just within the offset areas or Yarrabilba PDA alone.

Prior to the onset of nearby residential development, a control program could comprise a combination of baiting and shooting. The latter option will become increasingly problematic as new development progresses closer to offset areas, and to the point where it will no longer be a feasible option.

Liaison with Queensland Government DNPRSR will be required to assist in achieving coordinated and effective control program, especially in regards to Offset Areas 3 to 7, which are adjacent to the government-controlled reserves of Wickham National Park and Plunkett Regional Park.

As identified in Austecology (2012b), with site development, the offset areas (as well as Fauna Corridors) will be designated as dog exclusion zones, nominally prohibiting dogs from these areas¹⁵. Furthermore, for all residential and non residential lots which front onto land offset areas (as well as Fauna Corridors), a Koala exclusion fencing covenant on the property title will require the erection of Koala exclusion fencing and a prohibition on front boundary fencing to the front alignment of any lot (see Austecology 2012b).

As almost all dog-Koala interactions occur at night, limiting the movement of domestic dogs between dusk and dawn is the single most effective way of ensuring dogs and Koalas do not come into contact. An on-going public education and awareness campaign will be built around this theme, with strategies encouraging responsible dog ownership through practices such as denning or confinement of dogs to the house or portion of the yard during peak koala activity periods, e.g. between 6pm and 6am (see discussion in Austecology 2012b).

¹⁵ Within other community greenspace designated areas, fenced dog off-leash areas may be developed as required. Signage throughout public spaces will be erected to advise of koala presence and the need to restrain dogs.

3.4. Fire Management

Whilst a pre-development bushfire mitigation strategy for the Yarrabilba has been implemented on parts of the site since 2012, arson has, and continues to be a problematic site-management issue. Arson results in often uncontrolled frequent fires which can cause erosion, promote pest plant growth, and lead to decreases biodiversity values.

Fire can affect Koala populations both directly and indirectly. Fire can deplete some plant species and favour others that are highly flammable and contribute to the fuel load. Hot crown fires can cause high numbers of Koala mortalities, as well as destroy habitat or reduce it to remnant patches (NRMMC 2009). However, if there are unburnt refuge areas, nearby populations may survive fires and recolonise habitat as vegetation recovers.

In regard to the offset areas, fire management strategies will need to strike a balance between maintenance and rehabilitation of habitat values, and the need for hazard reduction and asset protection. As Offset Areas 3 to 7 are located adjacent to the government-controlled reserves of Wickham National Park and Plunkett Regional Park, liaison and planning with the Queensland Government DNPRSR will be essential to achieve an effective fire management outcome.

For all Offset Areas, with the overall objective of achieving a healthy open forest habitat, key issues to be considered with a fire management strategy are: the reduction of overabundant saplings (e.g. *Acacia* spp. and *Lophostemon confertus*), managing invasive grasses (e.g. *Melinis minutiflora*), and reducing over of *Lantana camara*.

For the Regional Ecosystems occurring across the suite of Offset Areas, the following summarises the key elements of a recommended fire management strategy (after QPWS (2012) and Queensland Herbarium (2014)):

- Suitable season for prescribed burns is January to August;
- A fire interval¹⁶ is 4 to 8 years to maintain a healthy grass layer, and 8 to 20 years to maintain a healthy shrubby understorey; and
- A fire strategy which plans for a low to moderate intensity fire with the aim of a 40 to 60% mosaic burn.

As noted previously, a pre-development bushfire mitigation strategy has been developed and implemented across parts of the Yarrabilba PDA (BPS 2012). The strategy is currently being implemented and focuses on the management of the designated fauna corridors to enhance their ecological value and protect them from unplanned fire or degradation from invasive species. Actions being implemented include the following:

- Establishment and maintenance of management zones¹⁷ along boundary interfaces to the Fauna Corridors and Environmental Protection Zone.
- Strategic vegetation management of large areas of vegetation located within the development footprint to reduce the likelihood, intensity and impacts of unplanned fires.
- Use mega mulching and slashing to reduce fuel loads within the buffers of development areas adjacent to the Fauna Corridors and Environmental Protection Zone.

¹⁶ The timing of a prescribed burn should primarily be determined through on-ground assessment of vegetation health, fuel accumulation and previous fire history and adjusted for wildfire risk and drought cycles.

¹⁷ Comprising a minimum low fuel buffer within the perimeter of fauna corridors, environmental corridors and open space areas and managed buffers within adjacent developable areas that may be affected by unplanned or planned fire.

- Repair of heavily eroded trails or sections of trails to allow safe access for rural fire brigade teams and vegetation management contractors.
- Implementing planned burns in designated zones to reduce fuels and lower the likelihood of unplanned fires occurring.
- Progressive eradication of pine trees in all areas where they will not be retained as a resource as uncontrolled pine growth contributes to higher fuel levels and as a consequence, higher fire intensities and rates of spread.

3.5. Unauthorised Access and Site Misuse

There is evidence within all Offset Areas of a history of unauthorised recreational access (e.g. off-road vehicles and trail bikes) and misuse of these areas (e.g. rubbish, and informal camp sites). Land management issues arising from illegal activities and misuse are also acknowledged as key issues for the adjacent Wickham National Park and Plunkett Regional Park (NPRSR 2013)¹⁸.

For most Offset Areas, soils of the site tend to be poor, sandy and of an erodible nature. This in combination with off-road vehicle use of tracks on slopes, has led to significant erosion and subsequent sediment runoff impacts on vegetation or water quality in the watercourses. Whilst most rubbish that is left by unauthorised recreational activities, is relatively benign, though incompatible with conservation management objectives. Use of sites as informal camp sites has led to localised degradation (e.g. collection of firewood, both standing and fallen) and the use of these sites for camp fires has the potential for the spread of an uncontrolled fire event.

For Offset Areas 3, 4, 6, and 7, there is also evidence that these sites are regularly traversed by horse riders. Australian research that has documented terrestrial environmental impacts from horse-riding. These impacts include vegetation clearing and degradation, track degradation (soil compaction, erosion), nutrient addition, changes in hydrology, and the introduction and spread of weeds and pathogens (Landsberg *et. al.* (2001), Newsome *et. al.* (2002), and Pickering (2008)).

Horse riding is permitted on 13 kilometres¹⁹ of the trail system within the adjacent Wickham National Park and Plunkett Regional Park (NPRSR 2013). Those trails form part of the South East Queensland horse riding trail network (see Attachment A)²⁰. The Queensland Government has produced a code of practice to minimise riders' impacts on State protected areas, and applies trails identified as the Southeast Queensland parks horse trail network (NPRSR 2014). That code of practice is designed to prevent soil erosion, minimise trampling and grazing impacts, prevent the introduction and spread of noxious and exotic plants, protect waterways, protect significant and environmentally sensitive areas and species, protect cultural sites and minimise conflicts with other users (NPRSR 2014).

Attachment A identifies that the parts of the trail system within the adjacent Wickham National Park and Plunkett Regional Park terminate at the shared boundary between the reserves and the Offset Areas. For a user of the reserve, there is no evidence of an obvious

¹⁸ e.g. arson and fire management, activities and conditions that promote the spread of pest plants and animals and change the structure of native vegetation, and visitor management.

¹⁹ There is an additional horse trail in the northern section of Plunkett Conservation Park not recorded on the horse trail map (NPRSR 2013). That unmapped trail is local to Offset Area 3

²⁰ During 2012, the Queensland Government developed the strategy to deliver the South East Queensland horse riding trail network to facilitate the continuation of horse riding access to a number of former State forests that have been transferred to National Parks under the South East Queensland Forests Agreement (SEQFA).

boundary between the reserve and the Offset Areas (which by way of the existing tracks and surrounding bushland, appear to provide a continuation of the reserve trial system).

It is apparent that signage and/or fencing is required to differentiate the Offset Areas from the adjacent reserves. It is also apparent that there needs to be cooperation with Reserve management to manage illegal activities and misuse which is a shared management issue.

3.6. Habitat Rehabilitation

A management plan for the habitat rehabilitation of the Offset Areas has been prepared by Natura (2015). That Habitat Rehabilitation Management Plan (HRMP) has been prepared to respond to the requirements as described by Conditions 4 and 5 of the EPBC 2013/6791 Approval. The HRMP describes the restoration approach, benchmarks and performance indicators, a staging plan, and monitoring strategies. That HRMP address the requirements of this Offset Management Plan (OMP).

In addition to the HRMP commitments, this OMP recommends that in order to understand which tree species (as fodder trees) are of most value to Koalas within the Offset Areas, thus optimising Koala habitat rehabilitation outcomes, it is essential that seasonal dietary patterns over the course of a year be investigated through the collection faecal pellets and subsequent cuticle analysis. Based on the findings of the faecal cuticle analysis, a seed collection program be instigated on the Offset Areas (and adjacent habitat) in order that seed of preferred fodder trees of local provenance can be propagated for use in Koala habitat rehabilitation.

3.7. Grazing Regulation

Grazing will be excluded from Offset Areas 3, 4, 6, and 7. For each of the Offset Areas 3, 4, 6, and 7, the gradual development of a shrub and tree layer in more open areas, in combination with improved fire management practices and grazing by indigenous macropods is expected to restrict the development of dense swards of grassy ground cover.

As both Offset Areas 1 and 5 support a comparatively higher of weeds and grasses, a regulated grazing program is proposed to be implemented to augment the initial short-term component of the land management regime for these areas. The regulated grazing program will be established that maintains the existing native vegetation and floristic integrity and value of Offset Areas 1 and 5. The grazing program will take into account natural grazing pressures from the existing macropod population as well as any changes in biomass levels due to fire.

It is anticipated that the regulated grazing program will be implemented for approximately three years to coincide with the completion of the primary phase of control for the introduced weeds *Pinus radiata* and *Lantana camara*, then superseded by other habitat rehabilitation approaches as per the HMRP (Natura 2015).

3.8. Management Partnerships

As previously discussed, Offset Areas 3 to 7 share one or more boundaries with State reserves adjacent and to the east (Wickham National Park and Plunkett Regional Park). There are key issues which are applicable to the management of both the Offset Areas and adjacent reserves, e.g. fire, weeds, feral predators, and unauthorised access.

Offset Areas 1 to 5 have a common boundary with the high-voltage electricity transmission easement that transects the Yarrabilba PDA. This easement has historically provided an opportunity for unauthorised access into the Yarrabilba PDA and the adjacent public reserves (Wickham National Park and Plunkett Regional Park). Much of the easement supports rank grassland and environmental weeds are not uncommon. Thus in its current state, the easement maintains a source of weeds which could spread into adjacent parts of the Offset Areas.

Of particular relevance to Offset Areas 1 and 2, is that there are sections of the waterway which transects the Offset Areas which are located within the high-voltage electricity transmission easement. Being poorly vegetated and impacted by illegal recreational uses (off-road vehicles and trail bikes) those sections of the waterway are subject to significant degradation. In their current condition, those unmanaged waterway sections have the potential to negatively impact values within both Offset Areas 1 and 2.

It is apparent that for a variety of management issues identified above, that the effectiveness of Offset Area management strategies, could be enhanced through developing cooperative management strategies with neighbours and managing authorities, and other State agencies such as Queensland Police Service and Queensland Fire and Rescue Service.

To that end, a program will be required to establish and maintain communication and supportive relationships with Offset Area neighbours, asset managers (e.g. Powerlink²¹ and QPWS), State agencies (Queensland Police Service, Rural Fire Service Queensland, and Queensland Fire and Rescue Service) and local groups (e.g. Rural Fire Brigade).

²¹ Powerlink Queensland is a Government-owned Corporation that owns, develops, operates and maintains Queensland's high-voltage electricity transmission network.

Table 3-1 MP1 - Control of *Pinus radiata*

Management Issue	Pest Management – Control of <i>Pinus radiata</i>
Desired Outcome	To minimise the impact of the introduced weed Radiata pine <i>Pinus radiata</i> on existing and future habitat values of Offset Areas.
Implementation Requirements	<ul style="list-style-type: none"> • Implementation of manual removal techniques to avoid disturbance to surrounding areas by heavy machinery. • Tree removal to be achieved by cutting through the trunk about 30-50cm above the ground with a chainsaw. • Where pine trees are to be felled by chainsaw, they are to be felled so as to avoid damage to non-juvenile Koala habitat trees. • Felled pine trees are not to impede waterway drainage. • Stem injection with appropriate herbicides may be a required option for larger pine trees where adjacent native tree density is high (as per protocols in HRMP). • Leaving pine trunks and stumps degrade insitu to avoid collateral damage to native flora and habitat structure caused by machinery required to remove such material. • The timing of vegetation clearance should be selected in order to minimise impacts (direct and indirect disturbances) to affected fauna habitats during optimum breeding period. • No clearing of pine trees is to commence without the presence of a licensed Fauna Spotter/Catcher.
Benchmark	<ul style="list-style-type: none"> • Key attributes of the relevant pre-clearing Regional Ecosystem which contains Koala habitat. Key attributes include: average canopy cover; average height of canopy; dominant canopy species; average shrub cover; average groundcover; and species richness (as described in Queensland Herbarium 2014).
Performance Goals & Indicators	<ul style="list-style-type: none"> • Primary control phase - Removal of all pine trees (>2m) within 2 years of the commencement of this OMP. • Secondary control phase - Following completion of the above, on-going control of existing infestations to ensure that pine trees do not cover more than 5% of the Offset Areas.
Implementation Timeframe	<ul style="list-style-type: none"> • Primary control phase – achieved within 2 years of the commencement of this OMP. • Secondary control phase – Duration of the OMP post-Primary control phase.
Monitoring	<ul style="list-style-type: none"> • Establishment of monitoring sites and implementation of photo monitoring points and transect and quadrat surveys as per protocols described in the Habitat Rehabilitation Management Plan (Natura 2015).
Auditing	<ul style="list-style-type: none"> • Annual site audit by Project Ecologist and report to Development Manager.
Corrective Action	In the event that monitoring identifies practices inconsistent with the strategies developed for this management plan, the Development Manager shall take the necessary corrective steps.

Table 3-2 MP2 - Control of *Lantana camara*

Management Issue	Pest Management – Control of <i>Lantana camara</i>
Desired Outcome	To minimise the impact of the introduced weed <i>Lantana camara</i> on existing and future habitat values of Offset Areas.
Implementation Requirements	<ul style="list-style-type: none"> • Map areas of heavy infestation, i.e. infestations which contribute to >75% FPC for areas >500sqm for treatment as part of primary control phase. • Implementation of a mix (integration) of control methods dependent on size, density, and context and location of infestations. • Control methods to include as appropriate: manual removal techniques, herbicide application (basal stem application &/or foliar spraying), slashing/cutting and fire. • Infestations to be treated with herbicide should be healthy and actively growing. • Herbicide should not be applied during windy periods and/or prior to forecast rain or within six hours after rain. • Control of infestations is to be implemented without heavy machinery to avoid disturbance to surrounding areas. • <i>Lantana</i> management to be consistent with control strategies, methodologies, and monitoring protocols described in the approved HRMP (Natura 2015).
Benchmark	<ul style="list-style-type: none"> • Key attributes of the relevant pre-clearing Regional Ecosystem which contains Koala habitat. Key attributes include: average canopy cover; average height of canopy; dominant canopy species; average shrub cover; average groundcover; and species richness (as described in Queensland Herbarium 2014).
Performance Goals & Indicators	<ul style="list-style-type: none"> • Primary control phase - Removal of patches of “heavy infestation” within 3 years of the commencement of this OMP. • Secondary control phase - On-going control of existing infestations to ensure that <i>Lantana</i> infestations do not cover more than 5% of the Offset Areas.
Implementation Timeframe	<ul style="list-style-type: none"> • Field mapping of patches of “heavy infestation” of <i>Lantana</i> within 6 months of the commencement of this OMP. • Primary control phase – achieved within 3 years of the commencement of this OMP. • Secondary control phase – Duration of the OMP post-Primary control phase.
Monitoring	<ul style="list-style-type: none"> • Establishment of monitoring sites and implementation of photo monitoring points and transect and quadrat surveys as per protocols described in the Habitat Rehabilitation Management Plan (Natura 2015).
Auditing	<ul style="list-style-type: none"> • Annual site audit by Project Ecologist and report to Development Manager.
Corrective Action	In the event that monitoring identifies practices inconsistent with the strategies developed for this management plan, the Development Manager shall take the necessary corrective steps.

Table 3-3 MP3 - General Environmental Weed Control

Management Issue	Pest Management – General Environmental Weed Control
Desired Outcome	To minimise the impact of the environmental weeds on existing and future habitat values of Offset Areas.
Implementation Requirements	<ul style="list-style-type: none"> • Implementation of a mix (integration) of control methods dependent on size, density, and context and location of infestations. • Weed control methods to include as appropriate: manual removal techniques, herbicide application (basal stem application &/or foliar spraying), slashing/cutting and fire. • Infestations to be treated with herbicide should be healthy and actively growing. • Herbicide should not be applied during windy periods and/or prior to forecast rain or within six hours after rain. • Control of infestations is to be implemented without heavy machinery to avoid disturbance to surrounding areas. • Weed management to be consistent with control strategies, methodologies, and monitoring protocols described in the HRMP (Natura 2015).
Benchmark	<ul style="list-style-type: none"> • Key attributes of the relevant pre-clearing Regional Ecosystem which contains Koala habitat. Key attributes include: average canopy cover; average height of canopy; dominant canopy species; average shrub cover; average groundcover; and species richness (as described in Queensland Herbarium 2014).
Performance Goals & Indicators	<ul style="list-style-type: none"> • Relevant performance indicators as described in the HRMP (Natura 2015).
Implementation Timeframe	<ul style="list-style-type: none"> • Progressive implementation as described in the HRMP (Natura 2015).
Monitoring	<ul style="list-style-type: none"> • Establishment of monitoring sites and implementation of photo monitoring points and transect and quadrat surveys as per protocols described in the HRMP (Natura 2015).
Auditing	<ul style="list-style-type: none"> • Annual site audit by Project Ecologist and report to Development Manager.
Corrective Action	In the event that monitoring identifies practices inconsistent with the strategies developed for this management plan, the Development Manager shall take the necessary corrective steps.

Table 3-4 MP4 - Control of Feral Predators

Management Issue	Pest Management – Control of Feral Predators
Desired Outcome	To minimise the impact of feral predators on wildlife, particularly Koala, within the Offset Areas.
Implementation Requirements	<ul style="list-style-type: none"> • Where practical and appropriate, participate cooperatively in pest management planning and implementation with surrounding land managers, other government departments, local governments and utility providers to ensure pest management is successful. • Consultation with Queensland Department of National Parks, Recreation, Sport and Racing (DNPRSR), Queensland Parks and Wildlife Service (QPWS), and Powerlink Queensland in order to prepare a Memorandum of Understanding in regard to the control of feral predators. • In consultation with QPWS, design and implement a baiting program which is consistent with the QPWS Level 2 Pest Strategy which has been prepared for the adjacent reserves.
Benchmark	<ul style="list-style-type: none"> • Implementation of a management strategy consistent with the QPWS Level 2 pest strategy which has been prepared for the adjacent reserves.
Performance Goals & Indicators	<ul style="list-style-type: none"> • Relevant performance goals and indicators as described in the Level 2 pest management strategy.
Implementation Timeframe	<ul style="list-style-type: none"> • Consultation with DNPRSR, QPWS, and Powerlink Queensland and development of a MOU in regard to pest management within 1 year of the commencement of this OMP. • Preparation of management strategy, consistent with the QPWS Level 2 pest strategy, within 18 months of the commencement of this OMP. • Progressive implementation as described in the pest management strategy.
Monitoring	<ul style="list-style-type: none"> • Implementation of relevant monitoring protocols as described in the Level 2 pest management strategy. • Review and evaluation of the pest management strategy every 5 years of the life of this OMP.
Auditing	<ul style="list-style-type: none"> • Annual program audit by Project Ecologist and report to Development Manager.
Corrective Action	In the event that monitoring identifies practices inconsistent with the strategies developed for this management plan, the Development Manager shall take the necessary corrective steps.

Table 3-5 MP5 - Domestic Dogs

Management Issue	Domestic Dogs
Desired Outcome	To minimise the impact of domestic dogs to Koala within the Offset Areas.
Implementation Requirements	<ul style="list-style-type: none"> • All Offset Areas will be designated as dog exclusion zones, nominally prohibiting dogs from these areas. • Installation and maintenance of public education and awareness signage along interfaces between Offset Areas and future development (as per KMP; Austecology 2012b). • For all future residential and non residential lots which front onto Offset Areas, a Koala exclusion fencing covenant on the property title will require the erection of Koala exclusion fencing and a prohibition on front boundary fencing to the front alignment of any lot (as per KMP; Austecology 2012b). • Development and implementation of an on-going public education and awareness campaign which highlights strategies encouraging responsible dog ownership through practices such as denning or confinement of dogs to the house or portion of the yard during peak koala activity periods, e.g. between 6pm and 6am (as per KMP; Austecology 2012b).
Benchmark	<ul style="list-style-type: none"> • There are no existing benchmarks for this management issue.
Performance Goals & Indicators	<ul style="list-style-type: none"> • No dog-Koala interactions which result in Koala injury or mortality.
Implementation Timeframe	<ul style="list-style-type: none"> • Implementation in keeping with progression of each Development Precinct which adjoins an Offset Area.
Monitoring	<ul style="list-style-type: none"> • Review and evaluation of the relevant strategies and actions every 5 years of the life of this OMP.
Auditing	<ul style="list-style-type: none"> • Annual program audit by Project Ecologist and report to Development Manager.
Corrective Action	In the event that monitoring identifies practices inconsistent with the strategies developed for this management plan, the Development Manager shall take the necessary corrective steps.

Table 3-6 MP6 - Fire Management

Management Issue	Fire Management
Desired Outcome	<ul style="list-style-type: none"> • Maintenance and enhancement of habitat values; and • Minimise the risk of high-intensity fire in koala habitat; • Minimise the risk of koala mortality due to prescribed burns.
Implementation Requirements	<ul style="list-style-type: none"> • Consultation with Queensland Department of National Parks, Recreation, Sport and Racing (DNPRSR), Queensland Parks and Wildlife Service (QPWS), and Powerlink Queensland in order to prepare a Memorandum of Understanding in regard to fire management relevant to the Offset Areas, adjacent protected areas, and land within the high-voltage electricity transmission easement. • Development of a Fire Management Plan for Offset Areas which is designed to: a) assist in the maintenance and enhancement of their ecological values; and b) minimise the potential for high-intensity wildfires. • Consultation with Queensland Parks and Wildlife Service (QPWS), in order to design and implement a fire management strategy for Offset Areas which is consistent with the QPWS Level 2 fire management strategy which has been prepared for the adjacent reserves. • Development of a fire management strategy for the remainder of the site which is designed to reduce the likelihood, intensity and impacts of unplanned fires from within pre-development precincts which may impact Offset Areas. • Implementation requirements relevant to a fire management strategy for the Offset Areas and remainder of the site include: <ul style="list-style-type: none"> ○ Audit of existing tracks and the preparation of track plan in order to establish a designated track system to provide the multiple objectives of: a) provision of safe access for fire response teams; b) strategic fire breaks; and c) suitable access for implementing prescribed burns. ○ Repair of heavily eroded trails or sections of trails to allow safe access. ○ Establishment and maintenance of management zones along boundary interfaces between future development areas and to the Offset Areas in order to provide a low fuel buffer within the perimeter of Offset Areas, and managed buffers within adjacent developable areas that may be affected by unplanned or planned fire. ○ Strategic vegetation management of large areas of vegetation located within the pre-development footprint to reduce the likelihood, intensity and impacts of unplanned fires. ○ Use mega mulching and slashing to reduce fuel loads within the buffers of development areas adjacent to the Offset Areas. ○ Implementing planned burns in designated zones to reduce fuels and lower the likelihood of unplanned fires occurring. ○ Progressive eradication of pine trees in all areas within the pre-development footprint to reduce. • In regard to Offset Areas, where prescribed burns are to be implemented, the following strategies are relevant to Koala: <ul style="list-style-type: none"> ○ Implement pre-burn surveys to identify areas of high Koala activity or density and use this data to inform the planning process. ○ Ideally, no prescribed burning should be undertaken when female Koalas are likely to be carrying dependent young (generally during autumn)²²; ○ Prescribed burn(s) are to be carried out during appropriate weather conditions (i.e. low temperature, low wind) and soil-moisture conditions; ○ Minimise fire intensity so that the canopy vegetation is not burnt (or only a limited

²² In some areas, this may be counterintuitive as autumn may be the most appropriate time to carry out burning (in regards to weather conditions). This will need to be addressed on a case-by-case basis.

Management Issue	Fire Management
	<p>proportion or extent is burnt if avoiding canopy scorch is not possible);</p> <ul style="list-style-type: none"> ○ Perform post-fire practices such as extinguishing burning of large, old growth trees, as they are preferred by Koalas in some areas; and ○ Minimise the extent of burning so that the risk of injuring or killing Koalas is reduced, the risk of canopy scorch is lowered, whilst other biodiversity benefits to other species are achieved.
Benchmark	<ul style="list-style-type: none"> • Key attributes of the relevant pre-clearing Regional Ecosystem which contains Koala habitat are maintained. Key attributes include: average canopy cover; average height of canopy; dominant canopy species; average shrub cover; average groundcover; and species richness (as described by data in Queensland Herbarium 2014). • Implementation of a management strategy for Offset Areas which consistent with the QPWS Level 2 fire management strategy which has been prepared for the adjacent reserves.
Performance Goals & Indicators	<ul style="list-style-type: none"> • Relevant performance indicators as described in the fire management plans and strategies for the Offset Areas and remainder of the site. • Relevant performance indicators as described in the HRMP (Natura 2015).
Implementation Timeframe	<ul style="list-style-type: none"> • Consultation with DNPRSR, QPWS, and Powerlink Queensland and development of a MOU in regard to fire management within 1 year of the commencement of this OMP. • Preparation of fire management strategy for the Offset Areas, consistent with the QPWS Level 2 fire management strategy, within 18 months of the commencement of this OMP. • Preparation of fire management strategy for pre-development areas within 18 months of the commencement of this OMP. • Progressive implementation as described in the relevant fire management strategies.
Monitoring	<ul style="list-style-type: none"> • Establishment of monitoring sites and implementation of photo monitoring points and transect and quadrat surveys as per protocols described in the HRMP (Natura 2015).
Auditing	<ul style="list-style-type: none"> • Annual site audit by Project Ecologist and report to Development Manager.
Corrective Action	<p>In the event that monitoring identifies practices inconsistent with the strategies developed for this management plan, the Development Manager shall take the necessary corrective steps.</p>

Table 3-7 MP7 - Boundary Security and Site Management

Management Issue	Boundary Security and Site Management
Desired Outcome	<ul style="list-style-type: none"> • Minimise unauthorised and collateral damage/impacts associated with uncontrolled recreational activities and site misuse.
Implementation Requirements	<ul style="list-style-type: none"> • Consultation with Queensland Department of National Parks, Recreation, Sport and Racing (DNPRSR), Queensland Parks and Wildlife Service (QPWS), and Powerlink Queensland in order to prepare a Memorandum of Understanding in regard to management of unauthorised access and associated recreational impacts relevant to the Offset Areas, adjacent protected areas, and land within the high-voltage electricity transmission easement. • Development of a Site Security Strategy and Infrastructure Management Plan (SSSIMP) for Offset Areas. Issues to be addressed in the SSSIMP include: <ul style="list-style-type: none"> ○ Boundary signage, particularly at track interfaces with adjacent reserves. ○ Fencing and vandal-proof gates. ○ Track maintenance, closures and rehabilitation.
Benchmark	<ul style="list-style-type: none"> • There are no existing benchmarks for this management issue.
Performance Goals & Indicators	<ul style="list-style-type: none"> • Minimal incidents of unauthorised access and concomitant reduction in recreational impacts within Offset Areas.
Implementation Timeframe	<ul style="list-style-type: none"> • Consultation with DNPRSR, QPWS, and Powerlink Queensland and development of a MOU in regard to management of unauthorised access and associated recreational impacts within 1 year of the commencement of this OMP. • Preparation of a Site Security Strategy and Infrastructure Management Plan within 18 months of the commencement of this OMP. • Progressive implementation as described in the relevant SSIMP.
Monitoring	<ul style="list-style-type: none"> • Establishment of monitoring sites and implementation of photo monitoring points and transect and quadrat surveys as per protocols described in the HRMP (Natura 2015).
Auditing	<ul style="list-style-type: none"> • Annual site audit by Project Ecologist and report to Development Manager.
Corrective Action	<p>In the event that monitoring identifies practices inconsistent with the strategies developed for this management plan, the Development Manager shall take the necessary corrective steps.</p>

Table 3-8 MP8 - Grazing Regulation

Management Issue	Grazing Regulation
Desired Outcome	<ul style="list-style-type: none"> • Control of environmental weeds as part of the initial land management regime for Offset Areas 1 and 5. • Exclusion of grazing from Offset Areas 3, 4, 6, and 7.
Implementation Requirements	<ul style="list-style-type: none"> • Ensure fencing is established and maintained to exclude stock from Offset Areas 3, 4, 6, and 7. • Within Offset Areas 1 and 5, the following is applicable: <ul style="list-style-type: none"> ○ Grazing should be avoided during very wet or very dry conditions ○ Grazing is to be limited to cattle and goats – no sheep or horses. ○ Upon completion of the regulated grazing program, fencing is to be established and maintained to exclude stock.
Benchmark	<ul style="list-style-type: none"> • Key attributes of the relevant pre-clearing Regional Ecosystem which contains Koala habitat are maintained. Key attributes include: average canopy cover; average height of canopy; dominant canopy species; average shrub cover; average groundcover; and species richness (as described in Queensland Herbarium 2014).
Performance Goals & Indicators	<ul style="list-style-type: none"> • Permanent exclusion of grazing stock from Offset Areas 3, 4, 6, and 7. • Design and implementation of a program to monitor habitat condition during the grazing program. • In regards to Offset Areas 1 and 5: <ul style="list-style-type: none"> ○ No loss of non-juvenile Koala habitat trees due to grazing impacts. ○ No discernible loss of juvenile Koala habitat trees due to grazing impacts. • Relevant performance indicators as described in the HRMP (Natura 2015).
Implementation Timeframe	<ul style="list-style-type: none"> • Specific implementation timelines as per this OMP. • Progressive implementation as described in the HRMP (Natura 2015).
Monitoring	<ul style="list-style-type: none"> • In addition to the monitoring protocols identified in the HRMP (Natura 2015), implementation of a an inspection of Offset Areas 1 and 5 by Project Ecologist on a quarterly basis to assess habitat condition and consult with the Land Manager in regards to adaptive management strategy for the following 3 months. • Establishment of monitoring sites and implementation of photo monitoring points and transect and quadrat surveys as per protocols described in the HRMP.
Auditing	<ul style="list-style-type: none"> • Annual site audit by Project Ecologist and report to Development Manager.
Corrective Action	<p>In the event that monitoring identifies practices inconsistent with the strategies developed for this management plan, the Development Manager shall take the necessary corrective steps.</p>

Table 3-9 MP9 - Habitat Rehabilitation

Management Issue	Habitat Rehabilitation
Desired Outcome	<ul style="list-style-type: none"> • Maintenance and improvement of existing Koala habitat values of the Offset Areas. • The expansion of Koala habitat through the rehabilitation of existing cleared parts of the Offset Areas.
Implementation Requirements	<ul style="list-style-type: none"> • Implementation of the Habitat Rehabilitation Management Plan (HRMP) (Natura 2015). • To support the successful implementation of the HRMP, development and implementation of the following: <ul style="list-style-type: none"> ○ Site Security Strategy and Infrastructure Management Plan (SSSIMP) ○ Control strategies for <i>Pinus radiata</i> and <i>Lantana camara</i> as per this OMP. ○ Fire Management Plan for Offset Areas as outlined in this OMP. ○ Fire Management Strategy for pre-development areas adjacent to the Offset Areas as outlined in this OMP. • To enhance the successful implementation of the HRMP: <ul style="list-style-type: none"> ○ Design and implement a field program to investigate Koala seasonal dietary patterns. <ul style="list-style-type: none"> ▪ Primary field activity is the collection Koala faecal pellets from a representative suite of site habitats. ▪ Field investigations to be undertaken over a minimum twelve month period in order to sample the range of seasonal dietary scenarios. ○ Undertake faecal cuticle analysis and analyse potential seasonal dietary patterns. ○ Based on the findings of the faecal cuticle analysis, a seed collection program will be instigated on the Offset Areas (and adjacent habitat) in order that seed of preferred fodder trees of local provenance can be propagated for use in Koala habitat rehabilitation.
Benchmark	<ul style="list-style-type: none"> • Key attributes of the relevant pre-clearing Regional Ecosystem which contains Koala habitat are maintained. Key attributes include: average canopy cover; average height of canopy; dominant canopy species; average shrub cover; average groundcover; and species richness (as described by data in Queensland Herbarium 2014).
Performance Goals & Indicators	<ul style="list-style-type: none"> • Relevant performance indicators as described in the HRMP (Natura 2015). • Relevant performance indicators as described in the SSIMP, fire management plans and strategies to be developed as per this OMP.
Implementation Timeframe	<ul style="list-style-type: none"> • Specific implementation timelines as per this OMP. • Progressive implementation as described in the HRMP (Natura 2015).
Monitoring	<ul style="list-style-type: none"> • Establishment of monitoring sites and implementation of photo monitoring points and transect and quadrat surveys as per protocols described in the HRMP (Natura 2015).
Auditing	<ul style="list-style-type: none"> • Annual site audit by Project Ecologist and report to Development Manager.
Corrective Action	<p>In the event that monitoring identifies practices inconsistent with the strategies developed for this management plan, the Development Manager shall take the necessary corrective steps.</p>

4. Offset Security Arrangements

The Offset Areas will be legally secured by obtaining a voluntary declaration from the Queensland Department of Natural Resources and Mines under section 19F of the *Vegetation Management Act 1999* (Queensland) that the Offset Area shown in Appendix 2 of the EPBC Act Approval 2013/6791 dated 13 November 2014 (Note: or as otherwise described in OMP) is an area of high conservation value.

The voluntary declaration will be obtained within two years of commencement of the action. The declared area will be registered on the property title of the relevant properties, together with the Offset Management Plan and will bind current and future owners of the properties to ensure the long term protection of the offset.

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Attachment A SEQ Horse Riding Trail Network – Tamborine and Plunkett Regions

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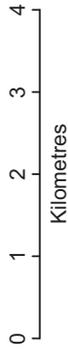
SEQ horse riding trail network Tamborine and Plunkett Regions

- Finalised horse trails (see note 1)
- Indicative trail on state forest and timber reserve (see note 1)
- - - Indicative trails on plantation forest estate (see note 2)
- - - Indicative trails on other lands (see note 3)
- Highways
- Major roads
- Other roads
- State plantation forest
- Protected areas of Queensland
 - National park (scientific) (NS)
 - National park (NP)
 - National park (recovery) (NC)
 - Conservation park (CP)
 - Resources reserve (RR)
 - Forest reserve (FR)
 - State forest (SF)
 - Timber reserve (TR)
 - Other lands (LO)



NOTES:

1. Access to horse trails are subject to the operational requirements of the Queensland Parks and Wildlife Service.
2. Access to forest plantation areas are subject to the operational requirements of State Plantation Forests.
3. Access to off park linkages are indicative only and, where appropriate, require the permission of the landholder. It is the responsibility of horse riders to determine appropriate access requirements.



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