environmental management

saunders havill group

Spring Mountain Estate

Fauna Management Plan

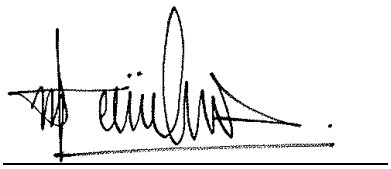
Sinnathamby Boulevard, Springfield Central

Lend Lease Communities Australia Pty Ltd
ABN: 88 000 966 085

EPBC Ref: 2013/7057
SHG Ref: 7243
17 July 2015

Declaration of Accuracy

In making this declaration, I am aware that section 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (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 regulations. This offence is punishable on conviction by imprisonment for not more than 1 year, a fine not more than 60 penalty units, or both. An extract of section 491 of the EPBC Act is attached.

Signed: 

Full Name: Murray Saunders

Organisation: Saunders Havill Group

Date: 13.04.2015

491 Providing false or misleading information to authorised officer etc.

(1) A person is guilty of an offence if the person:
  (a) provides information or a document to another person (the ***recipient***); and
  (b) knows the recipient is:
    (i) an authorised officer; or
    (ii) the Minister; or
    (iii) an employee or officer in the Department; or
    (iv) a commissioner;
  performing a duty or carrying out a function under this Act or the regulations; and
  (c) knows the information or document is false or misleading in a material particular.

(2) The offence is punishable on conviction by imprisonment for a term not more than 1 year, a fine not more than 60 penalty units, or both.

Note: Subsection 4B(3) of the *Crimes Act 1914* lets a court fine a body corporate up to 5 times the maximum amount the court could fine a person under this subsection.

Document Control

Title	Fauna Management Plan
Address	Sinnathamby Boulevard, Springfield Central
Job Number	**7243**
Client	Lend Lease

Document Issue

Issue	Date	Prepared By	Checked By
Internal Draft	20.04.2015	Angela Little	Murray Saunders
Final	26.06.2015	Keira Grundy	Murray Saunders

Disclaimer

This report has been prepared for **Lend Lease**. **Saunders Havill Group** cannot accept responsibility for any use of or reliance upon the contents of this report by any third party.

Reports and/or Plans by Others

Reports and/or plans by others may be included within this Environmental Management report to support the document.

Table of Contents

1. Introduction and Scope **4**

1.1. Project description 4

1.2. FMP Framework 4

1.3. Roles and Responsibilities 5

2. Potential Impacts, Strategies and Risks **6**

2.1. Matters protected under the EPBC Act 6

2.2. Potential Impacts and Strategies 6

2.3. Risk Assessment 7

3. Fauna Spotter and Catcher Assessment **8**

4. Site Contacts **9**

5. Attachments **10**

1. Introduction and Scope

The *Environmental Management Division* of **Saunders Havill Group** was commissioned by **Lend Lease** to prepare an overarching *Fauna Management Plan* (FMP) for Spring Mountain Estate residential development. This FMP has been prepared as part of the required information for the EPBC Preliminary Documentation submissions for Spring Mountain (EPBC 2013/7057), and provides a consolidated management document to manage impacts and protect native fauna during the approved clearing and construction activities, notably the Koala.

This FMP has been directed by the requirements within the *Environmental Management Plan Guidelines* (Department of Environment, 2014), and is intended to be read alongside the previously prepared Fauna Management Plan (see **Attachment 1**) prepared by **Austecology** (August, 2014). The **Austecology** FMP provides the technical detail on the management issues and strategies for all fauna, and those specific to the Koala. The legislative context with relation to threatened fauna is provided within the MNES Vertebrate Fauna Assessments (see **Part B- Attachment B2 & Part C – Attachment C of Preliminary Documentation**) prepared by **Austecology** (February, 2014).

The FMP includes step by step procedures for the management of fauna prior to, during and post-vegetation clearing and construction activities to reduce potential impacts. Fauna management specifications and principles incorporated into this FMP apply generally to all native animals and focus on incorporating measures to minimise disturbance and avoid conflicts, with a focus on the Koala. Compliance with this FMP is compulsory and incorporates the use of expert consultants, including a registered and **Department of Environment and Heritage Protection** (EHP) approved Fauna Spotter and Catcher. **Section 1.3 to 1.4** of the **Austecology FMP** outlines the statutory requirements and management guidelines and policies of the Management Plan.

1.1. Project description

For a description of the Spring Mountain Estate residential development project, **Chapter 1 (Introduction) and Chapter 3 (Description of the Action)** of the **Preliminary Documentation** provide a summary of the nature and scope of the project, including location, action activities, and timing/scheduling.

1.2. FMP Framework

The **Austecology FMP** provides a framework for fauna management within the Spring Mountain Estate Residential Development. This FMP should form part of the Construction Environmental Management Plan (CEMP). To assist in achieving a leading practice model for Fauna Management prior to, during and post the completion of the construction works, all land clearing will be managed in accordance with the *Code of Practice for Welfare of Animals effected by Land Clearing and Other Habitat Impacts and Wildlife Spotter/Catchers (Draft)* as prepared by the Wildlife Warriors and Voiceless (refer **Attachment 2**).

Section 1.5 of **Attachment 1** outlines the nature and application of management recommendations.

1.3. Roles and Responsibilities

Environmental management roles and responsibilities as detailed within the FMP are provided within **Section 1.2** of **Attachment 1**, and a list of key contacts for the project is contained in **Section 7** of this report.

2. Potential Impacts, Strategies and Risks

2.1. Matters protected under the EPBC Act

For detailed summary of the Threatened Fauna Habitat Areas and Opportunities on the land at Spring Mountain, **Austecology** have previously prepared a MNES Vertebrate Fauna Assessment Report (see **Part B- Attachment B2 & Part C – Attachment C of Preliminary Documentation**). Within the fauna assessment report, **Section 4 (Assessment of Impact Significance)** provides further detail on habitat areas and opportunities on site.

2.2. Potential Impacts and Strategies

Within **Section 2** of the Fauna Management Plan (see **Attachment 1** of this report), the key issues to native fauna and strategies relevant to the Spring Mountain project are detailed in the form of issue-specific management tables (**Tables 2-1 to 2-8**). The issues and strategies specific to the koala are addressed with **Section 3** (**Tables 3-1 to 3-6)**, and **Section 4** provides information related to other MNES. The management tables provide technical information in the form of implementation requirements, responsible person, auditing and reporting, corrective action and timing. Within **Chapter 1 (Section 1.6)** of the previously prepared Fauna Management Plan (**Attachment 1**), an adaptive management approach further details a method of review and modification.

The issues and strategies identified within the Austecology FMP for all fauna includes:

- Vegetation and Fauna Habitat Clearing (**Section 2.1**)
  - Table 2-1
- Animal Welfare (**Section 2.2**)
  - Table 2-2
- Fauna Movement (**Section 2.3**)
  - Table 2-3: Site Preparation Operations, Table 2-4: Operational Phase
- Environmental Weeds and Feral Animals (**Section 2.4**)
  - Table 2-5: Site Preparation Operations, Table 2-6: Retained Habitat Areas
- Domestic Dogs (**Section 2.5**)
- Fire (**Section 2.6**)
- Habitat Rehabilitation (**Section 2.7**)
  - Table 2-7
- Education and Awareness (**Section 2.8**)
  - Table 2-8: Native Wildlife

Issues and strategies identified specific to the Koala include:

- Vegetation Clearing (**Section 3.1**)
  - Table 3-1
- Koala Welfare (**Section 3.2**)
  - Table 3-2
- Roads and Vehicle Interactions (**Section 3.3**)
  - Table 3-3: Operational Phase
- Domestic Dogs (**Section 3.4**)

- Feral Animals and Environmental Weeds (**Section 3.5**)
- Fire (**Section 3.6**)
- Habitat Rehabilitation (**Section 3.7**)
    - Table 3-4
- Education and Awareness (**Section 3.8**)
    - Table 3-5
- Monitoring Habitat Use (**Section 3.9**)
    - Table 3-6

2.3. Risk Assessment

In consideration of the environmental issues and control strategies reported within the **Austecology FMP**, a risk assessment table has been prepared below (see **Table 1**) for the issues identified. This table provides a qualitative measure of likelihood (how likely is it that this event/issue will occur after strategies have been put in place) and consequences (what will be the consequence/result if this issue does occur).

Table 1: Risk Assessment for key events/issues to native fauna at Spring Mountain

Event/Issue	Measure of likelihood	Measure of consequence	Risk Rating
Direct injury or death due to vegetation clearing	D	2	Low
Direct injury or death due to vehicle interactions	D	1	Low
Direct injury or death from domestic dogs	D	1	Low
Habitat fragmentation	D	2	Low
Damage to adjacent habitats (outside clearing areas)	D	2	Low
Invasion of environmental weeds	C	1	Low
Habitat damage by fire	D	2	Low
Operational Impacts on Koala (dog attack/vehicle strike)	D	2	Low

Qualitative measure of likelihood: Almost Certain (A), Likely (B), Possible (C), Unlikely (D), Rare (E). Qualitative measure of consequences: Insignificant (1), Minor (2), Moderate (3), Major (4), Catastrophic (5). See Environmental Management Plan Guideline (DoE, 2014) for further explanation.

A low risk rating has been identified for each of the issues identified for the Spring Mountain project, and these ratings reflect the level of response provided within the **Austecology FMP**.

3. Fauna Spotter and Catcher Assessment

The Fauna Spotter and Catcher assessment as part of the pre-clearing surveys and updated Fauna Spotter Report, may reveal suitable fauna habitat adjacent on land within the Karawatha-Greenbank-Flinders Peak Bioregional Corridor for protected/listed species present on the site and/or the requirement for relocation of fauna. The following table details the actions to be taken in these events.

Fauna Spotter and Catcher required – suitable habitat present adjacent to the site	If the engaged Fauna Spotter and Catcher's assessment determines that no protected wildlife or listed species are present but that native fauna may be present with suitable habitat existing adjacent to the site, the following must be submitted to ICC with a development application for operational work (vegetation clearing): ▪ A letter from the Fauna Spotter and Catcher stating the spotter-catcher's credentials and setting out a list of anticipated species; and ▪ An updated Fauna Management Plan (FMP) for ICC's approval.
Fauna Spotter and Catcher required – protected / listed species present and/or relocation of fauna required	If the Fauna Spotter and Catcher's Assessment determines that any protected wildlife or listed species are present, and/or native fauna are to be relocated, fauna must be relocated in accordance with the Pre-clearing Trapping and Release Plan. The Pre-clearing Trapping and Release Plan must be submitted to Department of Environment and Heritage Protection (EHP) for endorsement. The following must then by submitted to ICC with a development application for operational works (vegetation clearing): ▪ A letter from the Fauna Spotter and Catcher stating the spotter-catcher's credentials and setting out a list of anticipated species; ▪ A letter from EHP stating its endorsement of the proposed Pre-trapping and Release Plan; and ▪ A copy of the EHP endorsed Pre-trapping and Release Plan for ICC's approval.

Given the impact area is surrounded on two side by conservation land, appropriate sequencing and flushing of animals should avoid the need for translocation on this site.

The currency period of an FMP submitted as a result of the above will be six months from the date of approval of the plan. An updated plan must be submitted to **ICC** for approval if works are not substantially started within the six month period.

4. Site Contacts

The Proponent
Ian Murray (Regional Development Manager)
Lend Lease Communities
Level 2
19 Lang Parade
Milton QLD 4064
(07)3292 2275

Site Superintendent
To be appointed.

Project Consultant
Murray Saunders (Director)
Saunders Havill Group
9 Thompson Street
Bowen Hills QLD 4006
Ph. (07) 3251 9444

Ipswich City Council
143 Brisbane Street
Ipswich QLD4305
council@ipswhich.qld.gov.au
(07) 3810 66666

Fauna Spotter and Catcher
To be appointed.

Veterinarian (in closest proximity to application site)
Springfield Lakes Pet and Vet
1 Springfield Lakes Boulevard, Springfield Lakes, 4300
Mon, Wed & Fri: 7:00am – 6:00pm, Tues & Thurs: 7.00am – 7.00pm, Sat: 7:00am – 3:00pm
Ph. (07) 3818 4119
After Hours Contact: Animals Emergency Service, Cnr Lexington & Logan Rd, Underwood
Ph. (07) 3423 1888

Department of Environmental and Heritage Protection
For wildlife incidents and licensing and permits:
Ph. 1300 130 372

RSPCA Queensland
For reporting injured, sick or orphaned wildlife:
Ph. 1300 ANIMAL (1300 264 625)

5. Attachments

Attachment 1

Fauna Management Plan - Spring Mountain (Austecology, 2014)

Attachment 2

DRAFT Code of Practice for Welfare of Animals effected by Land Clearing and Other Habitat Impacts and Wildlife Spotter / Catcher as prepared by the Wildlife Warriors and Voiceless

Attachment I

Fauna Management Plan - Spring Mountain (Austecology, 2014)

Fauna Management Plan

Spring Mountain Mixed Use Master Planned Community Development

EPBC Referral 20137057

Prepared for:	**Tanya Martin, Lend Lease**
Prepared by:	**Lindsay Agnew, Austecology**
Report Status:	**July 2015**

Table of Contents

1. Introduction 4
1.1. Background and Purpose 4
1.2. Terminology, Definitions and Acronyms 5
1.3. Statutory Requirements 6
1.4. Management Guidelines and Policies 6
1.5. Nature and Application of Management Recommendations 6
1.6. Adaptive Management 7
1.7. Peer Review 7
2. Management Issues and Strategies – All Fauna 9
2.1. Vegetation Clearing 9
2.2. Animal Welfare 12
2.3. Fauna Movement 13
2.4. Environmental Weeds and Feral Animals 16
2.5. Domestic Dogs 18
2.6. Fire 18
2.7. Habitat Rehabilitation 19
2.8. Education and Awareness 20
3. Management Issues and Strategies – Koala 21
3.1. Vegetation Clearing 21
3.2. Koala Welfare 24
3.3. Roads and Vehicle Interactions 25
3.3.1. Road Speed Limits 25
3.3.2. Road Crossing Points 25
3.3.2.1.1. Grade Separated Crossings 25
3.3.2.1.2. At Grade Crossings 27
3.3.3. Directional Fencing 27
3.3.4. Roadside Treatments 28
3.3.5. Driver Awareness 29
3.4. Domestic Dogs 32
3.5. Feral Animals and Environmental Weeds 32
3.6. Fire 33
3.7. Habitat Rehabilitation 33
3.8. Education and Awareness 35
3.9. Monitoring Habitat Use 36
4. Management Issues and Strategies – Other MNES 38
5. References 39

List of Figures

Figure 1-1 Conceptual Phasing Plan 8
Figure 3-1 Locations of road crossings requiring dedicated design treatments 31

List of Tables

Table 2-1 FMP1 - Vegetation and Fauna Habitat Clearing 9
Table 2-2 FMP2 - Animal Welfare 12
Table 2-3 FMP3A - Site Preparation Operations – Roads and Vehicle Interactions 13
Table 2-4 FMP3B – Maintenance of Safe Wildlife Movement Opportunities - Operational Phase 14
Table 2-5 FMP4A - Feral Animal Management - Site Preparation Operations 17

Table 2-6 FMP4B - Feral Animal Management – Retained Habitat Areas 18
Table 2-7 FMP5 - Fauna Habitat Rehabilitation 19
Table 2-8 FMP6 - Community Education and Awareness – Native Wildlife 20
Table 3-1 FMP7 - Habitat Clearing - Koalas 21
Table 3-2 FMP8 - Koala Welfare 24
Table 3-3 FMP9 - Maintenance of Safe Koala Movement Opportunities – Operational Phase 29
Table 3-4 FMP10 – Koala Habitat Rehabilitation 34
Table 3-5 FMP11 - Community Education and Awareness – Koala 35
Table 3-6 FMP12 – Monitoring of Koala Occurrence within Retained Habitat 36

List of Attachments

Attachment A Concept Drawings for Grade Separated Road Crossings 40
Attachment B Photographs of Koala Management Treatments 42
Attachment C Concept Drawing for Slow Zone Road Treatment 49
Attachment D Koala Exclusion Fencing Design 50
Attachment E Open Space & Residential Interface – Exclusion Fencing & Design Treatments . 51
Attachment F Peer Review Statement – Dr. F. Carrick 52

1. Introduction

1.1. Background and Purpose

In June 1999, Lend Lease entered into an alliance agreement with the Springfield Land Corporation (the landowners) for the rights to develop a significant proportion of the master-planned residential component known as Springfield Lakes. This master-planned development comprises a large proportion of greater Springfield, and is being developed to accommodate a population of approximately 30,000 people residing in approximately 10,000 dwellings upon completion.

The subject site[1] is contained within the Springfield Structure Plan area, which has been granted development approval by the State Government. The subject site comprises approximately 387ha, and is approximately one kilometre wide and four kilometres in length. The subject site is located to the near west of the Springfield Lakes town centre, south of the Centenary Highway and west of Sinnathamby Boulevard. The White Rock – Spring Mountain Conservation Estate borders part of the western and southern site boundaries.

Lend Lease has previously commissioned Austecology to specifically assess the site's values for a suite of fauna, and Yurrah to assess flora, listed as Matters of National Environmental Significance under the *Environment Protection and Biodiversity Conservation Act 1999* (Austecology 2013; Yurrah 2013).

Austecology has been commissioned by Lend Lease to provide a Fauna Management Plan (FMP) which identifies management strategies to inform the future and progressive development of the Spring Mountain site. The findings of the Austecology (2013) report, and of other reports pertaining specifically to the site and/or the Springfield Lakes development (e.g. BAAM 2005; Chenoweth EPLA 2005; and BAAM 2011), have been used to inform the development of this FMP.

This FMP has been prepared to augment previous information provided as part of the referral to the Department of Environment.

The aim of the FMP is to provide strategies for the protection of fauna and the management of their habitat within the Spring Mountain site before, during and after the construction phase, and during the operational phase of each development precinct. The key outcomes which this FMP seeks to achieve are:

- That all construction operations are carried out so as to avoid or minimise negative impacts on fauna and that habitats to be retained are protected throughout such operations.
- That during both the operational and construction phases, safe fauna movement opportunities are maintained.
- That during both the operational and construction phases, retained habitats are managed to control threats associated with feral animals, weeds, uncontrolled fire, and unauthorised recreational uses.

[1] The Lot and Plan details for the area are as follows Part of Lot 22 on SP234042, Part of Lot 26 & 27 on SP234044, Part of Lot 21 on SP234042, Lots 11, 12 & 13 on SP234040 and Lots 23 & 24 on SP234042.

1.2. Terminology, Definitions and Acronyms

Within this report, the land subject to this assessment is described as the *site*. The term *surrounding area* refers to adjacent lands and features as described below:

- Greater Springfield development, including the Town Centre development and Sinnathamby Drive to the east and south-east of the site;
- Centenary Highway to the north of the site; and
- White Rock – Spring Mountain Conservation Estate, which borders part of the western and southern site boundaries.

The following definitions are used throughout the management plans:

- The **Development Manager** is Lend Lease (Communities) Pty Ltd.
- The **Contractor** refers to the party or company that performs construction works on site, and includes all employees of the Contractor and its sub-contractors.
- The **Site Superintendent** refers to the party contracted by the Development Manager to oversee daily site operations and site management.
- The **Project Consultant** refers to a specialist consultant employed by the Development Manager.
- **Koala Spotter** refers to a Contractor employed to implement Koala welfare responsibilities associated with vegetation clearing operations. A person is likely to be suitably qualified as a Koala spotter if they have worked with Koalas in their natural habitat (e.g. by conducting Koala surveys, Koala monitoring, or involved with Koala rescue) or experience in Koala habitat areas as a licensed spotter/catcher.
- **Fauna Spotter/Catcher** refers to a Contractor employed to implement fauna welfare responsibilities associated with vegetation clearing operations. A person is likely to be suitably qualified as a Fauna Spotter/Catcher if they are industry licensed and have undertaken such responsibilities for a minimum of two years.
- **Council** refers to the Ipswich City Council.
- **Development Precinct** refers to each development stage. The proposed development will be undertaken in a staged manner over approximately thirty years.

Acronyms used in this report include the following.

- **DAFF** - Queensland Department of Agriculture, Fisheries and Forestry
- **DE** - Commonwealth Department of the Environment
- **DEHP** - Queensland Department of Environment and Heritage Protection
- **EPBCA** - Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
- **FMP** - Fauna Management Plan
- **ICC** - Ipswich City Council
- **KSPRP** - Queensland *South East Queensland Koala State Planning Regulatory Provisions* (May 2010)
- **LPR** - Queensland *Land Protection (Pest and Stock Route Management) Regulation 2002*
- **MNES** - Matter of National Environmental Significance (as defined under the EPBCA)
- **NCA** - Queensland *Nature Conservation Act 1992*
- **SBMP** - Site Based Management Plan

Within this report, fauna refers to all vertebrate fauna, with nomenclature which follows: Van Dyck & Strahan (2008); Churchill (2008); Christidis & Boles (2008); and/or Wilson (2009). The conservation status of a species is described in accordance with the Commonwealth EPBCA and/or the Queensland NCA and its regulations and amendments. Within this report, an environmental weed refers to any plant that survives in a natural area where its presence is undesirable, harmful or troublesome to native biodiversity. A declared animal or plant refers to a species declared under the LPR.

1.3. Statutory Requirements

Activities associated with this FMP will comply with the relevant provisions of legislation and regulations, policies, but not exclusive to the following:

- Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* with regard to species listed under the provisions of this Act;
- Queensland's *Nature Conservation Act 1992* with regard to species listed under the provisions of this Act;
- Queensland's *Vegetation Management Act 1999* with regard to Essential Habitat;
- Queensland's *Land Protection (Pest and Stock Route Management) Regulation 2002* (LPR) with regard to weeds and pests; and
- The requirements of the Commonwealth, State, and/or Local Government decision notices, including any relevant "conditions of approval".

1.4. Management Guidelines and Policies

Impact management strategies, mitigation measures and specific design treatments within this FMP have been developed to provide consistency with the requirements of a variety of best practice guidelines and management policies, including:

- The Commonwealth *Draft EPBC Act referral guidelines for the vulnerable koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)* (DoE 2013), in particular:
    - Mitigation standards and measures provided in Table 6 (Dog attack), Table 7 (Vehicle strike), Table 8 (Barriers to dispersal), and Table 10 (Fire).
- Queensland's *Nature Conservation (Koala) Conservation Plan 2006 and Management Program 2006-2016* (EPA 2006), in particular:
    - Relevant management approaches: Habitat protection and vegetation clearing; Vehicle related koala mortality; and Domestic dog related koala-mortality; and
    - Policy 1 (Koala sensitive development), Policy 4 (Koala survey methodology for site assessment), Policy 6 (Vegetation clearing practices), Policy 11 (Rehabilitation of land to provide koala habitat), and Policy 12 (Local road placement, design and upgrade).

1.5. Nature and Application of Management Recommendations

The proposed development will be undertaken in a staged manner over approximately fifteen years. Figure 1-1 depicts the spatial extent, timing and sequence of the development.

Given the extended development time horizon, for many of the issues addressed in this FMP, it is not possible to, nor intended, that this FMP provide a detailed prescription of management actions for each Development Precinct. This aim of this FMP is to provide a suite of management strategies which will direct the development of a detailed management plan addressing each issue relevant to each stage as development progresses.

It is required that for each Development Precinct, a specific management plan will provide clear cross-referencing to this Plan to identify consistency of approach throughout the long-term development of the project in regard to Koala issues.

1.6. 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. This FMP 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).

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 fauna continue to use existing habitat, notwithstanding the ongoing changes occurring to their habitats and surrounds.

1.7. Peer Review

The FMP has been reviewed by Dr. Frank Carrick. This version of the FMP and has been revised accordingly and has incorporated or taken account of Dr. Carrick's review comments and recommendations.

Dr. Carrick's conclusions are provided in Attachment F.

Village	Phasing	Approx. Area	Approx. Density Range	Approx. avg Res Yield	Approx. Non-Res Yield
6	2015 - 2017	36.5ha	16-18dw/ha	657	
7	2016 - 2019	11ha	18-20dw/ha	220	
Activity Centre	2016+	1.5ha			100 children
8	2018 - 2020	36ha	16-18dw/ha	648	
9	2026 - 2027	5.5ha	18-20dw/ha	110	
10	2018 - 2020	17.5ha	16-18dw/ha	315	
11	2018 - 2019	23ha	16-20dw/ha	460	
12	2017 - 2018	8ha	16-20dw/ha	160	
N'hood Centre	2017	2ha			6000m2 GFA
13	2015 - 2018	27.5ha	16-20dw/ha	550	
School	Subject to DET. Refer to 4.3	6.5ha			1000 students
14	2026 - 2027	10ha	2-8dw/ha	80	
15	2018 - 2019	18ha	16-20dw/ha	360	
16	2023 - 2026	41.5ha	16-18dw/ha	747	
17	2020 - 2022	20ha	15-18dw/ha	360	
Activity Centre	2023 - 2026				Refer to section 4.3
Total		**268ha**		**4667**	

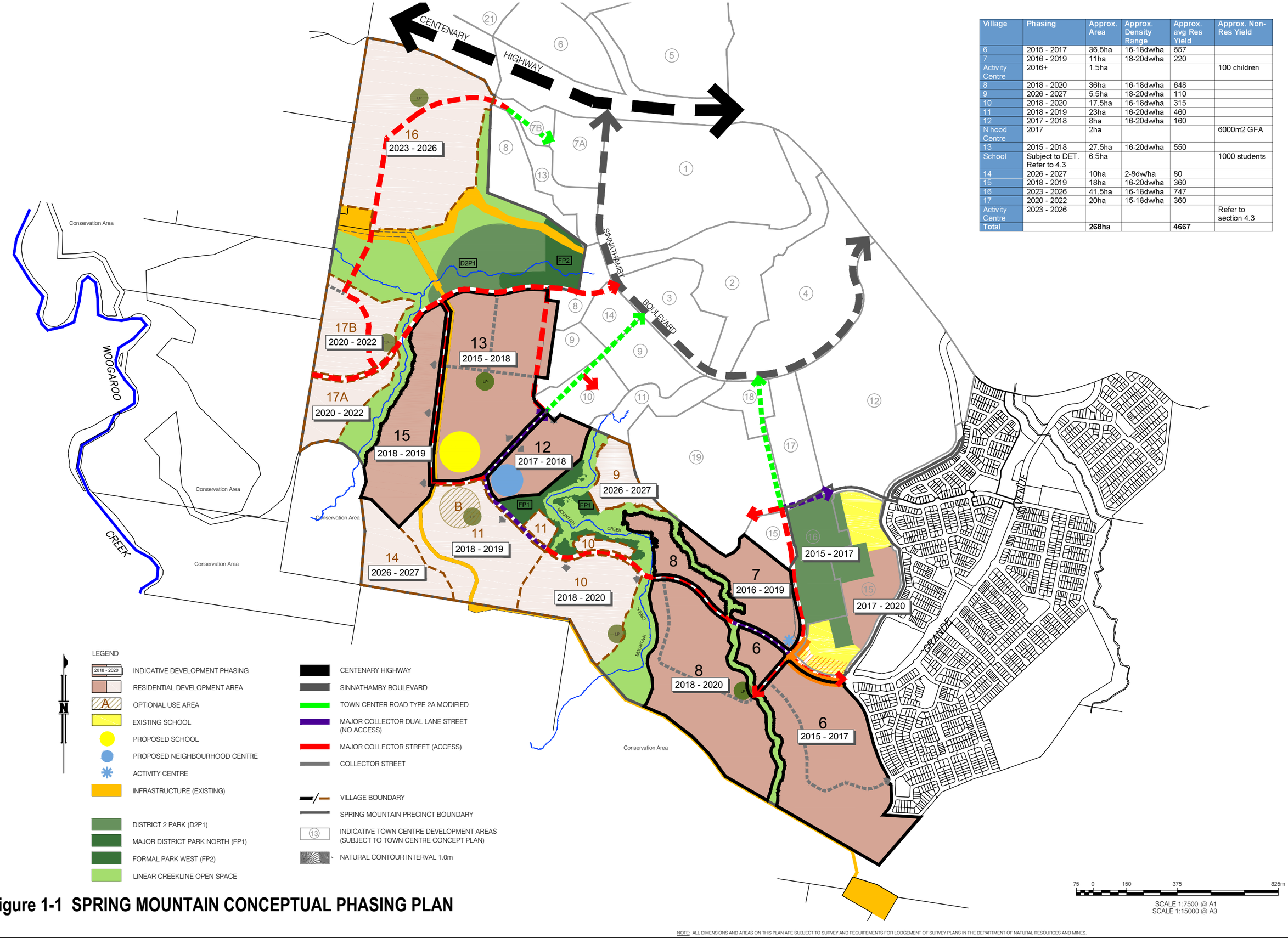


Figure 1-1 SPRING MOUNTAIN CONCEPTUAL PHASING PLAN

NOTE: ALL DIMENSIONS AND AREAS ON THIS PLAN ARE SUBJECT TO SURVEY AND REQUIREMENTS FOR LODGEMENT OF SURVEY PLANS IN THE DEPARTMENT OF NATURAL RESOURCES AND MINES.

DATE: 30/ 06/ 2015

WC006626 000-040D 662600O4

2. Management Issues and Strategies – All Fauna

Strategies for the management of impacts to native fauna and their habitat are described by way of a suite of key impact issues. Environmental control measures and responsibilities for identified actions to minimise and mitigate impacts during construction and operational phase are outlined in each related issue-specific management table.

The following management issues and impact management strategies are relevant to all fauna and threatened species (MNES or other) which are known to occur on the site, or whose occurrence is considered possible. Separate report sections provide additional management issues and impact management strategies where relevant to specific threatened species requirements.

2.1. Vegetation Clearing

Clearing of native vegetation has the potential to result in direct injury or death to fauna. Clearing of vegetation for the purposes of preparing development areas also has the potential to result in incidental damage to adjacent habitats to be retained. The following table describes the relevant management requirements to address this issue, though also refer to additional strategies identified in the relevant sections of the SBMP.

Table 2-1 FMP1 - Vegetation and Fauna Habitat Clearing

Issue	**Vegetation and Fauna Habitat Clearing**
Management Objective	To minimise the adverse direct and indirect effects on terrestrial fauna during vegetation clearing operations.
Implementation Requirements	1) No vegetation removal shall occur until relevant approvals have been obtained. All permit approval conditions will be followed. 2) To prevent damage and/or disturbance to native vegetation and associated habitats outside clearing areas: a) Clearing boundaries will be delineated on all drawings and in the field to define the extent of authorised/permitted clearing. b) Installation of vegetation clearance markers (e.g. high visibility poly-web fencing) prior to the commencement of vegetation clearance to identify and protect remnant vegetation for retention. c) Along the interface between clearing precincts and retained habitat, trees are to be felled towards the clearing precinct to avoid damage to adjacent retained habitat. d) Cleared vegetation is to be stockpiled so as not to impede waterway drainage and avoid damage to adjacent retained vegetation. 3) Conduct vegetation clearing in sequential stages for sites with an area of more than three hectares. Vegetation clearing is to conform with the following: a) The direction of clearing should be away from threatening processes or hostile environments, and towards any retained vegetation or habitat links, ensuring that: i) Fauna are not required to cross roads or move through developed or disturbed areas, such as residential areas or areas that require movement of greater than 100m over cleared ground to reach suitable habitat; ii) Fauna are not left occupying an “island” of habitat between hostile environments, such as a road and a cleared area, unless there are no other more suitable habitat areas in which to direct fauna; and iii) Fauna can safely leave the site of clearing and relocate to adjacent habitat. b) Cleared vegetation is to be stockpiled so as not to impede fauna movement. c) Where vegetation to be cleared includes non-juvenile Koala habitat trees, implement sequential clearing as per the requirements for Koala (see separate management plan requirements).

Issue	Vegetation and Fauna Habitat Clearing
	4) Avoid clearing of vegetation between the hours of 6pm and 7am. 5) No clearing of relevant vegetation is to commence without the presence of a licensed Fauna Spotter/catcher, or where clearing includes non-juvenile Koala habitat trees, a Koala Spotter (see separate management plan requirements). a) An appointed Site Superintendent will be responsible for ensuring that all trees scheduled for removal will be checked on the day of their removal for the presence of fauna by a suitably experienced fauna spotter/catcher or Koala spotter as vegetation characteristics dictate. b) The fauna spotter/catcher will check and clear vegetation prior to its felling and, if required, will relocate native wildlife (other than a Koala) into appropriate habitat areas within the site which are to be retained. In the case of a Koala being present, see separate management plan requirements. c) Hollowing-bearing (habitat) trees are to be identified in the field and by plan prior to commencement of clearing operations. These shall be marked and dismantled using a cherry picker and a suitably qualified arborist and spotter/catcher. Hollows containing fauna shall be blocked, removed from the tree and gently lowered to the ground, with species relocated to a pre-identified, suitable site. Areas inaccessible to a cherry picker, requiring hollow removal shall use a hydraulic grabber to remove and lower to the ground. d) A fauna spotter/catcher is not to be involved in the clearing of vegetation while they are responsible for surveying for fauna present on the clearing site. 6) All remnant vegetation removed should be reused wherever possible within rehabilitation areas (chipped soon after clearing and/or reuse of logs). Logs and large rocks should be placed in nearby vegetation or adjacent to such vegetation to create shelter habitat for terrestrial fauna species. These 'stock piles' may then be used during later operations to create artificial habitats within rehabilitation areas. 7) Companion animals (e.g. dogs) are to be banned from all construction areas. 8) All construction personnel shall attend environmental training as part of the site induction process prior to entering the work site. As part of this training, all personnel will be instructed on their obligations in regard to vegetation clearing protocols and to protect native fauna. Areas identified for vegetation clearance are to be clearly defined and detailed in site inductions.
Performance Indicators	• No disturbance to native vegetation outside permitted clearing footprints. • Prevent fauna mortality and disturbance to terrestrial fauna.
Responsible Person	• The Development Manager is responsible for ensuring requirements are included in relevant contract tenders and acknowledged in subsequent contracts awarded. • The Contractor is responsible for implementing the requirements and reporting to the Site Superintendent. • The Site Superintendent is responsible for auditing Contractor compliance with the requirements and reporting to the Development Manager. • Project Ecologist to be consulted as required to assist in specialist input to processes, auditing, and design issues.
Auditing and Reporting	• Weekly report by the Fauna Spotter/Catcher or Koala Spotter to the Contractor on the clearing of any native vegetation and any animals encountered or relocated is to be submitted during each clearing stage. • For each day of native vegetation clearing operations, a daily audit log is to be completed by the Contractor either prior to, or on completion of daily operations. Audit of key requirements, e.g. clearing contained within designated limits, integrity of clearing boundary devices, no damage to vegetation outside clearing boundaries, Fauna Spotter/Catcher present. • Monthly report by the Contractor to the Site Superintendent on native vegetation operations, including compliance, non-compliance incidents and corrective actions, outcomes of Fauna Spotter/Catcher activities. • Bi-annual report by the Site Superintendent to the Development Manager. • 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 Contractor shall take the necessary corrective steps and note them in the monthly report to be reviewed by the Site

Issue	Vegetation and Fauna Habitat Clearing
	Superintendent.
Timing	Duration of construction period.

2.2. Animal Welfare

Clearing of native vegetation has the potential to result in injury or death to fauna. Development protocols to respond to injured wildlife must be prepared prior to vegetation clearing operations. It is expected that some of these protocols are likely to be applicable to responses required for all injured fauna (including Koala), thus could be included in a single Animal Welfare Plan (AWP) which would have site-wide application in regards to clearing operations within any one of the Development Precincts during the life of the development. The following Table describes the relevant management requirements to address this issue.

Table 2-2 FMP2 - Animal Welfare

Issue	Animal Welfare
Management Objective	Prevent fauna mortality and minimize disturbance to terrestrial fauna.
Implementation Requirements	1) A requirement that a permit to interfere with wildlife from the Queensland DEHP will be mandatory for the wildlife handling activities as will the appropriate Animal Ethics Permit from the Queensland DAFF. 2) Fauna handling and relocation activities must only be undertaken by those identified on a current site-specific Damage Mitigation Permit (Removal and Relocation of Wildlife) from the Queensland DEHP. 3) Fauna Spotter/Catchers are to relocate injured wildlife to the nearest designated veterinary clinic (or wildlife hospital). Full contacts for each of the suite of designated veterinary clinics are to be provided within the AWP. 4) A register of fauna incidents/interactions is to be maintained daily during clearing operations. 5) 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. 6) Establishment of habitat enhancements to areas outside the area of clearing operations prior to vegetation clearing (e.g. microbat roost boxes).
Responsible Person	• The Development Manager is responsible for ensuring that an Animal Welfare Plan is prepared prior to vegetation clearing operations on the site, by an experienced Consultant, and that the requirements are included in relevant contract tenders and acknowledged in subsequent contracts awarded. • The Contractor is responsible for implementing the requirements and reporting to the Site Superintendent. • The Site Superintendent is responsible for auditing Contractor compliance with the requirements and reporting to the Development Manager. • Project Ecologist to be consulted as required to assist in specialist input to processes, auditing, and design issues.
Auditing and Reporting	• Weekly report by the Fauna Spotter/Catcher or Koala Spotter to the Contractor in regard to injured fauna and protocols implemented during vegetation clearing operations. • Monthly report by the Contractor to the Site Superintendent in regard to fauna injury incidents and responses. Report to consider incident patterns, if any, and provide recommended solutions, and a description of corrective actions taken. • Bi-annual report by the Site Superintendent to the Development Manager. Report to consider incident patterns, if any, and provide recommended solutions, and a description of corrective actions taken. • 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 Contractor shall take the necessary corrective steps and note them in the monthly report to be reviewed by the Site Superintendent.
Timing	Duration of construction period.

2.3. Fauna Movement

The following suite of best practice measures will be employed throughout the site, to minimise fauna habitat fragmentation, facilitate fauna movement and reduce vehicle related injury and mortality. Management requirements are considered in the context of:

- site preparation operations, i.e. during vegetation clearing and earthworks phases; and
- design treatments and strategies for the built phase of the development.

The following should be read in conjunction with the requirements for Koala (separate section) which provides further detail in regard to the design treatments and strategies for the built phase of the development.

The Table 2-3 describes the relevant management requirements in regard to site preparation operations, whilst Table 2-4 highlights design treatments and strategies to be implemented during the construction phase of development. It should be noted that in regard to the suite of recommended design treatments and strategies for the built phase of the development, not all of these treatments will be appropriate in all instances due to technical and economic constraints. Section 3.3 of this FMP (Management Issues and Strategies - Koala) provides more detailed discussion of recommended design treatments and strategies of relevance to both Koalas and other native wildlife.

Table 2-3 FMP3A - Site Preparation Operations – Roads and Vehicle Interactions

Issue	Maintenance of Safe Fauna Movement Opportunities – Site Preparation Operations
Management Objective	To maintain safe fauna movement opportunities within retained habitat areas and minimise fauna movement opportunities through site preparation areas.
Implementation Requirements	1) A track plan is to be developed for retained habitat areas and rehabilitation. 2) Site protocols are to be established which restrict authorised area access to the approved track network identified with the plan. 3) Access to retained habitat areas will be restricted to land management and environmental monitoring only. 4) Vehicle movements outside designated operational areas (other than for land management purposes) will be prohibited. 5) Road speeds throughout construction areas and through retained habitat areas will be restricted to 40km/hr. 6) Strategic use of awareness signage is to be implemented along the interface between operational areas and retained habitat areas and access restriction signage at all track entry points to retained habitat areas. 7) Proposed construction access roads will be subject to design treatments to ensure safe fauna crossing opportunities. Construction of an elevated portion (or portions) in the form of bridging structures (culverts) in association with guide fencing will be incorporated to ensure the provision of safe crossing opportunities. 8) All construction personnel shall attend environmental training as part of the site induction process prior to entering the work site. As part of this training, all personnel will be instructed on their obligations in regard to vehicle movement restrictions and construction road speed limits.
Responsible Person	• The Development Manager is responsible for the preparation of for the preparation of a site access plan, and ensuring that the requirements are included in relevant contract tenders and acknowledged in subsequent contracts awarded. • The Contractor is responsible for implementing the requirements and reporting to the Site Superintendent. • The Site Superintendent is responsible for auditing Contractor compliance with the requirements and reporting to the Development Manager. • Project Ecologist to be consulted as required to assist in specialist input to processes, auditing, and design issues.

Auditing and Reporting	• Monthly report by the Contractor to the Site Superintendent in regard to development/maintenance of structures implemented to facilitate fauna movement, review of fauna/vehicle incident patterns, if any, and provide recommended solutions, and a description of corrective actions taken/to be taken. • Bi-annual audit report by the Site Superintendent to the Development Manager. Report to include compliance with site access restrictions, integrity of structures implemented to facilitate fauna movement, review of fauna/vehicle incident patterns, if any, and provide recommended solutions, and a description of corrective actions taken. • 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 Contractor shall take the necessary corrective steps and note them in the monthly report to be reviewed by the Site Superintendent.
Timing	Duration of construction period.

Table 2-4 FMP3B – Maintenance of Safe Wildlife Movement Opportunities - Operational Phase

Issue	**Maintenance of Safe Wildlife Movement Opportunities - Operational Phase**
Management Objective	To avoid the impact of habitat fragmentation by roads and maintain safe movement opportunities for native wildlife between retained habitat areas.
Implementation Requirements	1) The designated primary road network will be designed to support speed limits no greater than 60 kph (posted speed limit). All other components of the network will be designed to support speed limits no greater than 50 kph (posted speed limit). 2) Design and construct dedicated road crossing treatments where ever roads transect retained habitat areas (refer to design treatment descriptions in FMP Section 3.3). a) In regard to the bridging structures, wherever possible the design will make provision for dry land passage through the retention of either the embankments of watercourses beneath a bridge, or elevated portions of road bridging dry land. Where this is not achievable, the structure will incorporate a dedicated Koala "boardwalk" underneath the bridge. b) Where culverts are required for at grade crossings, the design will accommodate minimum portal dimensions, fauna movement "furniture" treatments, and targeted rehabilitation of entrance areas. c) Where grade separated crossings are not implemented, treatments associated with "at grade" crossings should include the inclusion of "slow zones" which limit traffic speeds and raise driver awareness (including speed reduction or other traffic calming devices, awareness signs and other awareness heightening treatments such as the use of Cat's eye road reflectors). d) Directional (exclusion) fencing is to be considered in conjunction with grade separated crossings (underpasses) where roads intersect with retained habitat areas. 3) Roadside vegetation management measures are to be undertaken at key locations (e.g. dedicated "at grade" and grade separated crossing locations) to increase the visibility of wildlife entering the roadway. 4) Implement measures to improve driver awareness, and thereby minimise the incidence of fauna-vehicle collisions, including: a) The installation of general signage to signal the presence of native wildlife within the site will be undertaken at all primary (strategic) road entry points to the site. b) More specific signage treatments will be installed to signal areas within the site where there is an increased likelihood of encountering native wildlife on the road. Circumstances where such signage will be installed, include (but are not limited to) any section of road or residential street which intersects with a retained habitat area. c) "Cat's eye" reflectors to be installed in conjunction with the specific signage treatment zones. 3) Annual monitoring to assess fauna usage and an integrity audit of structures to be

Issue	Maintenance of Safe Wildlife Movement Opportunities - Operational Phase
	implemented for each crossing treatment for each year up to five years - to be initiated at the beginning of the "off-maintenance" period for each crossing treatment.
Responsible Person	• The Development Manager is responsible for: o development of a site plan which clearly designates the location and type of road crossing treatments; o ensuring that the design requirements are included in relevant contract tenders and acknowledged in subsequent contracts awarded; o the maintenance of treatments is implemented; and o the design and implementation of a strategy to improve driver awareness of encountering native wildlife on development roads. • The Contractor is responsible for implementing the requirements and reporting (prior to completion off-maintenance period) to the Site Superintendent. • The Site Superintendent is responsible for Contractor compliance with the requirements and reporting to the Development Manager. • Project Ecologist responsible for integrity audits and site monitoring and reporting to the Development Manager, and consulted as required to assist in specialist input to design issues and treatment locations.
Auditing and Reporting	• An "on-maintenance" and an "off-maintenance" report by Contractor to Development Manager. • Annual report (integrity audit and site usage) by Project Ecologist to Development Manager.
Corrective Action	In the event that monitoring identifies structural or design failures, the Development Manager shall take the necessary corrective steps.
Timing	Duration of construction/maintenance period or as specified above.

2.4. Environmental Weeds and Feral Animals

A weed management plan will be implemented during both construction and operational phases (construction areas and retained habitat areas). Weed control strategies are to be developed and implemented and include, but not be limited to the design and implementation of an ongoing eradication program which targets environmental weeds and an ongoing systematic monitoring program to detect the occurrence of environmental weeds and to assess the success of the control/eradication program. A strategy for the control of environmental weeds across the site (retained habitat areas and rehabilitation areas) is provided within the SBMP.

Feral animals are known to occur on the site, with cats, dogs and foxes presenting a comparatively higher level of potential threat to native fauna[2]. Whilst these species are not expected to gain a significant benefit from operational phase of the development, effective pest management is important in the management of native species during habitat disturbances and during revegetation. Management requirements are considered in the context of:

- site preparation operations, i.e. during vegetation clearing and earthworks phases; and
- on-going management of retained habitat areas.

A pest control and monitoring program will be developed and implemented in accordance with relevant local and State legislation and plans. The ultimate success of any control strategy on the site is likely to be linked to the management approaches implemented on the adjacent lands, particularly extensive areas of Council-controlled bushland to the west.

On this, it is highly recommended that the Development Manager engage in discussions with Ipswich City Council to maximise the effectiveness of feral animal control on the site through a coordinated/integrated control strategy across both the site (Development Manager responsibility) and the adjacent Council-controlled lands (ICC responsibility).

In regard to feral cats, the following is highlighted:

- Whilst baiting is typically the most economical and effective local/broadscale technique for dogs and foxes, it is less effective in controlling cats.
- The implementation of a variety of management measures within site preparation and construction areas have the potential to influence cat abundance within more sensitive environments, i.e. the retained habitat areas. Conditions around disturbance areas and focused on centres of human activity (e.g. workshops, storage sheds, and site offices) may provide suitable conditions for mice and, in turn, provide a favourable prey base for cats. These areas may provide an important focus for control and management measures which may have an important bearing on the success of controlling cat numbers throughout the site during site preparation and construction phases.

In regard to foxes and feral dogs, the following is noted:

- There is a variety of control techniques available, though many are not practical, cost-effective and/or not permissible for the site, e.g. shooting, or exclusion fencing. Available methods are generally expensive and labour intensive, require continuing management effort and can be effective only in limited areas.
- Whilst poison baiting is regarded as an effective method of reducing fox and dog numbers and their impact[3], this may not be acceptable within open space areas of the site adjacent to established residential development, given the potential to poison domestic dogs and the subsequent community backlash (even though the majority of such areas are intended to be

[2] Although hares, house mice, and feral pigeons have been observed on the site (though uncommon), currently their presence is not regarded as significant or warranting target control measures within retained open space. No rabbits, or signs of their presence, have been observed on the site.

[3] Although acknowledging that a drawback is that it may affect native carnivores and scavengers (e.g. goannas) and also domestic dogs.

dog-free zones). On this, it is likely that implementation of such control methods on adjoining Council-controlled bushland reserves will be important as those controls could have a flow-on positive impact on feral fox and dog abundance within retained habitat areas on the site.

- In regard to foxes, a suitable site control strategy could comprise searches for, and destruction of, fox dens throughout the retained habitat areas and undertaken regularly, i.e. on a seasonal basis, either early summer or autumn.

The Table 2-5 describes the relevant management requirements in regard to site preparation operations, whilst Table 2-6 addresses design treatments and strategies for the retained habitat areas during the built phase of the development. It should be noted that in regard to the suite of recommended design treatments and strategies for the built phase of the development, these are to be refined following consultation with Ipswich City Council for the reasons noted above.

Table 2-5 FMP4A - Feral Animal Management - Site Preparation Operations

Issue	Feral Animal Management - Site Preparation Operations
Management Objective	To minimise the impact of introduced pest species on native wildlife within retained habitat areas.
Implementation Requirements	1) Minimise available food sources for introduced rodents such as House Mouse and Black Rat around workshops, storage sheds, site offices and crib huts. This can be maximised through maintenance of routine practices and environmental education, e.g.: a) Promoting good housekeeping practices in relation to food scraps; b) Ample provision of waste receptacles which prevent access by rodents; c) Ensuring daily food waste removal; and d) Providing regular communication with staff to increase awareness of the linkage between poor housekeeping practices and the environments which support rodent populations, which in turn, support feral cats, and the consequent impact of feral cats on native fauna. 2) Implementation of an on-going, monthly rodent baiting program around workshops, storage sheds, site offices and crib huts. Both rodent poison and disposable traps are a cost-effective measure. 3) Implementation of baiting event for foxes and dogs around the perimeter of a clearing/earthworks precinct (interface with retained habitat areas). To be implemented prior to initial works, then once for each six-month period of operations prior to completion of site preparation of each Development Precinct. 4) All construction personnel shall attend environmental training as part of the site induction process prior to entering the work site. As part of this training, all personnel will be instructed on their responsibilities related to avoiding and minimising the introduction/attraction to the construction site of feral animal species.
Responsible Person	• The Development Manager is responsible for ensuring that requirements are included in relevant contract tenders and acknowledged in subsequent contracts awarded. • The Contractor is responsible for implementing the requirements and reporting to the Site Superintendent. • The Site Superintendent is responsible for Contractor compliance with the requirements and reporting to the Development Manager. • Project Ecologist to be consulted as required to assist in specialist input to processes, auditing, and design issues.
Auditing and Reporting	• Weekly routine work area inspections to be undertaken by the Site Superintendent. • Quarterly report by the Contractor to the Site Superintendent on compliance with requirements to be implemented. • Bi-annual report by the Site Superintendent to the Development Manager.
Corrective Action	In the event that monitoring identifies practices inconsistent with the strategies developed for this management plan, the Contractor shall take the necessary corrective steps and note them in the quarterly report to be reviewed by the Site Superintendent.
Timing	On-going during the life of preparation each development precinct.

Table 2-6 FMP4B - Feral Animal Management – Retained Habitat Areas

Issue	Feral Animal Management - Retained Habitat Areas
Management Objective	To minimise the impact of introduced pest species on native wildlife within retained habitat areas.
Implementation Requirements	1) Implement seasonal searches for, and destruction of, fox dens throughout retained habitat areas. 2) Liaise with Ipswich City Council in regard to establishing a co-ordinated and integrated strategy for the control of feral and exotic carnivores. 3) Include information on feral pests within an ongoing community environmental awareness campaign.
Frequency	• Fox den searches are to be implemented as annual events, i.e. early summer or autumn. • Community awareness campaign – regular intervals and on-going.
Responsible Person	• The Development Manager is responsible for ensuring that requirements are implemented. • The Contractor is responsible for implementing the requirements and at the completion of each event, providing a report to the Development Manager. • Project Ecologist to be consulted as required to assist in specialist input to processes, auditing, and design issues.
Auditing and Reporting	Annual report by the Contractor to the Development Manager.
Corrective Action	The findings of each Contractor report are to be reviewed, and where required, augment the control program with additional resources as required.
Timing	On-going throughout the development phase.

2.5. Domestic Dogs

Domestic dogs have a significant and preventable impact on Koala populations. Domestic dogs have also been implicated in disturbance to, and attacks on other native fauna such as wallabies. This management issue and required impact management strategies are relevant to all fauna, though are addressed in detail within the subsequent report section dedicated to Koala.

2.6. Fire

Fires are a part of the natural process that strongly influences wildlife habitat and their resultant biodiversity characteristics. High fire frequencies may lead to a decrease in structural diversity of habitats as a result of reduced tree canopy cover, elimination of an understorey and the subsequent development of a dense grass sward. Intense and frequent fires may also reduce and/or eliminate important habitat features including fallen timber and tree hollows. The subsequent process of habitat simplification is likely to disadvantage fauna species which prefer more structurally complex habitats, but favour aggressive, opportunistic native species and introduced predators and competitors (e.g. feral cat and cane toad).

Fire is also a direct threat to arboreal fauna (including Koalas) and can deplete some plant species and favour others that are highly flammable and contribute to the fuel load. Very hot fires that extend into the canopy (crown fires) can kill arboreal fauna (including Koalas) and effective fire management strategies can help reduce the chance of them occurring.

A bushfire mitigation and management strategy, has been prepared and covers both site preparation operations and on-going management of retained habitat areas (refer to BPS (2014) and FMP section 3.6).

2.7. Habitat Rehabilitation

Rehabilitation of retained habitat areas will be undertaken in accordance with vegetation management commitments previously described in the Site Based Management Plan. In addition to those commitments, the following treatments and strategies will be employed to further benefit fauna within the retained habitat areas. This includes a proposal to install nest boxes, which are intended to augment refuge/breeding resources of the retained habitat areas for hollow-dependent wildlife for a period of up to 10 years from the beginning of the development.

The following Table describes the relevant management requirements to address this issue.

Table 2-7 FMP5 - Fauna Habitat Rehabilitation

Issue	Fauna Habitat Rehabilitation
Management Objective	To improve habitat values for fauna within retained habitat areas.
Implementation Requirements	1) Installation of artificial nest and refuge structures throughout the retained habitat areas[4] as follows: a) habitat/nest boxes suitable for insectivorous bats installed at a density of 1 box/2.5ha of retained habitat. b) habitat/nest boxes suitable for small gliders/possums installed at a density of 1 box/2.5ha of retained habitat. c) habitat/nest boxes suitable for owls installed at a density of 1 box/20ha of retained habitat. 2) Randomly placing hollow tree trunks retrieved from the clearing areas within retained habitat areas to provide additional ground habitat values (refer to section on Vegetation and Fauna Habitat Clearing). 3) Randomly placing ground rocks retrieved from the clearing areas within retained habitat areas to provide additional ground habitat values (refer to section on Vegetation and Fauna Habitat Clearing).
Responsible Person	• The Development Manager is responsible for ensuring that requirements are implemented. • The Contractor refuge/habitat boxes is responsible for: o determining with Project Ecologist to suitable refuge/nest box design and materials, and layout of refuge/nest boxes within retained habitat areas; o provision and installation of refuge/nest boxes; o implementing integrity monitoring; • Project Ecologist is responsible for: o Technical input into the establishment of tender requirements for refuge/habitat box contract. o Consultation with Contractor to assist in specialist input to processes, auditing, and design issues. o Liaison with vegetation clearing and earthworks Contractor(s) to implement relocation of hollow tree trunks and ground rocks.
Auditing and Reporting	• Annual audit over the 10-year maintenance period of integrity of refuge/habitat boxes and report to Development Manager. • Annual report over the 10-year maintenance period of habitat resource relocation works implemented.
Corrective Action	• Replacement/repair of refuge/nest boxes as identified and within three months of submission of annual report.
Timing	• Installation of habitat/nest boxes within six months of initiation of vegetation clearing operations.

[4] The proposed action includes the retention of approximately 88ha as open space, inlcuding 61.5ha specifically retained as habitat.

2.8. Education and Awareness

Community awareness is vital in fostering support for the site-wide initiatives proposed in the previous sections of this management plan. It is important that these treatments and initiatives be accompanied by an effective public information campaign which is ongoing and repeated at regular intervals to reinforce the messages in regards to wildlife management issues. Key topics include driver awareness in regard to avoiding fauna-vehicle collisions, awareness of feral animal issues, and strategies for responsible dog ownership (e.g. denning/confinement of dogs during peak Koala activities, and dog exclusion / dog-free zones in open space).

There are various platforms to deliver information, which have been previously employed by Lend Lease for other developments. These could include, for example, a Springfield Lakes community web site, local newspapers, letter box drops, etc. The following Table outlines key elements for community education and awareness in regards to wildlife within the site (though also refer to the dedicated section for Koala).

Table 2-8 FMP6 - Community Education and Awareness – Native Wildlife

Issue	Education and Awareness for Residential Community – Native Wildlife
Management Objective	To improve community awareness of, and fostering support for, wildlife management issues and the site-wide initiatives.
Implementation Requirements	Design a program of, and maintain relevance of, community education and awareness initiatives to raise awareness of, and fostering support for, protection of native wildlife and related management issues.
Responsible Person	• The Development Manager is responsible for ensuring that requirements are implemented. • Contractor is responsible for preparation of information through a variety of platforms as employed by the Development Manager for other developments. • Project Ecologist is responsible as required to assist in specialist input to educational materials.
Auditing and Reporting	Biennial report by the Contractor to the Development Manager summarising initiatives, community responses, and recommendations.
Corrective Action	Implementation of biennial report recommendations as required.
Timing	On-going

3. Management Issues and Strategies – Koala

The aim of this component of the FMP is to provide specific strategies, where not addressed in the previous sections of this FMP, for the protection of Koalas and management of their habitat within the site before, during and after the construction phase, and during the operational phase of each development precinct. The key outcomes which this component of the FMP seeks to achieve are:

- That Koalas on the site are protected;
- That Koala habitats are protected, maintained and their integrity enhanced;
- That the ability of Koalas to move into, within and out of the site is maintained; and
- That those involved in both the construction and operation of the development are aware of the site values, their potential to impact on Koalas and their habitats, and their responsibilities in regard to procedures and strategies within this plan.

3.1. Vegetation Clearing

Clearing of native vegetation has the potential to result in injury or death to Koalas. Wherever land clearing involves the removal of non-juvenile Koala habitat trees[5], operations are implemented consistent with the requirements of the following management measures.

Table 3-1 describes the relevant management requirements to address this issue, though also refer to previous sections of this FMP and the SBMP (as highlighted in the Table 3-1).

Table 3-1 FMP7 - Habitat Clearing - Koalas

Issue	**Habitat Clearing**
Management Objective	To minimise the adverse direct and indirect effects on Koalas during habitat clearing operations.
Implementation Requirements	1) No vegetation removal shall occur until relevant approvals have been obtained. All permit approval conditions will be followed (as per protocols described in FMP1). 2) Prevent damage and/or disturbance to native vegetation and associated habitats outside clearing areas (as per protocols described in FMP1). 3) Implement sequential clearing protocols. Sequential Clearing means the clearing of vegetation that: a) is carried out in a way that ensures Koalas on the area being cleared have enough time to move out of the clearing site without human intervention and, for sites with an area of more than three hectares, involves: i) carrying out the clearing in stages; and ii) ensuring not more than the following is cleared in any one stage: • for a clearing site with an area of six hectares or less – 50% of the site's area; • for a clearing site with an area of more than six hectares - three hectares or 3% of the site's area, whichever is the greater; and • ensuring that between each stage and the next, there is at least one period of 12 hours that starts at 1800hrs on a day and ends at 0600hrs on the following day, during which no trees are cleared on the site. b) is implemented in a way that ensures, while the clearing is being carried out,

[5] **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 KSPRP and EPA 2006). **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 KSPRP and EPA 2006).

Issue	Habitat Clearing
	appropriate habitat links are maintained within the clearing site and between the site and its adjacent areas, to allow koalas living on the site to move out of the site; and c) ensures that no tree in which a koala is present, or a tree with a crown overlapping a tree in which a koala is present, is cleared until the tree is vacated by the koala. d) ensures that vegetation clearing is directed away from threatening processes or hostile environments, and towards any retained vegetation or habitat links, ensuring that: • Koalas are not pressured, through loss of habitat, to cross roads or move through developed or disturbed areas, such as residential areas or areas that require movement of greater than 100m over cleared ground to reach suitable habitat; • Koalas are not left occupying an "island" of habitat between hostile environments, such as a road and a cleared area, unless there are no other more suitable habitat areas in which to direct koalas; and • Koalas can safely leave the site of clearing and relocate to adjacent habitat. 4) No vegetation clearing is to commence or continue without the presence of a Koala Spotter. 5) All trees scheduled for removal will be checked on the day of their removal (prior to start of operations) for the presence of Koalas by the Koala Spotter. 6) The Koala Spotter is responsible for ensuring, throughout the duration of the clearing operations, that no tree in which a Koala is present, or a tree with a crown overlapping a tree in which a Koala is present, or a tree identified as being a risk to Koalas if felled, should not be felled, damaged or interfered with until the Koala has moved from the felling site of its own volition. 7) Where a Koala is present in a tree scheduled for removal, the tree will be marked with distinctive flagging tape (and other advisory means as required) and machinery operators will be briefed on the location of such trees and it will be clearly confirmed with operators that the subject tree(s) are to remain undisturbed until the Koala has moved of its own volition (where the strategy is to allow the Koala to move of its own accord, overnight). On the following day, such trees are to be checked again prior to their eventual removal and, if necessary, the procedure is repeated until the Koala has moved. a) A Koala Spotter is not to physically move koalas from a tree in which they are residing to another location. 8) A Koala Spotter is not to be involved in the clearing of vegetation while they are responsible for identifying koalas present on the site. 9) Companion animals (e.g. dogs) are to be banned from all construction areas. 10) All construction personnel shall attend environmental training as part of the site induction process prior to entering the work site. As part of this training, all personnel will be instructed on their obligations in regard to vegetation clearing protocols and to protect Koalas. Areas identified for vegetation clearance are to be clearly defined and detailed in site inductions (see also FMP1).
Performance Indicators	• No disturbance to native vegetation outside permitted clearing footprints. • Prevent fauna mortality and disturbance to terrestrial fauna.
Responsible Person	• The Development Manager is responsible for ensuring requirements are included in relevant contract tenders and acknowledged in subsequent contracts awarded. • The Contractor is responsible for implementing the requirements and reporting to the Site Superintendent. • The Site Superintendent is responsible for auditing Contractor compliance with the requirements and reporting to the Development Manager. • Project Ecologist to be consulted as required to assist in specialist input to processes, auditing, and design issues.
Auditing and Reporting	• Weekly report by Koala Spotter to the Contractor on vegetation clearing operations and any Koalas encountered.

Issue	Habitat Clearing
	• For each day of native vegetation clearing operations, a daily audit log is to be completed by the Contractor either prior to, or on completion of daily operations. Audit of key requirements, e.g. clearing contained within designated limits, integrity of clearing boundary devices, no damage to vegetation outside clearing boundaries, Koala spotter in attendance. • Monthly report by the Contractor to the Site Superintendent on native vegetation operations, including compliance, non-compliance incidents and corrective actions, outcomes of Koala Spotter activities. • Bi-annual report by the Site Superintendent to the Development Manager. • 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 Contractor shall take the necessary corrective steps and note them in the monthly report to be reviewed by the Site Superintendent.
Timing	Duration of construction period.

3.2. Koala Welfare

Development protocols to respond to injured Koalas must be prepared prior to clearing operations. These requirements are to be included with the previously proposed Animal Welfare Plan (see FMP2) which would have site-wide application in regards to clearing operations within any one of the Development Precincts during the life of the development. The following Table describes the relevant management requirements to address this issue.

Table 3-2 FMP8 - Koala Welfare

Issue	Koala Welfare
Management Objective	To avoid Koala mortality, and implement where necessary, timely response to injured Koalas.
Implementation Requirements	1) A requirement that a permit to interfere with wildlife from the Queensland DEHP will be mandatory for the wildlife handling activities as will the appropriate Animal Ethics Permit from the Queensland DAFF. 2) Koala handling and relocation activities must only be undertaken by those identified on a current site-specific Damage Mitigation Permit (Removal and Relocation of Wildlife) from the Queensland DEHP. 3) Koala Spotters and/or Fauna Spotter/Catchers are to relocate injured wildlife to the nearest designated veterinary clinic. Full contacts for each of the suite of designated veterinary clinics are to be provided within the AWP. 4) A register of Koala incidents/interactions is to be maintained daily during clearing operations.
Responsible Person	• The Development Manager is responsible for ensuring that an Animal Welfare Plan is prepared prior to vegetation clearing operations on the site, by an experienced Consultant, and that the requirements are included in relevant contract tenders and acknowledged in subsequent contracts awarded. • The Contractor is responsible for implementing the requirements and reporting to the Site Superintendent. • The Site Superintendent is responsible for auditing Contractor compliance with the requirements and reporting to the Development Manager. • Project Ecologist to be consulted as required to assist in specialist input to processes, auditing, and design issues.
Auditing and Reporting	• Weekly report by the Koala Spotter and/or Fauna Spotter/Catcher to the Contractor in regard to injured fauna and protocols implemented during vegetation clearing operations. • Monthly report by the Contractor to the Site Superintendent in regard to fauna injury incidents and responses. Report to consider incident patterns, if any, and provide recommended solutions, and a description of corrective actions taken. • Bi-annual report by the Site Superintendent to the Development Manager. Report to consider incident patterns, if any, and provide recommended solutions, and a description of corrective actions taken. • 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 Contractor shall take the necessary corrective steps and note them in the monthly report to be reviewed by the Site Superintendent.
Timing	Duration of construction period.

3.3. Roads and Vehicle Interactions

Vehicle strike is one of the main identified threats to the Koala (SEWPaC 2012). Data derived from research within the Koala Coast (e.g. Dique *et al.* 2003; EPA 2006; Preece 2007) indicates that:

- the vast majority of death and injury to Koalas caused by motor vehicles occurs between sunset and sunrise, i.e. typically 1900 to 0500hrs;
- the vast majority of this mortality occurs on high traffic volume, high speed roads, i.e. roads with posted speed limit >60 kph; and
- mortality caused by motor vehicles is negligible within residential areas where the speed limit is ≤50 kph.

The previous section of this FMP (Fauna Movement) has provided details of relevant management requirements in regard to site preparation operations and is applicable to those requirements for Koala (see FMP3A).

The following suite of best practice measures will be employed throughout the site, though noting that not all of these will be appropriate in all instances due to technical and economic constraints. The table that follows, provides an outline of the process to deliver the appropriate combination of design treatments for each road crossing of retained habitat areas throughout the site.

3.3.1. Road Speed Limits

Figure 1-1 identifies the primary road network for the site development. The designated primary road network will be designed to support speed limits no greater than 60 kph (posted speed limit). All other components of the road and street network will be designed to support speed limits no greater than 50 kph (posted speed limit).

3.3.2. Road Crossing Points

Dedicated road crossing treatments will be implemented to minimise koala habitat fragmentation, facilitate Koala movements and reduce vehicle related koala injury and mortality. The two primary road crossing treatments to be implemented are:

- Grade separated crossings (underpasses); and
- At grade crossings.

The type of road crossing (and associated treatments) will need to be determined on a location-by-location basis considering local conditions for each road or section of road recommended for treatment, taking into account a range of management considerations.

Figure 3-1 describes the location of each road crossing point where dedicated design treatments will be implemented.

3.3.2.1.1. Grade Separated Crossings

Whilst the general location of each dedicated grade separated road crossing treatment is known, preparation of detailed design and construction plans is dependent on the final location chosen. The appropriate size and characteristics of structures to be installed at each specific location will need to be determined in consultation with the project design engineers following final site selection. Factors which will have a bearing on the appropriate size and characteristics of structures include waterway characteristics, dry land topography, and existing vegetation (e.g. presence or otherwise of noteworthy Koala habitat trees).

Primary Crossings

At each Primary Crossing location, three sub-road spaces will be incorporated. This will include a central bridging structure, and a dedicated fauna underpass on either side of the bridge (see concept drawings; Attachment A).

In regard to the bridging structure, wherever possible the design will make provision for dry land passage through the retention of either the embankments of watercourses beneath a bridge, or elevated portions of road bridging dry land. Where this is not achievable, the structure will incorporate a dedicated Koala "boardwalk" at each end of the bridge (as per the designs currently used by Koalas and incorporated within bridging structures within the Redlands Shire[6]; see Attachment B).

At each dedicated Primary Crossing, underpasses on either side of the bridge will provide for a dry land passage portal of a minimum size of 2.4m high by 3m wide. The location of each dedicated fauna underpass between the central bridging structure and outer edge of the corridor crossing will need to be determined on a site-specific basis, though to be located at a minimum of 30m from the outer edge of the retained habitat area footprint. Each dedicated fauna underpass is to incorporate a Koala "bridge" structure[7] comprising of a line of raised interconnecting logs which mirrors the length of the underpass to reduce the threat of predation and/or provide a resource for Koala access in the event of inundation (see Attachments A & B).

Other design considerations for each Primary Crossing include the following:

- Provision of an unobstructed view through to the far side of the underpass/sub-road space.
- Dedicated fauna underpass design to ensure suitable drainage and avoidance of water logging – even shallow pools of surface water may deter Koalas from using the crossing structure. Underpass floors are to be designed to remain dry at all times except in significant rain events where the structure quickly dries out, or ledges or Koala furniture are incorporated in the underpass to provide a dry path for movement.
- Habitat rehabilitation to provide some protective cover on approach/exiting the underpass though should not obstruct access or view of underpass entrance. For Koalas, the most suitable environment should reflect open forest or woodland conditions, with eucalypts near the overpass structure that are connected to adjacent Koala habitat, scattered midstorey species, and a sparse or low groundcover[8].
- Where possible, separate carriageways by at least 1.5m to allow light penetration beneath the road[9].
- Dedicated fauna underpass design to include earthen or gravel floor (preferred) or a concrete floor – all of which need to be well drained.
- Consideration of a skylight if under four-lane road where there is no split between carriageways.

---

[6] Timber and concrete designs incorporated within bridging structures at Coolynwimpin and Eprapah Creeks, Redland Shire). There is satisfactory evidence that Koalas use such "boardwalk"" structures at sites being monitored by Griffith University (*pers comm*. D. Jones 2013)

[7] A Koala "bridge" comprises a combination of a line of horizontal poles (extending through the length of the culvert), which are supported at regular intervals (app. 5m) by vertical poles for the Koalas to ascend/descend as required, with several vertical (retreat/refuge) poles near the entrances . Horizontal logs should be placed as high off the ground as possible for koalas to avoid predators, with a minimum space of 60cm between the top of the horizontal log/plank and the culvert ceiling. Poles, either horizontal or vertical poles, are to be >15cm in diameter. Horizontal planks should be >15cm in width. Materials should be timber and a post/rail diameter of no greater than 50cm diameter as a maximum.

[8] Dense or overgrown ground cover or low shrub cover (e.g. tall, rank grass cover, dense weed infestations) are not favorable conditions for Koala ground movement and may deter usage of the crossing structure under such circumstances.

[9] Underpasses >20m in length have been found to be less effective than those that are less than 20m, deterring koala use due to lack of natural light. Roads requiring culverts to allow koala movement should be designed as split carriageways to avoid lengthy underpasses.

- Culvert length to be minimized and run at 90^{o} to the road.
- Installation of Koala refuge poles[10] at strategic locations near entry/exit points where suitable tree cover is sparse or absent. The purpose of these structures is to provide an available retreat/refuge site if a koala is disturbed/threatened (e.g. by a dog).

Secondary Crossings

For culverts to be of potential value to Koala movement, the design of the grade separated crossings of the Secondary Crossings should include the following characteristics:

- A minimum dimension of 1.8m wide and 1.2m high box culvert (applicable for a two lane-road only).
- Incorporates "furniture" such as combination of a line of horizontal poles (extending through the length of the culvert), which are supported at regular intervals (app. 5m) by vertical poles for the Koalas to ascend/descend as required, with several vertical (retreat/refuge) poles near the entrances[11]. Horizontal logs should be placed as high off the ground as possible for Koalas to avoid predators, with a minimum space of 60cm between the top of the horizontal log/plank and the culvert ceiling.
- Rehabilitate entrance areas with eucalypts, shrubs and low grassy groundcover ($\pm$ retreat/refuge poles).

3.3.2.1.2. At Grade Crossings

There may be locations where "at grade" crossings are appropriate rather than grade separated crossings. The primary objective of the treatments to be applied where "at grade" crossings area considered, will be to create "slow zones" which limit traffic speeds and raise driver awareness. In regard to road/street design, treatments will include:

- speed reduction or other traffic calming devices (e.g. speed bumps, roundabouts, and chicanes);
- curving and winding road sections, where appropriate; and
- Koala movement awareness signs and other awareness heightening treatments such as the use of Cat's eye road reflectors.

Attachment C provides an example of the "slow zone" treatments which are being applied within the approved Precinct One of the Yarrabilba Priority Development Area (a non-regulatory, Lend Lease initiative).

3.3.3. Directional Fencing

It is considered necessary that, as a minimum, directional (exclusion) fencing be installed in 'conjunction with grade separated crossings (underpasses) where roads intersect with the retained habitat areas. Given the often unpredictable nature of Koala movement and dispersal patterns, it is not possible to ensure that all animals are guided to these crossing points (unless the entire extent of the fauna corridor is fenced, which is not proposed), thus the aim of such treatment is to minimise, rather than prevent casualties.

The use of directional fencing for "at grade" road crossings will need to be determined on a site-by-site basis considering local conditions for each road or section of road recommended for treatment, taking into account a range of management considerations.

[10] Access poles must be of a width suitable for climbing (approximately 50cm diameter maximum) and should be timber.

[11] Poles, either horizontal or vertical poles, to be $\geq$15cm in diameter. Horizontal planks should be $\geq$15cm in width. Materials should be timber and a post/rail diameter of no greater than 50cm diameter as a maximum.

The following provides the key design and siting considerations for the application of directional fencing on the site (see also Attachment D) :

- Chain wire fencing to a height of least 1.5m[12], with a Koala exclusion metal strip or similar of at least 60cm in width which is attached beneath the top rail on the exclusion side of the fence.
- Fence bracing/supports are located on the opposite side to the Koala exclusion Koala exclusion metal strip or similar (i.e. the non-exclusion side of the fence).
- Fencing has a gap of less than 100 mm between the ground and the fence.
- A 1.5m high treated timber pole (15cm diameter) to be located at one per lot or at 20 metre centres, on the opposite side to Koala exclusion metal strip or similar (i.e. the non-exclusion side of the fence).
- Vegetation adjacent to the fence is to be maintained to achieve the following:
  - exclusion of trees and shrubs from within 3m of the fence; and
  - keeping tree canopies trimmed to remove links to tree canopies on the other side of the fence; and
  - removal of fallen branches and vines growing on the fence to maintain fence effectiveness.

3.3.4. Roadside Treatments

In the circumstance where a Koala attempts to cross a road, and where the Koala is not visible until it moves into a traffic lane, the potential of a collision being avoided is notably reduced and may also lead to an instinctive (and potentially dangerous) driver reaction (e.g. a driver instinctively swerving in reaction). Consequently it is recommended that, roadside vegetation management measures be undertaken at key locations (e.g. dedicated at grade and grade crossing locations) to increase the visibility of Koalas entering the roadway.

Recommended verge treatments, though also applicable to median strips, include the following:

- regular mowing/slashing of grassy road verges to ensure that vegetation is maintained below the height of a Koala when walking (approximately 30-40cm) and thus, the Koala's presence is not obscured by long grass or weeds;
- branches at the base of all trees and shrubs removed to at least 60cm from the ground for a distance of at least 3m from the side of the road pavement so that koalas are visible entering the road way;
- complete removal of any low or shrubby vegetation that cannot be trimmed for a distance of at least 3m from the side of the road; and
- Avoiding the use of low, dense bushes and shrubs along the edge of the roadway that might otherwise hinder a koala's exit from the roadway.

Maintenance of the nominated verges should be incorporated into existing roadside maintenance programs. The frequency of the management regime will vary seasonally, particularly during summer months when rainfall is higher and vegetation growth rates increase, and thus maintenance frequency needs to increase concomitantly.

[12] The top of the "unclimbable" side of fencing is at least 1.5 m from the ground to prohibit koalas jumping up from the ground and gripping the top of the fencing. In regard to fencing, the following attributes, capabilities, and characteristics need to be considered. Koalas can leap from the ground to around 1.2m onto a tree trunk or other structure. Adult koalas are of the following general dimensions: height walking – average 30 cm; reach when standing on back legs – maximum of 90 cm for a large adult. When confronted by an obstacle/barrier (e.g. fencing), koalas will attempt to go under it or through, taking the path of least resistance/effort before attempting to climb over the obstacle.

3.3.5. Driver Awareness

Measures which will be undertaken to improve driver awareness, and thereby minimise the incidence of Koala-vehicle collisions, will include:

1. The installation of general signage to signal the presence of Koalas within the site will be undertaken at all primary (strategic) road entry points to the site (see Attachment B). For example, a combination of the standard Main Roads format (fluorescent diamond-shape with Koala on road icon) and an additional sign with wording informing motorists to be alert to the possibility of encountering Koalas on roads throughout the site (e.g. BE ALERT). Sign colour should contrast with standard colour combinations used within the region.
2. More specific signage treatments will be installed to signal areas within the site where there is an increased likelihood of encountering a Koala on the road (see Attachment B). Circumstances where such signage will be installed, include (but not be limited to) any section of road or residential street which intersects with a retained habitat area. An example of this signage treatment includes a combination of the standard Main Roads format (fluorescent diamond-shape with Koala on road icon) and an additional sign with wording informing motorists to be alert to the possibility of encountering Koalas on the signed road (e.g. HIGH ALERT ZONE). Again, sign colour should contrast with standard colour combinations used within the region.

It is highly recommended that "Cat's eye" reflectors also be installed in conjunction with the specific signage treatment zones.

Table 3-3 FMP9 - Maintenance of Safe Koala Movement Opportunities – Operational Phase

Issue	Maintenance of Safe Koala Movement Opportunities – Operational Phase
Management Objective	To reduce the impact of habitat fragmentation by roads and maintain safe Koala movement opportunities between retained habitat areas.
Implementation Requirements	4) The designated primary road network will be designed to support speed limits no greater than 60 kph (posted speed limit). All other components of the network will be designed to support speed limits no greater than 50 kph (posted speed limit). 5) Design and construct dedicated road crossing treatments where roads transect retained habitat areas (refer to design treatment descriptions in FMP Section 3.3). e) In regard to the bridging structures, wherever possible the design will make provision for dry land passage through the retention of either the embankments of watercourses beneath a bridge, or elevated portions of road bridging dry land. Where this is not achievable, the structure will incorporate a dedicated Koala "boardwalk" between each end of the bridge. f) Where culverts are required for "at grade" crossings, the design will accommodate minimum portal dimensions, fauna movement "furniture" treatments, and targeted rehabilitation of entrance areas (± retreat/refuge poles as required). g) Where grade separated crossings are not implemented, treatments associated with "at grade" crossings should include "slow zones" which limit traffic speeds and raise driver awareness (including speed reduction or other traffic calming devices, awareness signs and other awareness heightening treatments such as the use of Cat's eye road reflectors). h) Directional (exclusion) fencing is to be considered in conjunction with grade separated crossings (underpasses) where roads intersect with retained habitat areas. 5) Roadside vegetation management measures are to be undertaken at key locations (e.g. dedicated "at grade" and grade separated crossing locations) to increase the visibility of Koalas entering the roadway. 6) Implement measures to improve driver awareness, and thereby minimise the incidence of fauna-vehicle collisions, including: a) The installation of general signage to signal the presence of Koalas within the site will be undertaken at all primary (strategic) road entry points to the site.

Issue	Maintenance of Safe Koala Movement Opportunities – Operational Phase
	b) More specific signage treatments will be installed to signal areas within the site where there is an increased likelihood of encountering Koalas on the road. Circumstances where such signage will be installed, including (but not limited to) any section of road or residential street which intersects with a retained habitat area. c) "Cat's eye" reflectors to be installed in conjunction with the specific signage treatment zones. 6) Annual monitoring event to assess Koala usage and an integrity audit of structures to be implemented for each of five years - to be initiated at the beginning of the "off-maintenance" period for each crossing treatment.
Responsible Person	• The Development Manager is responsible for: o development of a site plan which clearly designates the location and type of road crossing treatments; o ensuring that the design requirements are included in relevant contract tenders and acknowledged in subsequent contracts awarded; o the maintenance of treatments is implemented; and o the design and implementation of a strategy to improve driver awareness of encountering Koalas on development roads. • The Contractor is responsible for implementing the requirements and reporting (prior to completion off-maintenance period) to the Site Superintendent. • The Site Superintendent is responsible for Contractor compliance with the requirements and reporting to the Development Manager. • Project Ecologist responsible for integrity audits and site monitoring and reporting to the Development Manager, and consulted as required to assist in specialist input to design issues and treatment locations.
Auditing and Reporting	• An "on-maintenance" and an "off-maintenance" report by Contractor to Development Manager. • Annual report (integrity audit and site usage) by Project Ecologist to Development Manager.
Corrective Action	In the event that monitoring identifies structural or design failures, the Development Manager shall take the necessary corrective steps.
Timing	Duration of construction/maintenance period or as specified above.

Spring MOUNTAIN

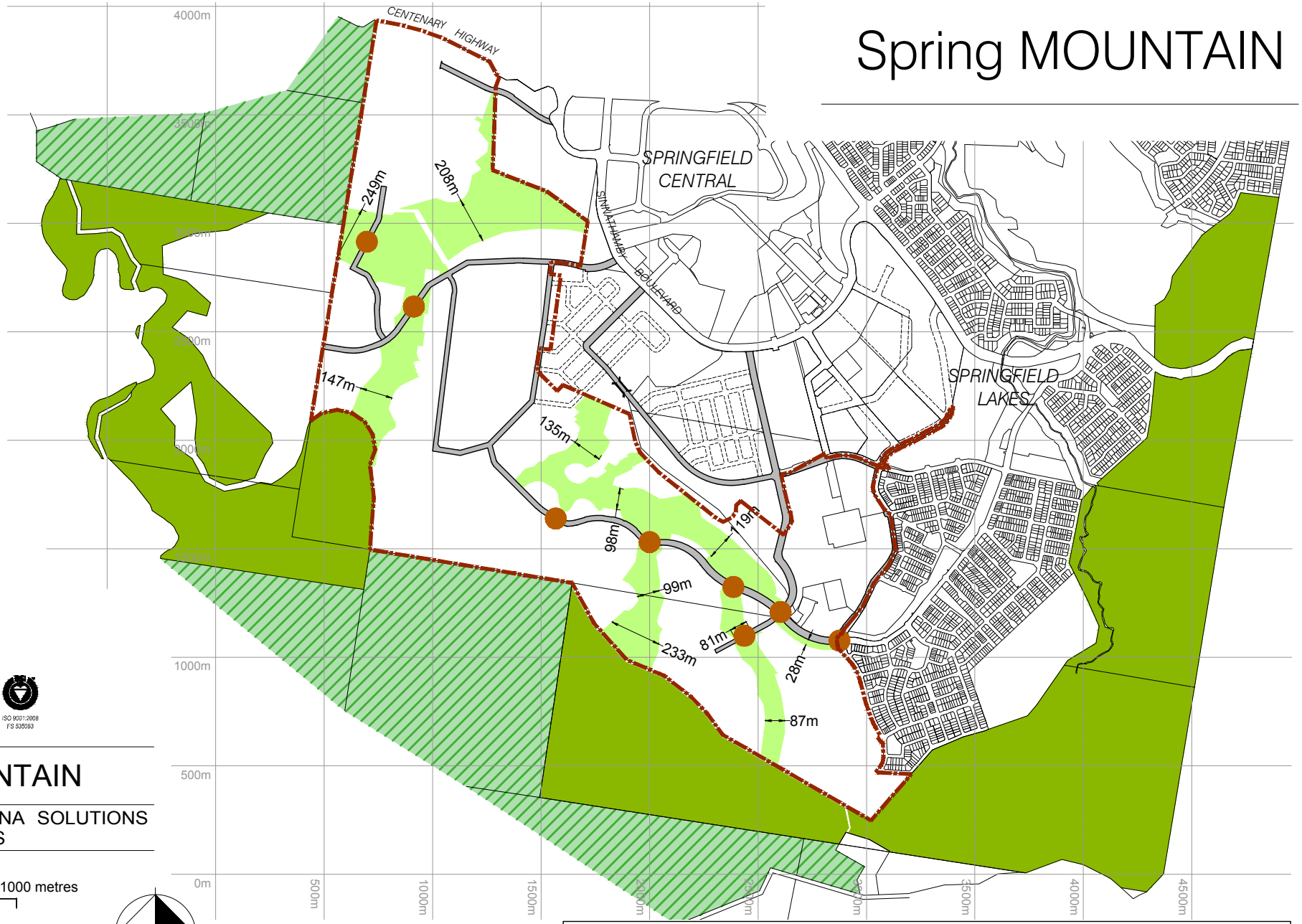


FIGURE 3-1

LANDPARTNERS built environment consultants
ISO 9001:2008 FS 535583

SPRING MOUNTAIN

LOCATIONS OF FAUNA SOLUTIONS TO ROAD CROSSINGS

0 250 500 750 1000 metres

Scale 1:25000 @ A4
File No. 1940BBMA
Dgn No. WC001940.0BB-050I
30 JUNE 2015

N

Fig No. 6

NOTE
The width of the linear open space corridors, the boundaries, land uses and road alignments shown hereon are preliminary only and are subject to detailed engineering design, final survey and approval of subsequent development applications by the relevant authorities.

LEGEND
- Conservation by others (Councils and State)
- Conservation provided as part of the Springfield development (Area: 390.0 ha)
- Linear Open Space
- Fauna Solution to Road Crossing (refer section 3.3.2 of FMP)
- Spring Mountain Site Boundary

3.4. Domestic Dogs

Domestic dogs have a significant and preventable impact on Koala populations. Attacks from domestic dogs are the third most significant known cause of mortality (after habitat clearing and vehicle strikes) within the Koala Coast (EPA 2006). Koalas are semi-arboreal, and whilst spending most of the time in trees (feeding or resting), they routinely (daily) move across the ground when changing trees or moving between habitat areas. When undertaking ground movements, Koalas are vulnerable to dogs.

Data derived from research within the Koala Coast (e.g. EPA 2006; Preece 2007; DERM 2010) collectively indicates that:

- Whilst dog attacks can occur throughout the year, a significant proportion of the overall number of attacks occurs during July to September (in the months preceding Koala breeding)[13]. There is a seasonal peak in dog attacks in September, which particularly affects young males.
- Approximately 96% of recorded attacks involve dogs of greater than 10kg in weight, with few attacks by dogs weighing less than 7kg[14].
- Almost all dog attacks occur at night.
- Most dog attacks occur in residential yards by landowners' dogs (*pers comm.* F. Carrick 2014).

The following strategies will be implemented on the site to minimise dog-Koala encounters.

For all residential and non residential lots which front onto land designated as retained habitat area, a Koala exclusion fencing covenant on the property title will require the erection of Koala exclusion fencing (as illustrated in Attachments D and E) and a prohibition on front boundary fencing to the front alignment of any lot.

As almost all dog-Koala interactions occur at night, limiting the movement of 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.

Retained habitat areas will be designated as dog exclusion zones, nominally prohibiting dogs from these areas. 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, particularly between the hours of 6pm and 6am. Refer Attachment B for sample signage.

3.5. Feral Animals and Environmental Weeds

Feral animals are known or expected to occur on the site (e.g. cats, dogs and foxes). Of these, dogs are a primary threat to Koalas. Management strategies in regard to domestic dogs (companion animals) have been addressed in other parts of the FMP (FMP1 & 11) and a discussion of potential control strategies for feral (wild) dogs is provided in the section on feral animal management (FMP4A & B).

[13] In south-east Queensland, Koala breeding season is from August to December, which includes the lead up to mating and the few months when the majority of mating occurs.

[14] All dogs have the potential to harm koalas, however it is thought that koalas have a better prospect of defending themselves against a single dog of a similar or smaller size. Koalas in Queensland average 4 to 8 kg in weight.

A weed management plan will be implemented during both construction and operational phases (construction areas and retained habitat areas). Weed control strategies are to be developed and implemented and include, but not be limited to the design and implementation of an ongoing eradication program which targets environmental weeds and an ongoing systematic monitoring program to detect the occurrence of environmental weeds and to assess the success of the control/eradication program. A strategy for the control of environmental weeds across the site (retained habitat areas and rehabilitation areas) is provided within the SBMP.

3.6. Fire

Fire is a direct threat to Koalas and can deplete some plant species and favour others that are highly flammable and contribute to the fuel load. Very hot fires that extend into the canopy (crown fires) can kill Koalas and other arboreal animals and effective fire management strategies can help reduce the chance of them occurring.

A bushfire mitigation and management strategy, has been prepared and covers both site preparation operations and on-going management of retained habitat areas (refer to BPS (2014)). In regard to Koalas, fire management objectives are to:

a. Minimise the risk of high-intensity fire in koala habitat; and
b. Minimise the risk of koala mortality due to prescribed burns.

In regard to retained habitat areas, where prescribed burns are to be implemented, the following strategies are relevant to Koala (after DoE 2013):

- Implement pre-burn surveys to identify areas of high Koala activity or density and use this data to inform the planning process[15];
- Ideally, no prescribed burning should be undertaken when female Koalas are likely to be carrying dependent young (generally during autumn)[16];
- 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 proportion or extent is burnt if avoiding canopy scorch is not possible);
- 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.

3.7. Habitat Rehabilitation

Rehabilitation of retained habitat areas will be undertaken in accordance with commitments previously described in this report (FMP5) and the SBMP. In addition to those commitments, the following treatments and strategies will be employed to further benefit Koalas within the retained habitat areas.

It is well demonstrated in the literature that for any particular site, determination of what tree species Koalas may browse (or locally preferred), cannot be determined by the presence of Koala scats under a particular tree species[17]. Furthermore, dietary selection has also been shown to vary over the course of the year as a seasonal response.

[15] These data should inform the decision-making process by allowing the application of fire to be minimised in areas where high koala activity or density is observed or inferred.
[16] 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.
[17] Trees in which Koalas browse and the trees in which they roost are not the same – potentially different tree species &/or different structure &/or differences in maturity.

In order to understand which tree species (as fodder trees) are of most value to Koalas on the site, 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. Furthermore, to maximise habitat rehabilitation opportunities specifically in regard to Koalas, it is highly recommended that based on the findings of the faecal cuticle analysis, a seed collection program be instigated on the site in order that seed of preferred fodder trees of local provenance can be propagated for use in Koala habitat rehabilitation.

The following Table describes the relevant management requirements to address this issue.

Table 3-4 FMP10 – Koala Habitat Rehabilitation

Issue	Habitat Rehabilitation – Koala
Management Objective	To maximise habitat rehabilitation opportunities specifically in regard to Koalas
Implementation Requirements	1) Design and implement a field program to investigate Koala seasonal dietary patterns. a) Primary field activity is the collection Koala faecal pellets form a representative suite of site habitats. b) Field investigations to be undertaken over a minimum twelve month period in order to sample the range of seasonal dietary scenarios. 2) Undertake faecal cuticle analysis and analyse potential seasonal dietary patterns. Alternatively, if required, complete seasonal surveys to determine higher use tree species. 3) Provide data to inform rehabilitation works.
Responsible Person	• The Development Manager is responsible for: o ensuring that requirements are implemented; o communicating report recommendations to the Contractor (habitat rehabilitation); o investigating with the Contractor (habitat rehabilitation), opportunities to incorporate recommendations on Koala forage tree species within habitat rehabilitation. • Contractor is responsible for the design and implementation of field program, faecal cuticle analysis, and analysis of data and reporting. • Project Ecologist is responsible as required to assist in specialist input to program design as required.
Auditing and Reporting	Contractor to provide a project report to the Development Manager.
Corrective Action	Implementation of recommendations within habitat rehabilitation program.
Timing	Contractor report to be delivered within two years of on-ground initiation of development.

3.8. Education and Awareness

It is important that the foregoing management initiatives be accompanied by an effective community education and awareness campaign which is ongoing and repeated at regular intervals. Of particular importance, will be the reinforcement of education and awareness messages in regards to avoiding Koala-vehicle collisions and responsible dog ownership (e.g. denning/confinement of dogs during peak Koala activities, and dog exclusion/dog-free zones in open space and retained habitat areas).

There are various platforms to deliver information, which have been previously employed by Lend Lease for other developments. These could include, for example, a Springfield Lakes community web site, local newspapers, letter box drops, etc. Information could include:

- Information of Koala ecology, particularly the general timing of dispersal;
- Information as to the number of Koalas that are being struck by vehicles or mauled by dogs the local authority area and the impact this situation is having on the local Koala population;
- Information regarding the best methods of "being alert" to Koala presence on roads. This may include scanning road verges, safe following distances, and adhering to speed limits;
- Information regarding who should be contacted if a Koala has been struck, and where to provide feedback regarding driver experiences with Koalas on roads; and
- Provision to all rate-paying households and local businesses of a flyer and bumper stickers designed to reinforce the "BE ALERT" message, with colouring linked to the Koala signage, ensuring that drivers within the local authority area are continually reminded of the issue.

The following Table outlines key elements for community education and awareness in regards to Koalas within the site.

Table 3-5 FMP11 - Community Education and Awareness – Koala

Issue	Education and Awareness for Residential Community – Koala
Management Objective	To improve community awareness of, and fostering support for, wildlife management issues and the site-wide initiatives.
Implementation Requirements	Design a program of, and maintain relevance of, community education and awareness initiatives to raise awareness of, and fostering support for, protection of Koalas and related management issues.
Responsible Person	• The Development Manager is responsible for ensuring that requirements are implemented. • Contractor is responsible for preparation of information through a variety of platforms as employed by the Development Manager for other developments. • Project Ecologist is responsible as required to assist in specialist input to educational materials.
Auditing and Reporting	Biennial report by the Contractor to the Development Manager summarising initiatives, community responses, and recommendations.
Corrective Action	Implementation of biennial report recommendations as required.
Timing	On-going

3.9. Monitoring Habitat Use

Monitoring for the purposes of measuring achievement of a variety of management requirements have been described in previous sections of this FMP. In addition to these requirements, it is important to undertake monitoring of Koala occurrence within the retained habitat areas, and throughout the progression of the overall development. The continued occurrence of Koala within the retained habitat areas is an underpinning measure of the performance success of a variety of management strategies within this FMP.

The following Table outlines key elements for community education and awareness in regards to Koalas within the site.

Table 3-6 FMP12 – Monitoring of Koala Occurrence within Retained Habitat

Issue	Continuity of Site Occurrence of Koalas
Management Objective	Retained habitat areas continue to support Koalas throughout the progressive development of the site.
Implementation Requirements	Design and implement a field monitoring program, based on the following key elements: 1) One baseline survey event to be implemented throughout the full extent of the suite of retained habitat areas. a) This survey event is to be implemented prior to the initiation of site preparation for the first Development Precinct. 2) An annual monitoring event of the retained habitat adjacent to any Development Precinct from the initiation to completion of the site preparation phase for the relevant Development Precinct. 3) A monitoring event of the retained habitat adjacent to any Development Precinct, coinciding with the fifth year following practical completion of a Development Precinct. Practical completion would be characterised by >90 of residential allotments of Development Precinct supporting dwellings and residents. 4) The primary objective of the field surveys is to investigate Koala occurrence and abundance through direct observation of actual animals. a) Indirect methods of assessing Koala presence (e.g. presence of faecal pellets, scratch markings etc.) are not required as part of the primary survey objective, though such data may be used to compliment survey findings. b) Field surveys should be conducted consistent with the method adopted by Dique *et al.* 2003. 5) Minimum data requirements for each Koala sighting include: a) Gender and Age class (Adult; sub-adult (2-4kg); or juvenile (<1 year old, < 2kg, not yet independent)). b) Reproductive status: Presence of a pouch young; back young; or no young associated with an adult female. c) Health status: Healthy; or showing indicators of poor health including cystitis (wet, stained bottom), conjunctivitis (red or swollen eyes discharging pus), or emaciated appearance, etc. d) Tree species that the koala is sighted in. e) GPS location. 6) Field surveys are to be implemented by biologist(s) with demonstrated experience in Koala surveys and monitoring.
Responsible Person	• The Development Manager is responsible for ensuring that requirements are implemented. • Project Ecologist is responsible to assist in specialist input to the design of the monitoring program. • Contractor is responsible for implementation of field monitoring program.
Auditing and Reporting	• Report on completion of each monitoring event by Contractor to Development Manager. • Triennial report by Development Manager to Commonwealth for the duration of the monitoring program.
Corrective	In consideration of observations and/or recommendations provided within monitoring

Action	reports.
Timing	From commencement of the action annually, with approximated project life of 15 years.

4. Management Issues and Strategies – Other MNES

The fauna MNES assessment report (Austecology 2013) describes the findings of the desktop investigations, expert consultation, targeted field surveys, and habitat assessments for the site. Based on that work, the report concluded that in regard to threatened fauna MNES, with the exception of the Grey-headed Flying-fox, there was a negligible likelihood of occurrence on the site. In regard to the Grey-headed Flying-fox, it is expected that a wide variety of impact mitigation strategies previously described in this FMP, would benefit this species, and those regarded as having a negligible likelihood of site occurrence. Furthermore, it is not envisaged that there are any additional strategies, particular to those species' requirements or sensitivities, which are required for inclusion in this FMP.

The fauna MNES assessment report (Austecology 2013) concluded that the site supports potentially suitable habitat for a variety of bird species[18], listed as migratory under the EPBCA provisions. Again, it is expected that a wide variety of impact mitigation strategies described in this FMP, would be of benefit to those species, and it is not envisaged that there are any additional strategies, particular to those species' requirements or sensitivities, which are required for inclusion in this FMP.

[18] White-throated Needletail, Fork-tailed Swift, Rainbow Bee-eater, Black-faced Monarch, Spectacled Monarch, Rufous Fantail, and Satin Flycatcher.

5. References

Austecology (2013). MNES Vertebrate Fauna Assessments Land at Spring Mountain. Report prepared by Austecology for Lend Lease.

BAAM (2005). EPBC Referral Faunal Assessment Report Springfield Lakes Area E Development. An unpublished report prepared by Biodiversity Assessment and Management Pty Ltd for Delfin Lend Lease.

BAAM (2011). Planning Review of Springfield Wildlife Corridor for Significant Fauna Species. An unpublished report prepared by Biodiversity Assessment and Management Pty Ltd for the Ipswich City Council.

BPS (2014). Overall Conceptual Bushfire Hazard Assessment and Mitigation Plan for the Spring Mountain Village (Area E2) Springfield Lakes. A report prepared by Bushland Protection Systems Pty Ltd for Lend Lease Communities.

Chenoweth EPLA (2005). Springfield Area "E" EPBC Act Flora Study. An unpublished report prepared by Chenoweth Environmental Planning & Landscape Architecture for Delfin Lend Lease.

Christidiis, L., and Boles, W.E. (2008). Systematics and Taxonomy of Australian Birds. CSIRO Publishing, Collingwood.

Churchill, S. (2008). Australian Bats. 2nd Edition. Allen and Unwin, Crows Nest.

DERM (2010). Koala Coast Koala Population Report 2010. Department of Environment and Resource Management, Brisbane.

Dique, D. S., de Villiers, D. L., and Preece, H. J. (2003a). Evaluation of line transect sampling for estimating koala abundance in the Pine Rivers Shire, south east Queensland. Wildlife Research 30: 127–133.

DoE (2013). *Draft EPBC Act referral guidelines for the vulnerable koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)*. Department of the Environment, Canberra.

EPA (2006). *Nature Conservation (Koala) Conservation Plan 2006 and Management Program 2006-2016*. Queensland Environment Protection Agency, Brisbane.

Preece, H.J. (2007). Monitoring and modelling threats to koala populations in rapidly urbanising landscapes: Koala Coast, South East Queensland, Australia. PhD Thesis, The University of Queensland, Brisbane.

SEWPaC (2012). Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) - Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory). Extract of the Species Profile and Threats Database. Department of Sustainability, Environment, Water, Population and Communities: Canberra.

Van Dyck, S. and Strahan, R. (2008). The Mammals of Australia. 3rd Edition. Australian Museum and Reed New Holland, Sydney, Australia.

Wilson, S. (2009). A Field Guide to Reptiles of Queensland. Reed New Holland, Sydney.

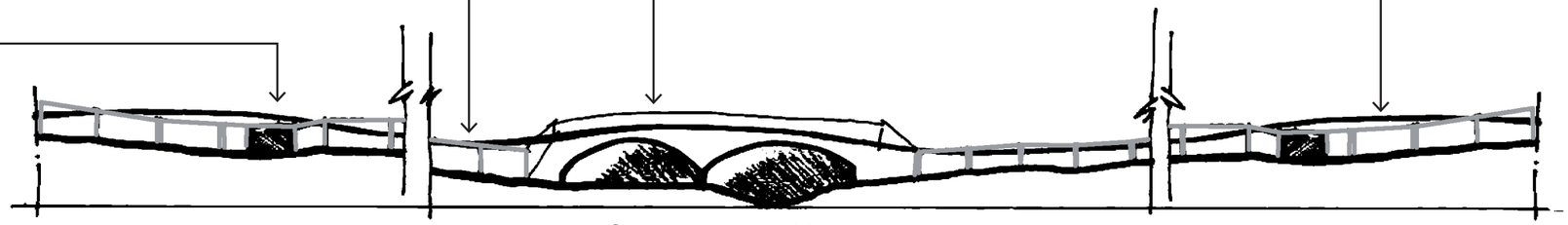
Yurrah (2013). Preliminary Draft MNES Assessment Report - Flora - Lend Lease Spring Mountain. A report prepared for Lend Lease Communities (Springfield) Pty Ltd.

Koala directional fence adjacent to road crossings of the corridor will guide fauna movement to grade separated points. Fences will be 1.5m high with vertical panels (refer Fauna Management Plan report)

Indicative bridge or culvert crossing drainage line with embankments beneath the bridge or culvert elevated portions of dry land or Koala "boardwalk" for fauna movement (refer Fauna Management Plan report)

Grade separated crossing of primary corridor. Indicative culvert/s approximately 30m from edge of corridor.

Grade separated crossing of primary corridor. Indicative culvert/s approximately 30m from edge of corridor.



Open space corridor extent

Primary and Secondary Open Space Corridors
Grade Separated Crossings

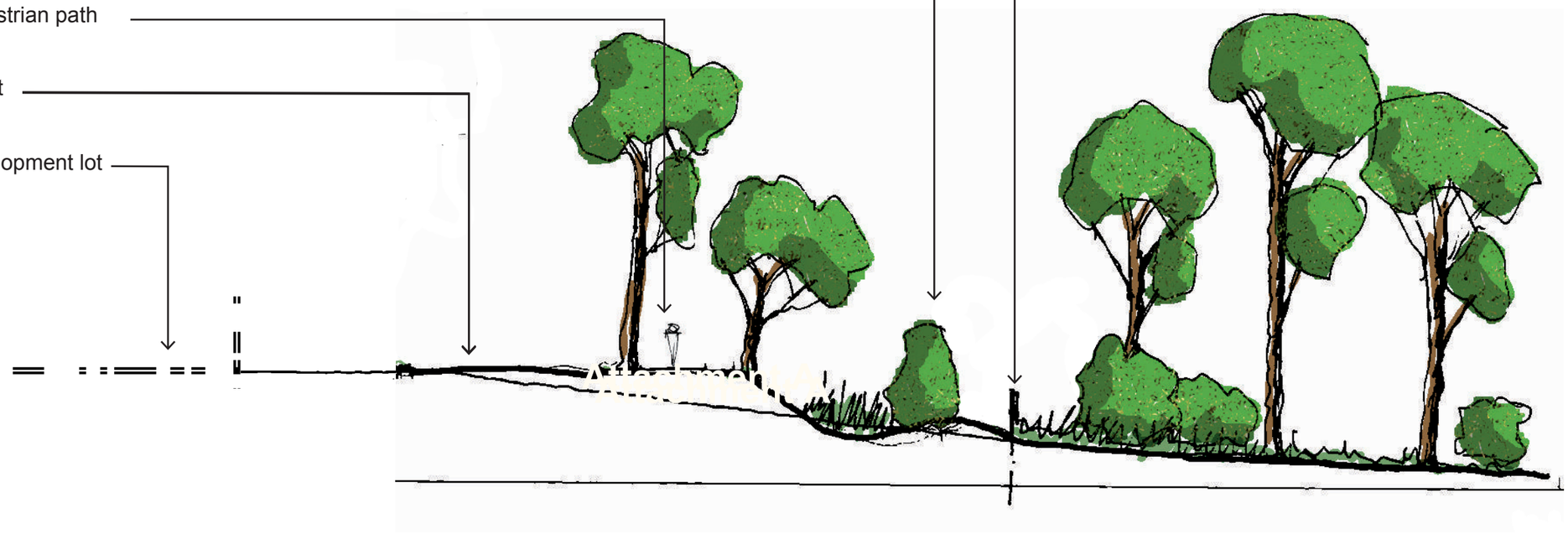
Mound to bottom of road batter

Pedestrian path

Street

Development lot

Directional/exclusion fence



Open Space including Directional/Exclusion Fence
beside Major Roads

NOT TO SCALE

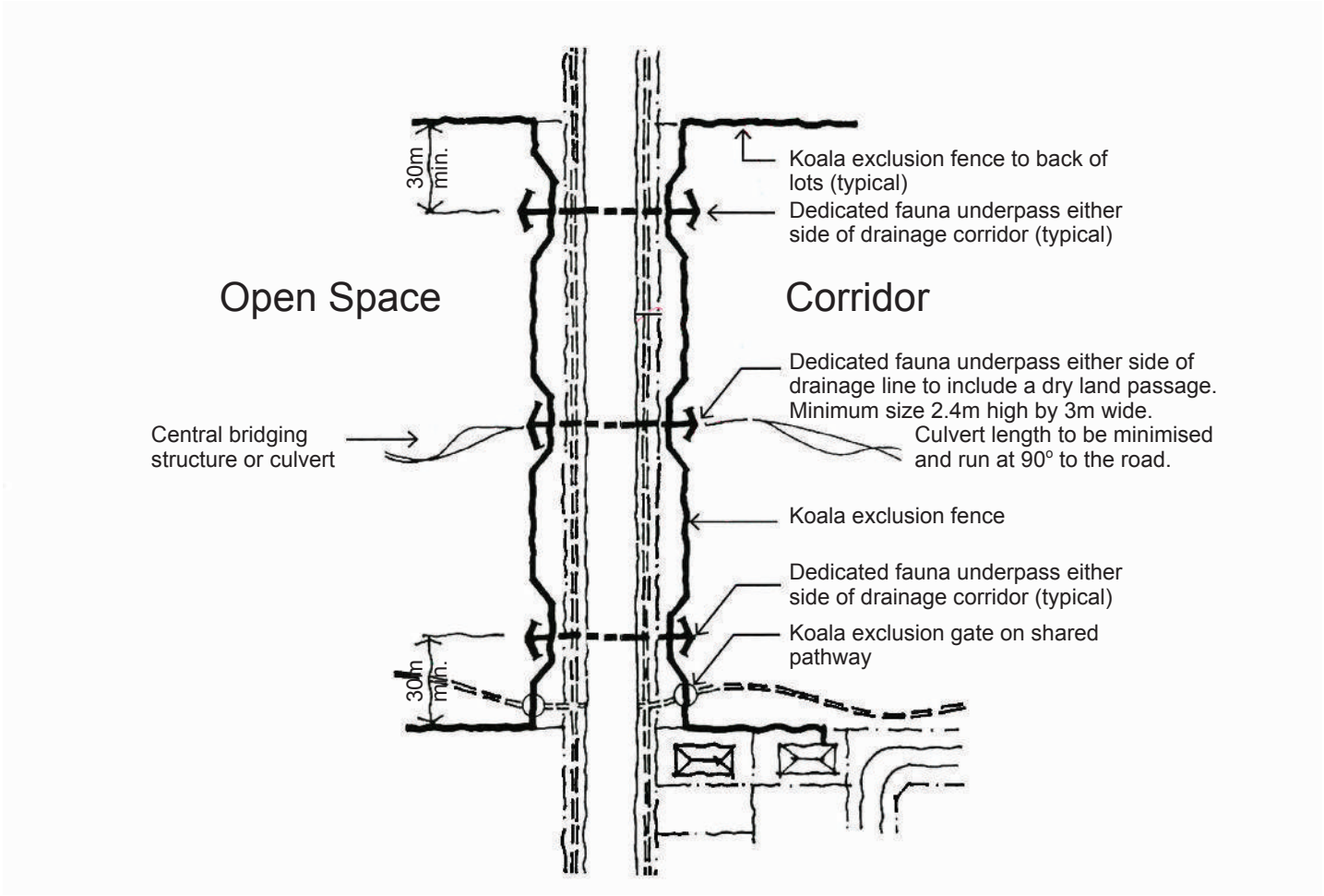
DATE: 7/02/14
PLAN NO. SL-OSXS-140205 - 1

Springfield LAKES

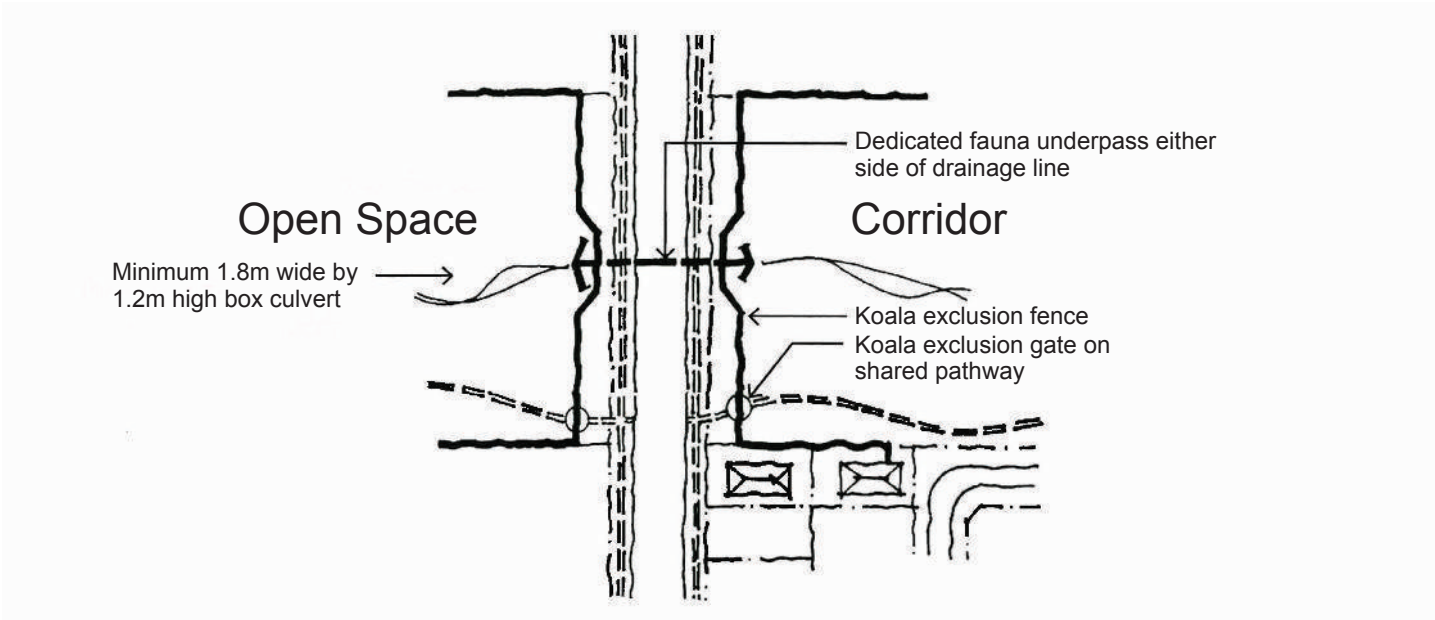
Attachment A

SPRING MOUNTAIN

OPEN SPACE CORRIDOR SECTIONS



PRIMARY GRADE SEPARATED CORRIDOR ROAD CROSSING



SECONDARY GRADE SEPARATED CORRIDOR ROAD CROSSING (for two-lane road only)

Note: The Fauna Management Plan provides further detail on design treatments and standards.

DATE: 7/02/14
PLAN NO. SL-OSXS2-140205 - 1

NOT TO SCALE

Attachment A

Springfield LAKES

SPRING MOUNTAIN
SEPARATED CORRIDOR ROAD CROSSING

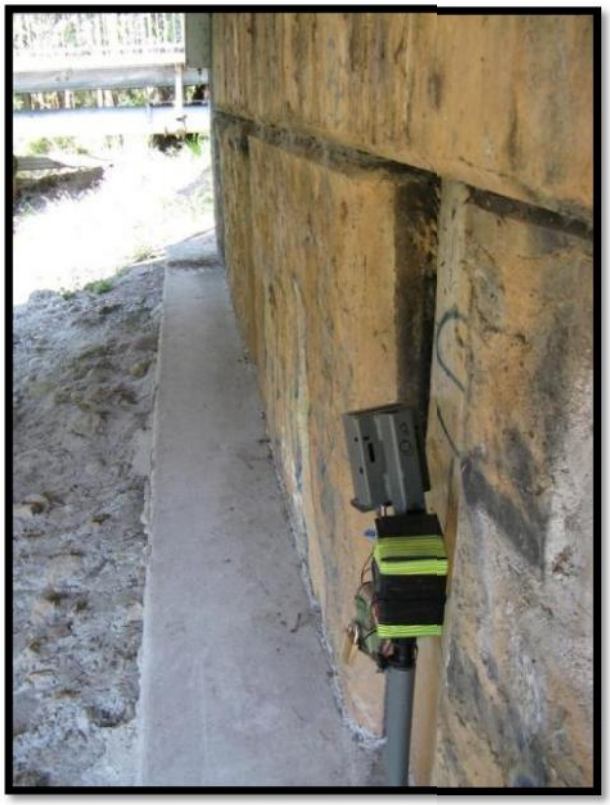
Attachment B Photographs of Koala Management Treatments

Above - Roadside Koala exclusion fencing with concrete footing (Burbank, Brisbane). Note vegetation management treatments. **Below** – Koala exclusion fencing applied to roadside and bridging over Coolnwynpin Creek (Redland Shire).

Below - Koala exclusion fencing applied to roadside and bridging over Eprapah Creek (Redland Shire).

Above & Below – Examples of Koala exclusion fencing functionality being compromised by poor siting and vegetation management (Brisbane).

Below – Timber and concrete Koala "boardwalk" retrofits to bridging over Eprapah Creek (Redland Shire). Both treatments are used by Koalas (*pers comm.* D. Jones 2012, Griffith University).



Below – Timber Koala “boardwalk” retrofit to bridging over Coolnwynpin Creek (Redland Shire). Boardwalk treatments are used by Koalas (*pers comm.* D. Jones 2012, Griffith University).

Below – Timber Koala “bridge” forms part of a suite of fauna “furniture” treatments under the Gateway Motorway (Rochedale, Brisbane).

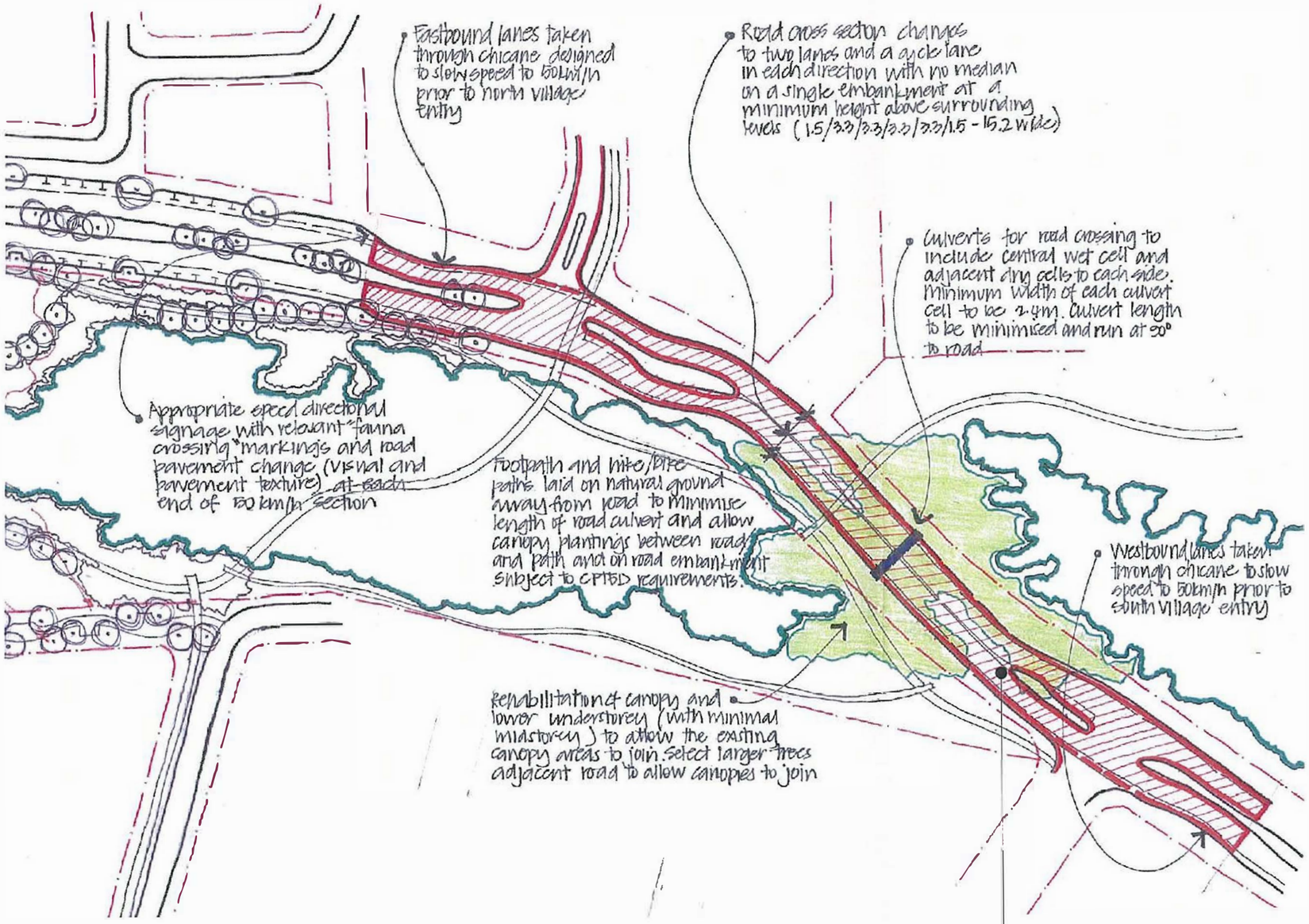
Below – Timber Koala “bridge” forms part of a retrofit to a box culvert under Compton Road, Kuraby (Queensland Government 2009).

Above – Example of a single-way travel climbing pole (Redland Shire). Colorbond metal collar (on right) prevents the Koala from climbing over fence into the road space, though plain timber pole (left) allows a Koala to escape from the road environment. **Below** – Examples of climbing poles (Queensland Government 2009).

Above – Examples of roadside awareness signage (fluorescent diamond-shape with Koala on road icon).

Below – Example of general awareness signage within open space where dogs are not excluded (Redlands Shire).

LEGEND



50 km/hr Speed Environment
Through Conservation
Corridor as hatched

PLANS AND DOCUMENTS
referred to in the ULDA
APPROVAL dated 12/10/2012

NOTE:
The boundaries shown hereon are subject to detailed engineering design, final survey and approval of subsequent development applications.

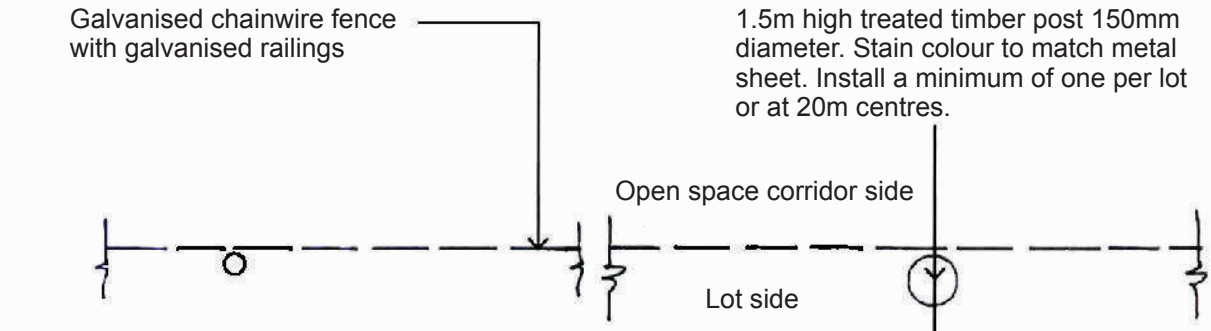
PRECINCT ONE

ROAD CROSSING - 'OF CONCERN'
VEGETATION CORRIDOR

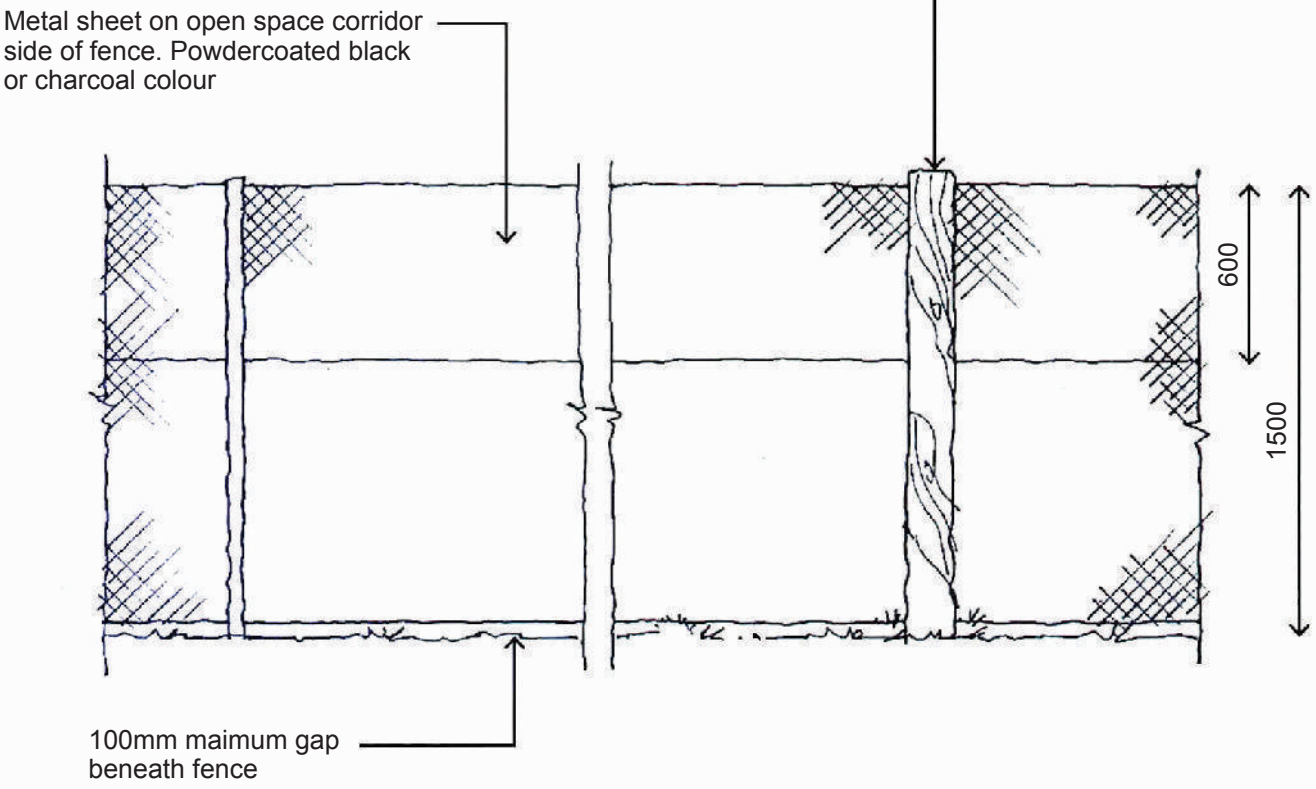
0 15 30 45 60 75 metres

Scale 1:1500 AT A3

File No. YB
Dgn No. YB-P01-FCD101118
18 NOV 2010 PW No A1000PDC0102



Plan



Elevation from Lot Side

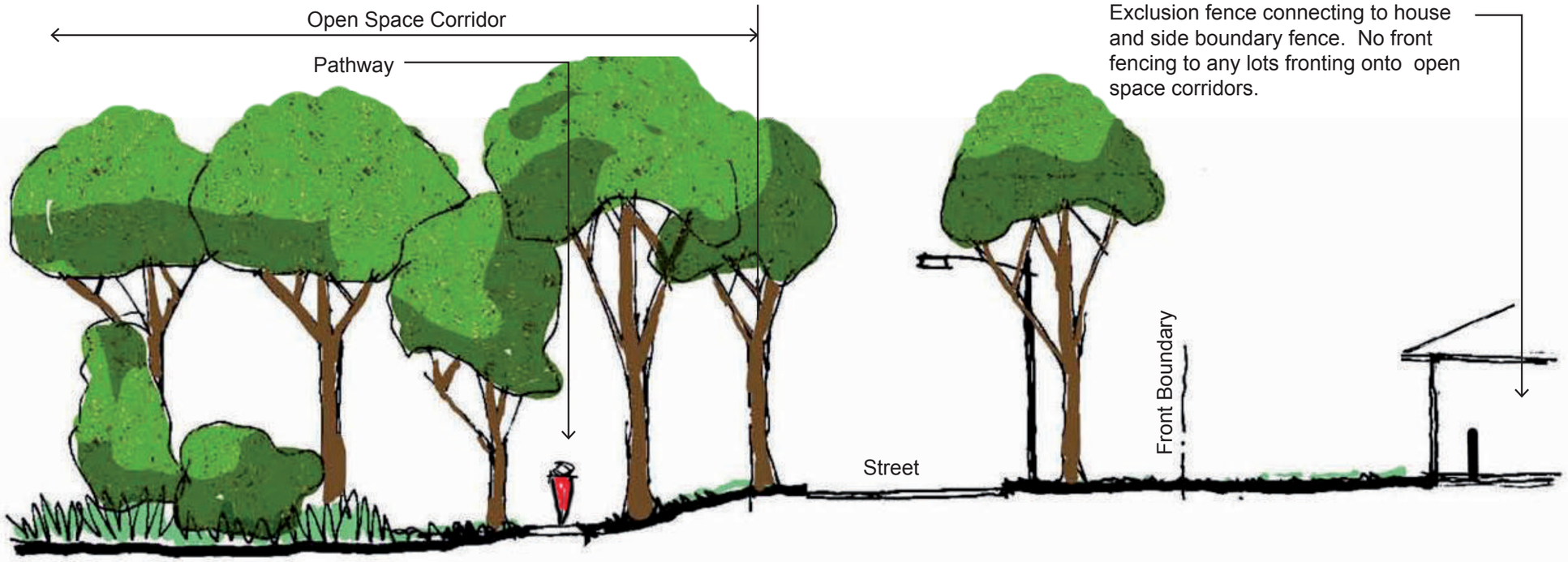
Other Koala exclusion fences may have the following alternataive fence treatments:

- Metal paling fence with spaces less than 10mm
- Brick or block wall with flush mortar joints
- Rendered Walls
- Non climable solid materials

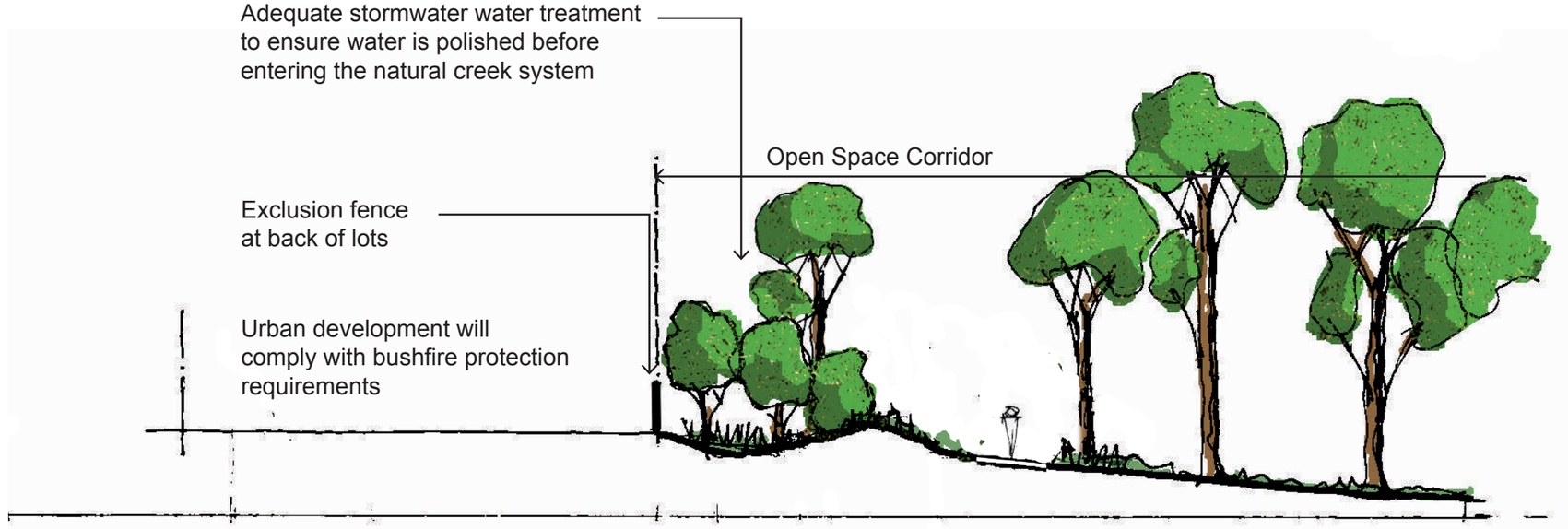
Note: The Fauna Management Plan provides further detail on design treatments and standards.

DATE: 7/02/14
PLAN NO. SL-OSXS2-140205 - 4

NOT TO SCALE



Open Space Corridor Interface for Typical Street Fronting Open Space



Open Space Corridor Fencing for any Allotments backing onto Open Space

NOT TO SCALE

DATE: 7/02/14
PLAN NO. SL-OSXS-140205 - 2

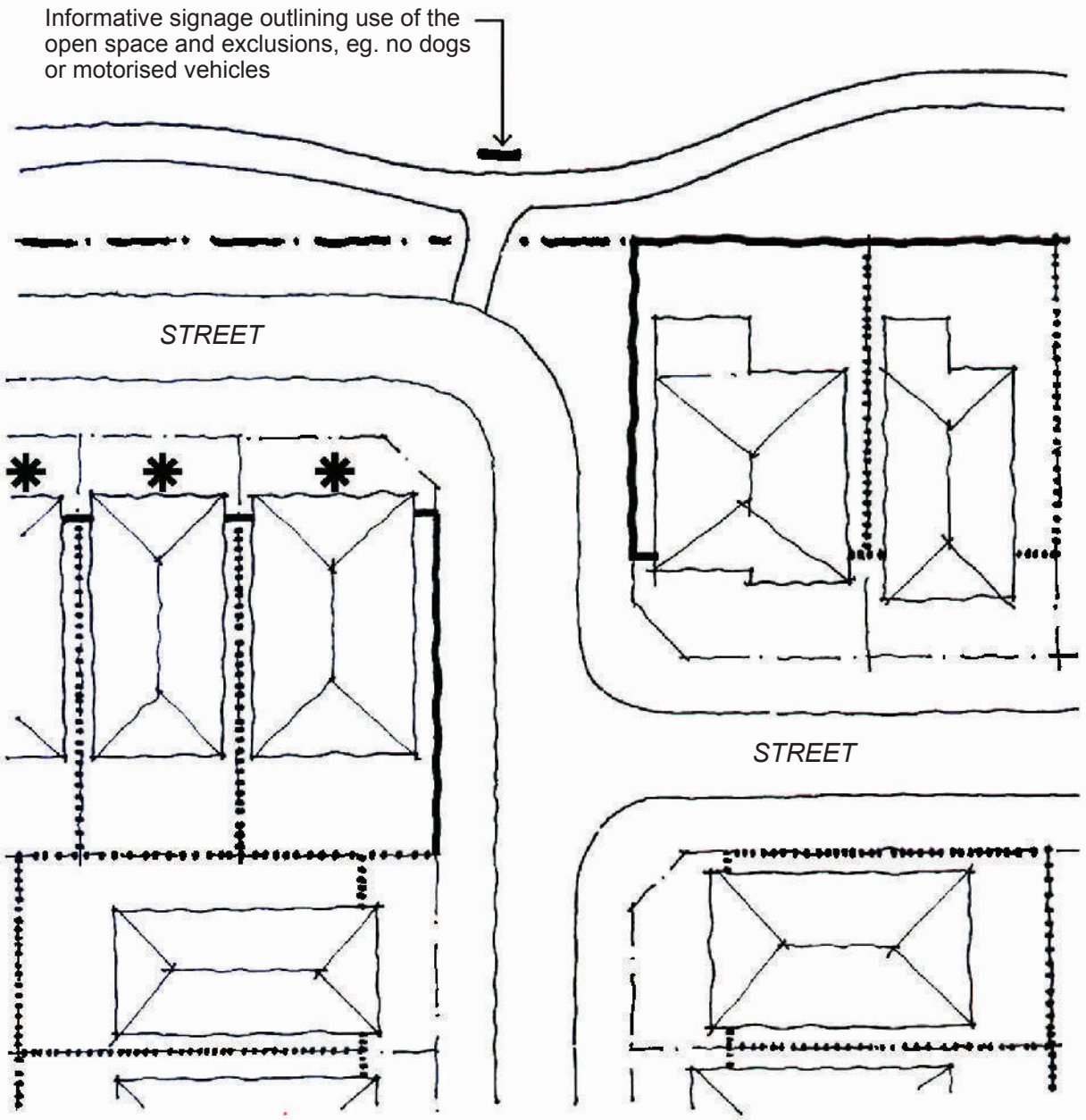
Springfield L AKES

Attachment E

SPRING MOUNTAIN

KOALA EXCLUSION FENCING TO OPEN SPACE CORRIDOR SECTIONS

Open Space



Directional exclusion fence

Residential fence

Vehicle barrier, eg. bollards

Directional exclusion fencing covenant applies - prohibits front fencing on any lot

Note: The Fauna Management Plan provides further detail on design treatments and standards.

DATE: 7/02/14
PLAN NO. SL-OSXS2-140205 - 3

NOT TO SCALE

Attachment E

SPRING MOUNTAIN

OPEN SPACE INTERFACE EXCLUSION FENCING PLAN

Springfield LAKES

Attachment F Peer Review Statement – Dr. F. Carrick

This page intentionally left blank.

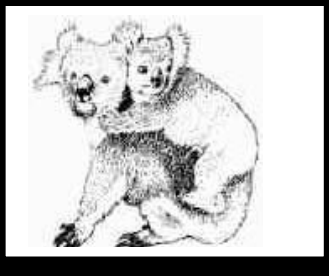
Dr Frank N Carrick *AM*

EcoIndig Resources Pty Ltd

ABN 19 066 041 219

• PO Box 498 • Kenmore • QLD • 4069

• Phone 0427 783 973 • eMail frank.carrick@uq.net.au •



Outcome of Peer Review of *Fauna Management Plan Spring Mountain Mixed Use Master Planned Community Development EPBC Referral 20137057* prepared by Austecology Pty Ltd

30 April 2014

I have been requested by Mr Lindsay Agnew of Austecology Pty Ltd to peer review a document entitled "Fauna Management Plan Spring Mountain Mixed Use Master Planned Community Development EPBC Referral 20137057" (Spring Mountain FMP). This has been prepared as part of the requirements of referral as a *Matter of National Environmental Significance* for the Spring Mountain development (Austecology, 2014).

I have subsequently undertaken that review and provided comments and recommendations to the author, Lindsay Agnew. The FMP has been revised accordingly and has incorporated or taken account of those comments and recommendations.

In my opinion, the FMP provides a comprehensive and evidence based structure to manage impacts of the proposed development on local fauna, including Koalas. I am satisfied that the revised FMP adequately describes the suite of potential impacts of the proposal, that impact mitigation strategies are practical, achievable and reflect current best practice. As a result, if implemented in accordance with the FMP, those measures and strategies are capable of minimising impacts to Koalas (and other native fauna).

Dr Frank N Carrick *AM*
Chief Investigator
EcoIndig Resources Pty Ltd

Attachment 2

DRAFT Code of Practice for the Welfare of Wild Animals Affected by Land Clearing and Other Habitat Impacts and Wildlife Spotter/Catchers

QUEENSLAND

CODE OF PRACTICE

FOR THE WELFARE OF WILD ANIMALS AFFECTED BY LAND-CLEARING AND OTHER HABITAT IMPACTS

AND

WILDLIFE SPOTTER/CATCHERS

Draft

Australian Wildlife Hospital
(A division of Australia Zoo Wildlife Warriors Worldwide Ltd)

1. INTRODUCTION AND BACKGROUND 5

1.1 PURPOSE OF THE QUEENSLAND CODE OF PRACTICE FOR THE WELFARE OF WILD ANIMALS AFFECTED BY LAND-CLEARING AND OTHER HABITAT IMPACTS AND WILDLIFE SPOTTER/CATCHERS (THE CODE). 5

1.2 WILDLIFE LOSS ASSOCIATED WITH LAND-CLEARING 5

1.3 ANIMAL WELFARE ISSUES ASSOCIATED WITH LAND-CLEARING 6

1.4 REMOVAL OF WILDLIFE PRIOR TO LAND-CLEARING AND ECO-FRIENDLY DEVELOPMENT 7

1.5 RELEVANT LEGISLATION 8

2. SCOPE AND AIMS OF THE CODE 9

2.1 SCOPE 9

2.2 AIMS 9

3. IMPORTANT GUIDING PRINCIPLES UNDERPINNING THE CODE AND DEFINITIONS 11

3.1 DUTY OF CARE 11

3.2 DUE DILIGENCE 11

3.3 FAIR, REASONABLE AND APPROPRIATE MEASURES 12

SECTION 1: GENERAL PRINCIPLES FOR THE WELFARE OF WILD ANIMALS LIKELY TO BE AFFECTED BY DEVELOPMENT PROCESSES 15

RESPONSIBILITIES OF A DEVELOPER 15

REQUIREMENT FOR ENGAGEMENT OF A WILDLIFE SPOTTER/CATCHER 16

DISCHARGE OF A DEVELOPER'S RESPONSIBILITIES UNDER THE CODE 16

REMOVAL OF WILDLIFE FROM A SITE WITHOUT ASSISTANCE FROM A WILDLIFE SPOTTER/CATCHER 17

USE OF WILDLIFE SPOTTER/CATCHERS FOR DEVELOPMENT ACTIVITIES OR PROCESSES 18

SECTION 2: ACCREDITATION, LICENSING AND RESPONSIBILITIES OF WILDLIFE SPOTTER CATCHERS 19

ROLES OF WILDLIFE SPOTTER/CATCHERS 19

LICENSING OF WILDLIFE SPOTTER/CATCHERS 19

POWERS OF WILDLIFE SPOTTER/CATCHERS UNDER THIS CODE 21

RESPONSIBILITIES OF WILDLIFE SPOTTER/CATCHERS 21

USE OF UNLICENSED PERSONNEL BY A WILDLIFE SPOTTER/CATCHER 22

ACCOUNTABILITY OF WILDLIFE SPOTTER/CATCHERS FOR POWERS GIVEN UNDER THIS CODE 22

Disagreement between a developer and a wildlife spotter/catcher 23

Termination of a contract by a developer 23

Termination of a contract by a wildlife spotter/catcher 24

Misconduct by a wildlife spotter/catcher 24

SECTION 3: SITE ASSESSMENT 26

General principles 26

Wildlife Protection and Management Plan (WPMP) 26

Approval of Wildlife Protection and Management Plan 28

Wildlife Protection and Management Plan not required 28

Site and Fauna Surveys 28

Site Survey 29

Fauna Survey 29

Reduction of wildlife load prior to operational works 30

Wildlife safety risk mitigation measures 30

Pre-works meeting 31

Vegetation or other habitat clearing or destruction 31

Timing and sequence of vegetation clearing 33

Vegetation and rubble piles 34

Design features and wildlife safety risks 34

Notification of unmanageable wildlife risk situations 35

SECTION 4: WILDLIFE MANAGEMENT 36

General Principles 36

Removal of terrestrial wildlife 36

Removal of arboreal wildlife 37

Removal of specific arboreal species 38

Preservation of tree hollows and other habitat features 39

Species Identification 39

Notification of species of special significance 40

Restraint and holding of captured wildlife 40
Capture, restraint and examination 40
Capture and restraint of macropods 41
Short-term holding 41
Long-term animal holding 43
Disposal of wildlife 43
Relocation of animals back to original site at completion of operational works 44
Translocation of animals to suitable habitat adjacent to development site 45
Translocation of animals to distant habitat 46
Placement of animals into permanent care or captivity 47
Placement of animals into temporary care or captivity 48
Notification of intention to keep native animals in temporary or permanent care 48
Euthanasia of animals 49
Euthanasia of healthy protected fauna 49
Euthanasia of feral or declared pests, or other non-native species 50
Emergency euthanasia of sick or injured animals 50
Use of veterinarians and veterinary services or drugs 51
Nomination of veterinarian on Wildlife Protection and Management Plan 51
Wildlife spotter/catcher to inform client of obligations regarding the provision of veterinary care 51
Provision of veterinary care to sick or injured animals 52
Requirement for presence of veterinarian on site 53
Requirement for monitoring of sedated or anaesthetised animals 53
SECTION 5: RECORD KEEPING AND REPORTING 54
Preparation of a Wildlife Management Report 54
Wildlife and habitat management plan 54
Wildlife capture and disposal record 55
Animal injury and euthanasia report 56

REPORTING 57

APPENDIX 1: RECOMMENDED EQUIPMENT FOR WILDLIFE SPOTTER/CATCHERS 58

APPENDIX 2: FORM FOR MAKING AN ANIMAL WELFARE DIRECTION 59

APPENDIX 3: WILDLIFE PROTECTION AND MANAGEMENT PLAN 61

APPENDIX 4: FAUNA SURVEY METHODOLOGY 62

APPENDIX 5: WILDLIFE MANAGEMENT REPORT 64

1. Introduction and Background

1.1 Purpose of the Queensland code of practice for the welfare of wild animals affected by land-clearing and other habitat impacts and wildlife spotter/catchers (The Code).

This code of practice provides standards and guidelines to ensure that fair, reasonable and appropriate measures are used by those involved in the destruction or modification of wildlife habitats to minimise the adverse effects on wild animal welfare and conservation. The principles set out in the Code are for the guidance of developers, town planners, plant and machinery operators, tree loppers and surgeons, farmers, and any other person, entity or agency involved in activities which are likely to cause suffering or death of wild animals, either directly or indirectly, as a result of destruction, modification or disruption of wildlife habitats, including land-clearing.

The Code emphasises the responsibilities of all relevant parties to:

- take all reasonable steps necessary to prevent cruelty or suffering to animals;
- minimise the loss of wildlife caused directly or indirectly by development or land-clearing;
- conserve, as much as possible, the ecological values of development sites and their surrounding natural environment.

The Code also provides standard operating procedures and guidelines for wildlife spotter/catchers, on whom much of the responsibility rests to ensure compliance with this Code, in respect of projects for which they are contracted or employed.

Although the greater community is largely ignorant of the impacts of development on wildlife welfare, there exists, nevertheless, an expectation that animals, whether domestic or wild, should not be treated cruelly. This Code reflects that general societal view by providing standards and guidelines to minimise cruelty to, or suffering of, wild animals as a result of development processes. There is also a rising awareness in the general community of the importance of protecting ecosystems, an expectation of the use of environmentally sustainable practices and minimisation of ecological harm.

1.2 Wildlife loss associated with land-clearing

The clearing of native vegetation, whether remnant or regrowth, represents the most significant cause of mortality of wildlife in Queensland. Based on land clearing rates in the state during 1997-1999, an estimated 100 million native mammals, birds and reptiles died yearly as a result of broad-scale clearing of remnant native vegetation[1]. That study did not seek to estimate wildlife loss associated with clearing of non-remnant (regrowth) vegetation, which suggests that the combined total may be significantly higher.

Land-clearing may also isolate populations or individuals in pockets of habitat, leaving them susceptible to misadventure, urbanisation edge effects, natural disasters, overpopulation, genetic degradation through inbreeding, and a range of other deleterious effects.

The concept of "extinction debt" relates to the likelihood of species extinctions sometime in the future as a result of passing a threshold of habitat loss and/or impact[2]. Extinction of rare species from habitat fragments in Queensland has been documented as occurring rapidly from small fragments or more slowly (over decades) from larger habitat fragments[3,4].

1.3 Animal welfare issues associated with land-clearing

Aside from the long-term ecological consequences of such a massive loss of wildlife, there are serious animal welfare issues associated with the methods used in the clearing of vegetation while animals are present. Although some animals may be killed instantaneously, it is likely that a much larger proportion suffer painful, distressing or prolonged deaths. Furthermore, displaced animals that survive the process of clearing may be subject to misadventure, motor vehicle trauma, starvation or attack by other animals or predators.

1.3.1 Animal injuries associated with land-clearing

Animals injured directly in the process of vegetation clearing generally suffer from major crushing, deceleration or fall related injuries. Arboreal species may suffer from trauma associated with falling from a tree and/or crushing and avulsive injuries associated with boughs falling on or beside them. Such injuries include severe internal bleeding and organ disruption, multiple bone breaks, eye and head injuries. Animals resting in hollows, similarly, may receive crushing injuries if the hollow bough disintegrates, or suffer internal organ injuries and tearing as a result of rapid deceleration (deceleration injury).

Ground dwelling animals, such as bandicoots, echidnas, snakes and lizards most commonly suffer from crushing and avulsive injuries (such as traumatic limb amputation), or may be buried alive during earthworks.

Highly mobile species such as birds and macropods may avoid direct injury by machinery, but may suffer injuries by running into fences, motor vehicle strike or other misadventure.

Injuries suffered by animals during land-clearing vary from mild to severe and fatal, but these animals are only rarely presented to wildlife hospitals or shelters. This is primarily because they are less likely to be discovered by members of the community and are more usually buried or confined in piles of debris during the process of clearing, which are then subsequently burnt or chipped.

1.3.2 Misadventure and starvation associated with land-clearing

Animals that survive the process of land-clearing may succumb later to starvation, predation, territorial aggression, misadventure (such as drowning in swimming pools, entanglement in fences, and the like) domestic animal attack, motor vehicle strike and maladaptation to new habitat. A small proportion of animals may disperse to adjacent habitat will little ill-effect, but, contrary to popular belief, the proportion of animals successfully doing this is likely to be small.

1.3.3 Isolation of wildlife and habitat fragmentation

Developments or land-clearing that result in destruction or diminishment of habitat corridors or loss of habitat connectivity may result in reduction or loss of the ability of individuals of a species to disperse from the isolated habitat fragment. This may lead to loss of wildlife through overpopulation and starvation, misadventure during dispersal attempts, and loss of individuals through edge effects (such as domestic animal attack), as well as marked diminishment of ecological values generally. Wildlife populations isolated by loss of corridors present larger and more complex management problems for future developments impinging on the remaining habitat, or alternatively may reach a critical population density at which mass mortality occurs, or causes human-animal conflict issues for surrounding communities.

1.4 Removal of wildlife prior to land-clearing and eco-friendly development

The removal of wildlife from sites shortly prior to, and during vegetation clearing represents the most proximate mechanism for reducing wildlife injury and mortality associated with land clearing. This requires the use of personnel skilled in the detection and removal of wildlife from vegetation and other terrestrial habitats, and the adoption of protocols and procedures for the humane handling, housing and disposition of wildlife following removal from their habitats.

The application of ecologically sound design and planning principles to proposed developments represents the most important method of reducing and minimising adverse impacts on wildlife and the ecological values of habitat remnants. These principles should be rigorously applied to all development proposals at an early stage in planning to minimise the requirement for expensive (and less desirable) wildlife and habitat management alternatives, some which are detailed in this code. It is important that all parties involved in urban and rural planning and development projects attempt to adhere to ecologically sound and sustainable development principles.

1.5 Relevant legislation

A number of state and federal statutes provide some degree of legislative protection for wildlife likely to be affected by land-clearing, including the Queensland *Nature Conservation Act 1992*, the Queensland *Vegetation Management Act 1999*, and the Federal *Environmental Protection and Biodiversity Conservation Act 1999*. In respect of animal welfare and the prevention of cruelty, the Queensland *Animal Care and Protection Act 2001* provides legislative protection to animals generally.

[1]Cogger, H., Ford, H., Johnson, C., Holman, J. & Butler, D. 2003, Impacts of Land Clearing on Australian Wildlife in Queensland (January 2003): WWF Australia Report, WWF Australia, Brisbane.

[2] Hanski, I. & Ovaskainen, O. 2002, Extinction Debt at Extinction Threshold**,** *Conservation Biology,* 16 (3), pp. 666–673.

[3] Laurence, W.F. 1990, Comparative responses of five arboreal marsupials to forest fragmentation, *Journal of Mammalogy,* 71, pp. 641-653.

[4] Laurence, W.F. 1995, Extinction and survival of rainforest mammals in a fragmented tropical landscape, Ch. 3 *in* Landscape Approaches in Mammalian Ecology and Conservation, ed. by W.Z. Lidecker Jr. University of Minnesota Press, Minneapolis.

2. Scope and Aims of the Code

2.1 Scope

This code of practice provides standards and guidelines for the humane treatment of wild animals affected by the clearing of vegetation or other natural or artificial terrestrial wildlife habitats. The first section deals with the general responsibilities of any person engaged in, or directing, an activity that involves the destruction or modification of wildlife habitats, including artificial habitats. The second section deals with the specific roles and responsibilities of wildlife spotter/catchers.

Many minor activities or development processes relevant to this Code may not require the use of a wildlife spotter/catcher (see Section 1 of the Code below). However, for larger projects or activities in which wildlife is likely to be at risk, the use of accredited wildlife spotter/catchers is required for compliance with this Code.

Responsibility for compliance with the Code, therefore, rests both with the developer and any other person whom, by virtue of their activities or involvement in a development, has a "duty of care" towards animals that may be affected by the development or activity, including wildlife spotter/catchers.

It is not the intent of the Code to provide detailed description of ecological assessment procedures, but rather Standard Operating Procedures (SOPs) for wildlife spotter/catchers, aimed at ensuring consistency and effectiveness of practice; and guidelines to assist developers and others in their legal and ethical obligations to minimise injury, hardship, suffering or death to wild animals, associated directly or indirectly with land-clearing and other development processes.

The Code provides standards and guidelines aimed at protecting the welfare of wildlife affected by land-clearing to a standard consistent with the intent of the Queensland *Animal Care and Protection Act 2001*, and the general views of society. It is the responsibility of any person or entity involved or engaging in relevant activities, to ensure compliance with relevant state and federal statutes, this Code, and other relevant codes of practice.

2.2 Aims

The broad aim of the Code is to provide standards and guidelines to ensure that all reasonable steps are taken to protect the welfare of wild animals affected by land-clearing or other forms of wildlife habitat modification or destruction.

The specific aims of this code of practice are:

- to provide standards and guidelines to prevent or minimise cruelty or harm to wild animals associated with, or resulting from land-clearing and other development processes causing habitat impacts;

- to define the requirements for accreditation and licensing of wildlife spotter/catchers;
- to provide standard operating procedures for wildlife spotter/catchers;
- to provide guidelines on the management of wildlife likely to be affected by land-clearing and other development processes;
- to provide guidelines for minimising the ecological harm caused by land-clearing and development.

3. Important Guiding Principles Underpinning the Code and Definitions

IMPORTANT PRINCIPLES

3.1 Duty of care

"*Duty of care*" obligations to wild animals, in respect of the Code, are similar to those underpinning the Queensland *Animal Care and Protection Act 2001*. However, in respect of this Code the *duty of care* responsibility rests individually and collectively on any and all parties involved with, engaged in, or directing land-clearing or the destruction or modification of wildlife habitats. The duty of care does not require specific knowledge of wildlife presence, only a general awareness of what might constitute a habitat of wild animals.

Furthermore, the *duty of care* exists in respect of any wildlife habitat, irrespective of whether animals are known to use the habitat or not. In other words, wildlife must be *assumed* to be present in potential wildlife habitat unless or until proven otherwise by a person suitably experienced and/or accredited to make that judgment.

Duty of care relates to the legal responsibility of a person, or persons, involved in an activity that may result in harm to or death of an animal or animals, to take all fair, reasonable and appropriate steps to avoid or minimise that risk. Failure to meet *duty of care* responsibilities, that is; failing to take fair, reasonable and appropriate measures to avoid or protect wild animals from harm, may result in prosecution under the Queensland *Animal Care and Protection Act 2001* or the *Nature Conservation Act 1992* irrespective of proof of animal death or injury.

3.2 Due diligence

The term "*due diligence*" relates to the application of sufficient and appropriate techniques to detect the presence of animals, or determine the absence of animals, in a tree, structure or other habitat. It also applies to determination of whether a structure, habitat feature or site is likely to be important or essential to the survival of a wild animal or population. It may also apply to assessment of the risk posed by a development process, activity or structure, to wildlife or their habitats.

Due diligence is a requirement of the Code, and must be performed prior to engaging in an activity or development process relevant to this Code.

3.3 Fair, reasonable and appropriate measures

The principle of "*fair, reasonable and appropriate measures*" includes guidelines, recommendations and standard operating procedures included in this Code, plus any other measure or activity that is available, suitable and appropriate to minimise the risk of harm to animals, or deleterious impacts on the natural environment. This guiding principle recognises that any process that causes significant disruption or destruction of wild animal habitats may result in the death of some animals, (particularly small animals such as skinks, small frogs and the like), in spite of efforts to avoid it.

Current societal attitudes lead to an expectation that fair and appropriate steps are taken to avoid or minimise cruelty or suffering to animals, and that due respect is given to minimising adverse impacts on their habitats. The expertise of wildlife spotter/catchers and other suitably qualified or experienced people is important in determining what constitutes *fair, reasonable and appropriate measures*, in the present circumstances.

DEFINITIONS

For the purposes of this Code:

"vegetation" is any native or non-native tree, shrub or plant, including grasses and mangroves, including "remnant vegetation" and "regrowth (non-remnant) vegetation".

"animal", "wildlife" and **"fauna"** are any free-living native or non-native vertebrate animal, including feral animal and declared pest animal species, and any invertebrate animal specifically protected under the Queensland *Nature Conservation Act 1992* or its regulations, or the Queensland *Animal Care and Protection Act 2001* or its regulations.

"significant wildlife", "significant fauna", "significant species" are any species listed under federal, state or local statutes or policy as endangered, vulnerable or rare, local significant, critically endangered, or any designation other than common.

"wildlife habitat" is any natural terrestrial, subterranean or aquatic habitat, or man-made structure, or other structure known to be, or reasonably likely to be used by wildlife. Wildlife habitats include, but are not necessarily limited to:

(a) vegetation, or vegetated areas, including forests, plains, mangroves, wetlands, heathlands, dunes, deserts, and marine environments; whether classified as "remnant" or "non-remnant", and whether native, non-native or artificially created;

(b) freshwater and marine habitats;

(c) caves, rocky outcrops, river banks and other natural geological features;

(d) man-made or artificial structures or habitats, such as drains, buildings, dams, canals, bridges, telecommunication towers, or any other structure known, or reasonably likely to be used by wildlife.

"wildlife corridor" is any section, strip or area of wildlife habitat (whether degraded or not), or cleared area, that is known to be used as, or may reasonably be expected to act as, a corridor for wildlife movement, between, or linking wildlife habitat areas.

"essential wildlife habitat" is any wildlife habitat block or area, or feature that is reasonably likely to be essential to the survival of one or more wild animals, such as a dam that is the only source of water for a wild animal or local wildlife population. (Note: "essential wildlife habitat" has a different meaning and application in respect of the *Vegetation Management Act.*

"land-clearing", **development processes"**, and **"relevant activity"** mean any process or activity that involves, causes, or results in, either directly or indirectly, the removal, destruction, or significant modification of natural or man-made wildlife habitats, that are known to contain, or may reasonably be expected to contain, support, or be used by, wildlife, for their survival, movement and reproduction, to an extent that is reasonably likely to cause death, suffering or significant hardship.

"wildlife spotter/catcher" is any person accredited in accordance with this code and licensed under the Queensland *Nature Conservation Act 1992* to conduct and/or supervise the preparation and implementation of Wildlife Protection and Management Plans, and the detection, capture, removal and disposal of wildlife from sites proposed to be developed.

"developer" is any person, corporation, entity, government body or agency conducting or proposing to conduct land clearing, vegetation clearing or other development processes, or any activity that results in the modification or destruction of wildlife habitats or corridors. For the purposes of the Code, this definition includes plant and machinery operators, tree loppers, site foremen, and any other person or persons engaging in, directing or supervising any activity or process involving the destruction or modification of a wildlife habitat, or other development process relevant to this Code.

"standard operating procedures (SOP)" are any documented procedures or protocols required to be routinely applied by relevant personnel to ensure compliance with the Code, or other relevant codes of practice.

"Wildlife Protection and Management Plan (WPMP)" is a document prepared by an accredited and licensed wildlife spotter/catcher, that defines all of the actions and measures, and their timing, in relation to a development or activity, required to protect the welfare of wild animals and minimise the adverse ecological impacts of that development or activity, to a level or standard required by the Code, and consistent with the intent of the Queensland *Animal Care and Protection Act 2001* and the Queensland *Nature Conservation Act 1992*. The WPMP is prepared before the onset of operational works, and must be approved by the Queensland DERM prior to implementation.

"Wildlife Management Report" is a document prepared by an accredited and licensed wildlife spotter/catcher at the completion of a project, which details the wildlife and habitat management procedures used and recommended for the development. It contains detailed returns on animal capture, movement and disposal.

"**Department of Environment and Resource Management**" or "**DERM**" refer to the Queensland Government Agency responsible for the administration and enforcement of the Queensland *Nature Conservation Act 1992* and its regulations, and the management of wildlife and the natural environment in Queensland.

"Queensland Primary Industries and Fisheries" or "QPI&F" is a part of the Queensland Government Department of Employment, Economic Development and Innovation (DEEDI). The Animal Welfare Unit is a division within that department which is responsible for the administration of the *Animal Care and Protection Act 2001*.

CODE OF PRACTICE

SECTION 1: GENERAL PRINCIPLES FOR THE WELFARE OF WILD ANIMALS LIKELY TO BE AFFECTED BY DEVELOPMENT PROCESSES

Responsibilities of a developer

1.1. A developer must not proceed with any development process or activity (as defined in the previous section) without first:

(a) determining whether, or not, a site, or portion of a site, or structure, that is proposed to be subject to a development process, is likely to be used as a wildlife habitat; and

(b) applying due diligence in determining the presence or absence of wild animals (if a site or structure contains a wildlife habitat); and

(c) determining that the site is *not* an essential wildlife habitat, and is *not* part of a wildlife corridor; and

(d) determining that any wild animals using the habitat or site are unlikely to suffer any harm, or injury or death as a result of the proposed development process or activity; or

(e) applying fair, reasonable and appropriate measures to avoid such harm, injury or death, including engaging a wildlife spotter/catcher in circumstances defined by this Code.

1.2. In the case of minor projects or activities, such as minor earth works on previously cleared land, or the removal of one or more small trees, the requirement for due diligence may be satisfied by simple observation.

For example: if a small tree is to be removed, "due diligence" and "fair, reasonable and appropriate measures" may be satisfied simply by close observation of the tree to confirm the absence of nests, hollows, animals under sloughing bark, and the absence of animals in the boughs or canopy.

1.3. A development assessor (usually a local government authority) may approve a development under the provisions of the IPA/IDAS regulatory framework with specific reference or conditions relating to compliance with this Code. However, approval of a development without specific reference to the Code does not relieve a developer of their obligations in respect of this Code.

Requirement for engagement of a wildlife spotter/catcher

1.4. In the case of any proposed project, activity or process, in which a lay person could not reasonably be expected to make the determinations defined in section 1.1 (a-e) above, then a licensed wildlife spotter/catcher or other appropriately qualified or experienced person, must be engaged to perform the same.

1.5. Furthermore, if a site, or portion of a site, or structure, forms part of a wildlife corridor, or forms a significant part of a wild animal's home range or territory, such that its destruction may result in harm or death to the animal, or have a significant adverse ecological effect, then a licensed wildlife spotter/catcher must be engaged to prepare and implement a *Wildlife Protection and Management Plan* (WPMP), to ensure compliance with this Code.

For example: the removal of a pole or stag used as a nesting site by ospreys must not occur without an appropriate replacement and the involvement of a licensed wildlife spotter/catcher.

1.6. Certain criteria relating to a site or proposed development processes or activities may determine the need for the engagement of a wildlife spotter/catcher, and include, but are not limited to:

(a) removal of any tree, or trees, containing hollow boughs or trunks, bird or possum nests or dreys, or other features indicative of current or recent use by wildlife;

(b) removal of all or part of a significant wildlife corridor, or essential wildlife habitat;

(c) any process or activity that, for compliance with the Code, requires the capture, trapping or removal of native animals;

(d) removal of any complex structure or habitat feature (such as an old farm shed, or log pile) which cannot, by cursory observation, be determined to be uninhabited by wildlife.

Discharge of a developer's responsibilities under the Code

1.7. If a developer has satisfied the provisions of section 1.1 above, then that is sufficient discharge of their responsibilities under this code, and a development activity or process may proceed, subject to other relevant regulatory approvals.

1.8. If a wildlife spotter/catcher, engaged in that role for a project or activity, makes a determination (in writing) that a development process is *unlikely* to cause significant adverse effects on wild animals, then that will be sufficient discharge of a developer's responsibilities in respect of this Code, and the development activity or process may proceed.

1.9. Notwithstanding sections 1.7 and 1.8 above, if new information becomes available regarding the presence of animals on, or using a site, then any determinations regarding the need for engagement of a wildlife spotter/catcher, and/or fair, reasonable and appropriate measures to protect the welfare of animals, must be reviewed.

Removal of wildlife from a site without assistance from a wildlife spotter/catcher

1.10. A person, other than an accredited and licensed wildlife spotter/catcher, may not catch, remove, harass or disturb any permanently protected animal (which includes all native vertebrate animals) under the Queensland *Nature Conservation Act 1992* and this Code, unless that person is licensed to do so by DERM. In general, such licensing will be limited to accredited wildlife spotter/catchers.

1.11. Notwithstanding section 1.10 above, if an animal has wandered onto a site that has previously been assessed as fulfilling the requirements of this Code, *and* an accredited wildlife spotter/catcher is not immediately available, then the animal may be encouraged to move off the site, with due care and attention paid to minimising the stress or danger to the animal, subject to the following criteria being met:

(a) the animal can be easily encouraged to move back into safe habitat without capture or undue interference or distress; and

(b) suitable habitat is easily able to be reached by the animal; and

(c) there are no proximate risks (such as busy roads) to the animal's safety; and

(d) there are no other apparent reasons to require the animal's capture (such as significant injury or illness.

For example: if a wallaby or group of wallabies is grazing on grassland (the development site) which is adjacent to an area of secure bushland, and no proximate danger is apparent (such as a busy road), then the animals may be carefully encouraged back into the vegetated area prior to the onset of operational works.

1.12. However, if a potential risk or danger to an animal is apparent (such as proximity to a busy road), or an animal would more appropriately be captured and translocated, then a licensed wildlife spotter/catcher must be engaged to manage the situation.

1.13. Notwithstanding section 1.12 above, if a wildlife spotter/catcher is not available within a reasonable timeframe, then a developer may contact the local or regional office of DERM, or the local regulatory authority, for direction on an alternative course of action that will comply with the requirements and intent of the Code.

Use of wildlife spotter/catchers for development activities or processes

1.14. Licensed wildlife spotter/catchers must be used in all circumstances requiring, or likely to require, or cause:

(a) the capture or removal of wildlife as required by the Code (except as exempted by virtue of section 1.11 of the Code, above);

(b) the preparation of a *Wildlife Protection and Management Plan*;

(c) the destruction or modification of an essential wildlife habitat or habitat feature, or a wildlife corridor;

(d) any impact, either through operational works, or by virtue of the design or functioning of a development after completion, that is likely to have a significant adverse effect on a wild animal or wildlife population.

For example: if a development will require the construction of a road (which is likely to become busy) through a wildlife habitat, or if, by virtue of the development, an existing road is likely to bear a significant increase in traffic, then the engagement of a wildlife spotter/catcher and the preparation of a WPMP is required for compliance with the Code, even if the road is not part of the development or site.

1.15. The omission of a "wildlife spotter/catcher must be used" condition, or similar condition, on a local government development approval is not sufficient grounds for exemption from compliance with the requirements of section 1.14 above.

SECTION 2: ACCREDITATION, LICENSING AND RESPONSIBILITIES OF WILDLIFE SPOTTER CATCHERS

Roles of wildlife spotter/catchers

2.1. The proper conduct of wildlife management procedures at land-clearing and development sites involves processes such as:

- fauna and flora assessment;
- species identification;
- animal trapping, capture and handling;
- assessment of animal health and injuries;
- assessment of development risks and impacts on wildlife and ecosystems;
- preparation of *Wildlife Protection and Management Plans*;
- husbandry of captured wild animals;
- identification of suitable wildlife release sites;
- emergency management and/or euthanasia of injured or sick animals.

2.2. It is therefore necessary that personnel conducting these activities are suitably trained in these techniques, and also accredited and licensed by appropriate government authorities.

Licensing of wildlife spotter/catchers

2.3. A person engaged as, or performing the duties of a wildlife spotter/catcher in Queensland must be accredited and currently licensed as such by DERM.

2.4. A person engaged as, or performing the duties of a wildlife spotter/catcher must have knowledge of, or be competent in:

(a) survey techniques for all vertebrate fauna;

(b) identification of vertebrate fauna, and significant invertebrate fauna;

(c) the humane capture, trapping and handling of vertebrate fauna;

(d) identification of habitat and or habitat resources of significant fauna;

(e) ecological processes and the relevance for fauna;

(f) locally occurring species, and those listed specifically under federal, state and local legislation or policy as significant;

(g) data recording and written reporting;

(h) humane techniques for emergency euthanasia of vertebrate animals;

(i) all state, federal and local statutes and laws, and international agreements, relevant to the conduct of activities and responsibilities of wildlife spotter/catchers, including, but not limited to:

1) the Queensland *Animal Care and Protection Act 2001*

2) the Queensland *Nature Conservation Act* and its subordinate legislation

3) the Queensland *Vegetation Management Act*

4) the *Integrated Planning Act* and *Integrated Development Assessment System*

5) JAMBA, CAMBA and other international wildlife agreements

6) the federal *Environment Protection and Biodiversity Conservation Act*

2.5. A person engaged in the role of a wildlife spotter/catcher must have appropriate equipment at their disposal for the detection and humane capture, husbandry and management of vertebrate fauna (*a list of recommended equipment is contained in Appendix 1 to this Code*).

2.6. A person engaged in the role of a wildlife spotter/catcher should maintain currency of vaccination against the following infections or infectious conditions:

(a) Australian Bat Lyssavirus (ABL) – rabies vaccination

(b) *Coxiella burnetti* (Q Fever) – Q Fever vaccination

(c) Tetanus

2.7. A person engaged in the role of a wildlife spotter/catcher should maintain currency of certification and/or competency relating to:

(a) use of chainsaws

(b) use of elevated work platform

(c) construction blue card

(d) basic first aid

Powers of wildlife spotter/catchers under this Code

2.8. A licensed wildlife spotter/catcher engaged in that role for a development or activity may make an *Animal Welfare Direction* in respect of operations, activities or structures that may impact on the welfare of wild animals. The direction should be made in an approved written format (Appendix 2). This direction may define the timing of and actions or measures required to protect the welfare of animals likely to be affected by such operational works, activities or structures. Any breach of the direction may be considered to be a breach of this Code.

For example: the wildlife spotter/catcher may make a direction that a wildlife-proof fence be constructed along the border of a busy road adjacent to a development site to prevent animals from moving onto the road during clearing activities.

2.9. Such directions may form part of the *Wildlife Protection and Management Plan*, or may be made separately upon identification of a specific risk. An A*nimal Welfare Direction* shall be made in writing in an approved form, and copies given to all relevant persons; or, in the case of a clear and present risk to animal welfare, an *Animal Welfare Direction* may be made verbally. In general, an A*nimal Welfare Direction* will only be used in circumstances in which the wildlife spotter/catcher considers that there exists a real and proximate risk to animal welfare.

2.10. In circumstances in which an *Animal Welfare Direction* has been breached, or in the opinion of the wildlife spotter/catcher an activity is occurring, or is likely to occur that may result in significant risk of harm to, or death of animals, the wildlife spotter/catcher may make a S*top Work Order*. This order will remain in force until the wildlife spotter/catcher is satisfied that appropriate measures have been taken to mitigate the risk.

Responsibilities of wildlife spotter/catchers

2.11. The wildlife spotter/catcher has ethical responsibilities guided by the *Animal Care and Protection Act 2001* and *Nature Conservation Act 1992* to ensure the protection of the welfare of wild animals in respect of a development or activity for which they are acting in that role. A wildlife spotter/catcher also has an obligation to comply with this Code.

2.12. In terms of the performance of duties and standard operating procedures required by the Code for each project, the wildlife spotter/catcher's responsibilities include, but are not limited to:

(a) thorough site assessment and fauna survey (or validation of a previously conducted fauna survey);

(b) preparation of a *Wildlife Protection and Management Plan* (WPMP);

(c) ensuring that relevant persons associated with developments and operational works or activities are provided with copies of the WPMP and understand their responsibilities under the *Animal Care and Protection Act 2001*, and the importance of complying with *Animal Welfare Directions*;

(d) clearly identifying to all relevant persons the specific wildlife welfare risks associated with the project, and recommended risk mitigation measures;

(e) ensuring the timely and appropriate removal and management of animals from development sites prior to and/or during operational works or activities;

(f) ensuring the appropriate housing, husbandry, veterinary assessment and care, translocation, euthanasia or other appropriate disposal of animals removed from development sites;

(g) preparation of a *Wildlife Management Report* (WMR) on completion of a development project or activity, which is to be submitted in a timely manner to the local regulatory authority, the Animal Welfare Unit of DEEDI and DERM if required;

(h) notification of the Director of the Animal Welfare Unit, DEEDI, or his delegate, of breaches of the *Animal Care and Protection Act 2001.*

2.13. In addition, the wildlife spotter/catcher should be aware of their own "duty of care" obligations under the Queensland *Animal Care and Protection Act 2001,* as these apply to animals captured, trapped or held in the course of their duties.

Use of unlicensed personnel by a wildlife spotter/catcher

2.14. In order to ensure compliance with the Code and other regulations regarding the welfare and protection of wild animals on a site, a licensed wildlife spotter/catcher must ensure that the level of supervision of personnel involved in the capture, management and care of animals takes into account their experience and competence.

2.15. Licensed wildlife spotter/catchers are responsible for the proper supervision and direction of their personnel.

Accountability of wildlife spotter/catchers for powers given under this code

2.16. Accredited and licensed wildlife spotter/catchers must be accountable for the correct and proper use of any powers given under the Code, and appropriate discharge of their responsibilities in respect of the Code.

2.17. Wildlife spotter/catchers are commonly contracted by a developer or developer's agent to perform services required as a condition of a development approval, and therefore have certain responsibilities towards their employer. They also have important responsibilities to

the community generally to ensure that all reasonable measures are taken to protect the welfare of wild animals likely to be impacted by a development.

2.18. Any powers given to a wildlife spotter/catcher under the provisions of the Code must be used strictly in accordance with the intent and provisions of the Code.

2.19. This Code confers no specific legal powers to a wildlife spotter/catcher in respect of any Federal or State Act or Regulation. However, breaches of this Code may concurrently breach relevant Acts or Regulations, and as such may lead to investigation and prosecution under the provisions of those Acts, in particular, the Queensland *Animal Care and Protection Act 2001*.

Disagreement between a developer and a wildlife spotter/catcher

2.20. In some circumstances there may arise some disagreement between a developer and a wildlife spotter/catcher with regard to what constitutes "fair, reasonable and appropriate measures" to protect the welfare of wildlife. Such disagreements may occur particularly in instances in which a measure, or measures, proposed by a wildlife spotter/catcher, is/are time or resource intensive. In such instances, resolution of disagreements should be attempted by reference to this Code, or some other standard operating procedure or code of practice. In all cases, however, the welfare of animals is of paramount importance and is the primary responsibility of the wildlife spotter/catcher.

2.21. Irreconcilable disputes between a developer or their agent, and the wildlife spotter/catcher should be referred, for resolution, to a tribunal consisting of a representative of DERM, a representative of the local regulatory authority and a representative of the Queensland Association of Professional Wildlife Managers.

Termination of a contract by a developer

2.22. A developer may wish to terminate the contract of the wildlife spotter/catcher and contract a new wildlife spotter/catcher for completion of a project. However:

2.22.1. If the reason for termination is as a result of disagreement over a measure or measures proposed by a wildlife spotter/catcher in the interests of protecting the welfare of wild animals, then the termination may only occur with the written consent of the Tribunal.

2.22.2. A developer may terminate a contract with a wildlife spotter/catcher without the written consent of the Tribunal if:

(a) the wildlife spotter/catcher has failed to perform any standard operating procedure or duty reasonably expected to be performed in the course of their duties as a wildlife spotter/catcher; or

(b) the wildlife spotter/catcher has misused a power given under the Code; or

(c) the wildlife spotter/catcher has failed to perform their duties to a standard expected, or in accordance with their contract; or

(d) any other reason, notwithstanding section 2.22.1 above.

Termination of a contract by a wildlife spotter/catcher

2.23. A wildlife spotter/catcher may terminate a contract with a developer for any reason, by giving due notice in writing, stating the reasons for termination of the contract, to:

(a) the developer or developer's nominated agent; and

(b) DERM; and

(c) the relevant local government authority in respect of developments requiring approval from local government.

2.24. Notwithstanding section 2.23 above, a wildlife spotter/catcher may be sued under Common Law for damages resulting from breach of contract.

Misconduct by a wildlife spotter/catcher

2.25. A wildlife spotter/catcher may be guilty of misconduct if:

(a) there has been an abuse of the powers given under the Code; that is, either *Animal Welfare Directions* or *Stop Work Orders* have been issued inappropriately, and/or in circumstances not supported by the Code;

(b) he or she has failed to apply due diligence in the detection of wildlife at a site, resulting in injury or death to a wild animal, or the likelihood of injury or death to a wild animal;

(c) he or she has failed to apply, or define in the *Wildlife Protection and Management Plan*, fair, reasonable and appropriate measures, resulting in injury or death to a wild animal, or the likelihood of injury or death to a wild animal;

(d) he or she has failed to make adequate or appropriate provision for the husbandry and veterinary needs of a captured animal, particularly those that are sick or injured.*

*Note: Under the provisions of the current *Animal Care and Protection Act 2001,* any person "in charge" of an animal has a duty of care to provide for its husbandry and veterinary needs irrespective of ownership of the animal.

STANDARD OPERATING PROCEDURES FOR WILDLIFE SPOTTER/CATCHERS

SECTION 3: SITE ASSESSMENT

General principles

3.1. The wildlife spotter/catcher has a significant burden of responsibility to ensure that the animal welfare and ecological impacts resulting from a development or activity, for which they are engaged in that role, are minimised.

3.2. The general principles of due diligence in the detection of wildlife, and fair, reasonable and appropriate measures in preventing wildlife loss or ecological damage, apply to the practice of wildlife spotter/catching as they do for any individual engaged in a relevant activity.

3.3. Wildlife spotter/catchers are expected to have specialised knowledge in the detection, identification and removal of wildlife; assessment of potential impacts of developments or activities on wildlife; an understanding of basic ecological principles; good animal handling and husbandry skills; local knowledge of appropriate release sites for wildlife; and a good general understanding of local, state, and federal statutes and non-statutory instruments and agreements relating to wildlife, habitat and development issues.

3.4. Wildlife spotter/catchers should maintain currency of information in their field of expertise by attendance at workshops, training days and by other means of continuing education.

3.5. In order to ensure consistency between, and high standards of practice by, wildlife spotter/catchers, the following minimum Standard Operating Procedures should be applied.

Wildlife Protection and Management Plan (WPMP)

3.6. A WPMP should be prepared for any project or activity in which:

(a) wild animals are likely to be captured or removed from a site to comply with the Code;

(b) an essential wildlife habitat or wildlife corridor will be, or is likely to be impacted by the development or activity; or

(c) operational works, or any of the operational aspects or features of the completed development, will have, or are likely to have significant impacts on local wildlife populations.

3.7. The WPMP should be in the format shown in Appendix 3 of the Code.

3.8. Notwithstanding sections 3.6 and 3.7 above, if a *Vegetation and Fauna Management Plan* has been prepared by other consultants to a project, a separate WPMP may not need to be prepared if:

(a) The *Vegetation and Fauna Management Plan* describes all of the measures required for wildlife management that would otherwise have been provided for in a WPMP; and

(b) The *Vegetation and Fauna Management Plan* makes a provision for all relevant wildlife protection and management measures to be conducted by an accredited and licensed wildlife spotter/catcher; and

(c) The wildlife protection and management measures satisfy the requirements this Code of Practice.

3.9. The detail in the WPMP should reflect the complexity or scale of wildlife management required for the site or activity.

For example: for a project in which a large area of highly significant wildlife habitat will be cleared the WPMP will be a long, thorough and detailed document, whereas that for the removal of a few small eucalypts would be short and simple.

3.10. The WPMP must include the following:

1) A description of the project (including timeframes for operational works) with special reference to features likely to affect wildlife or wildlife habitats.

2) A pre-development site plan with recent aerial photograph (if available) showing wildlife habitats, corridors, riparian features, and relevant adjacent habitat. Proposed development site plan should indicate areas of habitat likely to be removed or affected, and structures, roads or other potential hazards that may impact on wildlife after the development is completed.

3) Fauna survey results, including reference to species that were not detected, but are likely to be present (Wildnet, Queensland Museum databases).

4) Wildlife and habitat impact assessment detailing all aspects of development activities, operational works, and features likely to have an impact on wildlife, as well as likely future impacts on wildlife after completion of the development or activity. This section should include reference to adjacent habitat as well as that contained on site.

5) *Wildlife and Habitat Impact Mitigation Plan* indicating:

(a) measures required to be taken to minimise wildlife and habitat effects during operational works;

(b) wildlife capture and removal plan;

(c) contingency plan for wildlife requiring euthanasia, other veterinary procedures or captive care;

(d) wildlife storage and housing plan;

(e) wildlife release and disposal plan;

(f) measures required to be taken to minimise adverse wildlife impacts following completion of works.

Approval of Wildlife Protection and Management Plan

3.11. A completed WPMP should be submitted to DERM for approval, prior to implementation.

3.12. In the case of a development or activity requiring local government approval, a DERM-approved WPMP should be submitted to the relevant local government authority prior to its implementation.

Wildlife Protection and Management Plan not required

3.13. A wildlife spotter/catcher is not required to prepare a WPMP if:

(a) wildlife are not detected at a site, or will not be impacted by activities proposed for the site; and

(b) wildlife will not be required to be captured or moved from the site; and

(c) the site is not wholly, or part of, an essential wildlife habitat or wildlife corridor; and

(d) operational works, or operational aspects or features of the completed development, are unlikely to have adverse effects on local wildlife populations or individuals.

3.14. If an activity or development fulfils the requirements of section 3.12 above and is an activity or development requiring local government approval, then the wildlife spotter/catcher should give notice in writing to the relevant local government authority, that a WPMP is not required, and the reasons for that.

Site and Fauna Surveys

3.15. Each site or project must be assessed using fauna survey equipment and methodologies sufficient for the wildlife spotter/catcher to form a reasonably accurate picture of the species diversity and, whenever possible, broad estimates of the number of individuals likely to be present.

3.16. Such assessments, along with the project design and operational works plans and schedules, form the basis of the information required for the formulation of the WPMP.

3.17. In some instances, site, fauna and flora surveys may have been previously conducted by other consultants to the project. In such cases, duplication is not required by the wildlife spotter/catcher unless discrepancies are suspected or observed.

3.18. The use of resource bases such as the Queensland Museum, DERM, and Queensland Herbarium are encouraged in the preparation of fauna and/or flora surveys by wildlife spotter/catchers.

Site Survey

3.19. A site survey should be conducted and a basic site plan drawn up indicating terrain features, waterways, vegetation types and other habitat features. DERM regional ecosystem (RE) maps should be consulted to determine if vegetated areas have been mapped as requiring special attention. Detailed site plans may be available from surveyors consulting on larger projects.

3.20. Site survey plans should be of sufficient detail to enable easy interpretation of the WPMP.

For example: large habitat/hollow-bearing trees should be individually identified, as should special habitat features likely to contain ground dwelling or burrowing wildlife, known feed trees of significant species, such as Casuarinas with chewed cones, and the like.

Fauna Survey

3.21. Fauna survey methodology and effort should reflect the size, biodiversity and ecosystem attributes of the proposed development site. Survey methodology recommendations are provided in Appendix 4.

3.22. Fauna surveys must take into account seasonal, temporal and climatic variation in the detectability of fauna species, in particular, those species known to be cryptic.

3.23. Specific methodology and/or effort should be employed for the detection of significant fauna, particularly those classified under State or Federal legislation, or those listed as locally significant.

3.24. Fauna surveys may have been performed by other consultants to development projects, but it is not uncommon for such surveys to be deficient with respect to fauna present on, or utilising the site. Furthermore, such surveys may give little indication of the numbers of individuals present. Hence, the wildlife spotter/catcher should validate the findings of any previous fauna surveys, by conducting their own inspection of the site and/or performing additional surveys.

3.25. The results of the wildlife spotter/catcher's own fauna survey, or discrepancies identified by the wildlife spotter/catcher in previous fauna surveys, should be reported in the *Wildlife Protection and Management Plan*.

Reduction of wildlife load prior to operational works

3.26. Significant effort may be required to avoid or minimise the injury to, or death of wild animals from vegetation clearing, habitat damage or other operational works. The measures and timing of such measures should be defined in the *Wildlife Protection and Management Plan.*

3.27. Wildlife load reduction measures must be implemented or conducted by the wildlife spotter/catcher for an appropriate period of time immediately prior to the onset of operational works. Such measure may include, but not be limited to:

(a) thorough fauna trapping using an appropriate range of trapping methods;

(b) erection of fauna exclusion fencing;

(c) use of fauna aversion techniques;

(d) manual or pharmacological capture and removal of fauna.

3.28. Wildlife load reduction methods and effort must be appropriate for the diversity and abundance of fauna present, and be guided by the results of prior fauna survey and the extent and nature of proposed operational works.

3.29. The seasonal, temporal, climatic and behavioural variation in the detection, and ease of capture of different fauna species must be reflected in the timing and methods used for wildlife load reduction.

Wildlife safety risk mitigation measures

3.30. In some circumstances, the removal of wildlife from development sites may not be necessary due to the retention of habitat, and/or minimal impacts of the development or activity on wildlife or habitats. However, operational works may still present hazards to wildlife retained on site or inhabiting areas adjacent to the site.

For example:

I. Operational works may require the use of heavy earthmoving equipment on a site adjacent to wallaby habitat bounded by a major road. Risk mitigation may require temporary fencing of the road to minimise risk of motor vehicle accident.

II. *Operational works may require the construction of deep ditches or footings, presenting risks to wildlife wandering onto the site. Risk mitigation may require the use of temporary wildlife-proof fencing around trenches during operation works.*

3.31. It is the responsibility of the wildlife spotter/catcher to identify significant wildlife safety risks both for wildlife retained on site, as well as wildlife in adjacent areas or widely ranging wildlife that may use, or move through the site during operational works. Measures required for mitigation of such risks should be included in the *Wildlife Protection and Management Plan*.

Pre-works meeting

3.32. After preparation and approval of the WPMP, and prior to the onset of operational works or land-clearing, the wildlife spotter/catcher should have a briefing meeting with the project manager, site foreman and plant operators, for the purposes of discussing the requirements of the plan.

3.33. The wildlife spotter/catcher should clearly detail the sequence of land-clearing and wildlife capture, identify special habitat features, state any requirements for special plant or equipment (such as cherry pickers or cranes), and clearly outline the importance of compliance with any *Animal Welfare Directions*.

3.34. The wildlife spotter/catcher should ensure that the project manager or developer understand fully the requirements of the WPMP, and request their sign-off on the plan.

Vegetation or other habitat clearing or destruction

3.35. A wildlife spotter/catcher must be present during the clearing of any vegetation or damage or disturbance to any structures that may serve as habitat or refugia for wild animals.

3.36. The wildlife spotter/catcher must clearly define the allowable and non-allowable methods of vegetation clearing, such that the risk of harm or death to wild animals is minimised.

3.37. Acceptable and unacceptable methods of vegetation clearing or removal should be explicitly indicated in the *Wildlife Protection and Management Plan*, and should be discussed with the project manager well prior to the scheduled start of operational works.

3.38. Any technique, method or machine that causes, or may cause, an unmitigated risk of harm to wild animals must not be used as the primary method of vegetation removal. Unacceptable methods include, but are not limited to:

(a) the use of mobile mulching machines (for example: excavator-mounted mulching head or grinder) as the primary vegetation removal technique;

(b) the felling of hollow-bearing trees prior to thorough wildlife removal;

(c) the mulching or burning of vegetation windrows or other potential wildlife refugia without appropriate level of supervision by a wildlife spotter/catcher;

(d) the burning of standing vegetation or other habitat or refugia of wild animals.

3.39. Notwithstanding section 3.37 above, if the wildlife spotter/catcher has *positively* determined the absence of wild animals from a section of vegetation, then such methods or machinery may be used to clear that section only; however, the wildlife spotter/catcher must supervise such vegetation removal, and maintain radio communication with machinery operators.

3.40. A wildlife spotter/catcher must have, and maintain, a clear view of vegetation or habitat features being cleared by machinery, such that wild animals that are disturbed or uncovered during such activities are rapidly detected.

3.41. A wildlife spotter/catcher must, at all times, maintain two-way radio contact with machinery operators during the removal of vegetation or other potential wildlife habitats or refugia.

3.42. If wildlife is detected during such activities, the wildlife spotter/catcher must take immediate action to notify the machinery operator to cease work, either verbally using two-way radio or by visual commands, until such time as the wildlife is captured or otherwise removed from danger.

3.43. A wildlife spotter/catcher must not authorise, and must, in the WPMP, expressly prohibit, the felling of a tree known to contain, or likely to contain wildlife, including any hollow-bearing tree, by any means or method that is likely to:

(a) injure or kill any wild animal;

(b) result in the unmanaged dispersal or escape of arboreal fauna.

3.44. Notwithstanding section 3.42 above, any hollow-bearing tree, stag or other tree that may previously have contained wildlife, may be felled by any method if:

(a) the wildlife spotter/catcher has determined definitively that no wild animals are present in the tree at the time of felling; or

(b) the wildlife spotter/catcher has removed all wild animals from the tree immediately prior to felling.

3.45. Methods which a wildlife spotter/catcher may approve and use for the felling of a hollow-bearing tree containing, or likely to contain, wild animals are limited to:

(a) segmental removal of the tree by a tree surgeon, with hollow-bearing limbs being checked by the wildlife spotter/catcher and cleared of fauna using a cherry picker;

(b) segmental removal of the tree by a tree surgeon, with hollow-bearing limbs plugged and lowered to the ground for inspection by the wildlife spotter/catcher;

(c) use of an excavator with vertical grab to lower the main trunk (after removal of lateral limbs);

(d) a combination of the above methods.

3.46. For smaller trees, or in circumstances where access of a cherry picker is impossible, an excavator with a vertical tree-grab attachment may be used to lower a tree to the ground for inspection by the wildlife spotter/catcher.

3.47. A wildlife spotter/catcher must not authorise or recommend the "bumping" of a hollow-bearing tree with an excavator or other machine as a method of dispersing wild animals.

Timing and sequence of vegetation clearing

3.48. Whenever possible, vegetation clearing should be scheduled for mid to late summer so that:

(a) impacts on nesting and hatching avifauna and herpetofauna are minimized (greatest impacts in spring);

(b) likelihood of detection and capture of herpetofauna is maximised;

(c) wildlife load reduction measures are most productive.

3.49. Clearing of vegetation sequentially or segmentally to encourage natural movement of wild animals into habitat remnants may be appropriate as an adjunctive measure when:

(a) suitable habitat of sufficient area and resources is adjacent to the vegetation clearing boundary;

(b) target wildlife species are able to avoid potential harm caused by vegetation clearing;

For example: sequential clearing may be a sufficient measure to mitigate risk of harm to wallabies where suitable adjacent habitat exists, but is not an appropriate measure for arboreal fauna using tree hollows for nesting, or for herpetofauna, when clearing occurs during cold weather.

(c) mitigation measures are in place to avoid or minimise harm to wild animals that do not respond appropriately to sequential clearing.

For example: erection of wildlife-proof fences to prevent wildlife moving on to roads or into built-up areas.

3.50. Sequential clearing must not be used as a substitute for wildlife load reduction, when wildlife load reduction is essential for proper management of wildlife in the present circumstance.

*For example: sequential clearing **must not** be used as a primary fauna management measure when remnant habitat is likely to be insufficient to sustain displaced fauna, or is deficient in key resources, such as water sources, food trees or shelter opportunities or refugia.*

Vegetation and rubble piles

3.51. It is essential that piles of rubble, felled timber or any other material, proposed to be burnt, buried or chipped, are not left to serve as refugia for displaced or roaming wildlife. Felled vegetation piles and earth often provide attractive habitats for a range of small mammals, birds, reptiles and frogs, presenting a high risk of poor animal welfare outcomes if not managed appropriately.

3.52. Appropriate risk mitigation measures include immediate destruction or removal of such materials, or erection of wildlife-proof barriers to prevent wildlife use.

3.53. Old (>12 hours) piles of felled vegetation or other material must be treated in the same way as any other potential wildlife habitat, and must be assumed to be inhabited by wildlife, unless proven otherwise.

3.54. Cleared vegetation windrows or piles that have been left standing for >12 hours.

Design features and wildlife safety risks

3.55. In addition to wildlife risks associated with operational works, the wildlife spotter/catcher must attempt to identify any features of the design or plan of the completed project that may present a significant risk to wildlife, and recommend risk mitigation measures.

For example: swimming pools are a common cause of wildlife death by drowning. Wildlife species that are commonly affected include koalas and bandicoots which may be able to traverse pool fencing. Risk mitigation measures in sensitive areas may include provision of wildlife ramps or exit mechanisms from pools (such as thick ropes) and modification of pool fences to prevent wildlife incursion.

3.56. Design features likely to have undesirable impacts on wildlife should be brought to the attention of the developer. Early intervention in terms of recommending design changes may lead to significant reduction in costs associated with wildlife management and impact mitigation measures, caused by poor design.

Notification of unmanageable wildlife risk situations

3.57. In circumstances that result in risks to wild animal welfare or safety that are unable to be adequately managed, the wildlife spotter/catcher has an obligation to notify both DERM and local government regulatory authorities.

For example: an approved development may cause an essential wildlife corridor to be severed or significantly affected, resulting in starvation or misadventure of isolated wildlife.

3.58. Unmanageable wildlife risk situations are *serious* animal welfare issues that may require intervention beyond the scope of the wildlife spotter/catcher contract with the developer, and it is essential that regulatory authorities are appropriately informed of such circumstances.

3.59. Notification of unmanageable wildlife risk situations should be made in writing in the approved form (Appendix 2), and submitted promptly to DERM and local regulatory authority when appropriate. A copy should also be submitted to the developer.

3.60. If possible, the wildlife spotter/catcher should attempt to identify potential unmanageable wildlife risk situations pre-emptively, by developing a sound knowledge of surrounding habitat and important ecological features.

SECTION 4: WILDLIFE MANAGEMENT

General Principles

4.1. It is the responsibility of the wildlife spotter/catcher to direct and/or take all reasonable steps to protect the welfare of wildlife that may be impacted by vegetation clearing, construction, operational works or design features of development sites.

4.2. In many cases this will necessitate the removal and relocation of wildlife to other suitable habitat, or temporary housing of displaced wildlife during operational works.

4.3. It is preferable to remove as much wildlife as possible prior to the commencement of vegetation clearing to minimise the risk of injury to animals during the clearing process (see sections 3.25 to 3.28 above).

4.4. Attention must be paid to all habitat strata (arboreal, terrestrial, leaf litter etc), as well as all taxonomic groups in the removal of animals.

4.5. Seasonal and temporal variation in the visibility of animals must be taken into account when wildlife detection and capture procedures are being performed.

For example: many herpetofauna are primarily nocturnal, and are less visible and active during winter months. They are therefore much more at risk from earth works and land-clearing during these times, and in colder weather.

4.6. Particular attention must be paid to the results of the fauna survey to ensure that the specific methods used to detect and capture animals reflect the diversity of species expected at the site.

For example: in a site identified as habitat for bandicoots, echidnas or other ground-dwelling fauna, it is insufficient to simply concentrate effort on habitat trees. Thorough searching of all strata and wildlife habitats is necessary.

Removal of terrestrial wildlife

4.7. Terrestrial wildlife may be removed from the site prior to the onset of vegetation clearing using a variety of trapping methods. These methods will generally have been detailed in the fauna survey report prepared by the wildlife spotter/catcher or by other consultants to the project.

4.8. Specific habitat features of interest, such as log piles, rocky outcrops, riparian and wetland areas should be indicated on the site map prepared by the wildlife spotter/catcher and deserve special attention. These areas should be cleared or disturbed only after less

important surrounding habitat areas have been cleared. This is important because it provides opportunity for more intensive trapping around the feature, improved visibility for the wildlife spotter/catcher, and allows more flexibility to apply less destructive clearing methods.

4.9. The wildlife spotter/catcher must ensure that he/she has adequate numbers of appropriately trained staff working on habitat features likely to contain high numbers of wildlife that may scatter when the feature is disturbed.

4.10. It is the responsibility of the wildlife spotter/catcher to ensure that clearing methods used on terrestrial habitat features of special interest are appropriate to ensure minimal risk of injury or death to wildlife contained therein.

For example: log piles should be gently dismantled one by one, rather than bulldozed en masse. Hollow logs should be carefully inspected using a torch, and may require windows to be cut with a chainsaw for thorough inspection, prior to disposal or burning.

4.11. The wildlife spotter/catcher should pay particular attention to observing for the presence of burrows, tracks, scats, or other indications of recent use by wildlife substrates adjacent to rock or log piles or other habitat features.

Removal of arboreal wildlife

4.12. Removal of arboreal wildlife should be accomplished initially by thorough trapping efforts. Appropriate use of traps will minimise the risk of injury to wildlife collected by more direct methods, or at the time of clearing.

4.13. Trees contain a variety of different habitats for wildlife including hollows in the limbs and primary trunk, under bark, as well as foliage and upper limbs. All such habitats should be thoroughly explored for the presence of wildlife.

4.14. It is the responsibility of the wildlife spotter/catcher to ensure that appropriate methods are used to retrieve wildlife from arboreal habitats such that the risk of injury to the resident wild animals is minimised.

4.15. Trees containing wildlife *must not* be felled until all reasonable efforts have been made to remove wildlife.

4.16. Habitat trees of high importance should be felled last, after surrounding less important vegetation has been cleared to allow easy access of special plant and equipment (such as cherry pickers), traps (such as koala traps), and to allow unhindered lowering of hollow-bearing limbs. It is not acceptable to fell or push over hollow-bearing trees without first removing wildlife, due to the high risk of severe deceleration and/or crushing injuries to wildlife inhabiting such trees.

4.17. Hollow-bearing limbs can be cut and lowered gently to the ground using a variety of techniques, such as the use of cranes or special rigging. Prior to any intervention, exit holes should be plugged with rags or newspaper to prevent escape of wildlife during cutting or lowering of hollow-bearing limbs.

Removal of specific arboreal species

Koalas:

4.18. Under most circumstances koalas should be removed using koala traps set at or before dusk. It is desirable that traps are fitted with an indicator or transmitter to allow remote monitoring of trap operation. Traps without such remote monitoring devices should be checked a minimum of once every two hours.

4.19. Trapping represents the safest option (for both wildlife spotter/catcher and koala) for the capture of koalas. Pole and flagging techniques may be used if koalas are low to the ground and unlikely to be injured by an accidental fall or deliberate jump.

4.20. Cherry pickers may be used in circumstances which preclude the use of other methods.

4.21. Noosing techniques traditionally used for capture of koalas present unacceptable risks and must not be used under any circumstances.

4.22. Notwithstanding section 4.21 above, the use of a solid ring attached to a pole as an adjunct to traditional pole and flagging techniques, is acceptable in some circumstances, as long as the ring is of sufficient diameter to pass freely over the head of a koala (approximately 150mm diameter).

Possums and gliders:

4.23. Large possums (common brushtail possum and bobuck) may be captured using similar traps to those used for koalas, conventional baited traps, or manually with the assistance of cherry pickers.

4.24. Any noosing technique carries risk and is unacceptable.

4.25. The placement of appropriately sized and baited nest boxes in targeted trees may facilitate the removal of larger arboreal mammal species that are not utilising hollows.

4.26. Smaller possums and other arboreal species likely to use tree hollows or nest boxes, should be captured during daylight hours by blocking the entrance holes, and gentle removal of the hollow-bearing limb, or nest-box.

Tree kangaroos:

4.27. It is recommended that specialist advice is sought by wildlife spotter/catchers in the capture of tree kangaroos.

4.28. Notwithstanding section 4.27 above, modified koala traps may be useful in the capture of tree kangaroos from trees with sufficient isolation of their canopy to cause the animal to climb to the ground in order to move to another tree.

Preservation of tree hollows and other habitat features

4.29. Whenever possible, the integrity and structure of tree hollows contained in trees which are to be removed should be preserved. These should be relocated to appropriate habitat retained on the site, or to appropriate habitat close to the site.

4.30. The wildlife spotter/catcher should aim to ensure that there is no net loss of important habitat features, such as tree hollows.

4.31. In the case of tree hollows containing wildlife that are particularly sensitive to translocation (such as greater gliders for example), special efforts should be made to record the height and orientation of the hollow, and tree species from which it was obtained to enable it to be reproduced at the translocation site.

4.32. Other valuable habitat features such as large fallen logs, log piles, rock piles or outcrops etc should be preserved as much as possible, and translocated and re-established at appropriate habitat close to their site of removal.

4.33. In the interests of "no net loss" of tree hollows, the wildlife spotter/catcher should ensure that in instances in which natural tree hollows are destroyed, the replacement of artificial hollows occurs at a rate of 4 artificial replacements per natural hollow destroyed. This replacement should occur irrespective of whether hollows were used by wildlife at the time, or not.

Species Identification

4.34. All species removed or captured for translocation must be properly identified by the wildlife spotter/catcher to the species level.

4.35. For correct identification of any specimens that cannot be identified by the wildlife spotter/catcher the Queensland Museum should be consulted.

4.36. DERM must be notified within 24 hours of capture of any animal unable to be identified.

4.37. Any captured animal must not be disposed of unless its species has been positively identified.

Notification of species of special significance

4.38. Any individual animal captured by a wildlife spotter/catcher of a species that is indicated in lists published periodically by the Queensland Museum, or DERM as species of special significance, must be retained by the wildlife spotter/catcher, or retained at an approved wildlife holding facility pending notification by DERM as to its disposal. Species lists may vary according to bio-geographic region.

4.39. The finding of specimens of species outside of their known geographic range should be reported to the Queensland Museum, DERM and (when appropriate) the local regulatory authority. Photographs or other confirmatory information should be supplied.

Restraint and holding of captured wildlife

4.40. All animals removed from development sites must be captured, restrained and held in a manner that is unlikely to result in injury, unacceptable distress or suffering. Animal welfare is the primary priority and responsibility of the wildlife spotter/catcher.

Capture, restraint and examination

4.41. In general, capture methods that utilise netting, bagging, restraint with a blanket, trapping (not including snaring) or (in special circumstances) sedation/anaesthesia, are preferable to direct manual restraint.

4.42. As soon as possible after capture, and prior to release, all animals should be examined for signs of injury or illness. Restraint for examination may only require placing an animal into a transport cage for observation, or may require manual restraint using a calico bag, cloth or blanket.

4.43. Physical examination of an animal should include observation of normal movement, check for injuries, discharges, lumps, asymmetry, breathing pattern, bleeding or any other lesion indicative of injury or significant illness.

4.44. Any animal showing signs of injury or illness, or showing abnormal behaviour should be immediately referred to an experienced wildlife veterinarian or approved wildlife rehabilitation facility.

Capture and restraint of macropods

4.45. Capture and restraint of macropods carries a high risk of injury and fatal hyperthermia/myopathy syndrome, and must not be performed by inexperienced personnel, or without appropriate equipment and sedation.

4.46. Capture and restraint of healthy macropods (other than pouch young) must be performed using sedation or anaesthesia due to the high risk of development of myopathy, and other capture and restraint-associated conditions. Sedative and anaesthetic drugs may only be used under the direct supervision of a registered veterinarian, or by appropriately licensed persons.

Short-term holding

4.47. Captured animals may be held for short periods of time in calico bags, transport cages, box traps or any other appropriate container as long as the following criteria are met, and due regard is given for species differences:

(a) the animal is protected from extremes of temperature;

(b) the animal is protected from accidental trauma by other animals, equipment, machinery and the like;

(c) the animal is protected from adverse sensory stimuli such as loud noises;

(d) the bag or container provides sufficient airflow to allow normal air exchange and radiation/dispersal of heat;

(e) the container, receptacle or bag is protected from direct sunlight, rain, wind or other environmental conditions likely to cause suffering or harm to the animal;

(f) the animal is able to hide, or be protected from threatening stimuli (such as providing a hide box, or covering a wire transport cage with a towel or blanket);

(g) the animal is checked regularly during its period of confinement;

(h) the container, bag or receptacle is clean, hygienic and safe for the animal.

4.48. All mammals and birds held in short term containment for more than 4 hours, must be given access to water.

4.49. Mammals and birds held in bags of calico or other material for longer than 2 hours must be transferred to appropriate transport or holding boxes or enclosures containing hide spaces or boxes when appropriate for the species.

4.50. All neonatal or juvenile animals other than completely independent juveniles must be fed and contained in a manner appropriate for their age and species. Supplemental warmth must be provided to any nestling or juvenile unable to adequately thermoregulate.

4.51. All dependent young unable to be returned to parental care within a reasonable timeframe or unlikely to be accepted back by their parents must be immediately transferred to a licensed wildlife carer or approved wildlife rehabilitation facility.

4.52. The following guidelines should be followed for short to medium term (4-24 hours) containment of adult animals (Table 1). Maximum times are indicated in hours unless otherwise indicated. Animals should be released or transferred to an approved wildlife holding facility for long-term holding at or before the expiry of the times indicated in the last column.

Species	**Water**	**Food**	**Max. time in bag**	**Max. time in short-term enclosure (eg transport box)**
Macropod	4	12	4 (*)	4 (*)
Koala	4	4	2	4
Echidna	4	8	2	24
Bandicoot	4	8	2	24
Possum/glider	4	8	2	24
Rodent	4	8	2	24
Insect bat	4	4	12 (**)	12
Dasyurid	4	4	2	24
Flying fox	4	8	2 (***)	12
Wombat	4	8	n/a	4
Snake	24	7 days	24	24
Lizard	24	2 days	24	24
Turtle	24	2 days	24	24
Frog	12 (#)	24	8 (#)	24

* With sedation/anaesthesia only
** Only if fed and watered every 4 hours
*** Calico bags containing flying foxes must be hung rather than laid down.
# Containers for frogs must prevent drying. Plastic boxes with ventilation are preferred.

Table 1: Guidelines for the short to medium term (4-24 hours) containment of adult animals

Long-term animal holding

4.53. Animals may require long-term holding (> 24 hours) for a variety of reasons, such as:

(a) delayed access to appropriate release sites;

(b) accumulation of a number of individuals for group release;

(c) treatment of injuries or illness;

(d) inclusion in radio-tracking studies or other research;

(e) hand-rearing of dependent young;

(f) temporary housing during operational works prior to return to site.

4.54. Long-term holding of native animals should only occur in circumstances approved by DERM and in facilities approved for such reason by DERM.

4.55. Care and husbandry of animals in long-term care should be in accordance with the *Code of Practice - Care of orphaned, sick or injured protected animals by wildlife care volunteers* (DERM), and current best practice.

4.56. Facilities used by wildlife spotter/catchers for the holding of native animals awaiting translocation or relocation back to the original development site are restricted to those facilities approved for that express purpose by DERM. (*Such facilities may charge a fee for animal holding services, which the developer should be informed of prior to engagement by the wildlife spotter/catcher.*)

Disposal of wildlife

4.57. The ideal outcome for wildlife removed from a site during operational works is to be relocated back to the same site at the completion of works, so long as suitable and sufficient habitat remains. This ensures that any potential adverse ecological consequences associated with translocation and the potential adverse effects (on the individual) of placement in unfamiliar territory are avoided. However, this outcome is generally only achievable if there has been significant retention of habitat, and appropriately "eco-friendly" design and planning.

4.58. Translocation of animals is not a preferred option unless retention at, or relocation back to, the original site is inappropriate.

4.59. In order of preference, outcomes for removed wildlife are as follows:

(a) relocation back to suitable and sufficient habitat on original site following operational works;

(b) translocation to suitable habitat adjacent to site;

(c) translocation to distant suitable habitat;

(d) placement in captive institution for educational, conservation or research purposes;

(e) euthanasia.

4.60. Each of these options is dependent on fulfillment of a number of conditions and criteria which affect its relative suitability under different circumstances.

4.61. In determining the most suitable option for each individual, the wildlife spotter/catcher must ensure that the chosen option is appropriate in terms of both animal welfare and ecological outcomes.

4.62. Any animal showing obvious clinical signs, or behaviour consistent with injury or illness must be treated in an appropriate manner, as detailed in sections 4.100-4.105 below.

Relocation of animals back to original site at completion of operational works

4.63. In some circumstances, the extent of destruction of habitat may not be sufficient to warrant permanent translocation of animals, but operational works or other factors may present unacceptable risks to the health and safety of some animals present on site.

4.64. In such cases, a range of measures may be used by the wildlife spotter/catcher to mitigate or minimise risks, including the temporary removal of animals from the site, with the aim of returning animals back to their habitats at the completion of risk-associated works.

4.65. Important criteria for return of animals to the original development site include:

(a) sufficient habitat is, or will be retained on site to support the animal population, taking into account factors such as: viability of prey species populations; availability of nesting sites or hollows; availability of clean water; and availability of sufficient food resources;

(b) habitat corridors retained are of suitable size, topography and vegetation cover to provide effective routes for normal ecological processes such as immigration, emigration, recruitment and dispersal;

(c) habitat blocks and corridors are of sufficient size to maintain ecological integrity and effectiveness, taking into account likely edge effects;

(d) long-term risk factors to individual and population survival associated with the development have been (or will be) adequately managed or mitigated.

For example: domestic animal control, motor vehicle/road impacts, swimming pool risk.

4.66. The temporary removal of native animals destined for return back to the site of origin, is conditional upon the availability of appropriate long-term holding facilities and resources, and the suitability of the species and individuals for long-term holding.

4.67. In some instances (for example: macropods), it may be appropriate to construct temporary holding yards or enclosures on site during operational works, which are removed on completion of risk-associated works.

Translocation of animals to suitable habitat adjacent to development site

4.68. If development of a site occurs adjacent to a large area of similar habitat, with little retention of habitat on site, native animals are most appropriately translocated into adjacent areas. Criteria for use of adjacent habitat are as for 4.65 (a-d) above, but include:

(a) translocation of animals into adjacent habitat should only occur if the likelihood of significant impacts on resident animals in the recipient habitat is considered to be low (i.e. recipient habitat is not considered to be at maximum carrying capacity for that species);

(b) recipient habitat is of sufficient size to allow for dispersal of individuals from the point of release, with minimal likelihood of misadventure;

For example: koalas may disperse long distances from the point of release, particularly in already occupied habitat and should not be released into small habitat fragments bounded by busy roads or other hazards.

(c) recipient habitat is the same or very similar in type to the donor habitat, or is known to be able to support the species proposed to be translocated, and contains appropriate and sufficient sources of food and water;

(d) the recipient habitat is known to contain, or historically contained, the species proposed to be translocated;

(e) the recipient habitat is either permanently protected or not likely to be developed in the foreseeable future.

4.69. Additional conditions for translocation of animals to adjacent habitat include:

(a) appropriate wildlife-proof barriers must be used between adjacent habitat and risk-associated structures, such as swimming pools, busy roads, trenches, canals etc;

(b) translocated animals show no signs of infectious/contagious disease and must be in good health and body condition;

(c) species for which there is little or no information regarding efficacy of translocation should be fitted with radio-telemetry devices and radio-tracked for appropriate periods of time;

(d) for species utilising tree hollows: that appropriate numbers and types of natural or artificial hollows or nest boxes are placed into recipient habitat to provide for the nesting requirements of translocated animals.

Translocation of animals to distant habitat

4.70. If development of a site is such that wildlife habitats are completely removed, or retained habitats (including habitats adjacent to the site) are insufficient to support retention of animals on or adjacent to the site, then animals inhabiting the site may be translocated to other areas of suitable habitat that may be distant to the site.

4.71. Criteria for choice of recipient sites include:

(a) habitat is suitable for translocated species, either currently or historically inhabited by that species;

(b) recipient habitat is not considered to be at carrying capacity for that species, and has sufficient food and water to sustain population increase resulting from translocation;

(c) recipient habitat is of sufficient size, and/or with sufficient habitat corridors and connectivity to allow for expected dispersal of translocated individuals from the release site without significant likelihood of misadventure;

(d) recipient habitat is either permanently protected or not likely to be developed within the foreseeable future;

(e) notification of the proposed translocation is provided to DERM prior to translocation of any animals.

4.72. Conditions for translocation of animals to distant habitat sites include:

(a) animals are not showing signs of infectious/contagious diseases and are in good health and body condition;

(b) species for which there is little or no information regarding the efficacy of translocation should be fitted with radio-telemetry devices and radio-tracked for appropriate periods of time;

(c) for species utilising tree hollows: that appropriate numbers and types of natural or artificial hollows or nest boxes are placed into recipient habitat to provide for the nesting requirements of translocated animals;

(d) translocated animals must be released at a point with sufficient proximity to water and food sources that maximise their chances of survival;

(e) soft release methods should be used for species that are known to be susceptible to maladaptation syndromes and/or are likely to be exposed to excessive territorial aggression from resident conspecifics or other species;

(f) written permission from DERM has been obtained prior to translocation to distant site(s).

Placement of animals into permanent care or captivity

4.73. In some cases, animals may be captured or acquired by the wildlife spotter/catcher, that are either unsuitable for release back into the wild, or for which there is no suitable or appropriate habitat to be released into.

4.74. Unreleaseable native animals may be valuable for education, conservation and research purposes and may be suitable for permanent placement into a captive facility.

4.75. The Queensland branch of the Australasian Regional Association of Zoological Parks and Aquaria (ARAZPA) provides mechanisms for the placement of unreleaseable native animals into their member park animal collections.

4.76. Other alternatives for captive placement of unreleaseable animals may also be available by negotiation with DERM. These options should only be considered for animals that are unable or unlikely to survive in the wild, or for which no suitable translocation site is available.

4.77. Criteria for placement of unreleaseable native animals into captivity include:

(a) the animal is likely to be given a quality of life sufficient to justify keeping it alive;

(b) the proposed recipient person or institution has suitable long-term holding facilities and sufficient resources (including veterinary care) to maintain an acceptable quality of life for the animal for the term of its natural life;

(c) the animal provides some educational, conservation or research benefit;

(d) the animal is not suffering from incurable disease likely to significantly affect its quality of life now, or in the future;

(e) appropriate licences and permits are obtained by the recipient institution or person for the acquisition and keeping of the animal.

Placement of animals into temporary care or captivity

4.78. In some cases, a native animal removed from a site may require hand-rearing (in the case of dependent young) or rehabilitation because of injury or illness. In these cases, the responsibility for the ultimate disposal of the animal may be shared by the licensed wildlife carer or care organisation, in accordance with the relevant Code of Practice.

4.79. A healthy native animal removed from a development site, may be placed into temporary captive care at a facility approved for that purpose by DERM for the following reasons:

(a) during operational works, for ultimate relocation back to the original habitat site;

(b) the purposes of "soft release" into other appropriate habitat;

(c) for the purposes of accumulation of sufficient individuals to allow release of a viable "colony" or family group, for relevant species;

(d) pending definitive identification of an unidentified animal, or confirmation of species identification by the Queensland Museum;

(e) pending inclusion in an approved radio-tracking or research project;

(f) pending approval by DERM for the euthanasia of healthy native fauna (see section 4.84-4.86 below);

(g) for any other reason justifiable on animal welfare or ecological grounds.

4.80. Notwithstanding section 4.79 above, a healthy native animal should be held in temporary care only for the minimum amount of time required to achieve the relevant objective. Husbandry-related health issues, conditioning/imprinting and loss of survival skills and muscle tone may be consequences of excessive periods in captivity, leading to reduced survival following release.

Notification of intention to keep native animals in temporary or permanent care

4.81. The wildlife spotter/catcher should notify DERM, within 72 hours of capture, of a requirement or intention to place a healthy native animal into temporary or permanent care. The wildlife spotter/catcher should retain acknowledgement of the notification by DERM for inclusion in the *Wildlife Management Report* (see section 5.2 below).

Euthanasia of animals

4.82. In some circumstances, the euthanasia of some animals removed from a development site is the most appropriate or humane option. Reasons for euthanasia of animals include:

(a) the animal is either feral, and/or a declared pest;

(b) the animal is suffering from injuries or illness sufficient to warrant euthanasia on humane grounds;

(c) the animal is unlikely to survive if released back into the wild.

4.83. Euthanasia of animals must be conducted in accordance with the provisions of the Queensland *Animal Care and Protection Act 2001*. In most cases, euthanasia should be performed by a registered veterinarian following anaesthesia of the animal.

Euthanasia of healthy protected fauna

4.84. The euthanasia of healthy native animals must be performed only:

(a) as a last resort if no other approved alternative measure is possible;

(b) after submission of a euthanasia request to DERM stating the species, number, age group, sex, reason for euthanasia, proposed method of euthanasia and the credentials and experience of the person performing euthanasia;

(c) only after a written approval is obtained from DERM.

4.85. Dependent neonates of animals being killed must also be killed, or appropriate provision made for their care, in accordance with the relevant Code of Practice.

4.86. The euthanasia of healthy specimens of protected native animals must not be considered as a cheap or convenient alternative to the other preferred options described in previous sections.

Euthanasia of feral or declared pests, or other non-native species

4.87. The euthanasia of feral/non-native animals must be performed:

(a) only by a suitably qualified and experienced person;

(b) in accordance with the provisions of the Queensland *Animal Care and Protection Act 2001;*

(c) only if dependent young are able to be humanely captured and killed, or provision made for their care;

(d) in the case of domestic species, only if appropriate investigations have been made to rule out ownership of the animal(s).

4.88. In the case of a domestic animal whose status as feral (rather than owned) is not clearly determined, then the animal should be surrendered to the local government animal control authority.

Emergency euthanasia of sick or injured animals

4.89. If an animal is found to be suffering from injuries or illness likely to cause extreme suffering and/or distress, and a high likelihood of death, a wildlife spotter/catcher or other competent person may perform immediate euthanasia if the following conditions are met:

(a) the assistance of a veterinarian is not available within an appropriate timeframe given the suffering of the animal; and,

(b) the time taken to transport the animal to a veterinarian would impose undue further suffering on the animal; and,

(c) the requirements of the *Animal Care and Protection Act 2001* will be met in respect of the method of euthanasia; and,

(d) the chosen method of euthanasia will cause instant or rapid insensibility (loss of consciousness), followed shortly afterwards, (and before return of consciousness), by death; and,

(e) the person proposing to conduct the euthanasia procedure is competent at the procedure; and,

(f) The carcass is not disposed of until death is confirmed.

4.90. It is recommended that all wildlife spotter/catchers are appropriately trained in humane methods of euthanasia.

Use of veterinarians and veterinary services or drugs

4.91. Due to the nature of wildlife management, capture and translocation, the use of veterinary drugs and services is occasionally required.

4.92. Reasons for veterinary involvement in wildlife management processes include:

(a) use of restricted drugs for sedation or anaesthesia of animals;

(b) examination and veterinary management of sick, injured or orphaned animals;

(c) euthanasia of animals;

(d) consultation on animal welfare issues;

(e) assessment and management of wildlife population health and reproduction.

Nomination of veterinarian on Wildlife Protection and Management Plan

4.93. A wildlife spotter/catcher must nominate one or more registered veterinarians, whom they will use in the event that veterinary services are required.

4.94. A nominated veterinarian must be able to provide resources and facilities appropriate for responding to wildlife emergencies that may occur in the field.

4.95. The nominated veterinarian(s) must be indicated in the *Wildlife Protection and Management Plan* under the section entitled “Contingency plan for wildlife requiring euthanasia, other veterinary procedures or captive care."

4.96. It is preferable that nominated veterinarians are experienced with wildlife, although it is recognised that, in some areas of the state, this may not be possible.

Wildlife spotter/catcher to inform client of obligations regarding the provision of veterinary care

4.97. It is the responsibility of the wildlife spotter/catcher to inform the client and/or project manager of the potential for requirement of veterinary services, and the expected costs of such services.

4.98. The wildlife spotter/catcher must also ensure that the client or authorised representative is aware of their “duty of care” obligations to animals captured or injured in the course of the conduct of relevant activities.

4.99. It is recommended that the wildlife spotter/catcher prepare a document detailing the above, to be signed by the client or client’s authorised representative.

Provision of veterinary care to sick or injured animals

4.100. The wildlife spotter/catcher must make provision for the prompt veterinary examination and treatment of any animal injured, or caused to be sick, as a result of development processes or activities.

4.101. If an injured animal has not already been captured, then the wildlife spotter/catcher must make every reasonable attempt to capture the animal for the purposes of veterinary assessment and treatment. This may include the engagement of a veterinarian for the purposes of darting the animal with a tranquilliser or anaesthetic.

4.102. The wildlife spotter/catcher must also make provision for the veterinary assessment and treatment of any animal captured or trapped that is showing evidence of any significant injury or illness, irrespective of the cause of the injury or illness.

For example: a captured koala that is showing obvious signs of Chlamydial infection, such as weeping eyes or "dirty tail" should be referred to an approved wildlife rehabilitation facility for veterinary assessment and treatment, rather than being released back into the wild in that condition.

4.103. Any native animal requiring in-patient veterinary care must be referred to a recognised wildlife veterinary hospital or facility, or a private veterinary practice that has appropriate wildlife experience and facilities for the housing and treatment of native animals.

4.104. A wildlife spotter/catcher has not fulfilled their duty of care obligation to a sick or injured animal simply by delivering it to a veterinarian, unless that veterinarian or veterinary practice fulfils the requirements of section 4.103 above, and agrees to provide an appropriate level of care to the animal.

4.105. Similarly, the wildlife spotter/catcher has not sufficiently discharged their duty of care in respect of a sick or injured animal by simply delivering it to a wildlife rehabilitator.

Requirement for presence of veterinarian on site

4.106. In rare circumstances, a wildlife spotter/catcher may consider that, despite all reasonable measures being taken, a development process, activity or structure is likely to result in significant harm, injury or death to an animal.

4.107. In such circumstances the wildlife spotter/catcher must arrange for a registered veterinarian to be present on site, for the period of time during which the risk is present. If possible, the veterinarian should be experienced in the management and care of wildlife.

4.108. If any restricted or controlled drug is proposed to be used by a wildlife spotter/catcher, then this use must be on the direction of, and under the direct supervision of a registered veterinarian, except as allowed by licensing of non-veterinarians under the provisions of the Queensland *Health (Drugs and Poisons) Regulation 1996,* and relevant policy of Queensland Health.

Requirement for monitoring of sedated or anaesthetised animals

4.109. Both the wildlife spotter/catcher and on-site veterinarian have a 'duty of care' towards any animal affected by sedative or anaesthetic drugs, and must ensure that an appropriate level and duration of monitoring is applied to prevent injury, predation, drowning or other incident that may result from the impairment of the animal's normal abilities or responses.

SECTION 5: RECORD KEEPING AND REPORTING

Preparation of a Wildlife Management Report

5.1. During the course of the development or activity, the wildlife spotter/catcher should keep an accurate record of all animal captures, incidents and disposals for that project.

5.2. At the completion of a project, the wildlife spotter/catcher should prepare a *Wildlife Management Report* (WMR) in the approved format (Appendix 5) for submission to the Animal Welfare Unit, Queensland PI&F and DERM.

5.3. If the development or activity for which the *Wildlife Management Report* was prepared was subject to local government approval, then the report should also be submitted to the relevant local government authority.

5.4. The *Wildlife Management Report* consists of three sections:

(a) Wildlife and Habitat Management Plan

(b) Wildlife Capture and Disposal Record

(c) Animal Injury and Euthanasia Report

Wildlife and habitat management plan

5.5. The *Wildlife and Habitat Management Plan* should contain the following information:

(a) Aspects of the design or planning of the development identified as risks to wildlife, essential wildlife habitat or wildlife corridors, and the measures taken to mitigate or avoid the risks;

(b) Aspects of operational works identified as risks to wildlife health or safety, and the measures taken to mitigate or avoid the risks;

(c) Aspects of the operation or function of the finished development (including traffic impacts) identified as posing risks to wildlife health and safety either presently or in the future, and the measures taken, or required to be taken, to mitigate or avoid those risks;

(d) Recommendations on the type, frequency and timeframes for monitoring of wildlife and habitat impacts resulting from the development.

(e) Requirements for ongoing wildlife, habitat or ecological management measures for the site or development to mitigate or avoid present or future wildlife impacts.

(f) Any measures taken to replace or improve wildlife or habitat outcomes, including compensatory vegetation planting, nest-box or tree hollow replacement, and the like.

(g) Recommendations and/or outcomes associated with unmanageable wildlife risks identified as being caused by, or associated with the development or activity (include measures recommended or implemented by government agencies such as DERM and relevant local government authorities).

5.6. The detail contained in the *Wildlife and Habitat Management Plan* should reflect the size and/or likely environmental impacts of the development or activity.

Wildlife capture and disposal record

5.7. The *Wildlife Capture and Disposal Record* must contain the following details for each captured animal classified as *endangered, vulnerable* or *rare* under State legislation, classified by the local regulatory authority as *locally significant* or under the federal *EPBC* Act as *critically endangered, endangered* or *vulnerable*:

(a) species;

(b) identification name or number;

(c) sex (M, F, or unknown);

(d) approximate age or age class (neonate, juvenile, sub-adult, adult);

(e) time and date of capture;

(f) method of capture;

(g) exact point of capture (GPS point);

(h) state of health;

(i) incidents associated with capture likely to affect the animal;

(j) veterinary intervention or treatments;

(k) time held in captivity;

(l) disposal (euthanasia, re-release, translocation etc);

(m) date and time of disposal;

(n) details of disposal (if released, exact point of release GPS);

(o) for released animals: distance in metres from point of capture to point of release.

5.8. For captured animals not listed in legislation as defined in section 5.7 above, such details should be recorded if fewer than 10 individuals are captured, however if greater than 10 individuals are captured, the following details should be recorded in the *Wildlife Capture and Disposal Report*:

(a) species;

(b) total number captured;

(c) general location of capture;

(d) general location of release site;

(e) adverse incidents, mortality or euthanasia report;

(f) method of capture.

5.9. If any native animals were, or are presently, held in temporary or permanent captive care, then the wildlife spotter/catcher should provide details of the reason for such holding and a copy of DERM acknowledgement of notification (see section 4.78-4.80 above).

5.10. Furthermore, the wildlife spotter/catcher should indicate the availability of husbandry and veterinary records for each animal placed into temporary or permanent captive care.

Animal injury and euthanasia report

5.11. A separate *Animal Injury and Euthanasia Report* must form part of the *Wildlife Management Report*, detailing the circumstances, management and final outcome of every animal injury or incident, and the circumstances and reason for each animal euthanasia.

5.12. For each animal euthanasia requiring a DERM permit or written approval (see section 4.84-4.86), the reference or permit number must be recorded.

5.13. A "nil return" *Animal Injury and Euthanasia Report* should be included in the *Wildlife Management Report* if there were no animal injuries or euthanasia.

5.14. In tabulated form, the *Animal Injury and Euthanasia Report* should indicate, for each animal:

(a) species;

(b) sex (if identified);

(c) unique identification name or code (as used in the *Wildlife Capture and Disposal Record*);

(d) age class (neonate, juvenile, sub-adult, adult);

(e) nature and details of incident or condition resulting in injury or euthanasia;

(f) initial management or intervention (e.g. taken to veterinarian – give details);

(g) final outcome;

(h) method of euthanasia, by whom; or details of disposal;

(i) current location of animal or details and method of disposal;

(j) any other relevant information.

Reporting

5.15. The wildlife spotter/catcher should prepare and submit to the Animal Welfare Unit, Queensland PI&F and also DERM the following documents within one (1) month of completion of each project:

(a) Wildlife Protection and Management Plan;

(b) *Wildlife Management Report*.

5.16. If a development or activity is subject to approval by a local government, then the wildlife spotter/catcher shall submit a copy of the WPMP and WMR to the appropriate local government authority within one (1) month of completion of the project.

Appendix 1: Recommended Equipment for Wildlife Spotter/Catchers

A wildlife spotter/catcher must have the following essential equipment at his/her disposal at all times:

- 4-wheel drive vehicle
- 2-way radios
- Cages of various sizes and construction
- Various traps for animal capture
- Calico bags of various sizes
- Various nets with extendable handles
- Leather and latex gloves
- Towels
- Blankets
- Spray marking paint
- Flagging tape
- Chain saw
- Extension ladder
- GPS unit
- Digital camera
- Complete set of field guide publications to enable identification of wildlife to species level
- Snake handling equipment
- Binoculars
- Torches
- Waders
- Range of containers to hold and transport aquatic fauna
- Scales
- 10 x lens and vernier calipers
- Full set of PPE

Appendix 2: Form for making an Animal Welfare Direction

ANIMAL WELFARE DIRECTION

This Animal Welfare or Animal Protection Direction is made at:

Location:
Date:

Exact location of development or activity site	
Registered owner of the site	
Responsible person to whom this direction is made	
Position of responsible person (eg site foreman, project manager etc)	
Circumstances in which animal welfare or protection is at risk (describe in detail)	
Specific activity or process that may risk animal welfare or protection	

Activity is to:	☐ cease immediately ☐ continue, but only with mitigation measures in place ☐ continue with caution and WSC present at all times
Risk mitigation measures required	
Period of time over which activity may occur	

……
Signature of Responsible Person

……
Position

……
Name (printed)

……
Signature of WSC

……
Name (printed)

At completion:

Was the activity or process conducted in accordance with this Direction?

☐ Yes
☐ No Give details:.....

Did an adverse animal welfare or protection incident occur: ☐ Yes ☐ No
If yes, an adverse incident report must be completed.

Appendix 3: Wildlife Protection and Management Plan

Appendix 4: Fauna Survey Methodology

The following methodologies are provided as guidelines when conducting fauna surveys prior to wildlife habitat disturbance:

a) **Diurnal searches** – Intensive investigation of the ground layer (i.e. under logs, rocks, leaf litter) and low vegetation (i.e. under tree bark and tree stumps) and caves targeting amphibians, reptiles, bats and animal traces (i.e. scats, owl pellets, remains and tracks). Minimum effort: approximately 4 person hours per day conducted in the middle of the day.

b) **Pitfall traps** – This method targets amphibians, reptiles and small mammals, particularly those mammals not readily recorded using other trapping methods (for example: planigales and dunnarts). These traps should be cleared early morning and late afternoon. Minimum effort: Thirty (30) or more pitfall traps divided into four or eight lines comprising approximately four (4) pits (20L bucket) and a 15-20m drift fence. However, the number of buckets per line is often best determined on individual site characteristics and may require 6-20 pits on a 50m drift fence. Trapping duration is a minimum of four (4) days and nights.

c) **Spotlighting** – Nocturnal observations using both high powered spotlights and head torches. This method targets nocturnal flying, arboreal and terrestrial mammals, birds (owls and nightjars), reptiles (geckos) and amphibians. Call playback can also assist this method when targeting specific species (owls and amphibians). Minimum effort: approximately 3 person hours per day commencing in the early evening.

d) **Elliot traps** – This method targets small arboreal and terrestrial mammals. These traps should be cleared each morning by 7:00am and reset late in the afternoon after 5:00pm. Trap placement will be influenced by vegetation diversity, the size and shape of the habitat area and by naturally occurring features such as logs, rock outcrops, tree bases and clumping vegetation. As a guide, all distinctly different broad vegetation communities should be surveyed. Minimum effort: 100 traps over four nights, arranged in 5-10 transects with 10 or 20 traps in each transect with trap placement at 5m apart. A variety of baits should be utilised such as rolled oats with peanut butter +/- honey, bacon, tinned fish. When conducting arboreal trapping with this method, a diluted honey and water mixture may be sprayed on the trunk and branches near the trap to act as an attractant to species such as sugar and squirrel gliders.

e) **Cage traps** - This method targets medium to large arboreal and terrestrial mammals. These traps should be cleared each morning by 7:00am and reset late in the afternoon after 5:00pm. Trap placement will be influenced by vegetation diversity, the size and shape of the habitat area and by naturally occurring features such as logs, rock outcrops, tree bases and clumping vegetation. As a guide, all distinctly different broad vegetation communities should be surveyed. Minimum effort: 20 traps over four nights, arranged in 5 transects with trap placement at 5-20m apart. A variety of baits should be utilised such as rolled oats with peanut butter +/- honey, bacon, tinned fish.

f) **Hair tubes** – This method is additional to the above methods which target mammal species. Hair tubes of different sizes should be baited with a variety of baits (i.e. rolled oats with peanut butter +/- honey, bacon, tinned fish) and left *in situ* for a minimum of two (2) weeks. Upon collection, hair samples should be identified by a suitably qualified person with demonstrated experience in identifying mammal species from hair samples.

g) **Bird surveys** – Fixed or random transects are walked with five (5) minutes spent stationary at designated locations along the transects. Birds are recorded indicating the method of identification (i.e. call or visual observation) and the type and location of habitat. Minimum effort: 30-60 minutes commencing prior to and during dawn to early morning and prior to dusk.

h) **Harp traps, mist nets and sonic bat detectors** - These methods target insectivorous bats. Trap and sonic detector (i.e. ANABAT) should be located within suitable habitat where insectivorous bats are likely to frequent (i.e. natural flyways between vegetation and narrow forest tracks). Calls recorded from a sonic detector (i.e. ANABAT) should be analysed by a suitably qualified person to ensure accurate species identification.