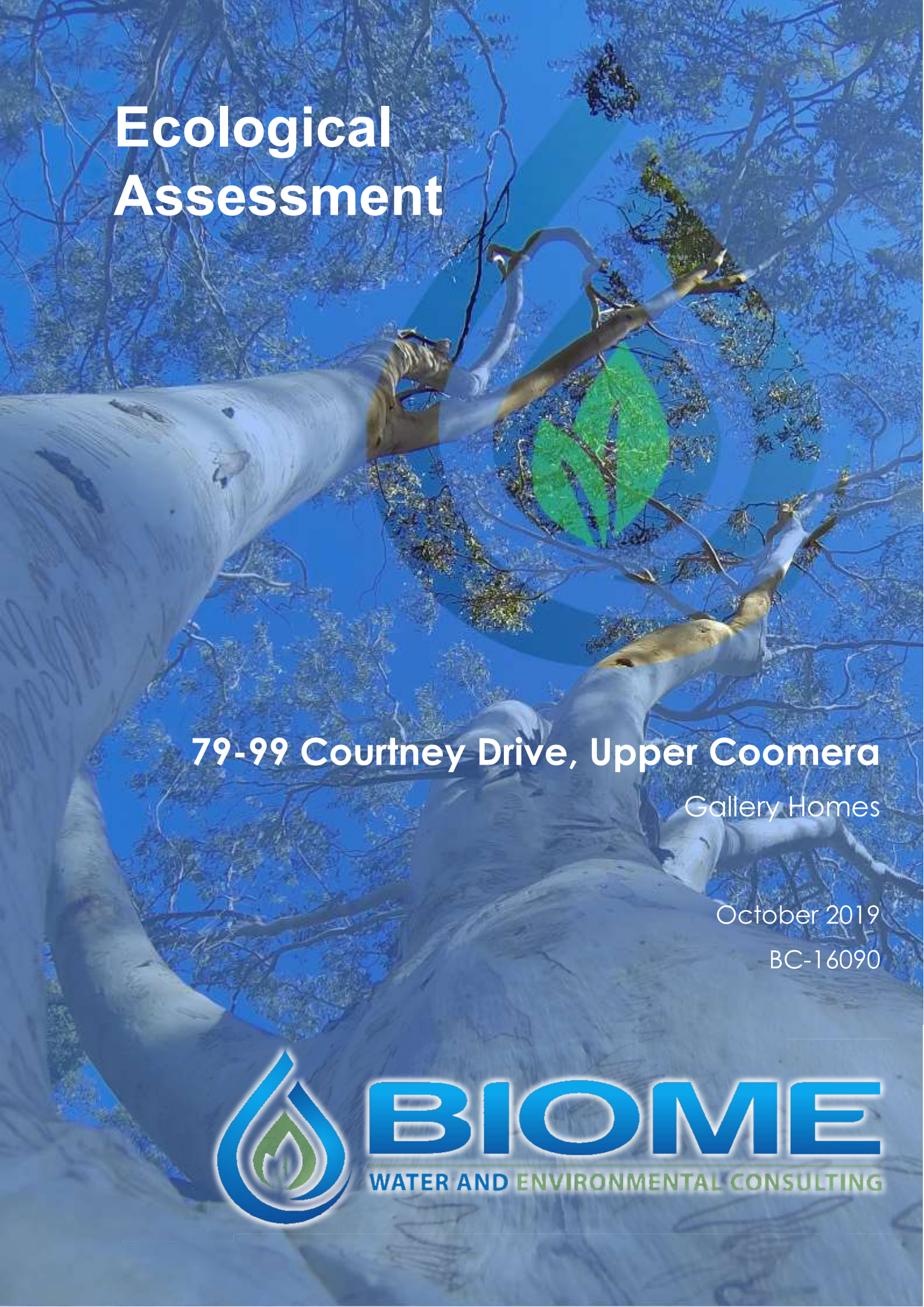
# Ecological Assessment



## 79-99 Courtney Drive, Upper Coomera

Gallery Homes

October 2019

BC-16090

BIOME

WATER AND ENVIRONMENTAL CONSULTING

# Document Control

| | | |
|---|---|---|
| **Project Name** | 79-99 Courtney Drive, Upper Coomera | |
| **Project Number** | BC-16090 | |
| **Report Title** | Ecological Assessment | |
| **Prepared by** | Nadya Lees<br>BSc (Hons) | David Conder<br>BAppSc |
| **Reviewed by** | Brad Comley | |
| **Approved by** | Brad Comley<br>CEnvP MEIANZ, MIEAust, MSc, BAppSc | |

| Version Number | Date | Distribution |
|---|---|---|
| 1 | March 2019 | Gallery Homes |
| 2 | 23 October 2019 | Gallery Homes |
| 3 | 9 November 2020 | Gallery Homes |


**Biome Consulting Pty Ltd**
**ABN: 86 166 087 476**

**PO Box 3469, Australia Fair SOUTHPORT QLD 4215**
**Office:** 5532 7779
**Mobile:** 0415 935 222
**Email:** admin@BIOMEconsulting.com.au
**Internet:** www.BIOMEconsulting.com.au



Issued in confidence for the sole benefit of our client, this document has been prepared to support a development application and is only to be used for the purpose for which it is supplied. Unofficial use of this document in any form is prohibited. BIOME Consulting Pty Ltd or any employee, contractor, or sub-consultant do not accept any liability with respect to unauthorised use. This disclaimer is valid despite recognition that the document may be made available to other persons for an application for permission or approval to fulfil a legal obligation.

# Abbreviations and Definitions

| Term | Meaning |
|---|---|
| CAMBA | China Australia Migratory Bird Agreement |
| CGC | City of Gold Coast |
| City Plan | City of Gold Coast Planning Scheme, *City Plan* Version 7 |
| DNRM | Department of Natural Resources and Mines |
| DoE | Department of the Environment |
| EPBC Act | *Environment Protection and Biodiversity Conservation Act 1999* |
| Endemic species | Species unique to a geographical location |
| EVNT | Endangered, Vulnerable or Near Threatened |
| Exotic Species | Refers to all species of both flora and fauna that are introduced to Australia |
| Fauna | Refers to all animal species |
| Flora | Refers to all plant species |
| JAMBA | Japan Australia Migratory Bird Agreement |
| KSAT | Koala Spot Assessment Technique – used to determine the level of use of an area by Koala |
| MLES | Matters of Local Environmental Significance |
| MNES | Matters of National Environmental Significance |
| MSES | Matters of State Environmental Significance |
| NCA | *Nature Conservation Act 1992* |
| Planning Scheme | City of Gold Coast Planning Scheme, *City Plan* Version 7 |
| PMST | Protected Matters Search Tool |
| QPWS | Queensland National Parks and Wildlife Services |
| RE | Regional Ecosystem. Defined as a vegetation community that is consistently associated with a particular combination of geology, landform and soil |
| RL | Reduced level - this is the height or elevation above the point adopted as the site datum for the purpose of establishing levels |
| RoKAMBA | Republic of Korea Australia Migratory Bird Agreement |
| RoL | Reconfiguration of a lot |
| SDAP | State Development Assessment Provisions |
| SL | Special Least Concern species are listed under the NCA for species on migratory bird agreements, the platypus and echidna |
| SPP | State Planning Policy |
| SPRP | State Regulatory Planning Provisions |
| Threatened species | Species listed under the NCA or EPBC Act as having a conservation status of near threatened, vulnerable, endangered or critically endangered. |
| VMA | *Vegetation Management Act 1999* |

# Executive Summary

This report has been prepared to identify the environmental values and constraints of the subject site, located at 79-99 Courtney Drive, Upper Coomera and to accompany a development application for a Reconfiguration of a Lot.

The subject site has been assessed for its development potential and constraints in the Investigation Area Program – Courtney Drive, Upper Coomera Draft Concept Plan, prepared by GHD (2017). The Draft Concept Plan ranked the site as having high marketability and development potential. The plan recommends the amalgamation of allotments to maximise development yields, habitat connectivity and bushfire management.

This ecological assessment investigated the environmental constraints of the subject site. The assessment of the ecological values on the site focused on the vulnerable Koala, which is known to occur in the Upper Coomera area.

Investigations were made to determine the habitat use of the site by Koala using a randomised grid-based spot assessment technique. Koala were determined to be using the site at low use levels (as defined by Phillips and Callaghan, 2011). Areas of Koala habitat have been included in the proposed open space areas of the development. No other threatened species were identified on the site during the survey period.

The site is mapped as containing a small area of regulated vegetation and essential habitat for state regulated species. The regulated vegetation area is reflective of least concern regional ecosystem 12.11.5 (Spotted Gum/Ironbark open forest). This area has been included within designated open space to ensure vegetation is protected and rehabilitated to improve its existing ecological condition.

Four vegetation associations were identified on the site:

- *Acacia* low open forest;
- Spotted Gum/Grey Ironbark open forest;
- *Acacia* low open woodland/mosaic in association with infrastructure; and
- Pasturelands.

No threatened flora species were identified in any of the vegetation communities. Several restricted invasive species were recorded. These species must be controlled by the landholder under the provisions of the *Biosecurity Act 2014.*

Recommendations have been made to rehabilitate and buffer Yaun Creek where it traverses the site in the northern corner, the Koala habitat area within the south-western corner of the site and the drainage channel in the south-eastern corner of the site.

To assist with the on-going management of the site and as stipulated in the City of Gold Coast planning provisions, it is recommended that the following reports be prepared:

- Flora and Fauna Management Plan;
- Open Space Management Plan; and
- Rehabilitation Management Plan.

# Contents


**1 Introduction ..... 1**

1.1 Scope and Objectives ..... 1

**2 Site Specifics ..... 2**

2.1 Site Location ..... 2

2.2 Current Land Use ..... 3

2.2.1 Land Use Zones ..... 3

2.3 Draft Concept Plan ..... 3

2.3.1 Courtney South East Precinct ..... 4

2.3.2 Courtney West Precinct ..... 5

2.3.3 Green Space ..... 5

**3 Legislation and Planning Considerations ..... 6**

3.1 Federal Legislation ..... 6

3.2 State of Queensland Legislation ..... 7

3.2.1 Planning Act 2016 ..... 7

3.2.2 Nature Conservation Act 1992 ..... 8

3.2.3 Vegetation Management Act 1999 ..... 8

3.2.4 Water Act 2000 ..... 9

3.2.5 Biosecurity Act 2014 ..... 9

3.2.6 Environmental Offsets Act 2014 ..... 9

3.3 City of Gold Coast Planning Scheme ..... 12

**4 Desktop Assessment ..... 13**

4.1 Aerial Photography ..... 13

4.2 Database Searches ..... 13

4.2.1 Protected Matters Database Search ..... 13

4.2.2 Wildlife Online ..... 14

4.3 Vegetation Mapping ..... 15

4.3.1 Regulated Vegetation ..... 15

4.3.2 Vegetation Management Regional Ecosystem and Remnant Map ..... 16

4.3.3 Watercourses and Drainage Features ..... 17

4.3.4 Essential Habitat Map ..... 18

4.4 Planning Scheme Overlays ..... 19

4.4.1 Environmental Significance – Priority Species ..... 19

4.4.2 Environmental Significance – Vegetation Management ..... 20

4.4.3 Environmental Significance – Wetlands and Watercourses ..... 21

4.5 Likelihood of Occurrence ..... 21

**5 Development Proposal ..... 27**

**6 Vegetation Field Survey ..... 28**

6.1 Methodology ..... 28

6.2 Flora Survey Results ..... 29

6.3 Vegetation Communities ..... 29

6.3.1 Vegetation Community 1 – Acacia low open forest ..... 31

6.3.2 Vegetation Community 2 – Spotted Gum/Grey Ironbark Open Forest (RE 12.11.5) ..... 32
6.3.3 Vegetation Community 3 - Acacia low open woodland/mosaic +/- landscaping around dwellings ..... 33
6.3.4 Vegetation Community 4 - Pasturelands +/- copses of native/exotic trees.. 34
6.4 Conservation Significant Flora ..... 35
6.5 Weed Incursions ..... 35
6.6 Habitat Trees ..... 37
6.7 Waterways and Riparian Vegetation ..... 37
6.7.1 Lot 192 ..... 38
6.7.2 Lot 191 ..... 39
6.7.3 Lot 189 ..... 41
6.7.4 Lot 188 ..... 42
**7 Fauna Field Survey ..... 44**
7.1 Diurnal bird surveys ..... 44
7.2 Targeted Searches for Conservation Significant Species ..... 44
7.2.1 Koala Searches ..... 44
7.2.2 Glossy Black-cockatoo Searches ..... 45
7.3 Opportunistic Records and Observations of Inferential Evidence ..... 45
7.4 Survey Limitations ..... 45
7.5 Results ..... 46
7.5.1 Significant Fauna Species ..... 48
7.5.2 Amphibians ..... 48
7.5.3 Birds ..... 48
7.5.4 Mammals ..... 48
**8 Ecological Functions ..... 49**
8.1 Core Habitat ..... 49
8.2 Ecological Corridors ..... 49
8.3 Waterways and Wetlands ..... 49
**9 Ecologically Significant Areas ..... 50**
**10 Impact Assessment ..... 52**
10.1 Koala Habitat ..... 52
10.1.1 Avoiding Impacts to Koala Habitat ..... 52
10.1.2 Minimising Impacts to Koala ..... 52
10.1.3 Compensating for loss of Koala Habitat ..... 53
10.2 Vegetation ..... 53
10.2.1 Avoiding Impacts to Medium Priority Vegetation ..... 53
10.2.2 Avoiding and Minimising Impacts to General Priority Vegetation ..... 53
10.2.3 Mitigating Impacts to Retained Vegetation ..... 53
10.3 Waterways ..... 54
10.3.1 Yaun Creek ..... 54
10.3.2 Lot 189 ..... 54
10.3.3 Lot 191 ..... 55
10.3.4 Lot 192 ..... 55
10.4 Environmental Areas ..... 55

10.5 Rehabilitation ..... 55
**11 Conclusions ..... 56**
11.1 Specialist Reports and Requirements ..... 56
**12 References ..... 57**

**Appendix A – Protected Matters Search**
**Appendix B – Wildlife Online**
**Appendix C – Flora Recorded**
**Appendix D – Code Responses**

## Figures

Figure 2.1 Site Location (Google Earth, image date 2016) ..... 2
Figure 2.2 Zones under the City Plan 2018 ..... 3
Figure 2.3 Draft Concept Plan (GHD, 2017) ..... 4
Figure 4.1 Regulated Vegetation Map (Qld Globe) ..... 15
Figure 4.2 Vegetation Management Support Map (Qld Globe) ..... 16
Figure 4.3 Watercourses and Drainage Features (Qld Globe) ..... 17
Figure 4.4 Drainage feature defined by Water Act 2000 (Qld Globe) ..... 18
Figure 4.5 Essential Habitat Mapping (Qld Globe) ..... 19
Figure 4.6 Priority Species Overlay (City Plan Interactive Mapping) ..... 20
Figure 4.7 Vegetation Management Overlay (City Plan Interactive Mapping) ..... 20
Figure 4.8 Wetlands and Watercourses Overlay (City Plan Interactive Mapping, 2018) ..... 21
Figure 5.1 Proposed Development Layout (Bennett and Bennett, 2019) ..... 27
Figure 6.1 Vegetation Communities ..... 30
Figure 6.2 Vegetation Community 1 ..... 31
Figure 6.3 Vegetation Community 2 ..... 32
Figure 6.4 Vegetation Unit 3 ..... 34
Figure 6.5 Vegetation Community 4 ..... 34
Figure 6.6 Waterway Lot 192 (City Plan mapping) ..... 38
Figure 6.7 Dam on Lot 192 ..... 39
Figure 6.8 Waterway Lot 192 (north of dam) ..... 39
Figure 6.9 Waterway Lot 191 (City Plan mapping) ..... 40
Figure 6.10 Dam on Lot 191 ..... 40
Figure 6.11 Waterway Lot 189 (City Plan mapping) ..... 41
Figure 6.12 Dam on Lot 189 ..... 42
Figure 6.13 Waterway Lot 188 (City Plan mapping) ..... 42
Figure 6.14 Waterway on Lot 188 ..... 43

# Tables

Table 2.1 Allotment Details ..... 2
Table 3.1 Summary of Legislative Considerations ..... 6
Table 4.1 Protected Matters Search Results ..... 13
Table 4.2 Conservation Significant Species Potentially Occurring On-Site ..... 14
Table 4.3 Description of Regional Ecosystems Mapped On-site ..... 16
Table 4.4 Threatened Fauna – Assessment of Likelihood of Occurrence ..... 22
Table 6.1 Structural Formation Classes for Woody Plant Communities ..... 28
Table 6.2 Vegetation Community 1 Quantitative Assessments ..... 31
Table 6.3 Floristic Association – Community 1 ..... 31
Table 6.4 Vegetation Community 2 Quantitative Assessments ..... 33
Table 6.5 Floristic Association – Community 2 ..... 33
Table 6.6 Weeds Observed On-site ..... 35
Table 6.7 Habitat Tree Locations ..... 37
Table 7.1 Fauna Observed On-Site ..... 46
Table 7.2 KSAT Results ..... 48
Table 9.1 Summary of Environmentally Significant Areas ..... 51

# 1 Introduction

Gallery Homes is proposing a new residential sub-division to be located within the rapidly developing northern Gold Coast region. Gallery Homes has commissioned Biome Consulting to undertake an assessment of the ecological constraints related to the proposal. This Ecological Assessment report accompanies a planning application to be assessed by the City of Gold Coast (CGC) for a development permit for Reconfiguration of Lots to accommodate the sub-division components.

The location of the sub-division is described as Lots 188-192 on RP173728, at 79-99 Courtney Drive, Upper Coomera (hereafter referred to as 'the site').

The intent of this assessment is to detail the ecological features and functions of the subject site and identify any potential impacts to these values as a result of the proposed development. The report includes a desktop assessment and field investigation. This version of the report (V3) has been updated so that impacts to the revised plan of development could be assessed.

## 1.1 Scope and Objectives

This Ecological Assessment aims to provide the following information:

- Desk top review of existing databases and local, state and federal environmental policy documents;
- Flora survey to identify:
  - terrestrial and aquatic flora species;
  - the presence of any significant flora species;
  - dominant vegetation associations and their level of integrity;
  - the presence of any regional ecosystems; and
  - areas of weed infestation and disturbance.
- Map of vegetation communities and significant species;
- Targeted fauna survey to identify:
  - terrestrial fauna species;
  - the presence of any significant fauna species; and
  - the presence of any significant fauna habitat.
- A map which identifies any important trees i.e. trees with active den and nest sites or the presence of hollows;
- An assessment of the ecological features, their function and significance;
- An assessment of impacts upon any matters of environmental significance;
- Recommendations to mitigate environmental impacts; and
- Required specialist reports.

# 2 Site Specifics

The following sections describe the site and current conditions.

## 2.1 Site Location

The subject site is located at 79-99 Courtney Drive, Upper Coomera on Lots 188-192 on RP173728 and is located within the City of Gold Coast Local Government Area. The site comprises of five allotments with a total land area of 18.849 ha (Table 2.1).

**Table 2.1 Allotment Details**

| Street Number | Lot Plan Number | Lot Size (ha) |
|---|---|---|
| 79 | 188 RP173728 | 3.079 |
| 89 | 189 RP173728 | 3.034 |
| 91 | 190 RP173728 | 3.095 |
| 97 | 191 RP173728 | 3.739 |
| 99 | 192 RP173728 | 5.902 |



**Figure 2.1 Site Location (Google Earth, image date 2016)**

## 2.2 Current Land Use

The site is used for residential/rural purposes. Residential dwellings and associated out buildings are present on the site and it is grazed by livestock. Several dams are present on the site. Yaun Creek and/or its tributaries pass through Lots 188, 191 and 192.

The immediate surrounding land use pattern is characterised by rural residential allotments to the immediate west, south and north. These allotments range in size from 3 – 157 ha. Small lot residential developments are present to the east.

The site is accessed via Courtney Drive. The unformed Reserve Road runs along the southern site boundary.

### 2.2.1 Land Use Zones

Under the City of Gold Coast Planning Scheme *City Plan* Version 7, the site is designated as Rural and Rural Residential (Figure 2.2). Some areas of the site are designated Rural Landscape and Environment Precinct.

The site falls within an Investigation Area for Future Development. The Draft Concept Plan (GHD, 2017) identifies much of the the site as *Suburban Neighbouhood.*

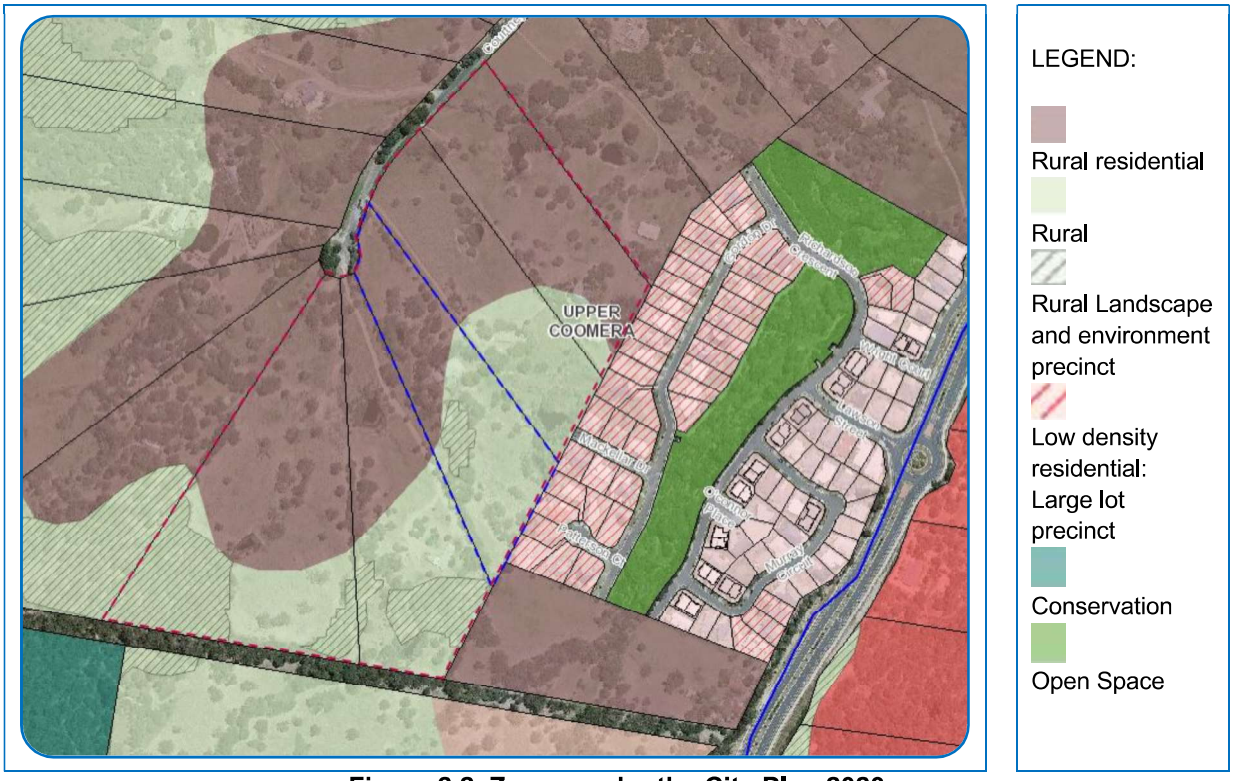



**Figure 2.2 Zones under the City Plan 2020**

## 2.3 Draft Concept Plan

Under the City Plan, 13 non-urban areas within the urban footprint of the *South East Queensland Regional Plan 2009-2031*, were identified for investigation into land use opportunities and constraints. Courtney Drive was given the highest ranking in terms of marketability and development suitability (GHD, 2017).

The subject site falls within the Courtney South East and Courtney West Precincts of the investigation area (Figure 2.3). Three potential land use categories have been identified on the subject site – suburban neighbourhood, suburban neighbourhood (constrained) and green space. Constrained suburban neighbourhood areas require special design considerations as the land is above Reduced Level (RL) 60.

The draft concept plan recommends the amalgamation of allotments to maximise the development potential, connectivity and bushfire management.

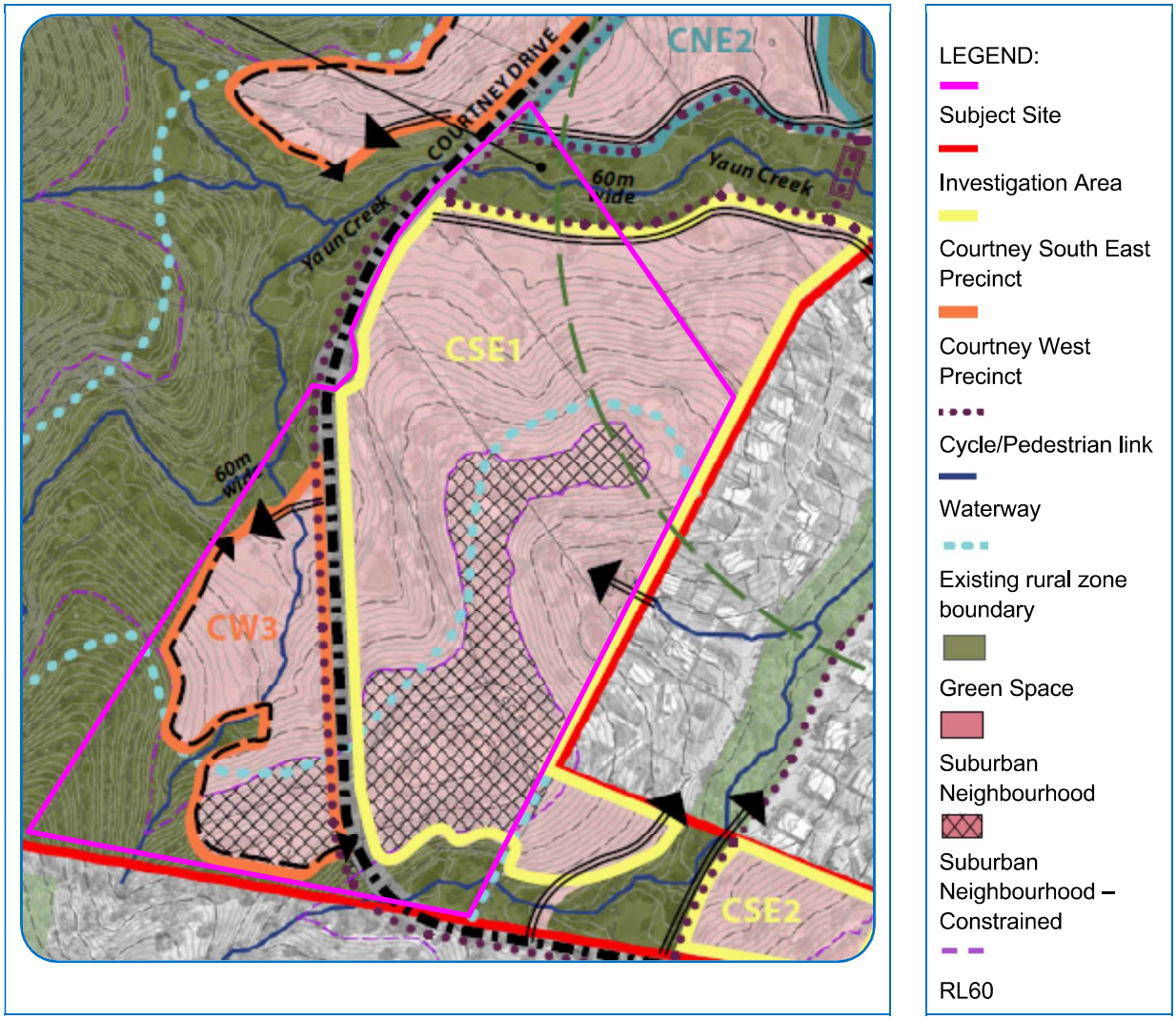



**Figure 2.3 Draft Concept Plan (GHD, 2017)**

### 2.3.1 Courtney South East Precinct

The Courtney South East Precinct includes the extension of Courtney Drive to connect with Reserve Road and the Yaun Creek Corridor at its northern edge.

GHD concluded that based primarily on slope, lot sizes similar to the adjoining residential area are the most appropriate response for the majority of housing in this precinct. Where properties can be amalgamated, increased density may be suitable. A density estimate of future dwellings for this precinct was determined to be 9.7-13.3 (GHD, 2017).

A large area of this precinct is greater than RL 60. These areas are considered suitable for significant earthworks to reduce the amount of land above RL 60 and achieve an extension of Courtney Drive that improves the development potential and connectivity.

Yaun Creek is considered a key character element.

### 2.3.2 Courtney West Precinct

The Courtney West Precinct is characterised by its proximity to conservation open space, its higher elevation and several overland flow paths. The extent of development in this precinct relies on the amalgamation of the site to address bushfire management.

The density estimate of future dwellings was determined to be 8.4-10.9 (GHD, 2017).

### 2.3.3 Green Space

Green Space areas have been proposed in the concept plan. Green Space is land suitable for a conservation or open space.

This land is considered not suitable for development based on the following constraints (GHD, 2017):

- High value and medium value ecological constraints;
- Extreme slopes 1:3 (33.33 %) or steeper;
- Land above RL 60 (where servicing issues, bushfire risk/ fire-fighting capabilities and scenic amenity values are anticipated to affect development potential); or
- Within 30 m from the outer bank of watercourse.

# 3 Legislation and Planning Considerations

Several acts, policies and guidelines apply to the assessment, planning and management of biodiversity values within the study site. The following sections provide an overview of their relevance to this report and identifies the stages when applicable. Table 3.1 provides a summary of this information.

**Table 3.1 Summary of Legislative Considerations**

| Legislation | Applicable to Development |
|---|---|
| *Environment Protection and Biodiversity Conservation Act 1999* | Referral under the EPBC Act only required if impacts to a threatened species is deemed to be significant.<br>No referral is considered necessary for this development. |
| *Nature Conservation Act 1992* | Parts of the site falls within the protected plants trigger area. A survey for threatened flora will need to be conducted prior to any vegetation clearing.<br>Essential habitat is mapped on the site and is excluded from the building envelopes. |
| *Vegetation Management Act 1999* | Regulated vegetation present on the site:<br>• Least Concern RE 12.11.5/12.11.24;<br>• Regulated vegetation intersecting a watercourse; and<br>• Essential habitat. |
| *Water Act 2000* | Drainage features as defined under the Water Act are present on the site. No permits are required for placing fill or excavating drainage features. |
| *Biosecurity Act 2014* | Restricted and invasive weeds must be controlled on the site. |
| *Environmental Offsets Act 2014* | No significant residual impacts to matters of state environmental significance will result due to the development. Therefore, the provisions of the Environmental Offsets Act do not apply. |
| City of Gold Coast Planning Scheme<br>*City Plan, Version 7* | The following are required under the planning scheme provisions:<br>• Basic Ecological Assessment;<br>• Compliance with the Environmental Significance Overlay Code. |

## 3.1 Federal Legislation

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is federal legislation that provides a framework for the protection and management of nationally and internationally important flora, fauna, ecological communities and heritage places, which are defined in the Act as Matters of National Environmental Significance (MNES).

There are eight MNES identified under the EPBC Act including:

- World Heritage Properties;
- National Heritage Places;
- Wetlands of National Importance (listed under the Ramsar Convention);
- Listed Threatened Species and Ecological Communities;
- Migratory Species (protected under international agreements);
- Commonwealth Marine Areas;
- The Great Barrier Reef Marine Park; and

- Nuclear Actions (including uranium mines).

Under the EPBC Act, actions that are likely to have a significant impact on either Commonwealth land or MNES are deemed 'controlled actions'. A controlled action is also any action which is likely to have a significant impact on the environment.

A significant impact is an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts.

If a proposed action is likely to have a significant impact on a MNES, it must be referred to the Australian Government Minister for the Environment for assessment against the EPBC Act.

To identify the MNES that are known or likely to occur on site, a review of EPBC Act Protected Matters database was undertaken. Results of this investigation are discussed in Section 4.

## 3.2 State of Queensland Legislation

State ordinances applicable to the study area are discussed below.

### 3.2.1 Planning Act 2016

The *Planning Act 2016* (Planning Act) and the underlying *State Planning Policy July 2017* (SPP) form Queensland's primary planning and development assessment legislation. The Planning Act seeks to achieve sustainable planning outcomes through managing the development process; managing the effects or impacts of development on the environment; and coordinating development assessment at local, regional and state planning level through the Integrated Development Assessment System (IDAS).

The SPP is supported by two interactive mapping systems the State Planning Interactive Mapping System (SP IMS) and the Development Assessment Mapping System (DAMS). These mapping systems provide links to registers or external mapping systems maintained by relevant state or federal agencies and are used to identify matters of state or national interest when assessing development applications.

A review of the SP IMS mapping indicates that the site is constrained by the following state environmental interests:

- Biodiversity:
  - Matters of State Environmental Significance (MSES) – Wildlife habitat;
  - MSES – Regulated vegetation (essential habitat); and
  - MSES – Regulated vegetation (intersecting a watercourse).

A review of the DAMS indicates that the site is constrained by:

- SEQ Regional Plan Triggers:
  - SEQ Regional Plan land use categories (Urban Footprint);
- Native Vegetation Clearing:
  - Regulated vegetation (category A and B extract);

The implications of the environmental constraints listed above are discussed in the following sections.

### 3.2.2 Nature Conservation Act 1992

The *Nature Conservation Act 1992* (NCA) protects areas that have been dedicated for conservation as well as individual specimens of native plants and animals that are prescribed as extinct, endangered, vulnerable, near threatened, special least concern and least concern under the schedules of the Act's regulation, the *Nature Conservation (Wildlife) Regulation 2006*.

The NCA endeavours to ensure that protected plants are not illegally removed from the wild or illegally traded. Some areas fall within a high-risk area for protected plants. For properties in a high-risk area, a flora survey must be undertaken on and within a 100 m buffer of the mapped high-risk area. If an endangered, vulnerable or near threatened plant (EVNT plant) is recorded in the survey area, a clearing permit is required. If a flora survey identifies that EVNT plants are not present or can be avoided by 100 m, the clearing activity is exempt and an exempt clearing notification application is required. In an area, other than a high-risk area, a clearing permit is only required where EVNT plants are present.

The protected plants map shows areas where provisions of the NCA apply to the clearing of protected plants. Parts of the site falls inside a high-risk area; therefore, a protected plants flora survey is required before clearing to identify the presence of EVNT flora on the site and within the 100 m survey buffer.

The Wildlife Online Database was queried to identify any threatened species recorded within a 2 km radius of the site. The results of this database search informed the targeted searches for threatened species during the field assessment. Results of this database search are discussed in Section 4.

### 3.2.3 Vegetation Management Act 1999

The *Vegetation Management Act 1999* (VMA) regulates the clearing of remnant vegetation, high value regrowth vegetation, and high value vegetation near regrowth watercourses across Queensland. The purpose of the VMA is mainly achieved through the classification of vegetation units and defining permissible clearing for each unit in accordance with its level of significance.

The VMA regulates the clearing of vegetation in a way that:

- Conserves remnant vegetation that is:
    - An endangered regional ecosystem; or
    - An of concern regional ecosystem; or
    - A least concern regional ecosystem.
- Conserves vegetation in declared areas;
- Ensures the clearing does not cause land degradation;
- Prevents the loss of biodiversity;
- Maintains ecological processes;
- Manages the environmental effects of the clearing; and
- Reduces greenhouse gas emissions.

The VMA defines regional ecosystems (RE) as a vegetation community in a bioregion that is consistently associated with a particular combination of geology, landform and soil.

Vegetation mapping indicates the subject area is constrained by:

- Least concern regional ecosystems; and

- Essential habitat.

Results of the vegetation mapping are discussed in Section 4.

Clearing of least concern regional ecosystems is governed by the VMA and as such, development is required to address the provisions of *State Code 16 – Native Vegetation Clearing* of the SDAP should this area not be avoidable.

The purpose of this code is to regulate the clearing of native vegetation within Queensland to conserve remnant vegetation, prevent the loss of biodiversity and maintain ecological processes.

In planning the proposed development, consideration should be given to the preservation of essential habitat and regulated vegetation.

### 3.2.4 Water Act 2000

The *Water Act 2000* seeks the sustainable management of Queensland's water resources. Amongst other regulatory provisions, the *Water Act 2000* protects vegetation within watercourses, whereby a permit is required for destroying vegetation, excavating or placing fill in a watercourse, lake or spring.

The waterways on the site are mapped as a drainage feature under the Water Act and therefore, the Act's provisions are not applicable.

### 3.2.5 Biosecurity Act 2014

The *Biosecurity Act 2014* provides comprehensive biosecurity measures to safeguard our economy, agricultural and tourism industries, environment and way of life, from:

- Pests (e.g. Wild dogs and weeds);
- Diseases (e.g. Foot-and-mouth disease); and
- Contaminants (e.g. lead on grazing land).

Every landholder has a general biosecurity obligation. This means activities on the land do not spread a pest, disease or contaminant.

Under the Biosecurity Act, weeds are categorised into prohibited, restricted, and other invasive plants. Prohibited weeds are not usually found in Queensland and must be reported immediately if found. Action should be taken to limit the impact of restricted plants by reducing, controlling or containing them.

Several restricted weed species were recorded on the site. The landholder is responsible for the control and containment of these species.

### 3.2.6 Environmental Offsets Act 2014

Under the *Environmental Offsets Act 2014* (EOA), there is a requirement in the first instance, of avoiding impacts on prescribed environmental matters and if avoidance cannot be achieved, demonstrating that impacts have been carefully managed and minimized. If after avoidance and mitigation, there is still a significant residual impact on prescribed environmental matters, an offset may be required.

The requirement to provide environmental offsets does not mean that development with unacceptable impacts will be approved. Offsets simply provide an additional tool that can be used in the application and assessment process.

Prescribed environmental matters include development in or impacting on:

- Regulated vegetation;
- Connectivity areas;
- Wetlands and watercourses;
- Protected wildlife habitat; and
- Koala habitat in south-east Queensland.

A significant residual impact for prescribed environmental matters is described in the following:

#### 3.2.6.1 Regulated Vegetation

Regulated vegetation is a 'prescribed regional ecosystem' that:

- Is an endangered or of concern regional ecosystem, as defined under the VMA; or
- Intersects with an area shown on the vegetation management wetlands map, as defined under the VMA, to remove doubt this refers to that component of a regional ecosystem that lies within a mapped wetland; or
- Is located within the defined distance from the defining banks of a watercourse identified on the vegetation management watercourse map, as defined under the VMA.

Clearing in regulated vegetation is restricted by size and/or distance from the watercourse or wetland. For example, buffers of at least 10 m along minor watercourses are required to avoid triggering the EOA.

The provisions of the EOA are not triggered in this instance as no regulated vegetation is mapped outside of the south-western corner of the site.

#### 3.2.6.2 Connectivity Areas

Development that will cause a change in core remnant ecosystem extent at the local scale or result in loss or fragmentation of core remnant ecosystem at the site scale is subject to offset.

A development impact on connectivity areas is determined to be significant if either of the following are true:

1. The change in the core remnant ecosystem extent at the local scale (post impact) is greater than a threshold determined by the level of fragmentation at the regional scale; or
2. Any core area that is greater than or equal to 1 hectare is lost or reduced to patch fragments (core to noncore).

The proposed development will not change the extent of core remnant ecosystems at a local scale.

#### 3.2.6.3 Wetlands and Watercourses

An offset may be required for the following wetlands:

- Wetland in a wetland protection area;
- Wetlands of high ecological significance; and

- Wetland or watercourse in a high ecological value waters.

An action is likely to have a significant residual impact on prescribed wetlands or watercourses if it is likely that the action will result in environmental values being affected in any of the following ways:

- Areas of the wetland or watercourse being destroyed or artificially modified;
- A measurable change in water quality of the wetland or watercourse—for example a change in the level of the physical and/or chemical characteristics of the water, including salinity, pollutants, or nutrients in the wetland or watercourse, to a level that exceeds the water quality guidelines for the waters; or
- The habitat or lifecycle of native species, including invertebrate fauna and fish species, dependent upon the wetland being seriously affected; or
- A substantial and measurable change in the hydrological regime or recharge zones of the wetland, e.g. a substantial change to the volume, timing, duration and frequency of ground and surface water flows to and within the wetland; or
- An invasive species that is harmful to the environmental values of the wetland being established (or an existing invasive species being spread) in the wetland.

No wetlands have been identified on the site. While there are mapped watercourses on the site, they are not defined as high value ecological waters identified under Schedule 2 of the *Environmental Protection (Water) Policy 2009*.

#### 3.2.6.4 Protected Wildlife Habitat

Protected wildlife habitat applies to endangered and vulnerable and special least concern species habitat.

Protected wildlife habitat also includes non-juvenile Koala habitat trees located in an area shown as bushland habitat, high value rehabilitation habitat or medium value rehabilitation habitat on the 'Map of Assessable Development Area Koala Habitat Values' that applies under the repealed *South East Queensland Koala Conservation State Planning Regulatory Provisions*.

A non-juvenile Koala habitat tree is a Matter of State Environmental Significance (MSES) if it is in:

a) A bushland habitat area under the *Planning Regulation 2017*; or
b) A high value rehabilitation habitat area under the *Planning Regulation 2017*; or
c) A medium value rehabilitation habitat area under the *Planning Regulation 2017*.

Koala habitat tree means:

- A food tree of the *Corymbia, Melaleuca,* or *Lophostemon* or *Eucalyptus* genera; or
- A preferred shelter species such as *Angophora*.

Non-juvenile Koala habitat tree means a Koala habitat tree that:

- Is more than 4 m high; or
- Has a trunk with a circumference of more than 31.5 cm at 1.3 m above the ground.

Habitat areas under the *Planning Regulations 2017* are those that fall within the Koala Assessable Development Areas.

Offsets apply when an action is considered likely to have a significant residual impact. Significant residual impacts are those that are likely to:

- Lead to a long-term decrease in the size of a local population; or
- Reduce the extent of occurrence of the species; or
- Fragment an existing population; or
- Result in genetically distinct populations forming as a result of habitat isolation; or
- Result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat; or
- Introduce disease that may cause the population to decline, or
- Interfere with the recovery of the species; or
- Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species.

The Koala offset policy objective is that development which must impact on important Koala habitat requires a net benefit large enough to ensure that is contributes significantly to the recovery of Koalas in SEQ Region. The policy objective can be met by requiring an offset to contribute the equivalent of five new Koala habitat trees for every non-juvenile Koala habitat tree removed. This is a net benefit ratio of 5:1.

The site is not within a Koala Assessable Development Area under the *Planning Regulations 2017*. In addition, while Koalas have been identified as using the site, it is considered, based on assessment of the species' ecology and habitat requirements and the proposed development design, that no residual significant impact to this species will occur.

The provisions of the EOA therefore, do not apply.

## 3.3 City of Gold Coast Planning Scheme

In accordance with the CGC *Guidelines for Ecological Site Assessments*, ecological assessments submitted as part of a development application must be undertaken where impacts to mapped vegetation and buffers to wetlands and waterways will occur.

The following section details the biodiversity overlays applicable to the site. Measures to avoid, mitigate or manage impacts to biodiversity values are provided in Section 10.

Code responses are included at Appendix D.

# 4 Desktop Assessment

A desk top assessment was conducted to inform the flora and fauna values within and proximal to the site. The outcomes of this investigation are presented in the following sections.

## 4.1 Aerial Photography

Aerial photographs indicate the site is mostly cleared of vegetation except for a relatively small area within the site's south-western corner. This vegetation is directly connected to vegetation located within allotments to the south and a council reserve located further west of the site (refer to Figure 1.1).

Given the extent of connectivity to surrounding bushland, vegetation on-site may provide ecological resources for a variety of native species, especially those adapted to disturbed environments.

## 4.2 Database Searches

To identify the threatened species and ecosystems present on or near to the site, database searches were undertaken.

### 4.2.1 Protected Matters Database Search

The EPBC Act protected matters search tool enables searches for MNES in a specified area (Appendix A). Results of this database search (using a 1 km buffer to a central coordinate: Latitude -27.869688; Longitude 153.278631) identified the site to be within 10 km of a Ramsar wetland (Moreton Bay).

A total of 19 threated species or species' habitat, *known* or considered *likely to occur*, are recorded within 1 km of the site (Table 4.1).

**Table 4.1 Protected Matters Search Results**

| Scientific Name | Common Name | Status |
|---|---|---|
| **Flora** | | |
| *Baloghia marmorata* | Marbled Balogia | V |
| *Bosistoa transversa* | Three-leaved Bosistoa | V |
| *Corchorus cunninghamii* | Native Jute | E |
| *Endiandra floydii* | Floyd's Walnut | E |
| *Macadamia integrifolia* | Macadamia Nut | V |
| *Samadera bidwillii* | Quassia | V |
| *Thesium australe* | Austral Toadflax | V |
| **Fauna** | | |
| *Anthochaera phrygia* | Regent Honeyeater | CE |
| *Botaurus poiciloptilus* | Australasian Bittern | E |
| *Erythrotriorchis radiatus* | Red Goshawk | V |
| *Limosa lapponica baueri* | Western Alaskan Bar-tailed Godwit | V |

| Scientific Name | Common Name | Status |
|---|---|---|
| *Turnix melanogaster* | Black-breasted Button-quail | V |
| *Chalinolobus dwyeri* | Large-eared Pied Bat | V |
| *Dasyurus maculatus maculatus* | Spotted-tailed Quoll | E |
| *Petauroides Volans* | Greater Glider | V |
| *Phascolarctos cinereus* | Koala | V |
| *Potorous tridactylus tridatylus* | Long Nosed Potaroo | V |
| *Pseudomys novaehollandiae* | New Holland Mouse | V |
| *Pteropus poliocephalus* | Grey-headed Flying-fox | V |

Status

Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*: CE= Critically Endangered, E= Endangered, V= Vulnerable, CD= Conservation Dependent, I = Introduced Species.

### 4.2.2 Wildlife Online

A search of the Queensland Government Wildlife Online database was undertaken to identify flora and fauna recorded in the local area and consequently species that may occur on-site that are listed as threatened under the Queensland *Nature Conservation (Wildlife) Regulation 2006* (Appendix B). A 2 km buffer was applied to a central coordinate in the site (Latitude -27.8697; Longitude 153.2786) to obtain a representative indication of potential species occurrences.

Seven species recorded in the search area are listed as threatened under State or Commonwealth legislation (Table 4.2). A further six species are listed under the NCA as special least concern. Special least concern species are defined under the NCA as those species listed on a migratory bird agreement (such as JAMBA, CAMBA or RoKAMBA), the Echidna and Platypus.

**Table 4.2 Conservation Significant Species Potentially Occurring On-Site**

| Scientific Name | Common Name | Status* |
|---|---|---|
| **Fauna** | | |
| *Calyptorhynchus lathami lathami* | Glossy Black-cockatoo (Eastern) | V |
| *Numenius madagascariensis* | Eastern Curlew | V, CE# |
| *Limosa lapponica baueri* | Western Alaskan Bar-tailed Godwit | SL, V# |
| *Phascolarctos cinereus* | Koala | V, V# |
| **Flora** | | |
| *Eucalyptus curtisii* | Plunkett Mallee | NT |
| *Cupaniopsis newmanii* | Long-leaved Tuckeroo | NT |
| *Endiandra floydii* | Floyd's Walnut | E, E# |

*Status

Queensland *Nature Conservation (Wildlife) Regulation 2006* (*Nature Conservation Act 1992*): E = Endangered, V = Vulnerable, NT = Near Threatened, SL = Special Least Concern.

Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*: CE#= Critically Endangered, E#= Endangered, V#= Vulnerable, CD#= Conservation Dependent, I# = Introduced Species.

## 4.3 Vegetation Mapping

Several State government maps were analysed as part of the desktop survey to identify vegetation constraints present on-site, including:

- Queensland Government Regulated Vegetation Map;
- Vegetation Management Regional Ecosystem and Remnant Map;
- Watercourses and Drainage Features; and
- Essential Habitat Map.

The results are discussed in the following sections.

### 4.3.1 Regulated Vegetation

The management and clearing of native vegetation in Queensland are regulated by the *Vegetation Management Act 1999* (VMA) and the *Planning Act 2016* in conjunction with associated regulations, policies and codes. The requirements for a permit depend on the type of vegetation, the land tenure, the location, and the extent and purpose of the proposed clearing. In urban areas, vegetation may be regulated by local government provisions even if it is not regulated vegetation under the VMA.

The regulated vegetation management map shows vegetation categories to determine clearing requirements. A small area within the south-western corner of the site and along the southern boundary is mapped as containing regulated vegetation (blue area in Figure 4.1). The balance of the site is mapped as Category X which is not regulated under the VMA.

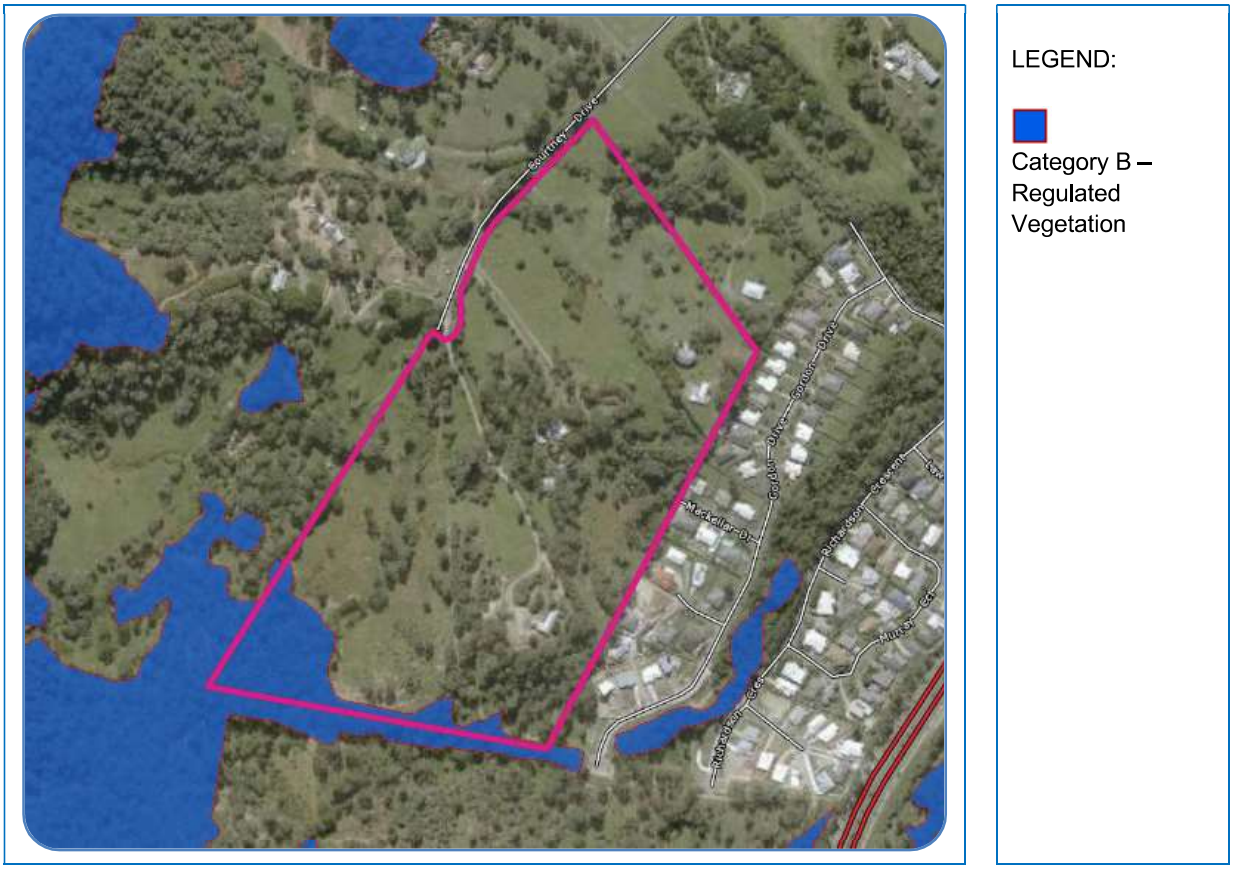



**Figure 4.1 Regulated Vegetation Map (Qld Globe, 2019)**

### 4.3.2 Vegetation Management Regional Ecosystem and Remnant Map

The vegetation management supporting maps provide information on regional ecosystems, wetlands, watercourses and essential habitat. The regulated vegetation shown in Figure 4.1 is mapped as a least concern regional Ecosystem 12.11.5/12.11.24 (70/30); 70% is RE12.11.5 and 30% is 12.11.24. A full description of RE 12.11.5 and 12.11.24 is provided in Table 4.3.

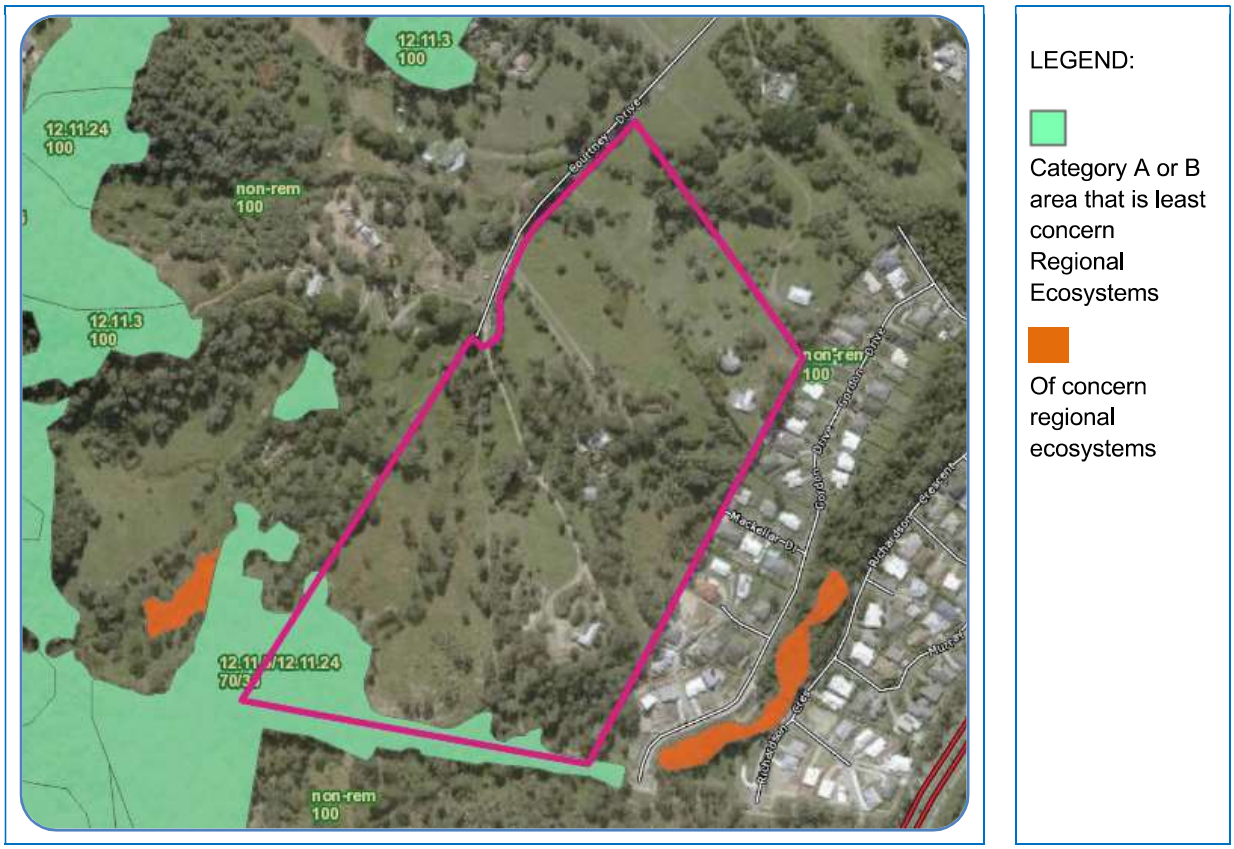



**Figure 4.2 Vegetation Management Support Map (Qld Globe, 2019)**

**Table 4.3 Description of Regional Ecosystems Mapped On-site**

| Regional Ecosystem | Characteristics | VMA Status |
|---|---|---|
| RE12.11.5<br><br>*Corymbia citriodora* subsp. *variegata*, *Eucalyptus siderophloia*, *E. major* open forest on metamorphics +/- interbedded volcanics | *Corymbia citriodora* subsp. *variegata* open forest to woodland, usually including *Eucalyptus siderophloia*/*E. crebra* (sub coastal ranges), *E. propinqua* and *E. acmenoides* or *E. carnea*. Other species that may be present and abundant locally include *Corymbia intermedia*, *C. trachyphloia* subsp. *trachyphloia*, *Eucalyptus tereticornis*, *E. microcorys*, *E. portuensis*, *E. helidonica*, *E. major*, *E. longirostrata*, *E. biturbinata*, *E. moluccana* and *Angophora leiocarpa*. *Lophostemon confertus* often present in gullies and as a sub-canopy or understorey tree. Mixed understorey of grasses, shrubs and ferns. Occurs on hills and ranges of Palaeozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. | Least concern |

| Regional Ecosystem | Characteristics | VMA Status |
|---|---|---|
| RE12.11.24<br>*Eucalyptus carnea, E. tindaliae, Corymbia intermedia* +/- *E. siderophloia* or *E. crebra* woodland on metamorphics +/- interbedded volcanics | *Eucalyptus carnea, E. tindaliae, Corymbia intermedia* woodland +/- *E. crebra* or *E. siderophloia, Eucalyptus resinifera, Eucalyptus major, E. helidonica, Angophora woodsiana, C. trachyphloia, E. microcorys, Corymbia citriodora* subsp. *variegata, C. henryi*. Occurs on Palaeozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics usually at altitudes <300 metres. | Least Concern |

### 4.3.3 Watercourses and Drainage Features

Several watercourses are mapped on the site (Figure 4.3). Vegetation along a mapped watercourse is regulated under the VMA where it intersects with a regional ecosystem. If the ecological values of the waterway and riparian vegetation are found to be high, then appropriate buffers should be incorporated into the development design.

Under the *Water Act 2000*, all these waterways are mapped as drainage features (Figure 4.4) and therefore, no Riverine Protection Permit is required to fill or excavate.

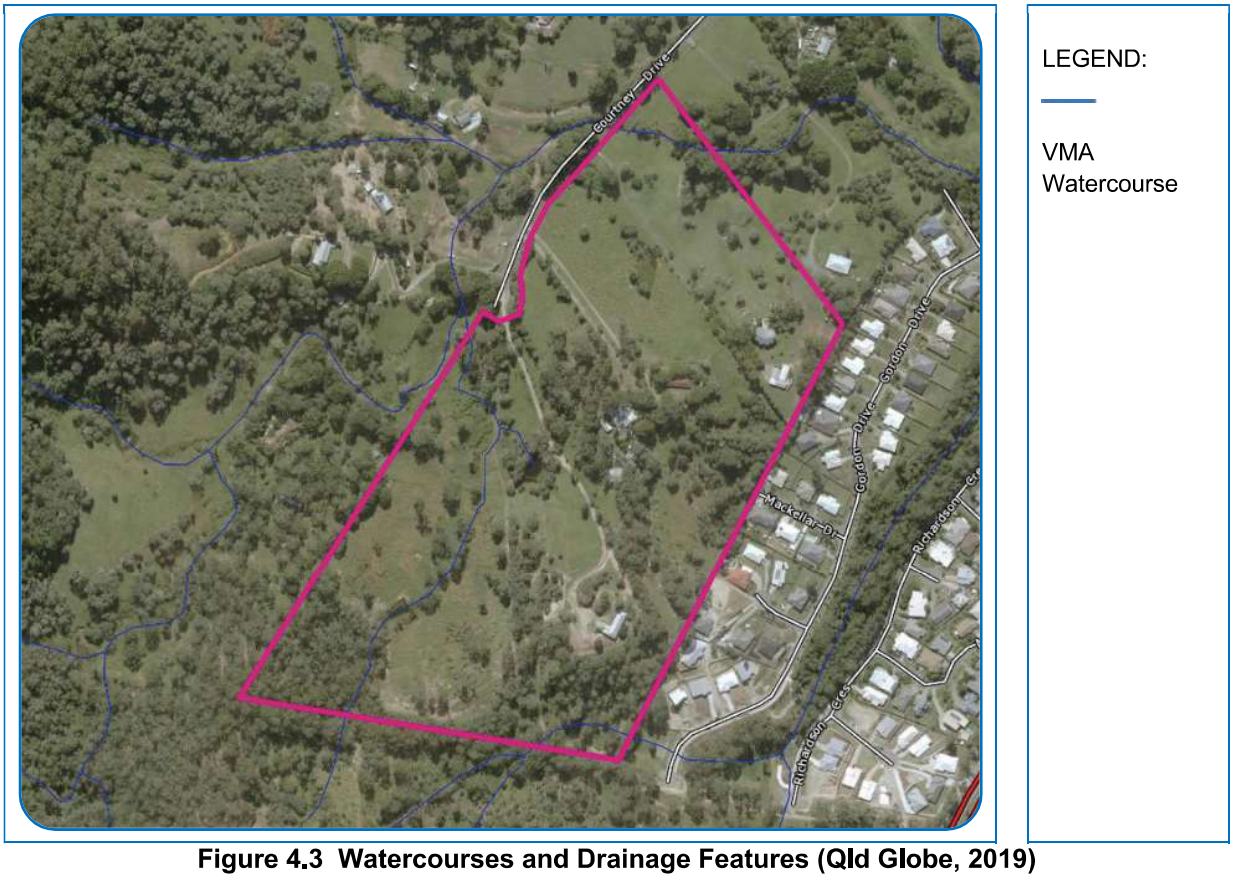



**Figure 4.3 Watercourses and Drainage Features (Qld Globe, 2019)**




**Figure 4.4 Drainage feature defined by Water Act 2000 (Qld Globe, 2019)**

### 4.3.4 Essential Habitat Map

Potential presence of significant fauna habitat is indicated by 'Essential habitat' mapping. Essential habitat mapping identifies areas of potential habitat for species listed as near threatened, vulnerable or endangered under the *Nature Conservation Act 1992*.

Essential habitat for Koala has been mapped over a very small area along the southern boundary of the site (Figure 4.5).




**Figure 4.5 Essential Habitat Mapping (Qld Globe, 2019)**

## 4.4 Planning Scheme Overlays

The proposed development will be assessed under the CGC Planning Scheme *City Plan* Version 7. Several Environmental Significance overlay codes have been identified as being applicable to the site. The purpose of the Environmental Significance Overlay Code and associated mapping is to identify and protect matters of environmental significance and ensure that development is consistent with, and contributes to, the achievement of the objectives of the *Gold Coast Nature Conservation Strategy 2009-2019*.

### 4.4.1 Environmental Significance – Priority Species

The Environmental Significance Priority Species code seeks to protect significant species and ensure their habitat is enhanced and maintained. Under this overlay code, assessable Koala feed and shelter trees are protected when they are located in Koala habitat areas.

The south-western corner of the site is mapped as containing Koala habitat area and state significant species (Figure 4.6). The overlay code does not identify which species are significant. It is assumed, based on essential habitat mapping, the species is Koala.

Therefore, development is to avoid or minimise impacts on assessable Koala feed and shelter trees to the greatest extent possible. Development design should incorporate safe Koala movement opportunities by incorporating measures to maintain connectivity between areas of Koala habitat on and adjacent to the site.

Where development impacts on state and local significant species and their habitat, it is a requirement that flora species are propagated and used in rehabilitation and landscaping on site and fauna species are safely relocated by a qualified fauna spotter catcher.

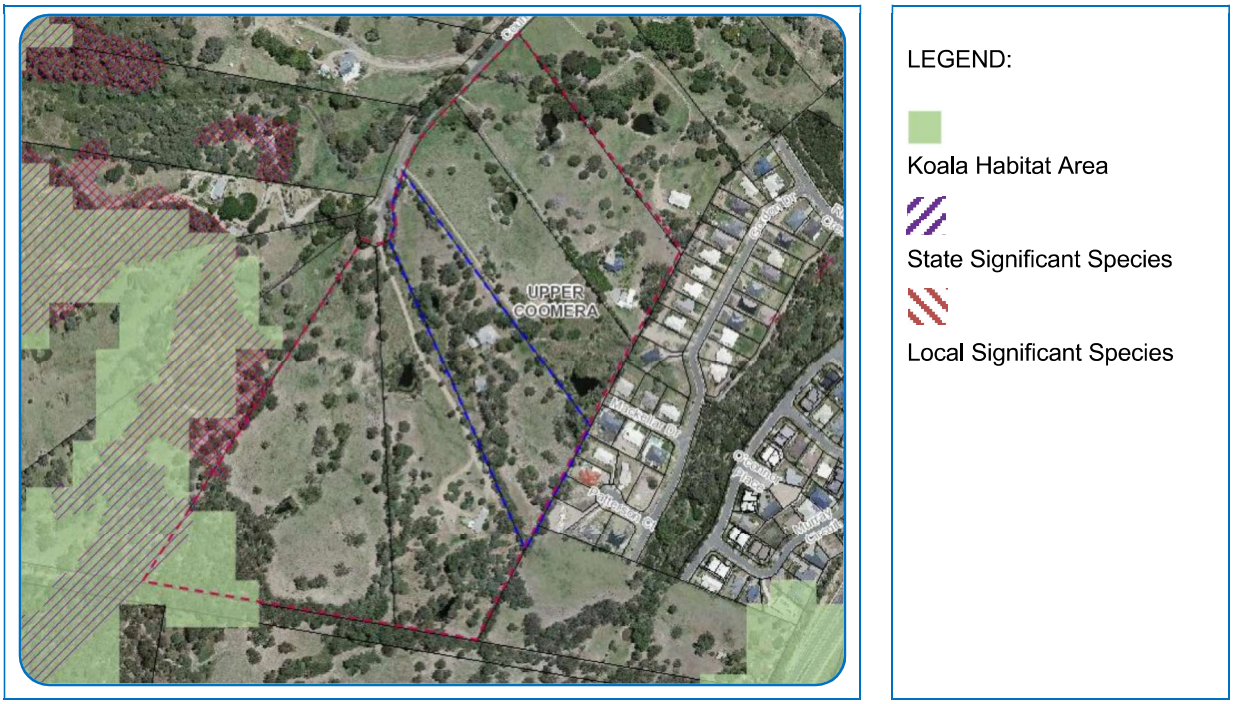



**Figure 4.6 Priority Species Overlay (City Plan Interactive Mapping)**

### 4.4.2 Environmental Significance – Vegetation Management

The purpose of the Vegetation Management code is to ensure that development does not impact on high, medium or general priority vegetation. Overlay code mapping indicates that medium and general priority vegetation is present on the site (Figure 4.7).

Damage to medium priority vegetation should be avoided or if damage is unavoidable, offset under the provisions of the *Environmental Offsets Act 2014* at an area ratio of 3:1 in accordance with SC6.8 City Plan policy – Environmental offsets. Damage to general priority vegetation should be minimised where it cannot be avoided.

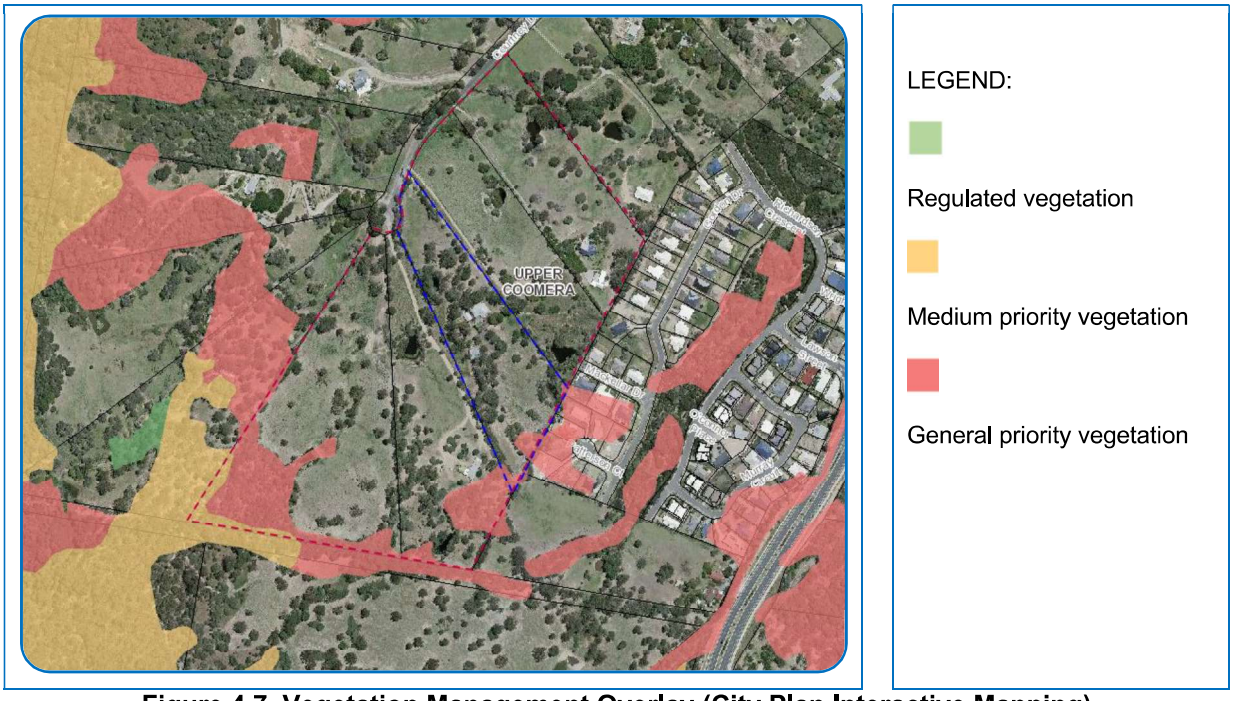



**Figure 4.7 Vegetation Management Overlay (City Plan Interactive Mapping)**

### 4.4.3 Environmental Significance – Wetlands and Watercourses

The purpose of this overlay is to ensure that wetlands and watercourses are protected and enhanced. Mapping indicates that there are locally significant minor watercourses on the site (Figure 4.7).

In accordance with the Planning Scheme, buffers of at least 30 m are to be provided from the outer bank of the minor watercourse, unless an alternative distance is determined through the ecological assessment.




**Figure 4.8 Wetlands and Watercourses Overlay (City Plan Interactive Mapping, 2018)**

## 4.5 Likelihood of Occurrence

Table 4.4 identifies the threatened fauna returned from the Protected Matters and Wildlife Online database searches (as described in Section 4.2) together with a likelihood of occurrence for each species.

Each species' likely occurrence was based on a desktop assessment, habitat availability based on site investigations, knowledge of the species' ecology and professional judgement.

Four terms for the likelihood of occurrence of species are used in this report. The terms for likelihood of occurrence are defined below:

- Known or Recorded = the species has been observed on the site.
- Potential = suitable habitat for a species occurs on the site.
- Unlikely = a very low to low probability that a species uses the site.
- No = habitat on site and in the vicinity, is unsuitable for the species.

**Table 4.4 Threatened Fauna – Assessment of Likelihood of Occurrence**

| Scientific Name | Common Name | Status* | Ecology | Likelihood of Occurrence |
|---|---|---|---|---|
| *Anthochaera phrygia* | Regent Honeyeater | E, CE[#] | The Regent Honeyeater is endemic to south-east Australia, where it is widespread but with an extremely patchy distribution (Garnett *et al*. 2011). Its range extends from south-east Queensland to central Victoria. In Queensland, the regent honeyeater has been recorded from 15 sites, primarily south of a line between Chinchilla and the Sunshine Coast (Environment Australia, 2016).<br>Regent Honeyeaters mostly occur in dry box-ironbark eucalypt woodland and dry sclerophyll forest associations in areas of low to moderate relief, especially along creek flats, or in broad river valleys and foothills (Environment Australia, 2016).<br>Regent Honeyeaters usually nest in the canopy of forests or woodlands. The diet of this species consists mainly of nectar, supplemented with some invertebrates (mostly insects) and their exudates (e.g. lerp, honeydew). Nectar is taken mainly from a variety of eucalypt species (Environment Australia, 2016). | **UNLIKELY**<br>Marginal habitat for this species exists on the site but were not observed. Known breeding sites for this species are restricted to west of Warwick. |
| *Calyptorhynchus lathami lathami* | Glossy Black-cockatoo (Eastern) | V | Glossy Black-cockatoos inhabit open forest and woodlands of the coast and the Great Dividing Range where stands of She-oak occur. They feed almost exclusively on the seeds of several species of She-oak (*Casuarina* and *Allocasuarina* species). They are dependent on large hollow-bearing eucalypts for breeding (Office of Environment & Heritage, 2015). | **UNLIKELY**<br>While a She-oak stand is present on the subject site, no evidence of feeding by this species was recorded during the survey period. |

| Scientific Name | Common Name | Status* | Ecology | Likelihood of Occurrence |
|---|---|---|---|---|
| *Botaurus poiciloptilus* | Australasian Bittern | E | The Australasian Bittern occurs from south-east Queensland to south-east South Australia, Tasmania and the south-west of Western Australia (Marchant & Higgins 1990).<br>The species is rarely recorded in Queensland, and possibly survives only in protected areas such as the Cooloola and Fraser regions (Department of Environment (DE), 2016). The Australasian Bittern occurs in terrestrial freshwater wetlands and, rarely, estuarine habitats. It favours wetlands with tall, dense vegetation, where it forages in still, shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water (Marchant & Higgins 1990).<br>The Australasian Bittern has been recorded feeding on freshwater crayfish, fish (including goldfish), beetles, snakes, leaves and fruit (Marchant & Higgins 1990). | **NO**<br>Suitable habitat for this species does not occur on the subject site |
| *Erythrotriorchis radiatus* | Red Goshawk | E, V# | The Red Goshawk is endemic to Australia. It is very sparsely dispersed coastal and sub-coastal Australia, from the western Kimberley Division (north of 19°S) to north-eastern NSW (north of 33°) (Marchant & Higgins, 1993).<br>The Red Goshawk occurs in coastal and sub-coastal areas in wooded and forested lands (Marchant & Higgins, 1993). Riverine forests are also used frequently (Debus, 1991, 1993). Such habitats typically support high bird numbers and biodiversity, especially medium to large bird species which the goshawk requires for prey. The Red Goshawk nests in large trees within one km of permanent water (Debus & Czechura, 1988b). | **UNLIKELY**<br>The low diversity of suitable prey for this species make the subject site an area unlikely to support Red Goshawk. |

| Scientific Name | Common Name | Status* | Ecology | Likelihood of Occurrence |
|---|---|---|---|---|
| *Turnix melanogaster* | Black-breasted Button-quail | V | The present-day known distribution in Queensland extends from near Byfield in the north, south to the New South Wales border and westwards to Palm Grove National Park and Barakula State Forest (Marchant & Higgins, 1993). The most significant populations appear to be in the Yarraman-Nanango, Jimna-Conondale and Great Sandy regions.<br>The Black-breasted Button-quail is restricted to rainforests and forests, mostly in areas with 770-1200 mm rainfall per annum (Marchant & Higgins, 1993). They prefer drier low closed forests, particularly semi-evergreen vine thicket, low microphyll vine forest, araucarian microphyll vine forest and araucarian notophyll vine forest (Marchant & Higgins, 1993). They may also be found in low, dense acacia thickets and, in littoral area, in vegetation behind sand dunes (Smith & Mathieson, 2004). | **NO**<br>No suitable habitat exists on the site for this species. |
| *Chalinolobus dwyeri* | Large-eared Pied Bat | V | This species prefers roosting habitat of sandstone cliffs and fertile woodland valley. Records from south-east Queensland suggest rainforest and moist eucalypt forest habitats on other geological substrates at high elevation are of importance to the species. Species distribution is poorly known (DE, 2016). | **NO**<br>No suitable habitat exists on the site. |
| *Dasyurus maculatus maculatus* | Spotted-tailed Quoll | E | The Spotted-tailed Quoll prefers mature wet forest habitat. Unlogged forest or forest that has been less disturbed by timber harvesting is also preferable. This predominantly nocturnal species rests during the day in dens. Habitat requirements include suitable den sites such as hollow logs, tree hollows, rock outcrops or caves (DE, 2016).<br>Individuals require an abundance of food such as birds and small mammals, and large areas of relatively intact vegetation through which to forage (DE, 2016). | **NO**<br>Suitable habitat in the form of intact mature wet forest was not observed on the subject site. While some hollows were recorded on-site, they were in low abundance, and no rocky outcrops or caves were recorded. |

| Scientific Name | Common Name | Status* | Ecology | Likelihood of Occurrence |
|---|---|---|---|---|
| *Petauroides volans* | Greater Glider | V[#] | The Greater Glider is an arboreal marsupial, largely restricted to eucalypt forests and woodlands. It is primarily folivorous, with a diet mostly comprising eucalypt leaves, and occasionally flowers (Kehl & Borsboom, 1984; Kavanagh & Lambert, 1990; van der Ree *et al*., 2004).<br>The Greater Glider is restricted to eastern Australia, from the Windsor Tableland in north Queensland to central Victoria, with an elevational range from sea level to 1200m ASL (Vanderduys *et al*., 2012).<br>It is found in highest abundance typically in taller, montane, moist eucalypt forests, with relatively old trees and abundant hollows (van der Ree et al., 2004; Vanderduys *et al*., 2012). The distribution may be patchy even in suitable habitat. The greater glider favours forests with a diversity of eucalypt species, due to seasonal variation in its preferred tree species (Kavanagh, 1984).<br>During the day, it shelters in tree hollows, with a preference for large hollows in large, old trees (Kehl & Borsboom, 1984; Smith *et al*., 2007).<br>In southern Queensland, greater gliders require at least 2-4 live den trees for every 2 ha of suitable forest habitat (Eyre, 2002). Home ranges vary from 1-4 ha in high productivity forests (Kavanagh & Wheeler, 2004) to 16 ha in open woodlands (Eyre, 2002; Smith *et al*., 2007). | **NO**<br>Suitable habitat and denning sites were not observed on the site. |
| *Phascolarctos cinereus* | Koala | V, V[#] | Koalas inhabit dry open sclerophyll forests and woodlands occurring on fertile soils (Van Dyck, 1995; Menkhorst and Knight, 2001; Environmental Protection Agency, 2006). Communities containing denser vegetation and larger trees are generally preferred; however, Koalas can also inhabit less optimal habitat such as young forests, highly fragmented vegetation communities, and small remnants (Environmental Protection Agency, 2006). They mainly feed on *Eucalyptus* species, along with some *Corymbia*, *Angophora*, *Lophostemon*, *Melaleuca*, and *Leptospermum* species (Environmental Protection Agency, 2006). | **KNOWN**<br>This species was not directly recorded during surveys. Indirect evidence (scratch marks and scats) were found of Koala during the KSAT survey. |

| Scientific Name | Common Name | Status* | Ecology | Likelihood of Occurrence |
|---|---|---|---|---|
| *Pteropus poliocephalus* | Grey-headed Flying-fox | V# | The Grey-headed Flying-fox occurs in the coastal belt from Rockhampton to Melbourne.<br>The Grey-headed Flying-fox requires foraging resources and roosting sites. It is a canopy-feeding frugivore and nectarivore, which utilises vegetation communities including rainforests, open forests, closed and open woodlands, *Melaleuca* swamps and *Banksia* woodlands (Eby, 1998). None of the vegetation communities used by the Grey-headed Flying-fox produce continuous foraging resources throughout the year, so the species selectively forages where food is available. Consequently, patterns of occurrence and relative abundance within its distribution vary widely between seasons and between years. At a local scale, the species is generally present intermittently and irregularly (Eby & Lunney, 2002).<br>The Grey-headed Flying-fox roosts in aggregations of various sizes on exposed branches. They most frequently travel around 15 km from a roost site to feed (Tidemann, 1998), although can travel up to 50 km as food resources change (Eby, 1991). | **POTENTIAL**<br>The site would provide seasonal foraging resources. No flying-fox camps are present on the site. |
| *Pseudomys novaehollandiae* | New Holland Mouse | V | The New Holland mouse is patchily distributed in coastal areas of south eastern Australia from southern Queensland in the north, to Flinders Island and Tasmania in the south, extending inland to around 100 km in NE NSW (Australian Museum, 2016). The species is now largely restricted to the coast of central and northern NSW (DE, 2016). | **NO**<br>Suitable heath habitat does not exist on the subject site. |
| *Potorus tridactylus tridatylus* | Long Nosed Potaroo | V | This species generally prefers rainforest and adjacent to wet sclerophyll forest, coastal heathlands and similar habitats with a dense understorey. Like all Potoroos, fungi are the major component of the diet and is also known to feed on invertebrates (DE, 2016). | **NO**<br>Suitable habitat for this species does not occur on the subject site. |

# 5 Development Proposal

The development involves reconfiguring the existing site into 207 lots, including 196 residential lots (Figure 5.1). The development will include:

- An internal road network with pedestrian footpath;
- Environmental Reserves to protect existing ecologically significant areas;
- Recreation areas;
- Drainage areas; and
- Rehabilitated waterways incorporated into public open space areas.

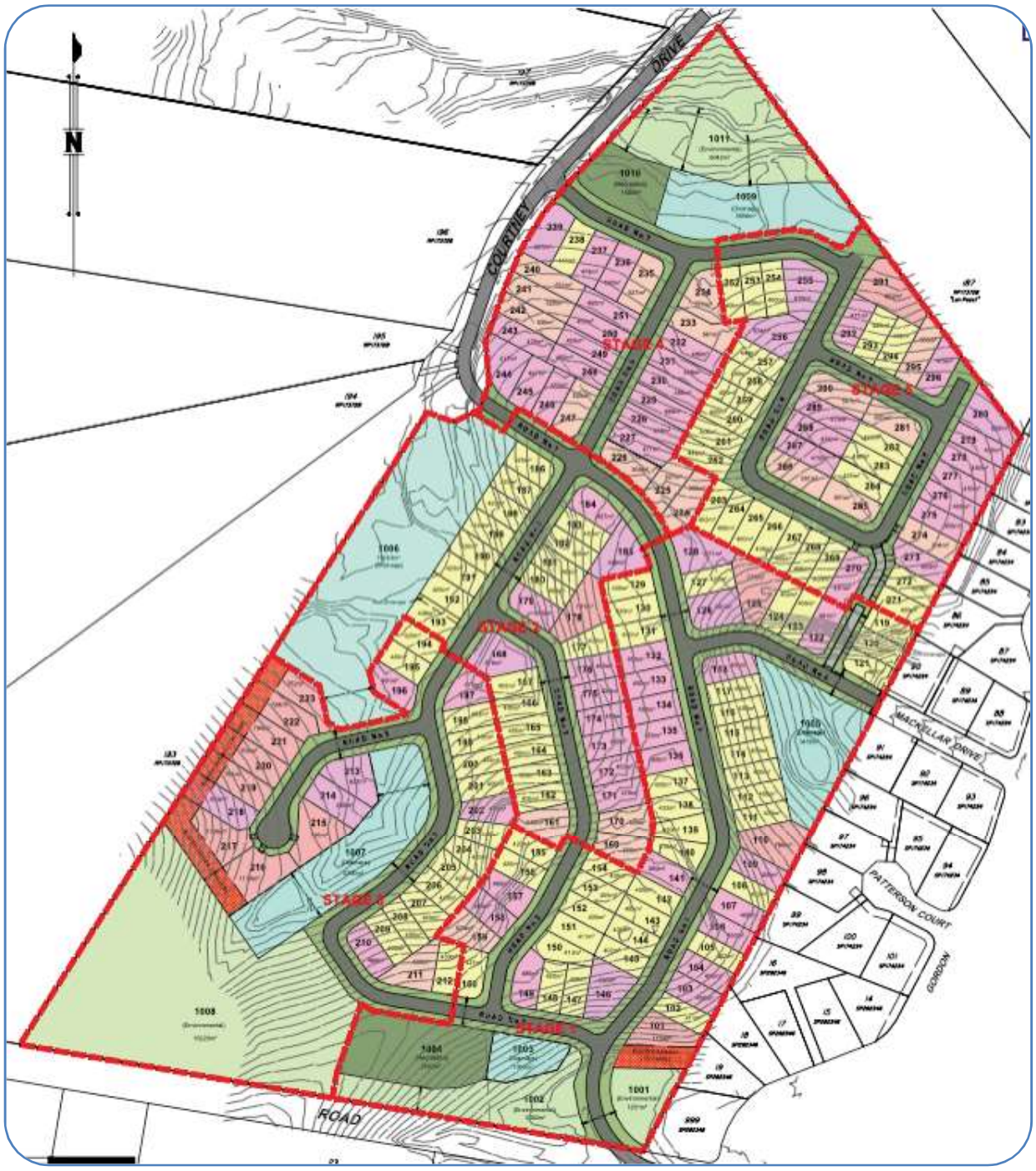



**Figure 5.1 Proposed Development Layout (Bennett and Bennett, 2020)**

# 6 Vegetation Field Survey

A flora survey to ground truth the floristic characteristics of the sites' vegetation communities was undertaken on 5 June 2017. The results of this investigation are presented in the following sections.

## 6.1 Methodology

The field assessment involved an initial walkover of the survey area to ground-truth desktop investigations and identify the presence and extent of vegetation community types. Random meanders were undertaken throughout the survey area generally in accordance with Cropper (1993). This survey technique enabled the identification of a comprehensive flora species list for the survey area.

An assessment of disturbance was undertaken at an association-wide scale.

Data associated with structural formations (i.e. growth form, stratum intervals, crown cover and height) and floristic associations (i.e. species diversity) for each broad vegetation type was collected (Table 6.1).

The vegetation surrounding the site's infrastructure was found to be too modified to represent natural vegetation associations or communities and was excluded from the quantitative assessment.

**Table 6.1 Structural Formation Classes for Woody Plant Communities**

| | | | | | |
|---|---|---|---|---|---|
| Vegetation cover equivalents | Foliage Projective Cover | 70-100% | 30-70% | 10-30% | <10% |
| | Crown Separation | Closed or dense | Mid-dense | Sparse | Very sparse |
| | Field Criteria | Crowns touching to overlapping | Crowns touching to slightly separated | Crowns clearly separated | Crowns well separated |
| | CROWNCOVER % | 100-81% | 81-52% | 52-20% | 20-0.2% |

| | GROWTH FORM | Structural Formation Classes | | | |
|---|---|---|---|---|---|
| Growth form and height | Trees >30 m tall | Tall closed forest | Tall Open forest | Tall woodland | Tall Open woodland |
| | Trees 10-30 m tall | Closed forest | Open forest | Woodland | Open woodland |
| | Trees <10 m tall | Low closed forest | Low open forest | Low woodland | Low Open woodland |
| | Shrubs 2– 8 m tall | Closed scrub | Open scrub | Tall shrubland | Tall Open-shrubland |
| | Shrubs 1-2 m tall | Closed heath | Open heath | Shrubland | Open-shrubland |
| | Shrubs <1 m tall | - | - | Dwarf shrubland | Dwarf Open-shrubland |

Source: DNRW Application Kit for a Property Map of Assessable Vegetation 2004.

## 6.2 Flora Survey Results

Based on past aerial photography, it appears that much of the site has been historically cleared for rural residential purposes while retaining a small area of bushland on a steep slope in the south-western corner and isolated copses throughout. Cultivated gardens around the existing dwellings are present.

A total of 106 species of flora were identified within the site, comprising 51 endemic species and 55 non-endemic species (Appendix C).

## 6.3 Vegetation Communities

The vegetation encountered on-site was broadly classified into four associations:

1. *Acacia* low open forest;
2. Spotted Gum / Grey Ironbark Open Forest (RE 12.11.5);
3. *Acacia* low open woodland/mosaic +/- landscaping around dwellings; and
4. Pasturelands +/- copses of native/exotic trees

These vegetation communities are illustrated in Figure 6.1 and are described in greater detail in the following sections.

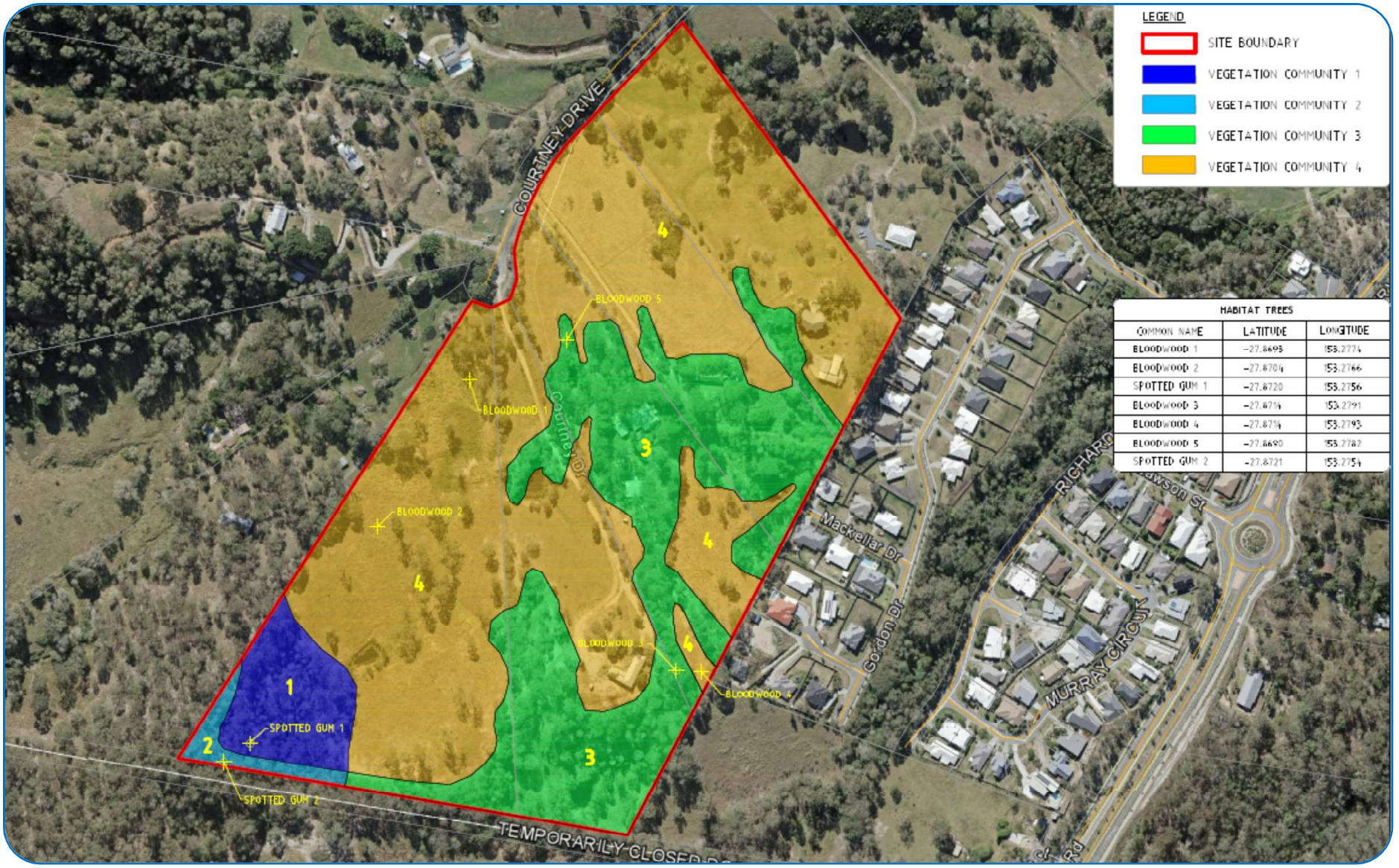



**Figure 6.1 Vegetation Communities**

### 6.3.1 Vegetation Community 1 – Acacia low open forest

Vegetation Unit 1 is comprised of mature *Acacia disparrima* regrowth with occasional emergent *Corymbia citriodora, Eucalyptus siderophloia, E. propinqua, and E. tereticornis*. Other common species in the mid stratum include *Lophostemon suaveolens* and *Allocasuarina littoralis*.

The notable disturbance within this vegetation community is the incursion of weeds, with Lantana dominating the shrub layer. Low level livestock grazing is presently occurring.



**Figure 6.2 Vegetation Community 1**

**Table 6.2 Vegetation Community 1 Quantitative Assessments**

| Stratum | Growth Form | Crown separation | Stratum Height (m) |
|---|---|---|---|
| Upper | Tall tree | Very Sparse | 15 - 20 |
| Mid | Small tree | Mid-dense | 3 - 15 |
| Lower | Shrub | Mid-dense | 0.5 - 3 |
| Ground | Forb | Sparse | <0.5 |

Tables 6.3 summarises the floristic characteristics of Vegetation Community 1 within each stratum.

**Table 6.3 Floristic Association – Community 1**

| Growth Form | Stratum | Scientific Name | Common Name |
|---|---|---|---|
| Woodland | Upper | *Corymbia citriodora* | Spotted Gum |
| | | *Eucalyptus propinqua* | Small-fruiting Grey Gum |
| | | *Eucalyptus siderophloia* | Grey Ironbark |
| | | *Eucalyptus tereticornis* | Queensland Blue Gum |
| | | *Lophostemon confertus* | Brush Box |

| Growth Form | Stratum | Scientific Name | Common Name |
|---|---|---|---|
| Low open-forest | Mid | *Acacia disparrima* | Hickory Wattle |
| | | *Allocasuarina littoralis* | Black She-oak |
| | | *Eucalyptus siderophloia* | Grey Ironbark |
| | | *Lophostemon confertus* | Brush Box |
| | | *Lophostemon suaveolens* | Swamp Box |
| - | Lower | *Acacia disparrima* | Hickory Wattle |
| | | *Lantana camara* | Lantana |
| - | Ground | *Cymbopogon refractus* | Barbed-wire Grass |
| | | *Entolasia stricta* | Wiry Panic |
| | | *Imperata cylindrica* | Blady Grass |
| | | *Lomandra multiflora* | Many-flowered Mat Rush |
| | | *Themeda triandra* | Kangaroo Grass |

### 6.3.2 Vegetation Community 2 – Spotted Gum/Grey Ironbark Open Forest (RE 12.11.5)

Vegetation Community 2 comprises a small area of the total subject site in the south-west corner and is an extension of a larger area of the same vegetation type beyond the site boundary. The composition of canopy trees is generally representative of RE 12.11.5. Low level livestock grazing is presently occurring with negligible weed incursion.



**Figure 6.3 Vegetation Community 2**

**Table 6.4 Vegetation Community 2 Quantitative Assessments**

| Stratum | Growth Form | Crown separation | Stratum Height (m) |
|---|---|---|---|
| Upper | Tall tree | Sparse | 15 - 20 |
| Mid | Small tree | Mid-dense | 3 - 15 |
| Lower | Shrub | Very Sparse | 0.5 - 3 |
| Ground | Forb | Sparse | <0.5 |

Tables 6.5 summarises the floristic characteristics of Vegetation Community 2 within each stratum.

**Table 6.5 Floristic Association – Community 2**

| Growth Form | Stratum | Scientific Name | Common Name |
|---|---|---|---|
| Open forest | Upper | *Corymbia citriodora* | Spotted Gum |
| | | *Eucalyptus siderophloia* | Grey Ironbark |
| Low open forest | Mid | *Corymbia citriodora* | Spotted Gum |
| | | *Corymbia intermedia* | Pink Bloodwood |
| | | *Eucalyptus carnea* | Broad-leaved White Mahogany |
| | | *Lophostemon confertus* | Brush Box |
| - | Lower | *Acacia disparrima* | Hickory Wattle |
| | | *Corymbia citriodora* | Spotted Gum |
| - | Ground | *Cymbopogon refractus* | Barbed-wire Grass |
| | | *Entolasia stricta* | Wiry Panic |
| | | *Imperata cylindrica* | Blady Grass |
| | | *Lomandra confertifolia* | A Mat Rush |
| | | *Lomandra longifolia* | Spikey-headed Mat Rush |
| | | *Themeda triandra* | Kangaroo Grass |

### 6.3.3 Vegetation Community 3 - Acacia low open woodland/mosaic +/- landscaping around dwellings

Vegetation Community 3 is primarily mature *Acacia* regrowth proximate to dwellings and outbuildings on the subject site. There are occasional larger eucalypts and small isolated thickets of lantana and vine weeds are common. Low level grazing is presently occurring throughout most of this community. Prevalent flora species for this community are provided below.

**Upper Stratum:**
*Acacia disparrima, Eucalyptus siderophloia, Eucalyptus tereticornis, Lophostemon confertus*.

**Mid stratum:**
*Acacia disparrima, Lantana camara, Eucalyptus spp.*

**Ground Stratum** (*exotic species)**:**
*Cynodon dactylon var. dactylon, *Setaria sphacelata, *Panicum megathyrsus.*



**Figure 6.4 Vegetation Unit 3**

### 6.3.4 Vegetation Community 4 - Pasturelands +/- copses of native/exotic trees

Vegetation Community 4 covers most of the site comprising introduced pasture species, copses of endemic tree species and trees associated with landscaping. Some of the largest eucalypt trees on site occur as isolated trees or within the copses.

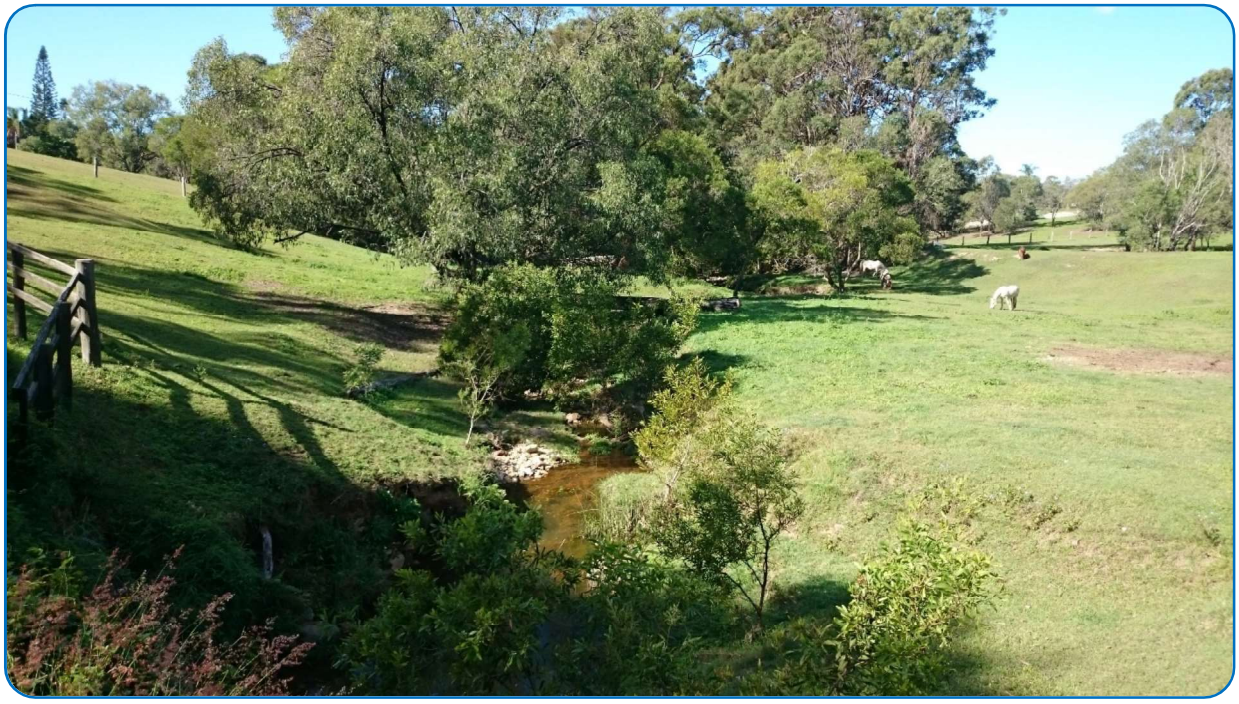


**Figure 6.5 Vegetation Community 4**

## 6.4 Conservation Significant Flora

As the site falls within a high-risk area for protected flora species, surveys noted any threatened species listed under state or Commonwealth legislation.

For the purposes of this report, a significant flora species has been defined as a species that is:

- Scheduled as critically endangered, endangered, vulnerable or conservation dependent under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act); and/or
- Scheduled as endangered, vulnerable, or near threatened under the Queensland *Nature Conservation Act 1992* (NCA).

No conservation significant species were recorded on site during surveys.

## 6.5 Weed Incursions

In its broadest definition, a weed is "a plant out of place". The State government has applied a hierarchical system of classification to invasive plants according to their estimated economic and environmental impacts. Each level of classification prescribes legal obligations designed to control the spread of declared invasive plants. Other plants that are simply exotic or non-endemic to a particular area may be considered less invasive or non-invasive but are nonetheless "out of place" depending on the given context or land use purpose.

In the context of this ecological assessment, a weed is a plant that is not endemic to any given natural area or ecological unit being assessed.

A total of 55 non-endemic species were identified on the subject site, 15 of which are Invasive Plants under the Queensland *Biosecurity Act 2014* (Table 6.6).

**Table 6.6 Weeds Observed On-site**

| Scientific Name | Common Name | Status |
|---|---|---|
| *Ageratum houstonianum* | Blue Billygoat Weed | |
| *Amaranthus spinosus* | Red Amaranth | |
| *Ambrosia artemisiifolia* | Ragweed | RIP |
| *Anagallis arvensis* | Scarlet Pimpernel | |
| *Asclepias curassavica* | Tropical Milkweed | |
| *Asparagus aethiopicus cv. Sprengelii* | Ground Asparagus | RIP |
| *Bidens pilosa* | Cobbler's Pegs | |
| *Cinnamomum camphora* | Camphor Laurel | RIP |
| *Cirsium vulgare* | Scotch Thistle | |
| *Conyza canariensis* | Canadian Fleabane | |
| *Conyza sumatrensis* | Tall Fleabane | |
| *Corymbia torelliana* | Cadagi | |
| *Crassocephalum crepidioides* | Thickhead | |
| *Crotalaria incana* | Woolly Rattlepod | |

| Scientific Name | Common Name | Status |
|---|---|---|
| *Crotalaria lanceolata* | Lance-leaved Rattlepod | |
| *Cupressus sempervirens* | Pencil Pine | |
| *Cyperus papyrus* | Papyrus | |
| *Emelia sonchifolia* | Emelia | |
| *Gomphocarpus sp.* | Cotton Bush | |
| *Hypochaeris radicata* | Flatweed | |
| *Jacaranda mimosifolia* | Jacaranda | |
| *Lantana camara* | Lantana | RIP |
| *Macrotyloma axillare* | Horse Gram | |
| *Megathyrsus maximus* | Guinea Grass | |
| *Melinis minutiflora* | Molasses Grass | OIP |
| *Murraya paniculata* | Mock Orange | OIP |
| *Neonotonia wightii* | White Glycine | |
| *Nymphaea capensis* | Cape Waterlily | |
| *Oxalis corniculata* | Yellow Wood Sorrel | |
| *Oxalis debilis var. corymbosa* | Soursob | |
| *Paspalum dilatatum* | Paspalum | |
| *Passiflora edulis* | Passionfruit | |
| *Passiflora foetida* | Stinking Passionflower | OIP |
| *Passiflora suberosa* | Corky Passionfruit | OIP |
| *Passiflora subpeltata* | White Passionflower | OIP |
| *Polygala paniculata* | Polygala | |
| *Phytolacca octandra* | Inkweed | |
| *Psidium guajava* | Yellow Guava | |
| *Ravenala madagascariensis* | Traveller's Palm | |
| *Richardia brasiliensis* | White Eye | |
| *Schefflera actinophylla* | Umbrella Tree | OIP |
| *Senecio madagascariensis* | Fireweed | RIP |
| *Senna pendula var. glabrata* | Easter Senna | OIP |
| *Setaria sphacelata* | Setaria | |
| *Sida cordifolia* | Flannel Weed | |
| *Sida rhombifolia* | Paddy Lucerne | |
| *Solanum chrysotrichum* | Giant Devil's Fig | |
| *Solanum mauritianum* | Wild Tobacco | OIP |
| *Solanum capsicoides* | Devil's Apple | |
| *Sphagneticola trilobata* | Singapore Daisy | RIP |

| Scientific Name | Common Name | Status |
|---|---|---|
| *Sporobolus africanus* | Paramatta Grass | |
| *Syagrus romanzoffiana* | Cocos Palm | OIP |
| *Tagetes minuta* | Stinking Roger | |
| *Urena lobata* | Urena Burr | |
| *Verbena bonariensis* | Purple Top | |

*Species listed under the Queensland *Biosecurity Act 2014*, where:

PIP = Prohibited invasive plants must not be kept, moved, given away or sold without a permit. The Biosecurity Act requires that all sightings to be reported to Biosecurity Queensland within 24 hours. By law, everyone has a general biosecurity obligation to take all reasonable and practical steps to minimise the risk of spreading prohibited invasive plants until they receive advice from an authorised officer.

RIP = Restricted invasive plants must not be given away, sold or released into the environment without a permit. The Biosecurity Act requires everyone to take all reasonable and practical steps to minimise the risks associated with invasive plants under their control. At a local level, each local government must have a biosecurity plan that covers invasive plants and animals in its area. This plan may include actions to be taken on certain species. Some of these actions may be required under local laws.

OIP = Other invasive plants are not prohibited or restricted, however, by law, everyone has a general biosecurity obligation to take reasonable and practical steps to minimise the risks associated with invasive plants under their control. Local governments must have a biosecurity plan that covers invasive plants and animals in their area. This plan may include actions to be taken on certain species. Some of these actions may be required under local laws.

## 6.6 Habitat Trees

Habitat trees are defined under Schedule 1 of the City Plan as *a living or dead tree greater than 80 centimetres diameter at 1.4 metres that has one or more hollows within its trunk or branches greater than 10 centimetres in entrance diameter*.

While no trees that met with the above definition were identified on the site, several trees with hollows were recorded. The locations of these trees are provided in Table 6.7 and shown in Figure 6.1.

**Table 6.7 Habitat Tree Locations**

| Common Name | Latitude | Longitude |
|---|---|---|
| Bloodwood | -27.869329 | 153.277390 |
| Bloodwood | -27.870399 | 153.276640 |
| Spotted Gum | -27.871978 | 153.275604 |
| Bloodwood | -27.871441 | 153.279087 |
| Bloodwood | -27.871448 | 153.279290 |
| Bloodwood | -27.869035 | 153.278187 |
| Spotted Gum | -27.872113 | 153.275391 |

## 6.7 Waterways and Riparian Vegetation

As noted in Section 4, minor waterways (including dams) are mapped as present on the site. Under the *Water Act 2000* these waterways are mapped as a drainage feature.

Field investigations identified these waterways to be degraded and primarily consist of eroded or heavily weed infested ephemeral overland flow paths discharging to dams.

To assist with the description and identification of the site's waterways and associated vegetation, they are discussed with regard to the Lot number on which they occur.

### 6.7.1 Lot 192

An ephemeral waterway flows through the centre of this allotment (Figure 6.7). The headwater of this waterway arises from the southern site boundary and is characterised by steeply sloping embankments, especially the western slope. The gully is vegetated south of the dam (vegetation community 1) and has notable weed infestations, especially lantana.




**Figure 6.6 Waterway Lot 192 (City Plan mapping)**

The dam is relatively small and is accessed by livestock (Figure 6.7). Surrounding vegetation is dominated by pasture grasses and regrowth vegetation. There is some evidence of erosion on the dam embankments where ground cover vegetation has been grazed to bare earth. There is very little native vegetation north of the dam (Figure 6.8).

The lack of native vegetation and permanent or temporary water limits the ecological values of the waterway north of the dam. The Draft Concept Plan (GHD, 2017) did not identify any ecological benefits in incorporating this flow path in future development.



**Figure 6.7 Dam on Lot 192**



**Figure 6.8 Waterway Lot 192 (north of dam)**

### 6.7.2 Lot 191

City Plan mapping shows a waterway is present on Lot 191 along the southern boundary (Figure 6.9). The waterway flows from the south of the site and to a large dam (Figure 6.10). The dam overflow is a narrow gully which flows to neighbouring properties to the east, connecting with a stormwater conveyance channel in the residential development.

As with the dam on Lot 192, grazing pressures have resulted in areas of exposed earth along the embankments. The vegetation surrounding the dam is dominated by *Acacia* and lantana.

Downstream flow paths are currently influenced by the dam and are likely to convey water only after the dam has exceeded capacity.

The Draft Concept Plan (GHD, 2017) proposed that the southern waterway be included into the green space network. It has connectivity through an adjacent rural property with the residential development located to the east of the site (refer to Figure 2.3).




**Figure 6.9 Waterway Lot 191 (City Plan mapping)**

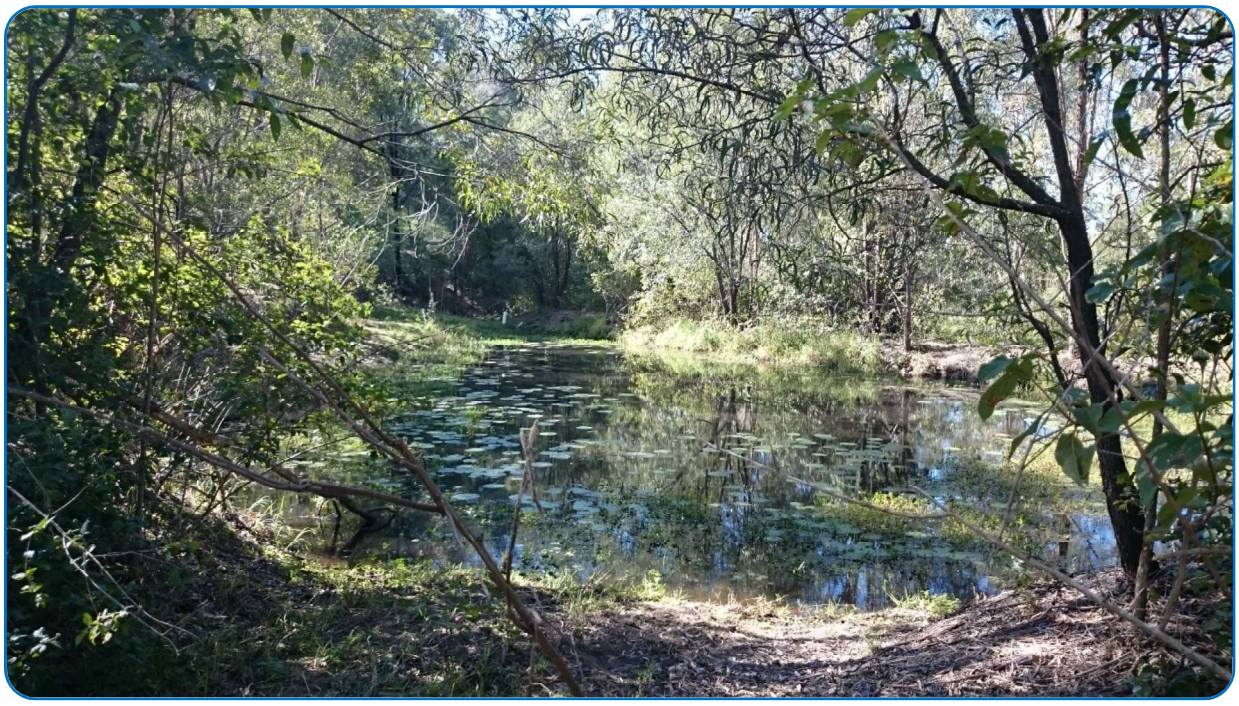


**Figure 6.10 Dam on Lot 191**

### 6.7.3 Lot 189

The waterway on Lot 189 is dominated by a large dam. The overflow of this dam discharges to a residential development located to the east (Figure 6.11). Downstream flow paths are likely to convey water only after the dam has exceeded capacity.

The downstream flow paths have been significantly modified through the establishment of a residential community. Inflows to the dam are via a small gully arising from near the dwelling.

Vegetation around the dam is dominated by pasture grass (Figure 6.12) and is accessed by livestock.

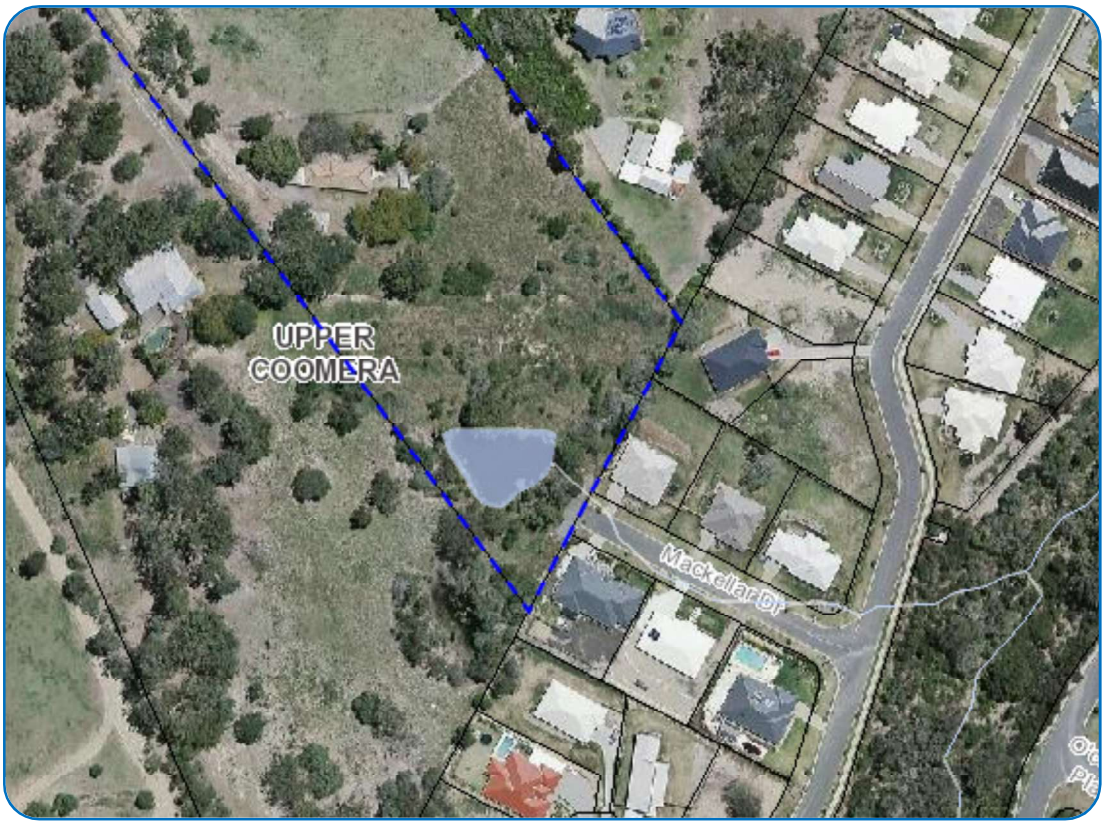



**Figure 6.11 Waterway Lot 189 (City Plan mapping)**



**Figure 6.12 Dam on Lot 189**

### 6.7.4 Lot 188

Yaun Creek runs through the northern corner of Lot 188. It arises from neighbouring properties to the west and passes under Courtney Drive via a culvert before flowing through the allotment (Figures 6.13).




**Figure 6.13 Waterway Lot 188 (City Plan mapping)**

The waterway has eroded and steep embankments. Very little riparian vegetation is present, and horses have direct access (Figure 6.14). The waterway discharges to neighbouring properties to the east. With the exceptions of the dams on all the allotments, this was the only waterway where standing water was present. The waterway is characterised in this reach by a series of shallow pools of still water.

Rehabilitation of this waterway was recommended in the Draft Concept Plan (GHD, 2017).

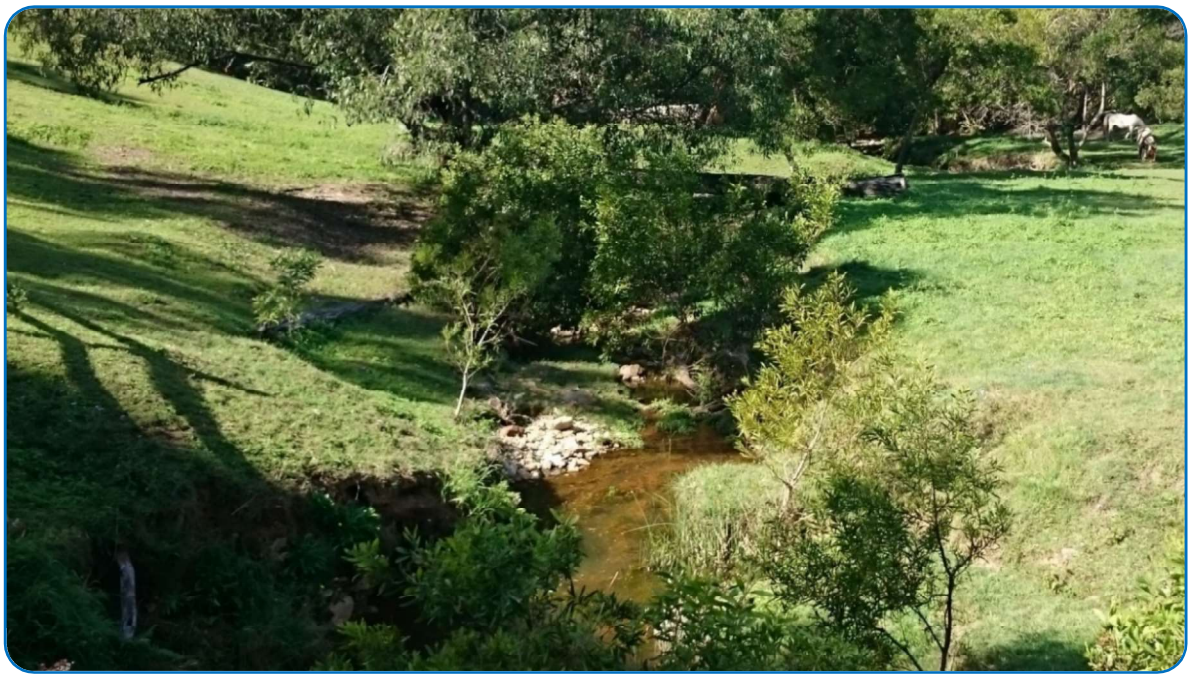


**Figure 6.14 Waterway on Lot 188**

# 7 Fauna Field Survey

With consideration given to the information obtained within the desktop assessment, fauna field surveys were undertaken on 5 June 2017.

Where relevant, observations regarding fauna habitat values on adjacent sites were also recorded, although limited to those that were discernible from within the subject site and/or from publicly accessible land.

The survey methodology incorporated the following survey techniques:

- Diurnal bird surveys;
- Targeted searches for conservation significant species; and
- Opportunistic records and observations of inferential evidence.

## 7.1 Diurnal bird surveys

Diurnal bird surveys were undertaken over all the site. Bird species were identified through direct observations (i.e. visual sighting) and/or vocalisations. The bird survey involved one observer walking slowly and quietly through the site, looking and listening for birds.

## 7.2 Targeted Searches for Conservation Significant Species

This section provides an overview of the specific techniques employed for surveys for specific threatened species. The targeted threatened species were identified in the database review as potentially occurring on the site. The survey methodologies described below differ from standard survey techniques.

### 7.2.1 Koala Searches

An assessment of habitat utilisation of Koala was made using the Randomised Grid-based Koala Spot Assessment Technique to identify Koala activity levels across the site. This technique involves a search of Koala scats to determine the relative activity level of Koalas in the area.

Finding and identifying traces such as faecal pellets and scratch marks allows for the presence of Koalas to be confirmed (Woosnam-Merchez *et al.,* 2012) and allows for past as well as present habitat occupancy to be evaluated. Scats are relatively identifiable and persist for a reasonable period post-departure of the animal (Woosnam-Merchez *et al.*, 2012).

Spot assessment locations were located randomly using a 100 m x 100 m grid overlay of the site. Within each of these grid cells, a Koala Spot Assessment Technique (KSAT) was performed where an adequate number of trees were present. Concurrent with each KSAT, all trees were visually searched for Koala. The methodology employed for the KSAT followed Phillips and Callaghan (2011). A total of two KSAT were conducted within Vegetation Communities 1 and 2 in the south-west corner of the site.

In accordance with Phillips and Callaghan (2011), a centre tree within a 40 m x 40 m (1,600 $m^2$) plot was selected. Within the plot, the 29 closest trees (of any species) to the central tree were selected. Searches for faecal pellets were made within a radial distance of up to 1 m from the base of the trees. For each tree, the survey effort dedicated to the faecal pellet search was two-person minutes, or until a Koala faecal pellet was found – whichever occurred first.

In refining the KSAT site selection, the center tree was selected on the basis of being:

- A tree beneath which one or more Koala faecal pellets were observed; or
- A preferred Koala food tree.

Tree species were selected for assessment based on the following:

- The tree was a Koala Habitat Tree, as defined by the *Nature Conservation (Koala) Conservation Plan 2006* (i.e. a tree from a genus that is *Angophora, Corymbia, Eucalyptus, Lophostemon* or *Melaleuca*); and
- The tree had a diameter at breast height (DBH) of greater than 100 mm.

### 7.2.2 Glossy Black-cockatoo Searches

Glossy Black-cockatoos inhabit open forest and woodlands of the coast and the Great Dividing Range where stands of She-oak occur. They feed almost exclusively on the seeds of several species of She-oak (*Casuarina* and *Allocasuarina* species) (NSW Environment and Heritage, 2014). As the birds feed, they drop the remnants of the She-oak cones after stripping the cone of seeds. These distinctive 'orts' are used to determine if Glossy Black-cockatoos have been feeding in the area. Within the subject site, searches were made for She-oaks.

A stand of She-oaks was located at Latitude -27.872105, Longitude 153.275550. The ground underneath these trees was searched for orts.

As with other cockatoo species, the Glossy Black-cockatoo is dependent on large hollow-bearing eucalypts for nest sites. Searches were made for suitable nesting trees within the subject site.

## 7.3 Opportunistic Records and Observations of Inferential Evidence

Observations of inferential evidence and opportunistic fauna encounters were recorded. Inferential evidence included observation of scratches, scats, tracks, shed skins and nests.

## 7.4 Survey Limitations

The fauna survey that was undertaken provides an overview of the species present and detectable on the subject site at the time of the survey. Weather and time constraints impact on the detectability of some species. Failure to detect a species during a single survey does not mean it is absent from the site. It cannot be confidently claimed a target species is absent from a site without repeated seasonal surveys.

It is recognised that the full inventory of fauna species utilising the site will not have been recorded. Although assessments of habitat and species ecology do provide an additional measure to predict the presence of species, there are no methodologies that can be used to predict, with absolute certainty, the absence of a species from potential habitat. There may be species that utilise habitats within the region like those on-site but have not been detected due to their occasional usage of the habitat types, rarity or cryptic nature.

Despite the limitations, and given the disturbed nature of the site, the survey effort conducted provides a level of fauna assessment that is consistent with the requirements associated with the preparation of an Ecological Assessment as per the planning scheme guidelines.

## 7.5 Results

The following section provides the results of the fauna field assessments. Table 7.1 provides a list of the fauna recorded on site. The survey results did not include domesticated livestock (sheep, goats, alpaca and horses), pets (dogs, cats) and caged birds (Red-tailed Black-cockatoo, Major Mitchell Cockatoo and Cockatiel) that were also present on the site.

**Table 7.1 Fauna Observed On-Site**

| Scientific Name | Common Name | Status* | Method** | Comment |
|---|---|---|---|---|
| **Amphibians** | | | | |
| *Litoria fallax* | Eastern Sedgefrog | LC | H | |
| **Birds** | | | | |
| *Sphecotheres vieilloti* | Australasian Figbird | LC | S | |
| *Cracticus tibicen* | Australian Magpie | LC | S | |
| *Pelecanus conspicillatus* | Australian Pelican | LC | S | F/O |
| *Threskiornis molucca* | Australian White Ibis | LC | S | O/S |
| *Chenonetta jubata* | Australian Wood Duck | LC | S | |
| *Geopelia humeralis* | Bar-shouldered Dove | LC | S | |
| *Coracina novaehollandiae* | Black-faced Cuckoo-shrike | LC | S | |
| *Bubulcus ibis* | Cattle Egret | LC | S | |
| *Phaps chalcoptera* | Common Bronzewing | LC | S | |
| *Psophodes olivaceus* | Eastern Whipbird | LC | H | |
| *Petrochelidon ariel* | Fairy Martin | LC | S | |
| *Cacomantis flabelliformis* | Fan-Tailed Cuckoo | LC | S | |
| *Pachycephala pectoralis youngi* | Golden Whistler (South-Eastern Australia) | LC | S | |
| *Cracticus torquatus* | Grey Butcherbird | LC | S | |
| *Rhipidura albiscapa* | Grey Fantail | LC | S | |
| *Sericornis magnirostra* | Large-Billed Scrub-wren | LC | S | |
| *Dacelo novaeguineae* | Laughing Kookaburra | LC | S | |
| *Meliphaga lewinii* | Lewin's Honeyeater | LC | S | |
| *Philemon citreogularis* | Little Friarbird | LC | S | |
| *Parvipsitta pusilla* | Little Lorikeet | LC | H | |
| *Anseranas semipalmata* | Magpie Goose | LC | S | O/S |
| *Grallina cyanoleuca* | Magpie-lark | LC | S | |
| *Vanellus miles novaehollandiae* | Masked Lapwing (Southern Subspecies) | LC | H | |
| *Philemon corniculatus* | Noisy Friarbird | LC | S | |
| *Manorina melanocephala* | Noisy Miner | LC | S | |

| Scientific Name | Common Name | Status* | Method** | Comment |
|---|---|---|---|---|
| *Oriolus sagittatus* | Olive-backed Oriole | LC | S | |
| *Anas superciliosa* | Pacific Black Duck | LC | S | |
| *Platycercus adscitus palliceps* | Pale-headed Rosella (Southern Form) | LC | S | |
| *Geopelia striata* | Peaceful Dove | LC | S | |
| *Strepera graculina graculina* | Pied Currawong (Eastern Australia) | LC | H | |
| *Porphyrio melanotus* | Purple Swamphen | LC | S | O/S |
| *Merops ornatus* | Rainbow Bee-eater | LC | H | |
| *Trichoglossus haematodus moluccanus* | Rainbow Lorikeet | LC | S | |
| *Malurus melanocephalus* | Red-backed Fairy-wren | LC | S | |
| *Trichoglossus chlorolepidotus* | Scaly-breasted Lorikeet | LC | S | |
| *Myzomela sanguinolenta* | Scarlet Honeyeater | LC | H | |
| *Zosterops lateralis cornwalli* | Silvereye (Eastern) | LC | H | |
| *Dicrurus bracteatus bracteatus* | Spangled Drongo (Eastern Australia) | LC | S | |
| *Streptopelia chinensis* | Spotted Dove | I | S | |
| *Pardalotus punctatus* | Spotted Pardalote | LC | H | |
| *Pardalotus striatus* | Striated Pardalote | LC | H | |
| *Plectorhyncha lanceolata* | Striped Honeyeater | LC | S | |
| *Cacatua galerita* | Sulphur-crested Cockatoo | LC | H | |
| *Corvus orru* | Torresian Crow | LC | S | |
| *Malurus lamberti* | Variegated Fairy-wren | LC | S | |
| *Hirundo neoxena* | Welcome Swallow | LC | S | |
| *Rhipidura leucophrys leucophrys* | Willie Wagtail (Southern) | LC | S | |
| **Mammals** | | | | |
| *Trichosurus vulpecula* | Common Brushtail Possum | LC | S | |
| *Macropus giganteus* | Eastern Grey Kangaroo | LC | S | |
| *Lepus europaeus* | European Brown Hare | I | S | |
| *Phascolarctos cinereus* | Koala | V, V# | S | |
| *Isoodon macrourus* | Northern Brown Bandicoot | LC | S | |
| *Wallabia bicolor* | Swamp Wallaby | LC | V | |

*Status:

As listed within the Queensland *Nature Conservation (Wildlife) Regulation 2006* (*Nature Conservation Act 1992*): E = Endangered, V = Vulnerable, RV = Regionally Vulnerable, NT = Near Threatened, SL = Special Least Concern, LC = Least Concern.

As listed within the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*: CE#= Critically Endangered, E#= Endangered, V#= Vulnerable, CD#= Conservation Dependent, I# = Introduced Species.

**Primary method of identification: C = hand caught, H = heard, V = visually observed, S = other signs of presence (e.g. scats, traces etc.).

Comment: F/O = Flying overhead; O/S = Off site

### 7.5.1 Significant Fauna Species

Evidence of one conservation significant species, Koala, was observed on the subject site. As determined through the assessment of likelihood of occurrence (refer to Table 4.4), the site also provides potential seasonal foraging habitat for Grey-headed Flying-fox.

### 7.5.2 Amphibians

One species of amphibian was recorded during the field survey, the Eastern Sedgefrog (*Litoria fallax*). This species is the most commonly recorded frog in the greater Brisbane area and is frequently found in suburban gardens (Qld Museum, 1995). It is likely that the site is habitat to more disturbance tolerant amphibian species that can complete their breeding cycle in still water.

### 7.5.3 Birds

All 47 bird species identified during the field survey are tolerant of disturbed environments. Given the site's connectivity to a much larger remnant bushland unit to the south, it is likely that the subject site would provide occasional foraging opportunities for predatory and nocturnal species with large home ranges.

Despite the presence of stands of She-oak on the site, there was no indication that these were used for foraging by Glossy Black-cockatoos.

### 7.5.4 Mammals

Scats and/or sign of six mammalian species were observed during the survey.

Indirect evidence of Koala presence was detected based on the results of targeted KSAT, in the form of faecal pellets and/or scratch marks on smooth-barked trees. Koala scats are distinctive in their shape and persist long after the Koala has departed (McAlpine *et al*., 2007; Woosnam *et al.*, 2012). The results of the KSAT are provided in Table 7.2. Activity level for each of the KSAT sites is expressed as a percentage of trees under which Koala faecal pellets were found.

Phillips and Callaghan (2011) defined activity levels for three general areas: east coast low, east coast medium-high and western slopes and plains. Koala densities in the east coast low areas were arbitrarily defined at ≤0.1 Koala/ha (Phillips and Callaghan, 2011).

Studies in the Coomera-Pimpama area have identified Koala density to be in the order of 0.23 – 0.37 Koala/ha (Biolink Ecological Consulting 2007; City of Gold Coast, 2014). Based on this density determination, Koala habitat use was compared to the east coast high area defined in Phillips and Callaghan (2011). Within the east coast high areas Phillips and Callaghan (2011) define Low Use is <22.52%, Med ≥22.52% but ≤32.84%, and High >32.84%. Results of the KSAT surveys indicated that the site has a low usage by Koala.

**Table 7.2 KSAT Results**

| KSAT Location | Activity Level (%) | Use Classification |
|---|---|---|
| -27.871817, 153.275265 | 6.67 | Low |
| -27.871524, 153.276303 | 3.33 | Low |
| **Average** | **5** | **Low** |

# 8 Ecological Functions

The ecological functions of the site were assessed during the field survey and are described in the sections below.

## 8.1 Core Habitat

For the purposes of this report, a core habitat area is defined as follows:

*Areas that, due to features such as their size, composition, diversity etc., provide important habitat for the conservation of particular plant or animal species, or of a range of plant and animal species.*

The low use activity levels recorded in the KSAT indicate that the vegetated area in the south-western corner of the site is currently being used by Koala, at least on a transient basis. It is considered that the site forms part of a larger home range for at least one Koala.

The site does not provide core habitat for any other flora and fauna species recorded during field surveys as most of these species are common and widespread.

## 8.2 Ecological Corridors

For the purposes of this report, an ecological corridor is defined as:

*An area of land or water, including areas above and below ground, that is capable of providing fauna habitat in its own right, and/or has the potential to do so, while allowing fauna to move to and between other habitats.*

The site is situated on the edge of an ecological corridor as it directly connects to large areas of existing bushland to the south. Under the *City Plan*, much of this bushland is zoned for conservation.

The proposed development facilitates a minimum 60 m wide linkage along Yaun Creek. The rehabilitation of Yaun Creek would provide a valuable movement corridor for fauna. The rehabilitation of a secondary waterway located in the south-east of the site will provide a major connection to the waterway within the residential community to the east, which is primarily used for storm water conveyance.

## 8.3 Waterways and Wetlands

There is limited native riparian vegetation along the site's waterways and this, together with livestock access, has resulted in stream bank erosion. Weed incursion in the riparian zone has further degraded the waterways.

Despite being mapped as a waterway under the *City Plan*, they perhaps can better de described as drainage channels as they have short duration flows following rain and no native riparian vegetation. They have been substantially modified through the creation of dams and are degraded through weed incursion and unrestricted livestock access.

Recommendations for the rehabilitation of Yaun Creek and waterways proposed to be retained have been made and are presented in Section 11 of this report.

# 9 Ecologically Significant Areas

This section provides a review and analysis of the results presented in the previous sections in the context of Matters of Environmental Significance at the Local, State and National levels.

Under the *City Plan*, matters of environmental significance include:

a) Matters of national environmental significance under the *Environmental Protection and Biodiversity Conservation Act 1999*, chapter 2, part 3, being:

- World heritage properties;
- National heritage places;
- Wetlands of international importance (listed under the Ramsar Convention);
- Listed threatened species and ecological communities;
- Migratory species protected under international agreements; and
- Commonwealth marine areas.

b) Matters of state environmental significance under the *State Planning Policy July 2017*, being:

- Protected areas (including all classes of protected area except coordinated conservation areas) under the *Nature Conservation Act 1992*;
- Marine parks and land within a 'marine national park', 'conservation park', 'scientific research', 'preservation' or 'buffer' zone under the *Marine Parks Act 2004*;
- Areas within declared fish habitat areas that are management A areas or management B areas under the *Fisheries Regulation 2008*;
- Threatened wildlife under the *Nature Conservation Act 1992* and Special Least Concern animal under the *Nature Conservation (Wildlife) Regulation 2006*.
- Regulated vegetation under the *Vegetation Management Act 1999* that is:
- Category B areas on the regulated vegetation management map, that are 'endangered' or 'of concern' regional ecosystems;
- Category C areas on the regulated vegetation management map that are 'endangered' or 'of concern' regional ecosystems;
- Category R areas on the regulated vegetation management map;
- Areas of essential habitat on the essential habitat map for wildlife prescribed as 'endangered wildlife' or 'vulnerable wildlife' under the *Nature Conservation Act 1992*;
- Regional ecosystems that intersect with watercourses identified on the vegetation management watercourse map;
- Regional ecosystems that intersect with wetlands identified on the vegetation management wetlands map;
- High preservation areas of wild river areas under the *Wild Rivers Act 2005*;
- Wetlands in a wetland protection area or wetlands of high ecological significance shown on the Map of Referable Wetlands under the *Environmental Protection Regulation 2008*;
- Wetlands and watercourses in high ecological value waters as defined in the *Environmental Protection (Water) Policy 2009*, schedule 2; and
- Legally secured offset areas.

c) Matters of local environmental significance, being:

- Hinterland core habitat systems;
- Coastal wetlands and islands core habitat systems;
- Substantial remnants;
- Hinterland to coast critical corridors;
- Local significant species and their habitat;
- High priority vegetation;
- Medium priority vegetation;
- General priority vegetation;
- Natural waterways and wetlands and associated buffers;
- Conservation estate, being areas owned or managed by the Council for nature conservation purposes (including Conservation Area, Environmental Reserve, Bushland Reserve and General Reserve);
- Areas subject to a Voluntary Conservation Agreement with the Council or registered voluntary covenant (for ecological purposes);
- Areas subject to a Vegetation Protection Order under the Council's Local Law No. 6 – Vegetation Management or similar mechanism;
- Environmental corridors required to link matters of environmental significance;
- Areas that contain environmental offsets provided in accordance with Queensland Government offset policies; and
- Areas that are subject to a statutory covenant (for ecological purposes).

Table 9.1 provides a summary of the identified ecological values on the site, as defined in the above criteria, that will be impacted by the proposed development.

**Table 9.1 Summary of Environmentally Significant Areas**

| Schedule of Environmentally Significant Areas | Present on Site |
|---|---|
| Matters of National Environmental Significance under the *Environmental Protection and Biodiversity Conservation Act 1999*, chapter 2, part 3 | One MNES determined to occur on the site – Koala (listed as vulnerable under the EPBC Act) |
| Matters of State Environmental Significance under the *State Planning Policy July 2017* | MSES determined to occur on the site:<br>• Koala (listed as vulnerable under the NCA). |
| Matters of Local Environmental Significance under the *City Plan* (Version 7) | MLES determined to occur on the site:<br>• Medium priority vegetation;<br>• General priority vegetation;<br>• Natural waterways; and<br>• Koala habitat. |

Section 10 provides management and mitigation measures to limit the impacts on the matters of environmental significance occurring on the site.

# 10 Impact Assessment

As identified in the preceding section, matters of environmental significance (MES) on the site were identified. Based on field investigations and the latest plan of development, potential impacts to MES have been assessed and identified as:

- Impacts to Koala habitat;
- Impacts to general priority vegetation; and
- Impacts to a waterway.

The following sections discuss the impacts to those MES listed above in greater detail and provide clarification on how these impacts are to be avoided, mitigated and/or compensated within the proposed development.

## 10.1 Koala Habitat

Indirect evidence the vulnerable Koala was recorded during the fauna survey and based on activity levels, use the site on a transient basis.

### 10.1.1 Avoiding Impacts to Koala Habitat

Koala habitat will be conserved in situ within the proposed environmental area in the south of the site.

### 10.1.2 Minimising Impacts to Koala

There is potential that vegetation outside of the mapped Koala habitat may be used by this species on occasion. As such, an experienced Koala spotter-catcher should be present on-site during all clearing works. Any clearing should not commence until approval has been granted in writing from the spotter-catcher. This approval is valid only for the day it is given. Where more than one machine (e.g. bulldozer or excavator) is to be used during clearing operations, it is recommended that there is a minimum of one spotter-catcher per machine.

Clearing works are to be carried out such that Koalas can safely move between any retained habitat. Dispersing wildlife should be guided towards retained vegetation or patches of vegetation off-site through directional clearing.

Should a Koala be observed on the site during vegetation clearing, all works will temporarily cease within a range of 25 m from any tree occupied by a Koala. Works can recommence after the Koala has moved from the tree of its own volition.

During vegetation clearing operations, threats to Koalas are to be mitigated by:

a) Ensuring no tree in which a koala is present or a tree with a crown overlapping a tree containing a koala is cleared;
b) Undertaking clearing of vegetation in stages, and ensuring:
    i. No more than 1 ha is cleared per day for sites less than 6 ha in size;
    ii. No more than 2 ha is cleared per day for sites greater than 6 ha in size;
    iii. That between each stage there is at least 12 hours where no clearing occurs; and
    iv. Koala habitat is always linked to allow koalas to move out of the site;
c) Use of qualified koala spotters;
d) Prohibition of domestic dogs and security dogs on site; and

e) Use of koala safety fencing.

Connectivity to vegetated areas external to the site will be provided through the retention of bushland areas in the south-western corner of the site.

### 10.1.3 Compensating for loss of Koala Habitat

In accordance with the requirements of the City Plan (Part 8, Section 8.2.6), degraded areas of threatened species habitat will need to be rehabilitated. The rehabilitation is to include the removal of weed species.

## 10.2 Vegetation

The proposed development has been positioned to avoid or minimise impacts to matters of environmental significance. Nonetheless, the removal of some native vegetation is unavoidable. This vegetation is either unmapped or mapped as general priority vegetation under the City Plan or Category X vegetation under the VMA.

### 10.2.1 Avoiding Impacts to Medium Priority Vegetation

The proposed development has been planned so that all of the mapped medium priority vegetation will be retained in situ. The medium priority vegetation is within an area to be designated for conservation and managed accordingly.

### 10.2.2 Avoiding and Minimising Impacts to General Priority Vegetation

The proposed development avoids impacts to general priority vegetation to the greatest possible extent by utilising the cleared areas of the site. Much of the general priority vegetation will be conserved in situ within the environmental reserve in the south-western corner of the site.

### 10.2.3 Mitigating Impacts to Retained Vegetation

Tree protection fencing is to be erected prior to any vegetation clearing being undertaken, at the limits of the drip zone of all retained vegetation. Tree protection fencing is to clearly delineate the extent of clearing and is to be installed in accordance with Australian Standard *AS4970-2009: Protection of trees on development sites*.

Activities excluded within the tree protection zone include, but are not limited to:

- Construction of unapproved pathways/trails;
- Earthworks;
- Storage of machinery and/or vehicles;
- Dumping of site waste;
- Liquid disposal;
- Stockpiling of mulch/chipped material/soil;
- Refuelling of machinery;
- Wash down and cleaning of equipment;
- Lighting of fires;
- Unauthorised application of pesticides, herbicides or chemicals;
- Preparation of chemicals, including cement products; and
- Physical damage to the tree.

Signage is to be displayed on the tree protection fence clearly identifying the area as a Tree Protection Zone and indicating that no entry is permitted.

All work in areas adjacent to retained vegetation must be carried out without causing damage to the vegetation.

Where a protected tree's root zone and/or trunk could be damaged by the proposed earthworks, a qualified arborist should be contracted to:

- Provide advice regarding the protection of the tree/s;
- Treat any roots that may be exposed during construction; and
- Treat any damage that may occur during construction.

Any road surface treatment within the drip zone of retained vegetation must employ cold pour techniques to minimise any damage to the trees.

Root pruning with a high-pressure needle point water jet is to be undertaken prior to the installation of any root barriers.

Pruning of protected trees is to occur as only where determined necessary by a qualified arborist and any such work on the trunk, foliage, or root system of the tree must adhere to the Australian Standard *AS 4373-2007: Pruning of amenity trees*.

All felled timber must be recycled (milled, chipped or mulched). Where possible, chipped and mulched material is to be incorporated into the landscape features, batter stabilisation techniques or other approved site works.

Non-recyclable debris is to be transported from the site and disposed of at an approved green waste facility. Pit burning or any other method of combustion of vegetation is prohibited.

Any invasive weeds removed from the site are to be disposed of at an approved green waste facility.

## 10.3 Waterways

As noted in Section 6.7, mapped waterways were assessed for their condition and function. The following sections discuss the mitigation and management of impacts to each of these waterways.

### 10.3.1 Yaun Creek

Yaun Creek will be incorporated into an environmental reserve that will be managed for conservation. As noted in Section 6, Yaun Creek is degraded with evidence of bank slumping and weed incursion. The riparian zone along the length of Yaun Creek within the site will be rehabilitated. The southern bank of Yaun Creek will have an effective buffer in excess of 60 m through the inclusion of drainage and recreation reserves beyond the rehabilitated riparian zone. Part of the drainage reserve is within 30 m of Yaun Creek (refer to Figure 5.1). However, the bio-retention basin is located beyond 30 m from the creek.

### 10.3.2 Lot 189

The waterway within Lot 189 comprises a dam with overflow pathway. This waterway will become a drainage reserve, receiving and treating stormwater from the residential areas before it being released downstream through the residential development to the east.

### 10.3.3 Lot 191

The waterway in Lot 191 provides a fauna movement pathway to areas east of the site. This waterway will be incorporated into environmental reserve and appropriately buffered. The buffered riparian zone will be complemented by the provision of both recreation and drainage reserve.

To ensure movement pathways are maintained and reduce the incidence of vehicle strike, a fauna underpass will be created under the road.

### 10.3.4 Lot 192

The waterway on Lot 192 is heavily degraded and consists of a grassed swale that directs flow from one dam to another. In its current state, this waterway does not provide a fauna movement corridor or have any riparian vegetation communities.

Given its degraded nature, it is proposed that this waterway be realigned, with the water captured near environmental reserve in the south-western corner and directed through the site to a large drainage area on the western site boundary.

The realigned waterway corridor will be 15 m wide and rehabilitated to resemble a natural waterway. The water will flow to a drainage reserve where it will be treated prior to its discharge into a tributary of Yaun Creek.

The realignment and consequent reconstruction of this waterway will enable wildlife corridors to be created and enable water quality to be managed.

## 10.4 Environmental Areas

Impacts to MES that may not have been specifically address in the preceding sections, will be minimised through the provision of environmental areas. These areas are to be excluded from any future development and managed for conservation.

The environmental areas will enable the on-going protection of Koala habitat, of concern regional ecosystems, mapped medium priority vegetation and the site's waterways.

A management plan should be prepared to guide the environmental areas' protection and to direct any specific rehabilitation that may be required.

## 10.5 Rehabilitation

Field investigations have determined that the proposed environmental areas are degraded by weed incursion and vegetation clearing.

Fabrication along the realigned waterway and reconstruction in heavily degraded areas, coupled with assisted natural regeneration supported by weed control, will improve the condition of the riparian vegetation and retained bushland areas.

Where it is not deemed safe for hollow-bearing trees to be retained in the development, their loss will be offset within open space areas through the provision of nest boxes.

A Statement of Rehabilitation Intent has been prepared to support this development application (Biome, 2020).

# 11 Conclusions

This report has been prepared in accordance with the guidelines for preparing an ecological assessment provided in the planning scheme. The report includes the results of desk top assessments and a field survey.

One conservation significant species, Koala, was identified though indirect evidence (scats) as occurring on the site. Habitat for Koalas was identified within two of the vegetation communities present on the subject site Vegetation Community 1 – low *Acacia* forest and Vegetation Community 2 - Spotted Gum/Grey Ironbark open forest. Vegetation Community 2 is mapped as state regulated vegetation and is reflective of Least Concern Regional Ecosystem 12.11.5. These communities have been retained as Environmental Reserve public open space within the proposed development. This will ensure vegetation is protected and habitat connectivity to adjacent bushland is maintained. It will be rehabilitated to improve its existing ecological condition.

Direct impacts to Koalas as a result of the proposed development are expected to be minimal. However, indirect impacts to Koala due to disturbance from human activities, such as vehicle traffic, increased noise and increased risk of injuries from domestic animals may occur.

Clearing of isolated Koala food tree species will be necessary to facilitate the construction of new dwellings. The clearing of these trees and any habitat trees that cannot be retained, will be offset in the areas of the site to be rehabilitated.

Four mapped waterways are present on the site. All are degraded due to lack of riparian vegetation, dominance of weed species, livestock access, modification (for dams) and bank erosion. Two of these waterways (Yaun Creek and the waterway on lot 191) will be buffered and rehabilitated to enhance ecological values and habitat function.

The dam on lot 189 will be modified into a bioretention basin and incorporated into a drainage reserve.

The waterway on lot 192 will be realigned. In its current state, this waterway does not facilitate fauna movement, nor does it have riparian vegetation. Extensive rehabilitation is planned to recreate a natural-looking waterway that will function as a wildlife movement corridor and improve water quality in downstream receiving environments.

## 11.1 Specialist Reports and Requirements

All vegetation clearing should be guided by a Flora and Fauna Management Plan and be conducted under the supervision of a Department of Environment and Science approved fauna spotter-catcher.

It is recommended that a Rehabilitation Management Plan be prepared to improve the existing ecological condition of the vegetation included within the proposed environmental reserves and to guide the restoration and rehabilitation of waterways. To this end, a Statement of Rehabilitation Intent has been prepared by Biome to accompany the development application.

Areas of the development that are designated public open space will need to be managed in accordance with an Open Space Management Plan. Consequently, an Open Space Management Statement has been prepared to guide the design, management, construction and operational principles of the open space.

# 12 References


Australian Museum (2016). New Holland Mouse. Available from: http://australianmuseum.net.au/new-holland-mouse

Batianoff, G.N. & Butler, D.W. (2002). *Assessment of invasive naturalised plants in south-east Queensland*. Environmental Protection Agency, Brisbane.

Castelle, A., Johnson, A., Conolly, C., 1994. Wetland and Stream Buffer Size Requirements—A Review. Journal of Environmental Quality. 23: 878-882.

Cropper, S.C. (1993) Management of Endangered Plants. CSIRO Australia, Melbourne.

Debus, S.J.S. (1991). An annotated list of NSW records of the Red Goshawk. Australian Birds. 24:72-89.

Debus, S.J.S. (1993). The status of the Red Goshawk (Erythrotriorchis radiatus) in New South Wales. Olsen, P., ed. Australasian Raptor Studies. Page(s) 182-191. ARA-RAOU, Melbourne.

Debus, S. & G. Czechura (1988b). Field identification of the Red Goshawk Erythrotriorchis radiatus. Australian Bird Watcher. 12:154-159.

Department of the Environment (2016) Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed Sat, 5 Nov 2016 14:55:16 +1100

Eby, P. (1998). An analysis of diet specialization in frugivore Pteropus poliocephalus in Australian subtropical rainforest. Australian Journal of Ecology. 23:443-456.

Eby, P. (1991). Seasonal Movements of Grey-headed Flying-foxes, Pteropus poliocephalus (Chiroptera: Pteropodidae), from Two Maternity Camps in Northern New South Wales. Wildlife Research. 18:547-559.

Eby, P. & D. Lunney (2002). Managing the Grey-headed Flying-fox as a threatened species in NSW. In: Proceedings of the Royal Zoological Society of New South Wales. Mosman, Sydney: Royal Zoological Society of New South Wales.

Environment Australia (2016) Threatened Species Fact Sheet. Available at: https://www.environment.gov.au/biodiversity/threatened/publications/factsheet.

Environmental Protection Agency (2006). Nature Conservation (Koala) Conservation Plan 2006 and Management Program 2006-2016. Queensland Government, Queensland.

Eyre, T. J. (2002). Habitat preferences and management of large gliding possums in southern Queensland. Ph.D. thesis, Southern Cross University, Lismore.

Garnett, S., J. Szabo & G. Dutson, (2011). The Action Plan for Australian Birds 2010. http://birdsindanger.net/actionplan

GHD (2017). Investigation Areas Program – Courtney Drive, Upper Coomera. Draft Concept Plan May 2017 Version 1.

Kavanagh, R. P. (1984). Seasonal changes in habitat use by gliders and possums in south eastern New South Wales. In: Possums and gliders. (Eds A. P. Smith and I. D. Hume.) pp. 527-543. (Surrey Beatty and Sons: Chipping Norton.)

Kavanagh, R. P., and Lambert, M. (1990). Food selection by the greater glider: is foliar nitrogen a determinant of habitat quality? Australian Wildlife Research 17: 285–299.

Kehl, J., and Borsboom, A. (1984). Home range, den tree use and activity patterns in the greater glider (Petauroides volans). In 'Possums and gliders'. (Eds. A. P. Smith and I. D. Hume.) pp. 229-236. (Surrey Beatty and Sons: Chipping Norton.)

Marchant, S. & P.J. Higgins, eds. (1990). Handbook of Australian, New Zealand and Antarctic Birds. Volume One - Ratites to Ducks. Melbourne, Victoria: Oxford University Press.

Marchant, S., & P.J. Higgins (eds) 1993. Handbook of Australian, New Zealand and Antarctic Birds. Volume 2: Raptors to Lapwings. Oxford University Press, Melbourne.

McAlpine, C., J. Rhodes, A. Peterson, H. Possingham, J. Callaghan, T. Curran, D. Mitchell, and D. Lunney (2007). Planning Guidelines for Koala Conservation and Recovery. A Guide to Best Planning Practice.

Menkhorst, P. and Knight, F. (2001). A Field Guide to the Mammals of Australia. Oxford University Press, South Melbourne.

NSW Environment and Heritage (2014). Glossy Black-cockatoo. Online Resource. http://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10140 Accessed 3/5/14

Office of Environment and Heritage (2015). Threatened species profile - Glossy black-cockatoo. Available from www.environment.nsw.gov.au/threatenedspeciesapp/profile

Phillips, S and Callaghan, J. (2011) The Spot Assessment Technique: a tool for determining localised levels of habitat use by Koalas Phascolarctos cinereus. Australian Zoologist 35 (3): 774-780

Queensland Museum (1995) Wildlife of Greater Brisbane. Queensland Museum, Brisbane.

Smith, G.C. & M. Mathieson (2004). Black-breasted button-quail. *Wingspan*. September:34-35.

Smith, G. C., Mathieson, M., and Hogan, L. (2007). Home range and habitat use of a low density population of Greater Glider, Petauroides volans (Pseudocheiridae: Marsupialia), in a hollow-limiting environment. Wildlife Research 34: 472-483.

Tidemann, C.R. (1998). Grey-headed Flying-fox, Pteropus poliocephalus, Temminck, 1824. In: Strahan, R., ed. The Mammals of Australia. French's Forest: New Holland Publishers Pty Ltd.

van der Ree, R., Ward, S. J., and Handasyde, K. A. (2004). Distribution and conservation status of possums and gliders in Victoria. In: The biology of Australian possums and gliders. (Eds R. L. Goldingay and S. M. Jackson.) pp. 91-110. (Surrey Beatty and Sons: Sydney.)

Van Dyck, S. (1995). Monotremes and Marsupials. In Ryan, M. (ed.), Wildlife of Greater Brisbane. Queensland Museum, Brisbane.

Vanderduys, E. P., Kutt, A. S., and Kemp, J. E. (2012). Upland savannas: the vertebrate fauna of largely unknown but significant habitat in north-eastern Queensland. Australian Zoologist 36: 59-74.

Woosnam-Merchez, O., Cristescu, R., Dique, D., Ellis, B., Beeton, R.J.S., Simmonds, J., and Carrick, F. What faecal pellet surveys can and can't reveal about the ecology of Koalas Phascolarctos cinereus. Australian Zoologist 36(2):192-200

# Appendix A

## Protected Matters Search Results

# EPBC Act Protected Matters Report

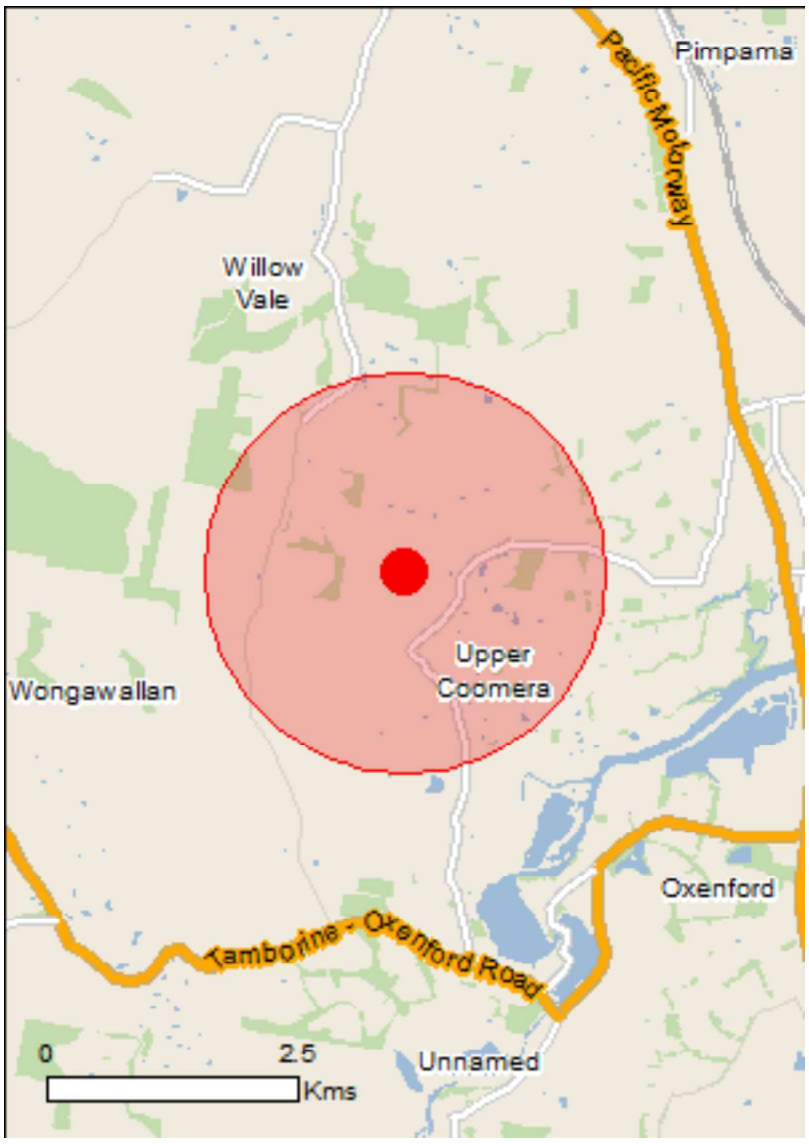
This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

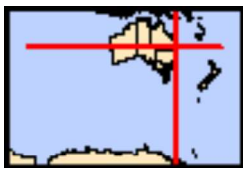
Report created: 02/06/17 13:22:51


Summary
Details
Matters of NES
Other Matters Protected by the EPBC Act
Extra Information
Caveat
Acknowledgements


This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates
Buffer: 2.0Km



This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

| | |
|---|---|
| World Heritage Properties: | None |
| National Heritage Places: | None |
| Wetlands of International Importance: | 1 |
| Great Barrier Reef Marine Park: | None |
| Commonwealth Marine Area: | None |
| Listed Threatened Ecological Communities: | 1 |
| Listed Threatened Species: | 41 |
| Listed Migratory Species: | 17 |

## Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

| | |
|---|---|
| Commonwealth Land: | None |
| Commonwealth Heritage Places: | None |
| Listed Marine Species: | 24 |
| Whales and Other Cetaceans: | None |
| Critical Habitats: | None |
| Commonwealth Reserves Terrestrial: | None |
| Commonwealth Reserves Marine: | None |

## Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

| | |
|---|---|
| State and Territory Reserves: | None |
| Regional Forest Agreements: | None |
| Invasive Species: | 38 |
| Nationally Important Wetlands: | None |
| Key Ecological Features (Marine) | None |

## Wetlands of International Importance (Ramsar) [ Resource Information ]

| Name | Proximity |
|---|---|
| Moreton bay | Within 10km of Ramsar |

## Listed Threatened Ecological Communities [ Resource Information ]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

| Name | Status | Type of Presence |
|---|---|---|
| Lowland Rainforest of Subtropical Australia | Critically Endangered | Community likely to occur within area |

## Listed Threatened Species [ Resource Information ]

| Name | Status | Type of Presence |
|---|---|---|
| **Birds** | | |
| Anthochaera phrygia<br>Regent Honeyeater [82338] | Critically Endangered | Foraging, feeding or related behaviour likely to occur within area |
| Botaurus poiciloptilus<br>Australasian Bittern [1001] | Endangered | Species or species habitat known to occur within area |
| Calidris canutus<br>Red Knot, Knot [855] | Endangered | Species or species habitat may occur within area |
| Calidris ferruginea<br>Curlew Sandpiper [856] | Critically Endangered | Species or species habitat likely to occur within area |
| Cyclopsitta diophthalma_coxeni<br>Coxen's Fig-Parrot [59714] | Endangered | Species or species habitat may occur within area |
| Dasyornis brachypterus<br>Eastern Bristlebird [533] | Endangered | Species or species habitat likely to occur within area |
| Erythrotriorchis radiatus<br>Red Goshawk [942] | Vulnerable | Species or species habitat likely to occur within area |
| Geophaps scripta_scripta<br>Squatter Pigeon (southern) [64440] | Vulnerable | Species or species habitat may occur within area |
| Lathamus discolor<br>Swift Parrot [744] | Critically Endangered | Species or species habitat may occur within area |
| Limosa lapponica_baueri<br>Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380] | Vulnerable | Species or species habitat known to occur within area |

| | | |
|---|---|---|
| Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat likely to occur within area |
| Poephila cincta cincta<br>Southern Black-throated Finch [64447] | Endangered | Species or species habitat may occur within area |
| Rostratula australis<br>Australian Painted Snipe [77037] | Endangered | Species or species habitat may occur within area |
| Turnix melanogaster<br>Black-breasted Button-quail [923] | Vulnerable | Species or species habitat likely to occur within area |
| **Insects** | | |
| Phyllodes imperialis smithersi<br>Pink Underwing Moth [86084] | Endangered | Species or species habitat may occur within area |
| **Mammals** | | |
| Chalinolobus dwyeri<br>Large-eared Pied Bat, Large Pied Bat [183] | Vulnerable | Species or species habitat likely to occur within area |
| Dasyurus maculatus maculatus (SE mainland population)<br>Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184] | Endangered | Species or species habitat likely to occur within area |
| Petauroides volans<br>Greater Glider [254] | Vulnerable | Species or species habitat known to occur within area |
| Petrogale penicillata<br>Brush-tailed Rock-wallaby [225] | Vulnerable | Species or species habitat may occur within area |
| Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)<br>Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104] | Vulnerable | Species or species habitat known to occur within area |
| Potorous tridactylus tridactylus<br>Long-nosed Potoroo (SE mainland) [66645] | Vulnerable | Species or species habitat likely to occur within area |
| Pseudomys novaehollandiae<br>New Holland Mouse, Pookila [96] | Vulnerable | Species or species habitat likely to occur within area |
| Pteropus poliocephalus<br>Grey-headed Flying-fox [186] | Vulnerable | Foraging, feeding or related behaviour known to occur within area |
| **Plants** | | |
| Arthraxon hispidus<br>Hairy-joint Grass [9338] | Vulnerable | Species or species habitat may occur within area |
| Baloghia marmorata<br>Marbled Balogia, Jointed Baloghia [8463] | Vulnerable | Species or species habitat likely to occur within area |
| Bosistoa transversa | | |

| | | |
|---|---|---|
| [Endiandra floydii](#)<br>Floyd's Walnut [52955] | Endangered | Species or species habitat likely to occur within area |
| [Endiandra hayesii](#)<br>Rusty Rose Walnut, Velvet Laurel [13866] | Vulnerable | Species or species habitat likely to occur within area |
| [Lepidium peregrinum](#)<br>Wandering Pepper-cress [14035] | Endangered | Species or species habitat may occur within area |
| [Macadamia integrifolia](#)<br>Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326] | Vulnerable | Species or species habitat likely to occur within area |
| [Macadamia tetraphylla](#)<br>Rough-shelled Bush Nut, Macadamia Nut, Rough-shelled Macadamia, Rough-leaved Queensland Nut [6581] | Vulnerable | Species or species habitat likely to occur within area |
| [Phaius australis](#)<br>Lesser Swamp-orchid [5872] | Endangered | Species or species habitat may occur within area |
| [Randia moorei](#)<br>Spiny Gardenia [10577] | Endangered | Species or species habitat likely to occur within area |
| [Samadera bidwillii](#)<br>Quassia [29708] | Vulnerable | Species or species habitat likely to occur within area |
| [Sophora fraseri](#)<br>[8836] | Vulnerable | Species or species habitat likely to occur within area |
| [Thesium australe](#)<br>Austral Toadflax, Toadflax [15202] | Vulnerable | Species or species habitat likely to occur within area |
| Reptiles | | |
| [Delma torquata](#)<br>Adorned Delma, Collared Delma [1656] | Vulnerable | Species or species habitat may occur within area |
| [Saiphos reticulatus](#)<br>Three-toed Snake-tooth Skink [88328] | Vulnerable | Species or species habitat may occur within area |

## Listed Migratory Species [ Resource Information ]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

| Name | Threatened | Type of Presence |
|---|---|---|
| Migratory Marine Birds | | |
| [Apus pacificus](#)<br>Fork-tailed Swift [678] | | Species or species habitat likely to occur within area |
| Migratory Terrestrial Species | | |
| [Cuculus optatus](#)<br>Oriental Cuckoo, Horsfield's Cuckoo [86651] | | Species or species habitat |

| | | |
|---|---|---|
| Spectacled Monarch [610] | | Species or species habitat likely to occur within area |
| Myiagra cyanoleuca<br>Satin Flycatcher [612] | | Species or species habitat known to occur within area |
| Rhipidura rufifrons<br>Rufous Fantail [592] | | Species or species habitat likely to occur within area |
| **Migratory Wetlands Species** | | |
| Actitis hypoleucos<br>Common Sandpiper [59309] | | Species or species habitat likely to occur within area |
| Calidris acuminata<br>Sharp-tailed Sandpiper [874] | | Species or species habitat likely to occur within area |
| Calidris canutus<br>Red Knot, Knot [855] | Endangered | Species or species habitat may occur within area |
| Calidris ferruginea<br>Curlew Sandpiper [856] | Critically Endangered | Species or species habitat likely to occur within area |
| Calidris melanotos<br>Pectoral Sandpiper [858] | | Species or species habitat may occur within area |
| Gallinago hardwickii<br>Latham's Snipe, Japanese Snipe [863] | | Species or species habitat may occur within area |
| Limosa lapponica<br>Bar-tailed Godwit [844] | | Species or species habitat known to occur within area |
| Numenius madagascariensis<br>Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat likely to occur within area |
| Pandion haliaetus<br>Osprey [952] | | Species or species habitat known to occur within area |
| Tringa nebularia<br>Common Greenshank, Greenshank [832] | | Species or species habitat likely to occur within area |

| | | |
|---|---|---|
| **Birds** | | |
| [Actitis hypoleucos](#)<br>Common Sandpiper [59309] | | Species or species habitat likely to occur within area |
| [Anseranas semipalmata](#)<br>Magpie Goose [978] | | Species or species habitat may occur within area |
| [Apus pacificus](#)<br>Fork-tailed Swift [678] | | Species or species habitat likely to occur within area |
| [Ardea alba](#)<br>Great Egret, White Egret [59541] | | Species or species habitat known to occur within area |
| [Ardea ibis](#)<br>Cattle Egret [59542] | | Species or species habitat may occur within area |
| [Calidris acuminata](#)<br>Sharp-tailed Sandpiper [874] | | Species or species habitat likely to occur within area |
| [Calidris canutus](#)<br>Red Knot, Knot [855] | Endangered | Species or species habitat may occur within area |
| [Calidris ferruginea](#)<br>Curlew Sandpiper [856] | Critically Endangered | Species or species habitat likely to occur within area |
| [Calidris melanotos](#)<br>Pectoral Sandpiper [858] | | Species or species habitat may occur within area |
| [Cuculus saturatus](#)<br>Oriental Cuckoo, Himalayan Cuckoo [710] | | Species or species habitat known to occur within area |
| [Gallinago hardwickii](#)<br>Latham's Snipe, Japanese Snipe [863] | | Species or species habitat may occur within area |
| [Haliaeetus leucogaster](#)<br>White-bellied Sea-Eagle [943] | | Species or species habitat known to occur within area |
| [Hirundapus caudacutus](#)<br>White-throated Needletail [682] | | Species or species habitat likely to occur within area |
| [Lathamus discolor](#)<br>Swift Parrot [744] | Critically Endangered | Species or species habitat may occur within area |
| [Limosa lapponica](#)<br>Bar-tailed Godwit [844] | | Species or species habitat known to occur within area |
| [Merops ornatus](#)<br>Rainbow Bee-eater [670] | | Species or species habitat |

| | | |
|---|---|---|
| [Monarcha trivirgatus](#)<br>Spectacled Monarch [610] | | Species or species habitat likely to occur within area |
| [Myiagra cyanoleuca](#)<br>Satin Flycatcher [612] | | Species or species habitat known to occur within area |
| [Numenius madagascariensis](#)<br>Eastern Curlew, Far Eastern Curlew [847] | Critically Endangered | Species or species habitat likely to occur within area |
| [Pandion haliaetus](#)<br>Osprey [952] | | Species or species habitat known to occur within area |
| [Rhipidura rufifrons](#)<br>Rufous Fantail [592] | | Species or species habitat likely to occur within area |
| [Rostratula benghalensis (sensu lato)](#)<br>Painted Snipe [889] | Endangered* | Species or species habitat may occur within area |
| [Tringa nebularia](#)<br>Common Greenshank, Greenshank [832] | | Species or species habitat likely to occur within area |

## Extra Information

### Invasive Species [ Resource Information ]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

| Name | Status | Type of Presence |
|---|---|---|
| Birds | | |
| Acridotheres tristis<br>Common Myna, Indian Myna [387] | | Species or species habitat likely to occur within area |
| Anas platyrhynchos<br>Mallard [974] | | Species or species habitat likely to occur within area |
| Carduelis carduelis<br>European Goldfinch [403] | | Species or species habitat likely to occur within area |
| Columba livia<br>Rock Pigeon, Rock Dove, Domestic Pigeon [803] | | Species or species habitat |

| | |
|---|---|
| Passer domesticus<br>House Sparrow [405] | Species or species habitat likely to occur within area |
| Streptopelia chinensis<br>Spotted Turtle-Dove [780] | Species or species habitat likely to occur within area |
| Sturnus vulgaris<br>Common Starling [389] | Species or species habitat likely to occur within area |
| **Frogs** | |
| Rhinella marina<br>Cane Toad [83218] | Species or species habitat likely to occur within area |
| **Mammals** | |
| Bos taurus<br>Domestic Cattle [16] | Species or species habitat likely to occur within area |
| Canis lupus familiaris<br>Domestic Dog [82654] | Species or species habitat likely to occur within area |
| Felis catus<br>Cat, House Cat, Domestic Cat [19] | Species or species habitat likely to occur within area |
| Feral deer<br>Feral deer species in Australia [85733] | Species or species habitat likely to occur within area |
| Lepus capensis<br>Brown Hare [127] | Species or species habitat likely to occur within area |
| Mus musculus<br>House Mouse [120] | Species or species habitat likely to occur within area |
| Oryctolagus cuniculus<br>Rabbit, European Rabbit [128] | Species or species habitat likely to occur within area |
| Rattus norvegicus<br>Brown Rat, Norway Rat [83] | Species or species habitat likely to occur within area |
| Rattus rattus<br>Black Rat, Ship Rat [84] | Species or species habitat likely to occur within area |
| Sus scrofa<br>Pig [6] | Species or species habitat likely to occur within area |
| Vulpes vulpes<br>Red Fox, Fox [18] | Species or species habitat likely to occur within area |
| **Plants** | |

| | |
|---|---|
| Climbing Asparagus-fern [48993] | Species or species habitat likely to occur within area |
| Cabomba caroliniana | |
| Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171] | Species or species habitat likely to occur within area |
| Chrysanthemoides monilifera | |
| Bitou Bush, Boneseed [18983] | Species or species habitat may occur within area |
| Chrysanthemoides monilifera subsp. rotundata | |
| Bitou Bush [16332] | Species or species habitat likely to occur within area |
| Cryptostegia grandiflora | |
| Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913] | Species or species habitat likely to occur within area |
| Genista monspessulana | |
| Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126] | Species or species habitat likely to occur within area |
| Hymenachne amplexicaulis | |
| Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754] | Species or species habitat likely to occur within area |
| Lantana camara | |
| Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892] | Species or species habitat likely to occur within area |
| Opuntia spp. | |
| Prickly Pears [82753] | Species or species habitat likely to occur within area |
| Parthenium hysterophorus | |
| Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566] | Species or species habitat likely to occur within area |
| Protasparagus plumosus | |
| Climbing Asparagus-fern, Ferny Asparagus [11747] | Species or species habitat likely to occur within area |
| Sagittaria platyphylla | |
| Delta Arrowhead, Arrowhead, Slender Arrowhead [68483] | Species or species habitat likely to occur within area |
| Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii | |
| Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497] | Species or species habitat likely to occur within area |
| Salvinia molesta | |
| Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665] | Species or species habitat likely to occur within area |
| Senecio madagascariensis | |
| Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624] | Species or species habitat likely to occur within area |
| **Reptiles** | |
| Hemidactylus frenatus | |
| Asian House Gecko [1708] | Species or species habitat |

and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods.  Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc).  In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

# Coordinates

-27.86969 153.27863

-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

© Commonwealth of Australia
Department of the Environment
GPO Box 787
Canberra ACT 2601 Australia
+61 2 6274 1111

# Appendix B

## Wildlife Online Database Search Results

Queensland Government

# Wildlife Online Extract

Search Criteria: Species List for a Specified Point
Species: All
Type: All
Status: Rare and threatened species
Records: All
Date: All
Latitude: -27.8697
Longitude: 153.2786
Distance: 2
Email: Nadya.Lees01@gmail.com
Date submitted: Friday 02 Jun 2017 10:44:18
Date extracted: Friday 02 Jun 2017 10:50:08

The number of records retrieved = 7


**Disclaimer**

As the DSITIA is still in a process of collating and vetting data, it is possible the information given is not complete. The information provided should only be used for the project for which it was requested and it should be appropriately acknowledged as being derived from Wildlife Online when it is used.

The State of Queensland does not invite reliance upon, nor accept responsibility for this information. Persons should satisfy themselves through independent means as to the accuracy and completeness of this information.

No statements, representations or warranties are made about the accuracy or completeness of this information. The State of Queensland disclaims all responsibility for this information and all liability (including without limitation, liability in negligence) for all expenses, losses, damages and costs you may incur as a result of the information being inaccurate or incomplete in any way for any reason.

| Kingdom | Class | Family | Scientific Name | Common Name | I | Q | A | Records |
|---|---|---|---|---|---|---|---|---|
| animals | birds | Cacatuidae | *Calyptorhynchus lathami lathami* | glossy black-cockatoo (eastern) | | V | | 2 |
| animals | birds | Scolopacidae | *Limosa lapponica baueri* | Western Alaskan bar-tailed godwit | | V | V | 1 |
| animals | birds | Scolopacidae | *Numenius madagascariensis* | eastern curlew | | E | CE | 1 |
| animals | mammals | Phascolarctidae | *Phascolarctos cinereus* | koala | | V | V | 3 |
| plants | higher dicots | Myrtaceae | *Eucalyptus curtisii* | Plunkett mallee | | NT | | 1/1 |
| plants | higher dicots | Sapindaceae | *Cupaniopsis newmanii* | long-leaved tuckeroo | | NT | | 1/1 |
| plants | lower dicots | Lauraceae | *Endiandra floydii* | | | E | E | 1/1 |

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992.* The codes are Extinct in the Wild (PE), Endangered (E), Vulnerable (V), Near Threatened (NT), Least Concern (C) or Not Protected ( ).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999.* The values of EPBC are Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Extinct in the Wild (XW) and Vulnerable (V).

Records – The first number indicates the total number of records of the taxon for the record option selected (i.e. All, Confirmed or Specimens).
This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.

# Appendix C

# Flora Recorded

## Flora Recorded Onsite

| Scientific Name | Common Name | Status |
|---|---|---|
| *Acacia disparrima* | Hickory Wattle | |
| **Ageratum houstonianum* | Blue Billygoat Weed | |
| *Allocasuarina littoralis* | Black She-oak | |
| *Alphitonia excelsa* | Red Ash | |
| **Amaranthus spinosus* | Red Amaranth | |
| **Ambrosia artemisiifolia* | Ragweed | RIP |
| **Anagallis arvensis* | Scarlet Pimpernel | |
| *Aristida calycina* | Dark Wire Grass | |
| **Asclepias curassavica* | Tropical Milkweed | |
| **Asparagus aethiopicus cv. Sprengeri* | Ground Asparagus | RIP |
| **Bidens pilosa* | Cobbler's Pegs | |
| *Bothriochloa decipiens* | Red Grass | |
| *Breynia oblongifolia* | Breynia | |
| *Capillipedium spicigerum* | Scented-top Grass | |
| *Centella asiatica* | Pennywort | |
| *Chrysocephalum apiculatum* | Yellow Buttons | |
| **Cinnamomum camphora* | Camphor Laurel | RIP |
| **Cirsium vulgare* | Scotch Thistle | |
| *Clematicissus opaca* | Small-leaved Water Vine | |
| **Conyza canadensis* | Canadian Fleabane | |
| **Conyza sumatrensis* | Tall Fleabane | |
| *Corymbia citriodora* | Spotted Gum | |
| *Corymbia intermedia* | Pink Bloodwood | |
| **Corymbia torelliana* | Cadaghi | |
| **Crassocephalum crepidioides* | Thickhead | |
| **Crotalaria incana* | Woolly Rattlepod | |
| **Crotalaria lanceolata* | Lance-leaved Rattlepod | |
| **Cupressus sempervirens* | Pencil Pine | |
| *Cyanthillium cinereum* | Cyanthillium | |
| *Cymbopogon refractus* | Barbed-wire Grass | |
| *Cynodon dactylon var. dactylon* | Common Couch | |
| *Cyperus gracilis* | Slender Flat Sedge | |
| **Cyperus papyrus* | Papyrus | |
| *Digitaria divaricatissima* | Umbrella Grass | |
| *Eleocharis dulcis* | Water Chestnut | |
| **Emelia sonchifolia* | Emelia | |

| Scientific Name | Common Name | Status |
|---|---|---|
| *Entolasia stricta* | Wiry Panic | |
| *Eragrostis brownii* | Brown's Lovegrass | |
| *Eucalyptus carnea* | Large-leaved White Mahogany | |
| *Eucalyptus propinqua* | Small-fruited Grey Gum | |
| *Eucalyptus siderophloia* | Grey Ironbark | |
| *Eucalyptus tereticornis* | Forest Red Gum | |
| *Eustrephus latifolius* | Wombat Berry | |
| *Glycine clandestina* | Twining Glycine | |
| *Glochidion ferdinandi* | Cheese Tree | |
| *Glochidion sumatranum* | Umbrella Cheese Tree | |
| **Gomphocarpus sp.* | Cotton Bush | |
| *Goodenia rotundifolia* | Goodenia | |
| *Hovea acutifolia* | Purple Pea Bush | |
| *Hypericum gramineum* | St. John's Wort | |
| **Hypochaeris radicata* | Flatweed | |
| *Imperata cylindrica* | Blady Grass | |
| **Jacaranda mimosifolia* | Jacaranda | |
| *Jagera pseudorhus* | Foambark Tree | |
| **Lantana camara* | Lantana | RIP |
| *Lobelia purpurascens* | White Root | |
| *Lomandra confertifolia* | A Mat Rush | |
| *Lomandra longifolia* | Spiny-headed Mat Rush | |
| *Lomandra multiflora* | Many-flowered Mat Rush | |
| *Lophostemon confertus* | Brush Box | |
| *Lophostemon suaveolens* | Swamp Box | |
| **Macrotyloma axillare* | Horse Gram | |
| *Mallotus philippensis* | Red Kamala | |
| **Megathyrsus maximus* | Guinea Grass | |
| *Melaleuca quinquenervia* | Broad-leaved Paperbark | |
| **Melinis minutiflora* | Molasses Grass | OIP |
| **Murraya paniculata* | Mock Orange | OIP |
| **Neonotonia wightii* | White Glycine | |
| **Nymphaea capensis* | Cape Waterlily | |
| **Oxalis corniculata* | Yellow Wood Sorrel | |
| **Oxalis debilis var. corymbosa* | Soursob | |
| *Panicum effusum* | Hairy Panic | |
| *Panicum pygmaeum* | Pygmy Panic Grass | |

| Scientific Name | Common Name | Status |
|---|---|---|
| *Panicum simile* | Two-coloured Panic | |
| *Parsonsia straminea* | Monkey Rope Vine | |
| **Paspalum dilatatum* | Paspalum | |
| *Paspalum orbiculare* | Ditch Millet | |
| **Passiflora edulis* | Passionfruit | |
| **Passiflora foetida* | Stinking Passion Flower | OIP |
| **Passiflora suberosa* | Corky Passionfruit | OIP |
| **Passiflora subpeltata* | White Passionflower | OIP |
| **Polygala paniculata* | Polygala | |
| **Phytolacca octandra* | Inkweed | |
| **Psidium guajava* | Yellow Guava | |
| *Pteridium esculentum* | Bracken Fern | |
| **Ravenala madagascariensis* | Traveller's Palm | |
| **Richardia brasiliensis* | White Eye | |
| *Rubus moluccanus* | Molucca Bramble | |
| *Rumex brownii* | Swamp Dock | |
| **Schefflera actinophylla* | Umbrella Tree | OIP |
| **Senecio madagascariensis* | Fireweed | RIP |
| **Senna pendula var. glabrata* | Easter Senna | OIP |
| **Setaria sphacelata* | Setaria | |
| **Sida cordifolia* | Flannel Weed | |
| **Sida rhombifolia* | Paddy Lucerne | |
| **Solanum chrysotrichum* | Giant Devil's Fig | |
| **Solanum mauritianum* | Wild Tobacco | OIP |
| **Solanum capsicoides* | Devil's Apple | |
| **Sphagneticola trilobata* | Singapore Daisy | RIP |
| **Sporobolus africanus* | Paramatta Grass | |
| *Stephania japonica* | Snake Vine | |
| **Syagrus romanzoffiana* | Cocos Palm | OIP |
| **Tagetes minuta* | Stinking Roger | |
| *Typha orientalis* | Bull Rush | |
| **Urena lobata* | Urena Burr | |
| **Verbena bonariensis* | Purple Top | |
| *Wikstroemia indica* | Bootlace Shrub | |

Key (as per Qld *Biosecurity Act 2014*): **PIP**=Prohibited Invasive Plant; **RIP**=Restricted Invasive Plant; **OIP**=Other Invasive Plant

*=Non-endemic

# Appendix D

# Code Responses

# City Plan code template

This code template supports the preparation of a development application against either the acceptable outcome(s) or performance outcome(s) contained in the code. Development assessment rules are outlined in **Section 5.3.3** of the City Plan.

**Please note:**

For assessment against the overall outcomes, refer to the appropriate code.

Impact assessable development requires assessment against the strategic framework prior to using this template.

## 8.2.6 Environmental significance overlay code

### 8.2.6.1 Application

This code applies to assessing all material change of use, reconfiguration of a lot and operational works (vegetation clearing, changes to ground level, infrastructure) for development on land identified in **Part 5.10 Levels of assessment** and containing the following mapped areas:

| Overlay map | Mapped area |
|---|---|
| Environmental significance – Biodiversity areas | **Matters of State Environmental Significance**<br>• Protected Areas<br>**Matters of Local Environmental Significance**<br>• Hinterland core habitat system;<br>• Coastal wetlands and islands core habitat system;<br>• Substantial remnants;<br>• Hinterland to coast critical corridors. |
| Environmental significance – Priority species | **Matters of State Environmental Significance**<br>• Koala habitat areas; and<br>• State significant species.<br>**Matters of Local Environmental Significance**<br>• Local significant species. |
| Environmental significance – Vegetation management | **Matters of State Environmental Significance**<br>• Regulated Vegetation.<br>**Matters of Local Environmental Significance** |

| Overlay map | Mapped area |
|---|---|
| | • High priority vegetation;<br>• Medium priority vegetation; and<br>• General priority vegetation. |

And for all land containing, sharing a property boundary with or within a defined buffer distance of, the following mapped areas:

| Overlay map | Mapped area |
|---|---|
| Environmental significance – Wetlands and watercourses | **Matters of State Environmental Significance**<br>• State significant aquatic systems<br>• State significant wetlands<br>**Matters of Local Environmental Significance**<br>• Major watercourse;<br>• Watercourse;<br>• Local significant wetlands. |

When using this code, reference should be made to **Section 5.3.2** and, where applicable, **Section 5.3.3,** in **Part 5.**

**Note: Buffers are taken as the maximum distance applicable for the site and are not cumulative.**

### 8.2.6.2 Purpose

(1) The purpose of the Environmental significance overlay code is to identify and protect matters of environmental significance and ensure that development is consistent with, and contributes to, the achievement of the objectives of the Nature Conservation Strategy.

(2) The purpose of the code will be achieved through the following overall outcomes:

(a) Matters of environmental significance are identified, protected in situ and enhanced to maintain flora and fauna diversity within:

(i) Hinterland core habitat systems;

(ii) Coastal wetlands and islands core habitat systems;

(iii) Substantial remnants; and

(iv) Hinterland to coast critical corridors.

(b) Degraded matters of environmental significance are protected and rehabilitated.

(c) High priority vegetation is protected in situ.

(d) Outside of Biodiversity Areas:

(i) Regulated, medium and general priority vegetation is maintained and disturbance is minimised.

(ii) Significant species and their habitat are identified, protected, enhanced and maintained.

(e) Wetlands, watercourses and their associated buffers (as prescribed in SO2) are protected and enhanced.

(f) Buffers are provided between matters of environmental significance and any proposed impacts.

(g) Appropriate tenure and management arrangements are provided for matters of environmental significance and their associated buffers.

(h) Where offsets are required, these are consistent with the *Environmental Offsets Act 2014*.

Editor's Note – in addition to the requirements of this planning scheme, obligations for the protection of matters of environmental significance are established by the Commonwealth and Queensland Government. Additional approvals or referrals may be required.

### 8.2.6.3 Criteria for assessment

**Table 8.2.6-2: Environmental significance overlay code – for assessable development**

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>If not, justify how the proposal meets either the performance outcome or overall outcome | Internal use |
|---|---|---|---|
| Ecological site assessment | | | |
| **PO1**<br>All matters of environmental significance on and adjacent to the development site are identified and protected.<br><br>**Note - An Ecological Site Assessment prepared in accordance with SC6.7 City Plan policy – Ecological site assessments, is Council's preferred method for addressing this performance outcome.** | **AO1**<br>Proposed works do not impact on:<br>(a) areas identified on **Environmental significance – vegetation management overlay map**;<br>(b) buffers to wetlands and watercourses being:<br>(i) 100m from the mapped boundary of a State significant aquatic area, as identified on **Environmental significance – wetlands and watercourse overlay map**;<br>(ii) 100m from the outer landward boundary of a State significant wetland, as identified on Environmental significance – wetlands and watercourse overlay map;<br>(iii) 100m from the outer landward boundary of a Local significant wetland, as identified on Environmental significance **– wetlands and watercourse overlay map**;<br>(iv) 60m from the outer bank of a Major Watercourse identified on Environmental significance – wetlands and watercourse overlay map; or<br>(v) 30m from the outer bank of a Watercourse identified on Environmental significance – | **COMPLIES WITH PO1**<br>An ecological site assessment has been prepared for the site (this report).<br><br>**COMPLIES WITH AO1 (a)**<br>The proposed works do not impact on areas of environmental significance identified on the vegetation management overlay map.<br><br>**COMPLIES WITH AO1 (b)(v)**<br>A minimum 30 m buffer to Yaun Creek in the northern corner of the site will be achieved. This buffer will be revegetated and rehabilitated.<br>The waterway in the south-eastern corner of the site will be rehabilitated and this area will be incorporated into the public open space network.<br>The proposed buffer widths are considered sufficient to mitigate impacts to water quality, provide wildlife movement corridors, protect property and provide for bank stability.<br>No recommendations for the buffer width of the waterway traversing Lot 192 have been made given its degraded nature, lack of existing native vegetation and lack of fauna connectivity. It is proposed that this waterway be realigned, and the waterway reconstructed to provide wildlife movement opportunities and improve water quality. The removal of this waterway was recommended in the Draft Concept Plan (GHD, 2017).<br><br>**COMPLIES WITH AO1 (c)**<br>All trees within the areas mapped on the priority species overlay will be retained and incorporated into an | |

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>**If not, justify how the proposal meets <u>either</u> the performance outcome or overall outcome** | Internal use |
|---|---|---|---|
| | wetlands and watercourse overlay map; and<br>(c) individual trees within areas mapped on the **Environmental significance – priority species overlay map.** | environmental reserve which will be managed for conservation. This area will be rehabilitated to improve its ecological function. | |
| Biodiversity areas | | | |
| **PO2**<br>Development does not impact on Protected Areas as identified on the **Environmental significance– biodiversity areas overlay map.** | **AO2.1**<br>No acceptable outcome provided. | **PO2 NOT APPLICABLE**<br>No protected areas are mapped within the subject site. | |
| **PO3**<br>Development within the Hinterland to Coast Critical Corridors as identified on the **Environmental significance – biodiversity areas overlay map** is located and designed to:<br>(a) provide corridors of sufficient dimensions and characteristics that will enable adequate movement of fauna through the site;<br>(b) protect in situ matters of environmental significance and associated buffers;<br>(c) protect in situ, vegetation identified on the **Environmental significance – vegetation management overlay map** and habitat for native flora and fauna;<br>(d) link matters of environmental significance, existing corridors and/or conservation estate/reserves on adjacent properties;<br>(e) maintain and improve upon the regional connectivity of the Hinterland to Coast Critical Corridors; | **AO3.1**<br>No acceptable outcome provided. | **PO3 NOT APPLICABLE**<br>The site does not fall within the Hinterland to Coast Critical Corridor. | |

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>If not, justify how the proposal meets either the performance outcome or overall outcome | Internal use |
|---|---|---|---|
| and<br>(f) allow for the rehabilitation of disturbed, cleared or modified areas that form part of the Hinterland to Coast Critical Corridors.<br>**Note : Recommendations provided in an ecological site assessment (prepared in accordance with SC6.7 City Plan policy – Ecological site assessments) are Council's preferred method for determining corridor dimensions.** | | | |
| **PO4**<br>Development within Hinterland Core Habitat Systems, Coastal Wetlands and Islands Core Habitat Systems and Substantial Remnant Areas as identified on the **Environmental significance – biodiversity areas overlay map** is located and designed to:<br>(a) protect in situ matters of environmental significance and associated buffers;<br>(b) protect in situ vegetation identified on the **Environmental significance – vegetation management overlay map** and habitat for native flora and fauna; and<br>(c) allow for the rehabilitation of disturbed, cleared or modified areas. | **AO4**<br>No acceptable outcome provided. | **PO4 NOT APPLICABLE**<br>The site does not fall within the Hinterland Core Habitat Systems, Coastal Wetlands and Islands Core Habitat Systems and Substantial Remnant Areas. | |
| Wetland and watercourse | | | |
| **PO5**<br>Buffers are provided to wetlands and watercourses identified on the **Environmental significance – wetlands and watercourse overlay map** to ensure the: | **AO5.1**<br>Buffers at least 100m wide are provided between the development and the mapped boundary of a State significant aquatic area, as identified on **Environmental significance – wetlands and watercourse overlay** | **AO5.1 NOT APPLICABLE**<br>No State significant aquatic areas are mapped on the site. | |

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>**If not, justify how the proposal meets <u>either</u> the performance outcome or overall outcome** | Internal use |
|---|---|---|---|
| (a) protection of matters of environmental significance mapped onsite or identified through an ecological site assessment;<br>(b) unimpeded movement of fauna along the watercourse;<br>(c) water quality is maintained;<br>(d) bank stability; and<br>(e) protection of property and infrastructure.<br><br>**Note: The buffer width for wetlands is measured from the outer, landward boundary of the mapped wetland, as shown on Environmental significance – wetland and watercourse overlay map.**<br><br>**Note: Recommendations provided in an ecological site assessment (prepared in accordance with SC6.7 City Plan policy – Ecological site assessments) is Council's preferred method for determining alternative buffer widths.**<br><br>**Note Artificial watercourses are to be addressed through the Coastal erosion hazard overlay code and map. Where a waterbody contains both natural and artificial banks, the natural banks are to be assessed in accordance with this performance outcome.** | **map.** | | |
| | **AO5.2**<br>Buffers at least 100m wide are provided between the development and the outer landward boundary of a State significant wetland, as identified on **Environmental significance – wetlands and watercourse overlay map.** | **AO5.2 NOT APPLICABLE**<br>No State significant wetlands are mapped on the site. | |
| | **AO5.3**<br>Buffers at least 100m wide are provided between the development and the outer landward boundary of a Local significant wetland as identified on the **Environmental significance – wetlands and watercourse overlay map.** | **AO5.3 NOT APPLICABLE**<br>No local significant wetlands are mapped on the site. | |
| | **AO5.4**<br>Buffers at least 60m wide are provided between the development and the outer bank of a Major Watercourse as identified on the **Environmental significance – wetlands and watercourse overlay map**. | **AO5.4 NOT APPLICABLE**<br>No major waterways are identified on the site. | |
| | **AO5.5**<br>Buffers at least 30m wide are provided between the development and the outer bank of a watercourse as identified on the **Environmental significance – wetlands and watercourse overlay map**. | **COMPLIES WITH AO5.5**<br>A minimum 30 m buffer to Yaun Creek in the north of the site will be achieved. The buffer will be revegetated and rehabilitated. The buffer will be further enhanced through the provision of drainage and recreation reserves.<br>The mapped waterway in the south-eastern corner of the site will be buffered to the width of approximately 10-40 m. This buffer will be further enhanced through the provision of adjacent drainage and recreation reserves. Where this waterway passes under the road, a fauna underpass will be provisioned to enable safe wildlife movement. This waterway and associated buffer will be rehabilitated to improve ecological and habitat values and | |

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>**If not, justify how the proposal meets <u>either</u> the performance outcome or overall outcome** | Internal use |
|---|---|---|---|
| | | enhance riparian connectivity to the east.<br>Proposed buffer widths have been scientifically proven to be adequate to maintain waterway function (Castelle, et al., 1994).<br>The mapped waterway emanating from the south-western corner of the site will be modified. In its current state, it does not provide any fauna linkages for species that are not highly mobile (such as birds), the vegetation along its length is dominated by pasture grasses and there is evidence of bank erosion.<br>It is proposed to realign this waterway and create a natural looking waterway that directs flows to a large bioretention basin to treat stormwater prior to its discharge into Yaun Creek. The extensive fabrication of riparian vegetation (to a total width of 15 m) along the realigned creek will provide wildlife movement opportunities and improve water quality. | |
| Vegetation management | | | |
| **PO6**<br>Regulated vegetation is protected in situ when it is:<br>(a) identified on the **Environmental significance – vegetation management overlay map**; and<br>(b) within biodiversity areas as identified on the **Environmental significance – biodiversity areas overlay map.** | **AO6**<br>Development does not impact on regulated vegetation. | **PO6 NOT APPLICABLE**<br>No biodiversity areas are mapped on the site | |
| **PO7**<br>Development is designed to maintain regulated vegetation and minimise disturbance when it is:<br>(a) identified on the **Environmental significance – vegetation management overlay map**; and<br>(b) outside of biodiversity areas as identified on the **Environmental** | **AO7**<br>Development avoids impacts on regulated vegetation. | **COMPLIES WITH AO7**<br>No state regulated vegetation will be impacted by the development. The regulated vegetation will be conserved and rehabilitated. | |

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>If not, justify how the proposal meets either the performance outcome or overall outcome | Internal use |
|---|---|---|---|
| **significance – biodiversity areas overlay map.** | | | |
| **PO8**<br>High priority vegetation as identified on the **Environmental significance – vegetation management overlay map** is protected in situ. | **AO8**<br>No acceptable outcome provided. | **PO8 NOT APPLICABLE**<br>No high priority vegetation is mapped on the subject site. | |
| **PO9**<br>Medium and general priority vegetation as identified on the **Environmental significance – vegetation management overlay map** within biodiversity areas as identified on the **Environmental significance –biodiversity areas overlay map** is protected in situ. | **AO9**<br>No acceptable outcome provided. | **PO9 NOT APPLICABLE**<br>No biodiversity areas, as identified on the Environmental Significance – biodiversity areas overlay map are present on the subject site. | |
| **PO10**<br>Vegetation is protected when it is:<br>(a) identified as medium priority vegetation on the **Environmental significance – vegetation management overlay map**; and<br>(b) located outside the biodiversity areas identified on the **Environmental significance – biodiversity areas overlay map.** | **AO10**<br>Vegetation is not damaged when it is:<br>(a) identified as medium priority vegetation on the **Environmental significance – vegetation management overlay map**; and<br>(b) located outside the **Environmental significance – biodiversity areas overlay map.**<br>OR<br>Where all attempts have been made to avoid and minimise damage to vegetation as stated above, any significant residual impact is offset consistent with the *Environmental Offsets Act 2014*, at a ratio of 3:1 (area) in accordance with **SC6.8 City Plan policy – Environmental offsets**.<br>OR<br>Damage to medium priority vegetation | **COMPLIES WITH P10 AND AO10**<br>Medium priority vegetation is excluded from development and will be rehabilitated. This area will be incorporated within the open space network on the site. | |

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>If not, justify how the proposal meets either the performance outcome or overall outcome | Internal use |
|---|---|---|---|
| | identified on the **Environmental significance – vegetation management overlay map** and located outside the biodiversity areas identified on the **Environmental significance – biodiversity areas overlay map** is for committed development. | | |
| **PO11**<br>Disturbance to vegetation is minimised when it is:<br>(a) identified as General priority vegetation on the **Environmental significance – vegetation management overlay map**; and<br>(b) located outside the **Environmental significance – biodiversity areas overlay map**. | **AO11**<br>Development avoids impacts on general priority vegetation. Any damage is minimised to the greatest extent possible. | **COMPLIES WITH PO11 AND AO11**<br>The proposed development has avoided impacting general priority vegetation to the great possible extent by utilising the cleared areas of the site. It will be rehabilitated where is occurs within the designated environmental reserve of the development or along retained waterways. | |
| **PO12**<br>Buffers are provided that protect the long term viability of high priority and regulated vegetation located on or adjacent to the site. | **AO12**<br>Buffers at least 30m wide are provided between the development and any retained vegetation identified as high priority or regulated vegetation on the **Environmental significance – vegetation management overlay map** on or adjacent to the site. | **AO12 NOT APPLICABLE**<br>No regulated or high priority vegetation is present on the site. | |

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>If not, justify how the proposal meets either the performance outcome or overall outcome | Internal use |
|---|---|---|---|
| Priority species | | | |
| **PO13**<br>Assessable koala feed and shelter trees are protected in situ when they are located:<br>(a) in koala habitat areas as identified on the **Environmental significance – priority species overlay map**; and<br>(b) within biodiversity areas as identified on the **Environmental significance – biodiversity areas overlay map**. | **AO13**<br>Development does not impact on assessable koala feed and shelter trees. | **PO13 NOT APPLICABLE**<br>No biodiversity areas are mapped on the subject site. | |
| **PO14**<br>Assessable koala feed and shelter trees are protected when they are:<br>(a) in koala habitat areas as identified on the **Environmental significance – priority species overlay map**; and<br>(b) outside biodiversity areas as identified on the **Environmental significance – biodiversity areas overlay map**. | **AO14**<br>Development avoids impacts on assessable koala feed and shelter trees. Any damage is minimised to the greatest extent possible. | **COMPLIES WITH PO14 AND AO14**<br>Mapped koala habitat areas will be wholly within the environmental open space of the proposed development. Where isolated koala food trees exist outside of this area and where they cannot be retained, these trees will be offset in the rehabilitation areas. | |
| **PO15**<br>Site design provides safe koala movement opportunities by incorporating measures to maintain connectivity between areas of koala habitat on and adjacent to the site.<br>**Note :** *DEHP's Koala-Sensitive Design Guideline* **should be consulted for suitable measures to provide for safe koala movement.** | **AO15**<br>No acceptable outcome provided. | **COMPLIES WITH PO15**<br>The development has been designed so that connectivity with adjacent bushland areas is maintained. The rehabilitation of waterways on the site will increase connectivity to bushland to the north. | |
| **PO16**<br>During the clearing and construction phases, measures are incorporated to protect koalas from death or injury. | **AO16**<br>Threats to koalas as a result of clearing and construction activities are mitigated by: | **COMPLIES WITH PO16 AND AO16**<br>No clearing will occur without a registered and experienced koala spotter catcher being present on the site. Best practice industry guidelines will be followed to | |

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>**If not, justify how the proposal meets <u>either</u> the performance outcome or overall outcome** | Internal use |
|---|---|---|---|
| | (a) ensuring no tree in which a koala is present or a tree with a crown overlapping a tree containing a koala is cleared;<br>(b) undertaking clearing of vegetation in stages, and ensuring:<br>(i) no more than 1 ha is cleared per day for sites less than 6 ha in size;<br>(ii) no more than 2 ha is cleared per day for sites greater than 6 ha in size;<br>(iii) that between each stage there is at least 12 hours where no clearing occurs; and<br>(iv) koala habitat is always linked to allow koalas to move out of the site;<br>(c) use of qualified koala spotters;<br>(d) prohibition of domestic dogs and security dogs on site; and<br>(e) use of koala safety fencing. | ensure the impacts to all wildlife are minimised.<br>Clearing and construction works will adhere to the conditions of AO16. | |
| **PO17**<br>State significant species, and their habitat, are protected in situ when it is:<br>(a) identified on the **Environmental significance – priority species overlay map,** or through an ecological site assessment; and<br>(b) within biodiversity areas as identified on the **Environmental significance – biodiversity areas overlay map.** | **AO17**<br>Development does not impact on State significant species, and their habitat. | **PO17 NOT APPLICABLE**<br>No biodiversity areas are mapped on the subject site. | |
| **PO18**<br>Development protects state significant species, and their habitat or is designed to minimise and mitigate impacts on | **AO18.1**<br>Development avoids impacts on state significant species, and their habitat. | **COMPLIES WITH PO18 AND AO18.1**<br>Mapped koala habitat areas will be wholly within the conservation reserve (environmental reserve) of the proposed development. Where isolated koala food trees | |

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>**If not, justify how the proposal meets <u>either</u> the performance outcome or overall outcome** | Internal use |
|---|---|---|---|
| habitat values when it is:<br>(a) identified on the **Environmental significance – priority species overlay map**; and<br>(b) outside of biodiversity areas as identified on the **Environmental significance – biodiversity areas overlay map.** | | exist outside of this area and where they cannot be retained, these trees will be offset in the rehabilitation areas. | |
| | **AO18.2**<br>Where development impacts on state significant species and their habitat, the following occurs:<br>(a) flora species are propagated and used in rehabilitation and landscaping onsite; and<br>(b) fauna species are safely relocated by a qualified fauna spotter catcher. | **COMPLIES WITH PO18 AND AO18.2 (b)**<br>All vegetation clearing will be conducted under the guidance of a registered fauna spotter catcher.<br><br>**AO18.2 (a) NOT APPLICABLE**<br>No threatened flora species have been identified on the site. | |
| **PO19**<br>Local significant species, and their habitat, are protected in situ when it is:<br>(a) identified on the **Environmental significance – priority species overlay map,** or through an ecological site assessment; and<br>(b) within biodiversity areas as identified on the **Environmental significance – biodiversity areas overlay map.** | **AO19**<br>Development does not impact on local significant species, and their habitat. | **PO19 NOT APPLICABLE**<br>No biodiversity areas are mapped on the subject site. | |
| **PO20**<br>Development protects local significant species, and their habitat or is designed to minimise and mitigate impacts on habitat values when it is:<br>(a) identified on the **Environmental significance – priority species overlay map**; and<br>(b) outside of biodiversity areas as identified on the **Environmental significance – biodiversity areas overlay map.** | **AO20.1**<br>Development avoids impacts on local significant species, and their habitat. | **COMPLIES WITH PO20 AND AO20.1**<br>Mapped habitat of locally significant species is excluded from the development footprint. | |
| | **AO20.2**<br>Where development impacts on local significant species and their habitat, the following occurs:<br>(a) flora species are propagated and used in rehabilitation and landscaping onsite; and<br>(b) fauna species are safely relocated by a qualified fauna spotter | **AO20.2 (a) NOT APPLICABLE**<br>No locally significant flora species have been identified on the site.<br>**COMPLIES WITH AO20.2 (b)**<br>All vegetation clearing will be conducted under the guidance of a registered fauna spotter catcher. | |

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>If not, justify how the proposal meets either the performance outcome or overall outcome | Internal use |
|---|---|---|---|
| | catcher. | | |
| Fauna management | | | |
| **PO21**<br>Development design and location provides for the safe movement of native fauna through the site. | **AO21**<br>Where infrastructure crosses native fauna movement paths, the design of new development incorporates fauna friendly movement solutions.<br>**Note: Fauna friendly movement solutions developed in accordance with the** *Queensland Government Fauna Sensitive Road Design Manual Volume 2: Preferred Practices; and the QLD Government Koala-Sensitive Design Guidelines* **is Council's preferred method for addressing this outcome.** | **COMPLIES WITH PO21 AND AO21**<br>The development design incorporates rehabilitated riparian areas that will facilitate the safe movement of wildlife through the site and to neighbouring habitat.<br>Reduced speed limits and traffic calming devices will be installed where necessary to limit wildlife vehicle strike. | |
| **PO22**<br>Where fauna habitat is proposed to be damaged, management strategies must be implemented to ensure:<br>(a) the native fauna is safely relocated to an area of similar habitat;<br>(b) the sequence of habitat disturbance ensures that fauna is not isolated from adjoining areas of habitat;<br>(c) fauna relocation occurs immediately prior to habitat disturbance;<br>(d) accredited and experienced spotter catchers, licensed by the Queensland Parks and Wildlife Service, are to be present on the site to direct and undertake the removal and relocation of fauna; and<br>(e) where possible, damaged habitat | **AO22**<br>No acceptable outcome provided. | **COMPLIES WITH PO22**<br>No clearing will occur without a registered and experienced koala spotter catcher being present on the site. Best practice industry guidelines will be followed to ensure the impacts to all wildlife are minimised.<br>Clearing and construction works will adhere to the conditions of PO22.<br>A fauna and flora management plan will be prepared for the site to guide vegetation clearing and mitigate impacts to flora and fauna on site and in adjacent areas. | |

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>If not, justify how the proposal meets either the performance outcome or overall outcome | Internal use |
|---|---|---|---|
| and nesting sites are rehabilitated outside of development areas.<br>**Note: A Fauna Management Plan prepared by a suitably qualified person is Council's preferred method for addressing this outcome.** | | | |
| Tenure, ownership and management arrangements | | | |
| **PO23**<br>Matters of environmental significance and associated buffers, mapped areas as identified on the **Environmental significance – vegetation management overlay map** proposed for retention and areas requiring rehabilitation are suitably protected in perpetuity and will:<br>(a) enable necessary fire management in accordance with an approved fire management plan and any adopted bushfire management plan;<br>(b) allow unimpeded movement of native fauna through matters of environmental significance and associated buffers;<br>(c) enable maintenance access and regular management;<br>(d) enable auditing and reporting of maintenance and management activities;<br>(e) provide for public access along major watercourses, where such access is consistent with the ecological functions;<br>(f) allow for linkages and buffers to adjacent areas of ecological significance; and<br>(g) allow for a coordinated approach to | **AO23**<br>Matters of environmental significance and associated buffers, mapped areas as identified on the **Environmental significance – vegetation management overlay map** proposed for retention and areas requiring rehabilitation are transferred to Council ownership as Public Open Space.<br>OR<br>Where not required for public access, matters of environmental significance and associated buffers, and mapped areas as identified on the **Environmental significance – vegetation management overlay map** proposed for retention and areas requiring rehabilitation are retained in private ownership and protected under a statutory covenant (under the *Land Title Act 1994*).<br>**Note: Where the area is adjacent to existing public open space, or is a buffer to a major waterway, Council's preference is for the land to be dedicated as Public Open Space.** | **COMPLIES WITH PO23**<br>Areas of environmental significance (koala habitat and medium priority vegetation areas) are to be retained within the conservation reserve (environmental reserve) open space of the proposed development. Public open space areas will be transferred to Council ownership. | |

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>**If not, justify how the proposal meets <u>either</u> the performance outcome or overall outcome** | Internal use |
|---|---|---|---|
| the management of adjacent areas of conservation estate. | | | |
| **PO24**<br>An Open Space Management Plan prepared in accordance with **SC6.10 City Plan policy – Landscape work** is prepared for areas to be dedicated to Council as Public Open Space. | **AO24**<br>No acceptable outcome provided. | **WILL COMPLY WITH PO24 VIA CONDITIONS**<br>An Open Space Management Plan will be prepared for the site for areas designation public open space. | |
| **PO25**<br>A Covenant Management Plan is prepared for areas to be protected under a statutory covenant. The management plan must include the following details:<br>(a) rehabilitation area and strategy of works;<br>(b) weed eradication and control requirements;<br>(c) how the covenant area will be maintained and managed in perpetuity;<br>(d) feral and domestic animal exclusion requirements; and<br>(e) required maintenance access. | **AO25**<br>No acceptable outcome provided. | **PO25 NOT APPLICABLE**<br>No areas of the proposed development will be protected under a statutory covenant. Public open space will be transferred to Council ownership. | |

| Performance outcomes | Acceptable outcomes | Does the proposal meet the acceptable outcome?<br>**If not, justify how the proposal meets <u>either</u> the performance outcome or overall outcome** | Internal use |
|---|---|---|---|
| Rehabilitation | | | |
| **PO26**<br>Disturbed, cleared or modified areas are rehabilitated where they form part of:<br>(a) an ecological corridor; or<br>(b) matters of environmental significance and associated buffers; or<br>(c) areas identified within an Ecological Site Assessment as requiring rehabilitation.<br>**Note : A Rehabilitation Management Plan prepared in accordance with the** *South East Queensland Ecological Restoration Framework* **is Council's preferred method for addressing this outcome.** | **AO26**<br>No acceptable outcome provided. | **WILL COMPLY WITH PO26 VIA CONDITIONS**<br>Environmentally significant areas on the site will be rehabilitated, as will riparian zones along the waterway and drainage channel where connectivity external to the site persists.<br>To guide the rehabilitation procedures, a Rehabilitation Management Plan will be prepared. | |