

# Significant Biodiversity Assessment Report

325 Wyatt Road, Kagaru
Prepared for WelCo Group Pty Ltd

13 November 2024

Job 11560 E

# Document control

Document: 11560 E Wyatt Road, Kagaru Significant Biodiversity Assessment Report – ROL Application, prepared by Saunders Havill Group for WelCo Group Pty Ltd.

## Document issue

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# Executive summary

**WelCo Group Pty Ltd** represents a land holding within the northern portion of the Greater Flagstone Priority Development Area (PDA) along Wyatt Road to the western side of the Interstate Railway Line. The property includes four (4) cadastral allotments (Lot 11 on SP341889, Lot 12 on S31468, Lot 22 on SP341889, Lot 27 on S311174) covering a total of approximately 301.93 hectares (ha).

A desktop analysis conducted prior to the commencement of field surveys identified what the site's characteristics and potential constraints are mapped under various State and Local Government legislative mapping and database search tools. Detailed field surveys identified some areas of ecological value; however, the majority of the site contains cleared paddocks with disturbance from historic clearing and use for cattle grazing.

**Site Features & Ecological Values**

The site's ecological values trigger consideration against both Commonwealth and State Legislation. Survey methods, currency and timing have been dictated by the requirements of these Government entities.

The site area covers approximately 301.93 ha and is located at Wyatt Road, Kagura. The land has been extensively cleared for cattle grazing and contains only scattered trees and patches of regrowth vegetation. The land use is in keeping with the broader rural landscape of the region. Based on aerial photography, significant portions of the site were cleared of vegetation prior to 1944, particularly in the southern portion of the site with land used for cropping through 1970 to 2002.

Remnant vegetation is mapped on site associated with several watercourses which consists of approximately 6.8 ha of Least Concern Regional Ecosystem (RE) 12.3.7 described as "*Eucalyptus tereticornis, Casuarina cunninghamiana* subsp. *cunninghamiana +/- Melaleuca spp.* fringing woodland".

The site also includes approximately 4.84 ha of remnant vegetation containing Of Concern RE 12.3.8 described as "Swamps with *Cyperus* spp., *Schoenoplectus* spp. and *Eleocharis* spp" which is representative of two palustrine wetlands. These wetlands are also mapped within *State Planning Policy 2017* (SPP) biodiversity mapping as 'high ecological significance wetlands'. Assessment of the northern wetland area against the AquaBAAM criteria resulted in the wetland considered the wetland to have moderate value to the overall protection of wetlands in the catchment rather than provide attributes of a wetland of High Ecological significance. Both wetland areas are proposed to be rehabilitated to retore ecosystem function.

The site contains regrowth vegetation at the northern extent mapped as Of Concern composite RE 12.9-10.2 / 12.9-10.7 / 12.9-10.3 / 12.9-10.17a and Endangered RE 12.3.3 and the southern extent Least Concern RE 12.9-10.17. Ground truthing confirms the status and size of the mapped endangered regrowth vegetation which does not meet the definition of viable remnant vegetation.

Four watercourses mapped under the *Vegetation Management Act 1999* are present onsite, being a main tributary of Teviot Brook / Woollaman creek and associated tributaries of this main central watercourse. The

central watercourse is mapped as a red 'high-value' waterway for waterway barrier works (WWBW) under the *Fisheries Act 1994* and Stream Order 3 under the *Vegetation Management Act 1999*. The associated tributaries off this watercourse are mapped as orange 'moderate-value' and green 'low-value' WWBW which are associated with mapped Stream Order 2 and Stream Order 1 watercourse respectively. The flow paths mapped as Stream Order 1 extending from the main watercourse onsite consist primarily of drainage features interrupted by constructed dams. South of the project area, Teviot Brook which transitions to Woollaman Creek represents a purple 'major-value' WWBW and stream order 6 watercourse. The waterways across the site were assessed and only Teviot Brook / Woollaman Creek and the main watercourse were found to have significant bed and bank features present throughout with riparian vegetation consisting of scattered large native trees and shrubs.

Fauna connectivity through the site is strongest at the southern extent of the site. Teviot Brook / Woollaman Creek provides lineal connectivity through to vegetation west of the site. Wyatt Road traversing through the centre of the site in the current alignment restricts fauna movement and is likely to create a significant barrier through the proposed major linear park and biodiversity corridor. As such, the alignment of Wyatt Road is proposed to be shifted further north to avoid impacts to the greenspace area. The central waterway traversing north through site retains some vegetation including scattered mature *Eucalyptus tereticornis* (Forest Red Gum) and *Melaleuca viminalis* (Weeping Bottlebrush). This provides connectivity offsite along the watercourse further upstream.

In the wider landscape, the Interstate Railway Line is located east of the site. Further to the north-east the landscape is heavily modified to contain urban residential housing, with large portions of land to the north, east and north-west earmarked for future residential developments. No mapped ecological corridors exist on the property although a State Riparian Corridor buffer is mapped associated with the Teviot Brook / Woollaman Creek to the south.

At the State level, the Swamp Tea-tree (*Melaleuca irbyana*), which is listed as 'endangered' under the *Nature Conservation Wildlife Regulation 2009,* is known to occur in the Broader Ripley Valley Area. No *M. irbyana* plants were found onsite and no other NCA or EPBC listed species were observed during ecological investigations. No fauna species listed as threated under the EPBC Act nor NCA were directly observed on site. *Phascolarctos cinereus* (Koala) and *Pteropus poliocephalus* (Grey Headed Flying Fox) are the only two threatened species listed that were identified as having potential to utilise the site in its current form.

**Development plan**

The development proposal is for a residential development, including medium density residential, low-medium density residential, community centre, new roads, and various park areas. The development will be accessed via Flinders Lakes Drive to the north traversing a re-aligned Wyatt Road. The removal of Wyatt Road from the floodplain area will improve connectivity through the planned major linear park. The proposed development will provide approximately 215.10 ha of parkland of various uses primarily to the south of the residential development, adjoining Teviot Brook / Woollaman Creek. Opportunities for revegetation and rehabilitation through large tracts of cleared paddocks within the planned major linear park will provide substantial benefits to biodiversity and improve fauna habitat value across the site. The proposed development plan has been guided by historical and ongoing ecological advice, including the ecological field

and desktop advice provided within this report. Specifically, it is proposed that management activities will include, rehabilitation of the riparian zone along Woolaman Creek, restoration of both on site wetlands and weed management activities within the various park areas.

**Summary**

The proposed development reflects the original outcomes outlined by the Urban Land Development Authority (ULDA – Now EDQ) in the development scheme. To implement the proposal, portions of remnant and regrowth vegetation will be cleared. The highest ecological values identified on site were located through the centre of the site consisting of Least Concern RE 12.3.7 remnant vegetation associated with the major watercourse, the wetland areas mapped as Of Concern RE 12.3.8 remnant vegetation and patches of scattered vegetation within non-remnant areas across the site. Field surveys confirm the Teviot Brook / Woollaman Creek waterway corridor bordering the southern extent of the site provides substantial ecological value. Development on the site intends to retain and improve majority of vegetation associated with the central watercourse and vegetation associated with Teviot Brook / Woollaman Creek in the south through rehabilitation within the environmental open space area. The vegetation mapped as regrowth endangered RE regrowth on site was found to not meet the minimum requirements to be classified as remnant vegetation and will be cleared as part of the proposal. Remnant vegetation at the north-western extent is proposed to be partially cleared as part of the development.

Development impacts will be managed through the measures outlined in the *PDA Guideline No.14 (Environmental Values and Sustainable Resource Use)* assessment or as per approval conditions.

This Significant Biodiversity Assessment Report (SBAR) forms the background data and rationale for the anticipated project. The information included herein has been utilised to inform the development application.

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# Acronyms

| | |
|---|---|
| AKF | Australian Koala Foundation |
| ASRIS | Australian Soil Resource Information System |
| BA | *Biosecurity Act 2014* (Qld) |
| DES | Department of Science and Environment |
| DILGP | Department of Infrastructure, Local Government and Planning |
| EDQ | Economic Development Queensland (formally ULDA) |
| EPBC | *Environment Protection and Biodiversity Conservation Act 1999 (Cth)* |
| EVNT | Endangered, Vulnerable or Near Threatened as listed under the NCA |
| GBO | General Biosecurity Obligation |
| Ha | Hectares |
| Km | Kilometers |
| LCC | Logan City Council |
| M | Meters |
| MLES | Matters of Local Environmental Significance |
| MNES | Matters of National Environmental Significance |
| MSES | Matters of State Environmental Significance |
| NCA | *Nature Conservation Act 1992* |
| NCWR | *Nature Conservation (Wildlife) Regulation 2006* |
| PDA | Priority Development Area |
| PMST | Protected Matters Search Tool |
| RE | Regional Ecosystem |
| SARA | State Assessment Referral Agency (part of DILGP) |
| SAT | Spot Assessment Technique Survey |
| SBAR | Significant Biodiversity Assessment Report |
| SDAP | State Development Assessment Provisions |
| SPP | *State Planning Policy 2017 (Qld)* |

| | |
|---|---|
| TEC | Threatened Ecological Community |
| ULDA | Urban Land Development Authority (now known as EDQ) |
| UDA | Urban Development Area (now known as PDA) |
| VMA | *Vegetation Management Act 1999 (Qld)* |

# 1. Introduction

The *Environmental Management Division* of Saunders Havill Group (SHG) were engaged by WelCo Group Pty Ltd to prepare a Significant Biodiversity Assessment Report (SBAR) in response to Economic Development Queensland's (EDQ) *PDA Implementation Guideline No. 14 (Environmental values and sustainable resources* - IG14) for an ROL application located at Wyatt Road, Kagaru.

The site is located within the *Greater Flagstone Priority Development Area* (PDA) and, as such, is subject to the rigours of an Economic Development Queensland (EDQ) assessment with assessment powers held by the Minister for EDQ. Although being entirely included within the Logan City Council (LCC) Local Government Area, EDQ have jurisdiction for the implementation and enforcement of development applications in relation to the project as a key regulator of development within *Priority Development Areas* (PDA) for the Department of State Development Infrastructure, Local Government and Planning (DSDILGP). Despite this legislative position on assessment, the majority of infrastructure assets, inclusive of park areas, will likely transition to the ownership of LCC.

This SBAR provides a review of the site's ecological values in accordance with Commonwealth and State Government legislation and is intended to support the submission of a development application for this Project to EDQ.

## 1.1. Property Summary

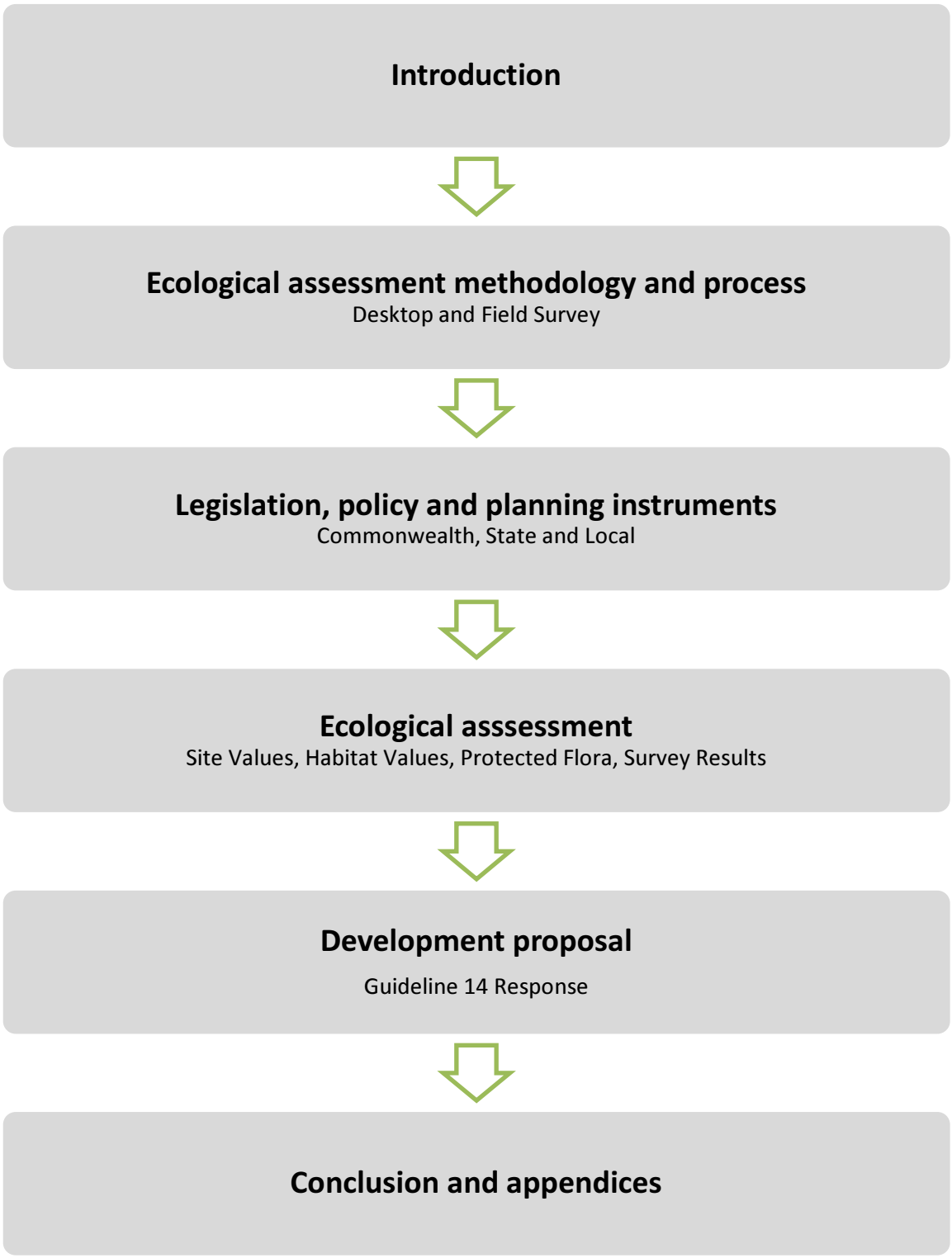
**Table 1: Property Summary**

| | |
|---|---|
| **Address** | 325 and 208 Wyatt Road, Kagaru, Queensland, 4285 |
| **Lot/plan** | Lot 11 on SP341889<br>Lot 12 on S31468<br>Lot 22 on SP341889<br>Lot 27 on S311174 |
| **Area** | 301.93 ha |
| **VMA 1999** | **Category B (remnant)** Of Concern RE12.3.8, Least Concern RE12.3.7, Least Concern RE12.9-10.2, Least Concern RE12.9-10.17, Of Concern RE12.9-10.3 and Of Concern RE12.9-10.7.<br>**Category C (high-value regrowth)** Endangered RE12.3.3 / RE12.3.7 and Of Concern 12.9-10.2 / 12.9-10.7 / 12.9-10.3 / 12.9-10.17.<br>Essential habitat - *Phascolarctos cinereus* (Koala)<br>VMA Wetland<br>Category X (non-remnant) |

| | |
|---|---|
| **Fisheries 1994** | Queensland Waterway for Waterway Barrier Works<br>• 'Low' – Unmapped drainage feature<br>• 'Moderate' – Unmapped drainage feature (Teviot Brook tributary)<br>• 'High' – Unnamed tributary of Teviot Brook<br>• 'Major' – Teviot Brook |
| **MSES** | MSES – Wildlife habitat (special least concern animal)<br>MSES – Wildlife habitat (koala habitat areas – core)<br>MSES – Regulated vegetation (category B)<br>MSES – Regulated vegetation (category C)<br>MSES – Regulated Vegetation (essential habitat)<br>MSES – Regulated vegetation (wetland)<br>MSES – Regulated vegetation (intersecting a watercourse)<br>MSES – High ecological significance wetlands |
| **Koala Plan 2020** | Outside Koala priority area<br>Core koala habitat area on site |
| **LGA** | Logan City Council |
| **Planning scheme / local plan** | Greater Flagstone Priority Development Area |
| **Environmental overlays** | Greenspace<br>Riparian Corridors<br>Waterways |
| **Existing land use** | Rural / cattle and horse agistment |
| **Proposed land use** | Residential and conservation biodiversity corridor |

## 1.2. Report Structure

This SBAR adopts the following structure:



## 1.3. Context and Background

The proposed residential development area covers a site of approximately 301.93 ha which is located 20 kilometres (km) south west of Logan Village, 12 km west of Jimboomba, 18 km north west of Beaudesert and has been subject to significant historical disturbance (refer **Plan 1** Historical Aerial Imagery). The surrounding landscape comprises largely of rural residences with some remaining bushland areas to the north, north-east and west. The adjoining allotments to the north, east and west are included within the Greater Flagstone PDA and are earmarked for future development (refer **Plan 2**). Several surrounding properties hold EPBC Act and EDQ Act determinations and approvals. The current alignment of Wyatt Road traverses through the centre of the site, which is proposed to be relocated to the northern regions of the site, above the floodplain to maximise Greenspace outcomes. Teviot Brook, which transitions to Woollaman Creek, bounds the site to the south, while a stream order 3 watercourse traverses through the centre of the site from east to northwest as a tributary of Teviot Brook. Several stream order 1 and 2 watercourses as tributaries of the stream order 3 watercourse are also present across the site, with the majority of the stream order 1 flow paths constituting drainage features interrupted by constructed dams. Refer to **Figure 1** for site context and **Figure 2** for site aerial.

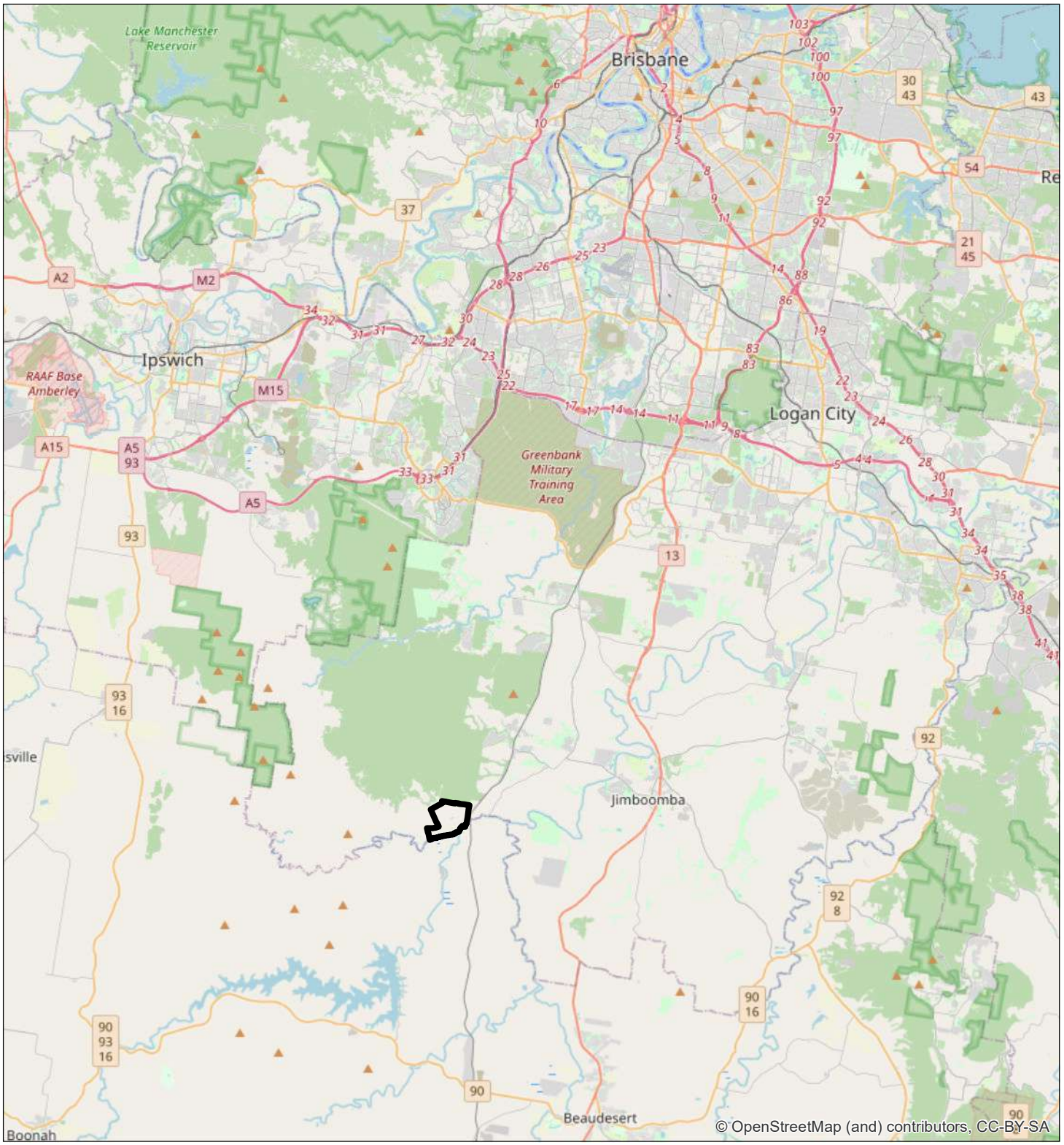
The development footprint of approximately 116.2 ha consists mainly of cleared paddocks, with scattered mature Eucalypt trees and patches of regrowth eucalypt open forest. A large dam is present at the southwestern extent which connects to a highly modified and degraded drainage feature. The majority of the site has been historically cleared and maintained as open paddocks on floodplain areas. Remnant vegetation is mapped through the centre and eastern extent of the site, associated with two wetland areas and a watercourse tributary of Teviot Brook. Two houses and associated infrastructure are present on-site across the four (4) existing allotments. There is a house south of Wyatt Road in Lot 11SP341889 with associated sheds, ancillary infrastructure and paddocks for cattle and horse agistment. Lot 27S311174 also contains a house along with sheds and ancillary infrastructure at the northern extent (refer **Figure 2**).

The site is currently used for horse and cattle agistment throughout Lot 11, 12, 22 and 27. As such, areas of the creek beds and waterway banks are highly degraded in some areas from trampling. Constructed dams intersect the watercourse and drainage features onsite. The ground layer across the site is dominated with exotic grasses. Lot 22 is dominated by the weed *Sporobolus pyramidalis* (Giant Rat's Tail Grass) and Lot 11 is dominated by the weed *Chloris gayana* (Rhodes Grass). To the east, the southern portion of Lot 12 is entirely cleared paddock dominated by *Chloris gayana* with scattered mature *Eucalyptus tereticornis* (Forest Red Gum) trees. Lot 12 north of Wyatt Road contains a wetland mapped as Category B vegetation containing permanent water. The southern portion of Lot 27 contains a small dam and the southern extent of the watercourse which traverses from the southeastern corner through to the western boundary and north into Lot 27. This waterway is lined with scattered mature *Eucalyptus tereticornis* (Forest Red Gum) and *Melaleuca viminalis* (Weeping Bottlebrush) trees. The northern extent of Lot 27 comprises the extension of the southern watercourse through the south of the lot, scattered mature Eucalypt trees, cleared paddocks and a patch of mapped regrowth vegetation in the northwestern corner. Several tracks traverse the paddocks throughout the site.

Overall, vegetation across the site consists of large areas of weed grasses and scattered mature Eucalypt species, primarily *Eucalyptus tereticornis*. *Melaleuca viminalis* trees are associated with the waterways and there

are relatively small patches of regrowth eucalypt open forest. Wetland associated vegetation in the mapped Category B areas consists of sedges and rush species, but these areas lack species diversity and structure. The site has been subject to several flora and fauna assessments to address various approval requirements including targeted surveys carried out specifically for assessment against Guideline 14. The results of these assessments are summarised and presented in this report.

The property has been identified for future development and is located within the Greater Flagstone PDA. The site will be developed in accordance with the proposed development plan. The development plan refines outcomes of the site in alignment with the *Greater Flagstone Urban Development Area Proposed Development Scheme*, as implemented by EDQ.




**Legend**

Site Boundary

# Figure 1

Site Context

WelCo Group Pty Ltd

***File ref.*** 11560 E Figure 1 SBAR Site Context A
***Date*** 6/08/2024
***Project*** Wyatt Road, Kagaru

0 2 4 6 8 10 km

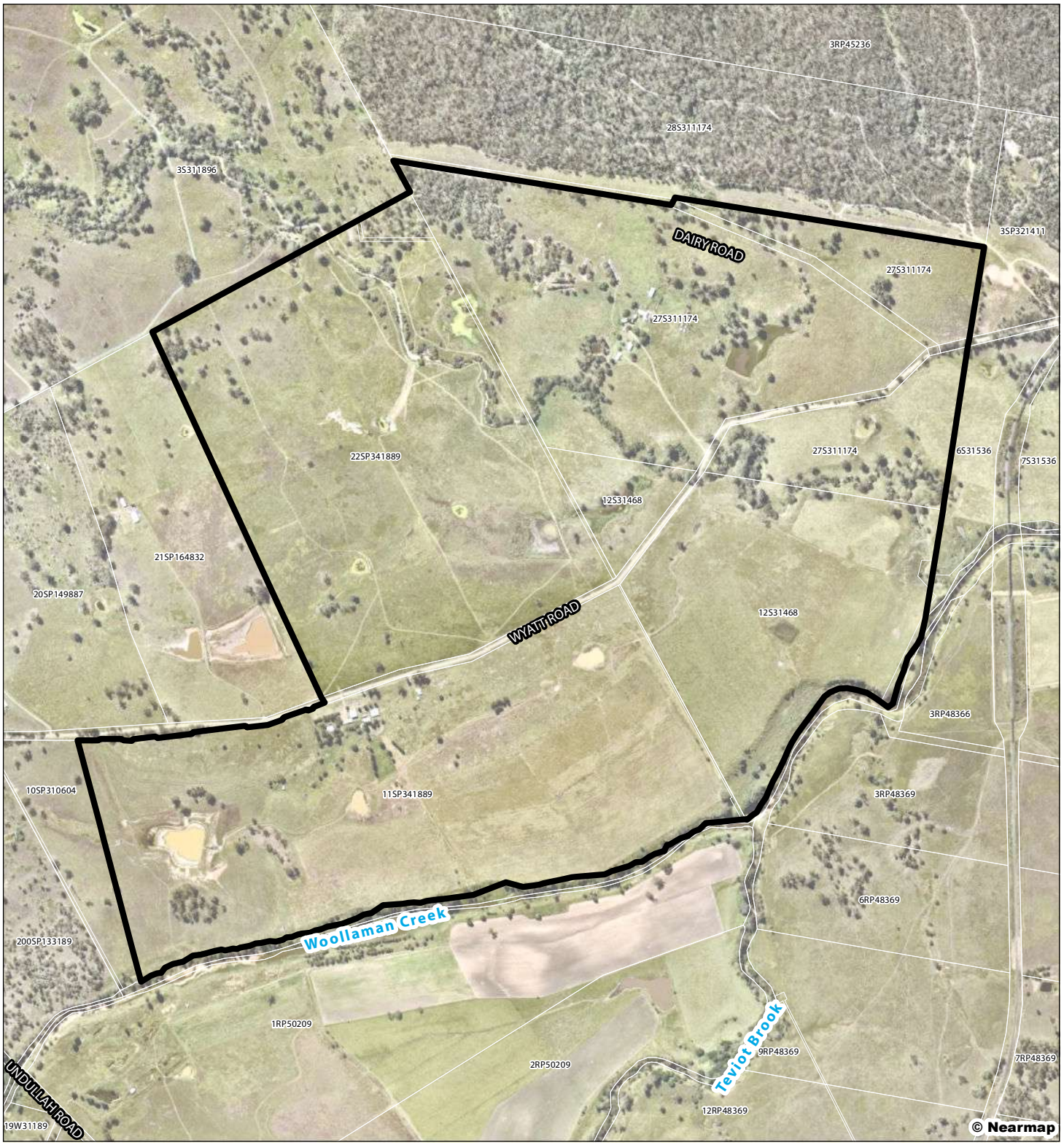
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*Scale (A4): 1:300,000 [GDA 2020 MGA Z56]*

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**Legend**

Site Boundary

Qld DCDB

# Figure 2

Site Aerial

WelCo Group Pty Ltd

***File ref.*** 11560 E Figure 2 SBAR Site Aerial A
***Date*** 6/08/2024
***Project*** Wyatt Road, Kagaru

0 100 200 300 400 500 m

N

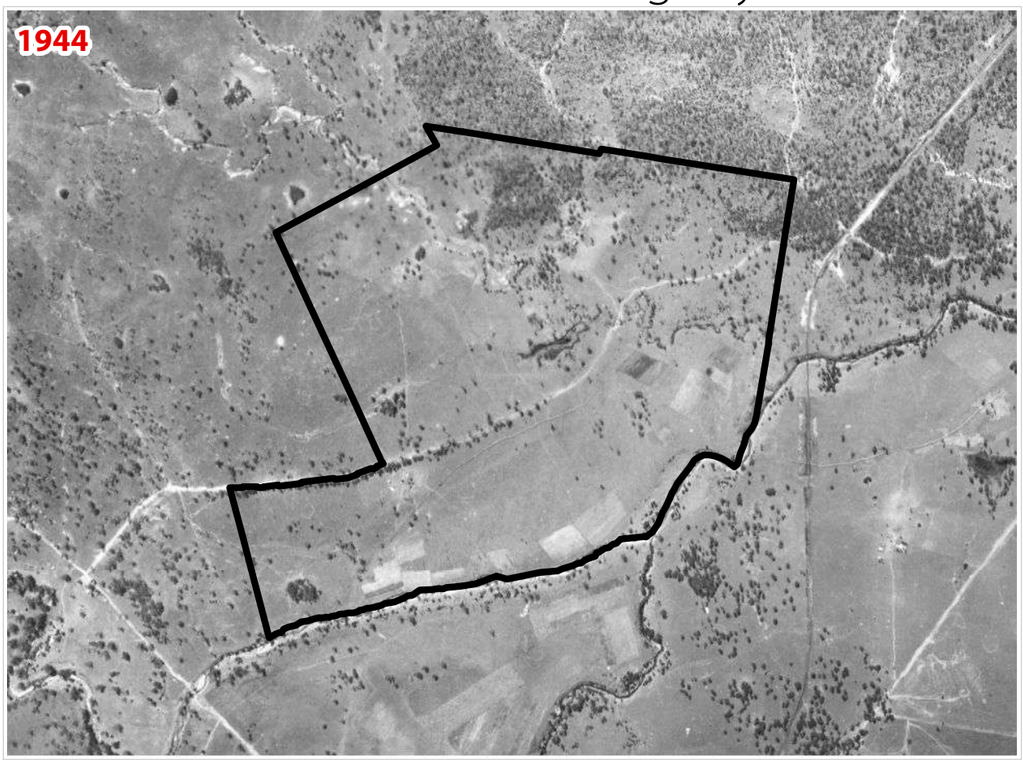
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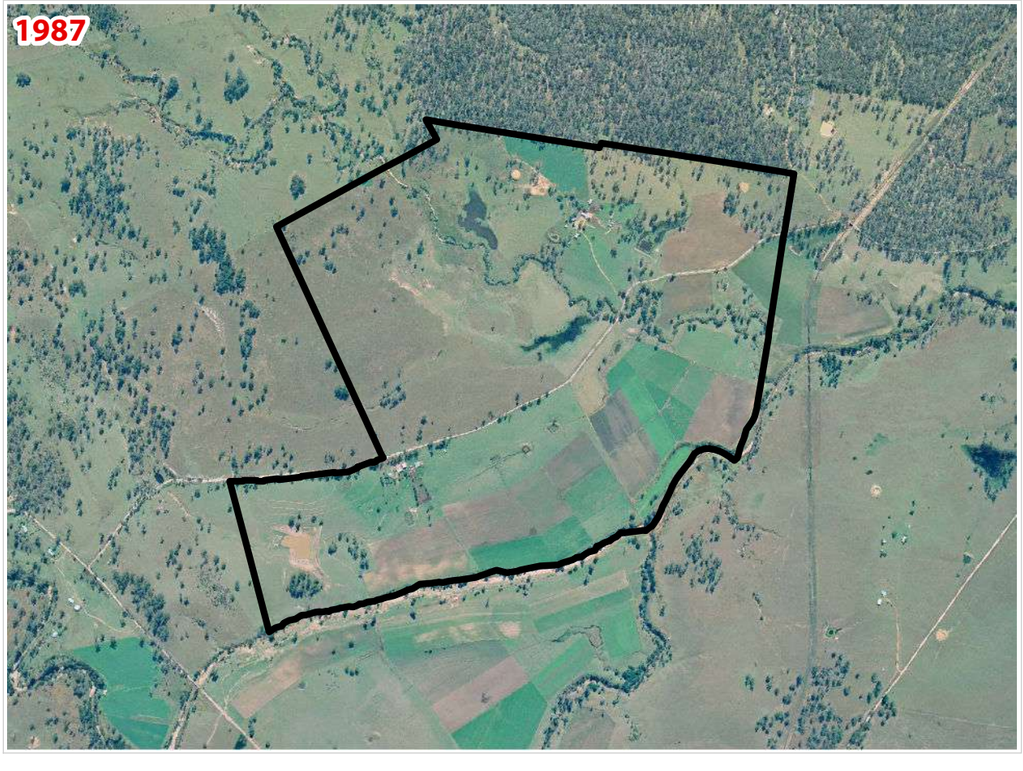
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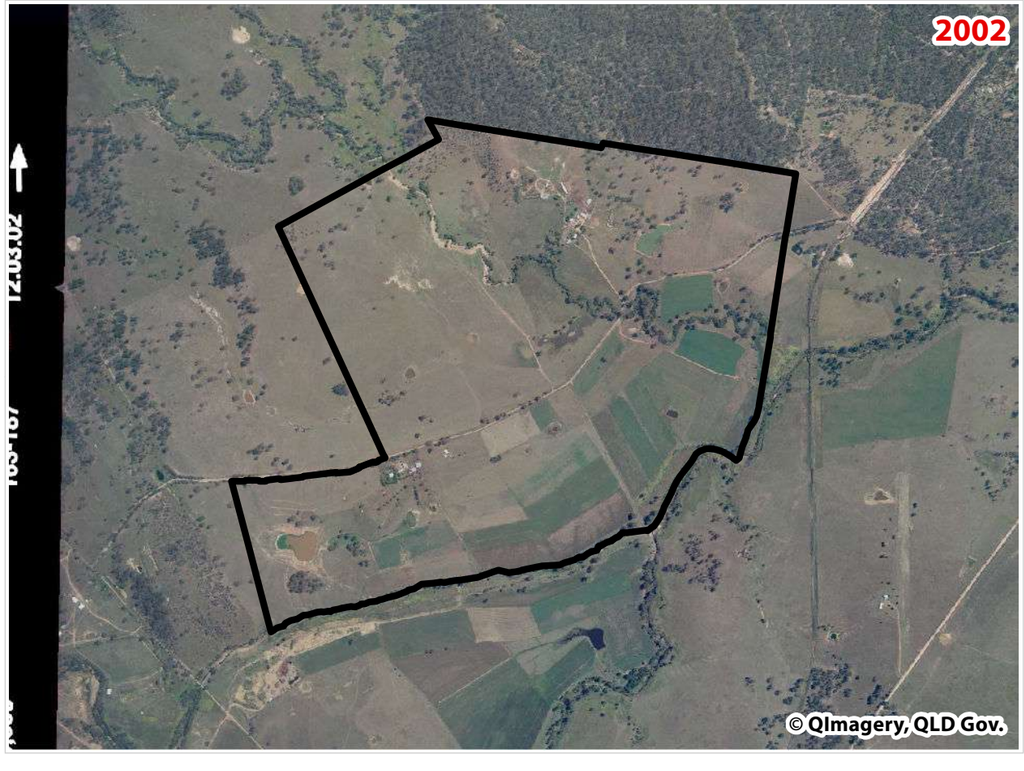
# 1. Historical Aerial Imagery










Notes:
This plan was prepared as a desktop assessment tool. The information on this plan is not suitable for any other purpose. Property dimensions, areas, numbers of lots and contours and other physical features shown have been compiled from existing information and may not have been verified by field survey. These may need verification if the development application is approved and development proceeds, and may change when a full survey is undertaken or in order to comply with development approval conditions. No reliance should be placed on the information on this plan for detailed design or for any financial dealings involving the land. Saunders Havill Group therefore disclaims any liability for any loss or damage whatsoever or howsoever incurred, arising from any party using or relying upon this plan for any purpose other than as a document prepared for the sole purpose of accompanying a development application and which may be subject to alteration beyond the control of the Saunders Havill Group. Unless a development approval states otherwise, this is not an approved plan.

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## Legend

Qld DCDB

Site Boundary

| Issue | Date | Description | Drawn | Checked |
|---|---|---|---|---|
| B | 11/03/2024 | Preliminary | TC | MD |
| C | 6/08/2024 | Updated Layout | LS | KM |

0 200 400 600 800 1,000 m

Transverse Mercator | GDA 2020 | Zone 56 | 1:25,000 @ A3

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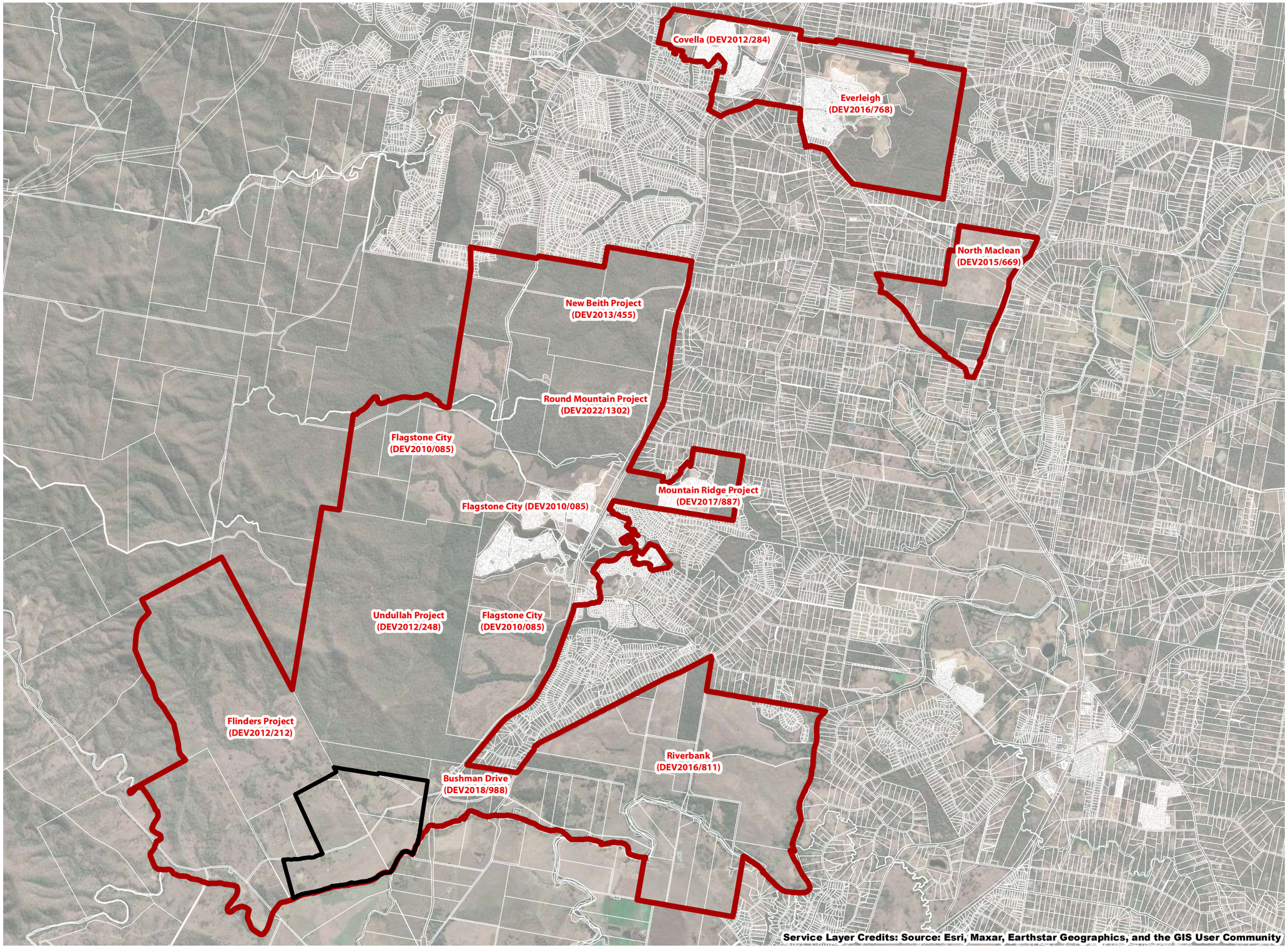
WelCo Group Pty Ltd

Wyatt Road, Kagaru

*Address / RPD: Lot 11 on SP310604*

*6/08/2024 | 11560 E 01 SBAR Aerial History C*

# 2. Proposed & Current Greater Flagstone Developments




Notes:
This plan was prepared as a desktop assessment tool. The information on this plan is not suitable for any other purpose. Property dimensions, areas, numbers of lots and contours and other physical features shown have been compiled from existing information and may not have been verified by field survey. These may need verification if the development application is approved and development proceeds, and may change when a full survey is undertaken or in order to comply with development approval conditions. No reliance should be placed on the information on this plan for detailed design or for any financial dealings involving the land. Saunders Havill Group therefore disclaims any liability for any loss or damage whatsoever or howsoever incurred, arising from any party using or relying upon this plan for any purpose other than as a document prepared for the sole purpose of accompanying a development application and which may be subject to alteration beyond the control of the Saunders Havill Group. Unless a development approval states otherwise, this is not an approved plan.

*Layer Sources*
*© State of Queensland (Department of Resources) 2024.*
*Updated data available at*
*http://qldspatial.information.qld.gov.au/catalogue/*

* This note is an integral part of this plan/data. Reproduction of this plan or any part of it without this note being included in full will render the information shown on such reproduction invalid and not suitable for use.

## Legend

- Qld DCDB
- Site Boundary
- Greater Flagstone PDA boundary

| Issue | Date | Description | Drawn | Checked |
|---|---|---|---|---|
| B | 11/03/2024 | Preliminary | TC | MD |
| C | 6/08/2024 | Updated Layout | LS | KM |

0 700 1,400 2,100 m

Transverse Mercator | GDA 2020 | Zone 56 | 1:61,000 @ A3

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Wyatt Road, Kagaru

*Address / RPD: Lot 11 on SP310604*

*6/08/2024 | 11560 E 02 SBAR PDA developments C*

# 2. Ecological Assessment Methodology and Process

The following steps were undertaken in the preparation of this assessment:

1. Desktop Analysis,
2. Legislation and Policy Review,
3. Field Survey,
4. Impact Assessment and Development Analysis, and
5. Conclusion and Recommendations.

Details of the methodology undertaken for each of the assessment phases is provided in the following sections.

## 2.1. Desktop Analysis Methodology

Prior to the commencement of field surveys, a desktop analysis was conducted of Commonwealth, State and Local environmental databases and overlay mapping, and included the following:

- Commonwealth Matters of National Environmental Significance protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on and around the site using the Protected Matters Search Tool (PMST) with a 5 km radius (refer **Appendix A**);
- *Nature Conservation Act 1992* (NCA) listed threatened species on and around the site using the Wildlife Online Database with a 5 km radius (refer **Appendix B**);
- Public Environmental Databases including Atlas of Living Australia and BioMaps;
- State Government Environmental Overlay Mapping including:
    - Regulated Vegetation Management and vegetation supporting maps under the *Vegetation Management Act 1999* (VMA)
    - Flora Survey Trigger Areas under the *Nature Conservation Act 1992*
    - Fish habitat under the *Fisheries Act 1994*
    - Watercourses under the *Water Act 2000*
    - Weeds under the *Biosecurity Act 2014*
    - Matters of State Environmental Significance (MSES) under the State Planning Policy (i.e. wetland protection areas, koala habitat etc.);
- PDA Planning Scheme Documents and Maps; and
- LCC Planning Scheme Documents and Maps.

### 2.1.1 Historical Aerial Review

A review of aerial photography history was undertaken via QImagery to assist with the broad delineation of vegetation communities. The assessment of historical aerial imagery allows historical patterns impacting vegetation communities to be identified, this includes clearing activities, land use, regrowth vegetation and general vegetation age.

**Plan 1** shows the subject site was extensively cleared prior to 1944, particularly through the western and southern extent. Through 1970 – 2022 the site was utilised for agricultural crops. The patch of vegetation at the northern corner of Lot 27 appears to have been cleared after the 1970s, with regrowth evident from 2002. Scattered trees have been retained across the site mainly in association with the major waterway through the centre of the site and surrounding the dams in the south-west and north-east. Overall, broadscale clearing across the site has resulted in limited native vegetation being retained across the site, other than the large mature trees associated with the watercourses.

### 2.1.2 Likelihood of Occurrence Assessment

A likelihood of occurrence assessment was based upon publicly available species records and/or other information sources, such as field guides and web-based species profiles, including but not limited to:

- Commonwealth Government's *Species Profile and Threats Database* (SPRAT) for the threatened species and ecological communities listed under the EPBC Act; and
- The Queensland *Department of Environment and Science* (DES) threatened species website.

The likelihood of occurrence assessment was informed by desktop assessment, including an appreciation and understanding of the species habitats within the subject site. The assessment adopts a two-tiered approach; the first based on desktop analysis and the potential of occurrence and the second based on a combination of desktop, field survey and expert opinion to determine the likelihood of occurrence.

The likelihood of threatened species and ecological communities occurring in the subject site has been assessed against the criteria outlined in **Table 2**.

**Table 2: Likelihood of Occurrence Assessment Criteria**

| Likelihood of occurrence | Assessment criteria |
|---|---|
| **Low** | No previous records of the species within the locality and one or more of the following criteria is met:<br>• Not previously recorded on the subject site and surrounds and the subject site is beyond the current known geographic range;<br>• Dependant on specific habitat types or resources that are not present on the subject site; or<br>• Considered extinct in the wild. |
| **Moderate** | Species previously recorded within the locality and one or more of the following criteria is met:<br>• Previously recorded in proximity to the subject site (ie. vagrant individuals); or<br>• Potential habitat typologies or resources are present on the subject site. |
| **High** | Species previously recorded within the locality and one or more of the following criteria is met:<br>• Previously recorded on the subject site;<br>• Dependant on habitats or habitat resources that are available on the subject site; or<br>• Suitable habitats are available on the subject site that are capable of supporting a resident population or individuals of the species. |
| **Known** | Flora species or ecological community positively identified during field surveys within the subject site.<br><br>Fauna species positively recorded during field surveys within the subject site or adjacent habitats. |

## 2.2. Field Survey Methodology

Methodologies utilised during the field survey to evaluate site ecological values is discussed in the following subsections. Detailed ecological surveys were completed across Lot 22and Lot 11 by two (2) ecologists on the 8th – 10th May 2023 and 22nd – 23rd May 2023 and across Lot 27 and 12 on 3rd – 4th and 17th, and 31st July 2023 (refer **Section 4** for detailed survey results and **Plan 3** for the field survey effort).

The ecological survey effort focused on assessing the general value of the mapped environmental areas in the context of potential MNES and MSES.

### 2.2.1 Animal Ethics Permits

SHG holds the relevant permits that are required from Department of Agriculture and Fisheries (DAF) Animal Ethics and Animal Ethics Committee (AEC) to conduct fauna surveys for environmental consulting (CA 2020/06/1387).

Ecological field surveys were conducted on the subject site in the attempt to confirm presence of potential matters of ecological significance (MNES, MSES and Matters of Local Environmental Significance (MLES)). Surveys were conducted in accordance with the following permits held by SHG:

- Scientific Purposes Permit **WA0022007** granted under Section 12(f) of *Nature Conservation (Administration) Regulation 2017.*
- DAF Ethics clearance **CA 2020/02/1355**.
- Scientific User Registration **SUR000451**.

### 2.2.2 Terrestrial Biodiversity Condition Assessment

Terrestrial Biodiversity Condition Assessment was conducted across the site using *"BioCondition – A condition assessment framework for terrestrial biodiversity in Queensland- Assessment Manual, Queensland Herbarium, Science Delivery, Version 2.2. February, 2015"*.

BioCondition is a condition assessment framework for Queensland that provides a measure of how well a terrestrial ecosystem is functioning for biodiversity values. It is a site-based, quantitative and therefore repeatable assessment procedure that can be used in any vegetative state and provides a numeric score that can be summarised as a condition rating out of 80. In BioCondition, 'condition' refers to the degree to which the attributes of a patch of vegetation differ from the attributes of the same vegetation in its reference state.

**BioCondition Assessment Framework Methodology**

The manual provides a step-by-step methodology explaining how to measure biocondition relative to benchmark Regional Ecosystems. This methodology has been adopted and tailored/modified to assess the relative value of biocondition on the investigation area using the Modified Biocondition Assessment (MBA) as proposed below. In this case, only site condition was applied to the investigation area to determine a Site Condition score.

**Site Condition**

Assessing Site Condition is an integral step in determining biocondition. The on-site condition is a key element of biocondition and has a direct influence on the biodiversity it supports. Site condition is assessed using a suite of attributes to describe the structure and function of the vegetation community, compared to the expected range for a relatively undisturbed community.

The following attributes of Site Condition were assessed, compared to a benchmark and assigned a score for the subject site:

1. Recruitment of Woody Species
2. Tree Species Richness
3. Shrubs Species Richness
4. Grasses Species Richness
5. Forbs Species Richness
6. Tree Canopy Height
7. Tree Canopy Cover
8. Shrub Canopy Cover
9. Native Perennial Grass Cover
10. Organic Litter
11. Large Trees
12. Coarse Woody Debris
13. Weed Cover

**Field Survey**

Five (5) 100 m x 50 m transects were undertaken within the site to ascertain the Site Condition (**Plan 3**). Each transect was positioned to provide a representative survey of the application area as a whole.

### 2.2.3 Observational Survey for Significant Flora and Fauna, Habitat Trees and Biodiversity Values

The subject site was walked with particular attention paid to any threatened species that were listed as possibly occurring on or within the vicinity of the application area and specific micro-assemblages which may support these threatened species. This included observations for vertebrate fauna present on or that may utilise the study area, including faunal lists and significance status of species under the Commonwealth's EPBC Act including the JAMBA, CAMBA, ROKAMBA and the Bonn Convention, and Queensland's NCA.

The observational survey included identification of ecological features and values such as broad vegetation communities, fauna habitats, and ecological corridors. Identification and description of the fauna habitats present within the area included any habitat trees. Specific attention was paid to threatened flora and fauna species.

For the purposes of this report, a significant flora and fauna species has been defined as a species that is scheduled as 'critically endangered', 'endangered', 'vulnerable' or conservation dependent under the Commonwealth EPBC Act and NCA.

Vegetation was ground-truthed and assessed against current VMA Regional Ecosystem (RE) mapping and pre-clear mapping. This included reviewing the accuracy and extent of mapped RE types in addition to the broad condition.

### 2.2.4 Scats, Tracks, and other Traces Search

Surveys for scats, tracks and other traces were conducted throughout the survey periods during May and July 2023. Both predator and non-predator scats were sought during all searches. Specific search efforts were made to locate the presence of koalas or evidence of their occurrence on the subject lands and the local area. In addition, particular notice of potential dens, scats and tracks for invasive species, such as wild dog and domestic cats, was taken to identify predator-prey interactions and understand existing impacts on-site.

### 2.2.5 Koala Habitat and Spot Assessment Technique Surveys

Tools for determining localised levels of use by *Phascolarctos cinereus* (Koala) included the Spot Assessment Technique (SAT) and opportunistic observations for Koala and Koala activity throughout the field survey effort. Three SAT surveys were completed within the mapped Koala Habitat Area (KHA) and two outside the mapped KHA. Additional general observations and habitat features across the site were also recorded. SAT surveys were undertaken on-site in accordance with the methodology developed by the Australian Koala Foundation (AKF[1]).

The SAT method is an assessment of Koala activity involving a search for any Koalas and / or signs of Koala usage. The SAT involves identifying a non-juvenile tree of any species within the site that is either observed to have a Koala or scats or is known to be a food tree or otherwise important for Koalas and recording any evidence of Koala usage of that tree including presence, identifiable scratches or scats. The nearest non-juvenile tree is then identified, and the same data recorded. The next closest non-juvenile tree to the first tree is then assessed and so on until 30 trees have been surveyed. Assessment of each tree involves a systematic search for Koala scats beneath the tree within one metre radius of the trunk. After approximately two minutes of searching for scats, the base of the trunk is observed for scratches and the crown for Koala. The number of trees showing evidence of Koala activity is expressed as a percentage of the total number of trees sampled to indicate the frequency of Koala usage[1].

### 2.2.6 Fauna Connectivity Assessment

The majority of the site has been subjected to historic disturbance and ongoing clearing. As such many areas contained only scattered vegetation. The vegetation on-site was assessed for overall suitability as well as the

[1] Phillips, S & Callaghan, J 2011, "The *Spot Assessment Technique*: a tools for determining localised levels of habitat use by Koala *Phascolarctos cinereus*", *Australian Zoologist*, 35:3.

potential connectivity value adjoining the proposed alignment. Habitat values were assessed through identifying the extent of habitat trees, known Koala food trees on-site (i.e., species from genera *Eucalyptus*, *Corymbia*, *Angophora*, *Lophostemon* and *Melaleuca*), modification levels (i.e., within woodland, planted surrounding houses or structures, situated within slashed / maintained environments), and the potential connectivity opportunity to surrounding habitat. Connectivity value was assessed through considering the surrounding regional ecosystems, and ground-truthing these where possible, identifying current and approved future land uses, and substantial barriers intersecting potential habitat such as major roads and existing high density residential areas. In addition, connectivity was assessed in relation to the Greater Flagstone Greenspace Network and the proposed development open space / biodiversity corridors. The results of this assessment were analysed through GIS and are illustrated and discussed within **Section 4.**

### 2.2.7 GPS Tree Plot – Ecologically Dominant and Habitat Trees

A survey of the ecologically dominant and habitat trees was conducted across the site to locate and describe trees that where larger than the surrounding canopy trees or contained hollows as fauna habitat. A handheld GPS device (Trimble) is used to record sub metre accurate locations (in some cases use survey accurate locations), and the following parameters of each tree specimen recorded:

- tree species, via a combination of observations of the gum nuts, buds, leaves, bark and growth form
- diameter of the trunk of the tree is measured at breast height (DBH) using a diameter tape
- height of the tree
- spread
- health assessment (canopy, trunk)
- habitat values (hollows, nests, termites, scratches, scats)

# 3. Legislation, policy and planning instruments

## 3.1. *Environment Protection and Biodiversity Conservation Act 1999*

The Australian Government's key piece of environmental legislation is the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The EPBC aims to protect and manage matters of environmental significance which include nationally and internationally important flora, fauna, ecological communities and heritage places.

A search using the Commonwealth's Protected Matters Search Tool (PMST) for the site. The search provides a list of wetlands of international significance, threatened ecological communities and threatened species which have the potential to be temporarily or permanently located within a 5 km radius from the central point of the site. **Table 3** lists a summary of these results relevant to the site. The complete results of this search are included in **Appendix A**.

**Table 3: EPBC Act PMST Search Results**

| **Threatened Ecological Communities** | | |
|---|---|---|
| **Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community** – Endangered (Community may occur within area)<br>**Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland** – Endangered (Community may occur within area)<br>**Grey box-grey gum wet forest of subtropical eastern Australia** – Endangered (Community likely to occur within area)<br>**Lowland Rainforest of Subtropical Australia** – Critically Endangered (Community may occur within area)<br>**Poplar Box Grassy Woodland on Alluvial Plains** – Endangered (Community may occur within area)<br>**Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions** – Endangered (Community likely to occur within area)<br>**White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland** – Critically Endangered (Community likely to occur within area) | | |
| **Threatened Species** | | |
| **Scientific name** | **Common name** | **Status** |
| **Birds** | | |
| *Anthochaera phrygia* | Regent Honeyeater | Critically Endangered |
| *Botaurus poiciloptilus* | Australasian Bittern | Endangered |
| *Calidris acuminata* | Sharp-tailed Sandpiper | Vulnerable |
| *Calidris ferruginea* | Curlew Sandpiper | Critically Endangered |
| *Calyptorhynchus lathami lathami* | South-eastern Glossy Black-Cockatoo | Vulnerable |

| | | |
|---|---|---|
| **Threatened Ecological Communities** | | |
| *Charadrius leschenaultii* | Greater Sand Plover | Vulnerable |
| *Climacteris picumnus victoriae* | Brown Treecreeper (south-eastern) | Vulnerable |
| *Cyclopsotta diophthalma coxeni* | Coxen's Fig Parrot | Critically Endangered |
| *Erythrotriorchis radiatus* | Red Goshawk | Vulnerable |
| *Falco hypoleucos* | Grey Falcon | Vulnerable |
| *Gallinago hardwickii* | Latham's Snipe | Vulnerable |
| *Geophaps scripta scripta* | Squatter Pigeon (southern) | Vulnerable |
| *Grantiella picta* | Painted Honeyeater | Vulnerable |
| *Hirundapus caudacutus* | White-throated Needletail | Vulnerable |
| *Lathamus discolour* | Swift Parrot | Critically Endangered |
| *Numenius madagascariensis* | Eastern Curlew | Critically Endangered |
| *Rostratula australis* | Australian Painted Snipe | Endangered |
| *Stagonopleura guttata* | Diamond Firetail | Vulnerable |
| *Tringa nebularia* | Common Greenshank | |
| *Turnix melanogaster* | Black-breasted Button-quail | Vulnerable |
| **Fish** | | |
| *Maccullochella mariensis* | Mary River Cod | Endangered |
| **Insects** | | |
| *Argynnis hyperbius inconstans* | Australian Fritillary | Critically Endangered |
| **Mammals** | | |
| *Cahlinolobus dwyeri* | Large-eared Pied Bat | Vulnerable |
| *Dasyurus maculatus maculatus* | Spot-tailed Quoll | Endangered |
| *Macroderma gigas* | Ghost Bat | Vulnerable |
| *Petauroides volans* | Greater Glider (southern & central) | Endangered |
| *Petaurus australis australis* | Yellow-bellied Glider (south-eastern) | Vulnerable |
| *Petrogale penicillata* | Brush-tailed Rock-wallaby | Vulnerable |
| *Phascolarctos cinereus* | Koala | Endangered |
| *Potorous tridactylus tridactylus* | Long-nosed Potoroo (northern) | Vulnerable |
| *Pseudomys novaehollandiae* | New Holland Mouse | Vulnerable |
| *Pteropus poliocephalus* | Grey-headed Flying-fox | Vulnerable |
| **Plants** | | |
| *Arthraxon hispidus* | Hairy-joint Grass | Vulnerable |

| | | |
|---|---|---|
| **Threatened Ecological Communities** | | |
| *Bosistoa transversa* | Three-leaved Bosistoa | Vulnerable |
| *Coleus habrophyllus* listed as *Plectranthus habrophyllus* | - | Endangered |
| *Cryptostylis hunteriana* | Leafless Tongue-orchid | Vulnerable |
| *Cupaniopsis Shirleyana* | Wedge-leaf Tuckeroo | Vulnerable |
| *Cupaniopsis tomentella* | Boondah Tuckeroo | Vulnerable |
| *Dichanthium setosum* | Bluegrass | Vulnerable |
| *Fontainea venosa* | - | Vulnerable |
| *Macadamia integrifolia* | Macadamia Nut | Vulnerable |
| *Macadamia tetraphylla* | Rough-shelled Bush Nut | Vulnerable |
| *Notelaea ipsviciensis* | Cooneana Olive | Critically Endangered |
| *Notelaea lloydii* | Lloyd's Olive | Vulnerable |
| *Picris evae* | Hawkweed | Vulnerable |
| *Planchonella eerwah* | Shiny-leaved Condoo | Endangered |
| *Rhaponticum australe* | Austral Cornflower | Vulnerable |
| *Rhodamnia rubescens* | Shrub Turpentine | Critically Endangered |
| *Rhodomyrtus psidioides* | Native Guava | Critically Endangered |
| *Samadera bidwillii* | Quassia | Vulnerable |
| *Sophora fraseri* | - | Vulnerable |
| *Thesium australe* | Austral Toadflax | Vulnerable |
| **Reptiles** | | |
| *Delma torquata* | Adorned Delma | Vulnerable |
| *Furina dunmalli* | Dunmall's Snake | Vulnerable |
| *Hemiaspis damelii* | Grey Snake | Endangered |

## 3.2. Nature Conservation Act 1992

The *Nature Conservation Act 1992 (*NCA) classifies and protects significant areas (Protected Areas) and protects Threatened plant and animal species. The Nature Conservation (Wildlife) Regulation 2020 (NCWR) lists plant and animal species presumed extinct, endangered, vulnerable, near threatened, least concern, international or prohibited. The schedules of this regulation were considered in this report using a Wildlife Online Database Search with a 5 km radius from the site. Species listed under the NCWR with the potential to occur around the subject site are shown in **Table 4**. Refer to **Appendix B** for full search results.

**Table 4: NCA Wildlife Online Search Results**

| Scientific name | Common name | Status |
|---|---|---|
| *Adelotus brevis* | Tusked Frog | Vulnerable |
| *Ninox strenua* | Powerful Owl | Vulnerable |
| *Phascolarctos cinereus* | Koala | Endangered |
| *Melaleuca irbyana* | - | Endangered |

The Protected Plants regulatory framework under the NCA commenced on 31 March 2014, establishing approval triggers and processes for clearing protected plants. A Protected Plant is defined as all Extinct, Endangered, Vulnerable and/or Near Threatened (EVNT) plant species listed by name in Schedules 1-5 of the NCWR and Least Concern wildlife, not listed by name but identified as a plant indigenous to Australia in Schedule 6.

Under the amended NCA, a Protected Plant that is in the wild must not be 'taken', which includes being cleared, unless taking is under:

- A conservation plan applicable to the plant;
- A license, permit or other authority under a regulation; or
- An exemption under a regulation.

A search of the Flora Survey Trigger Map shows a small area in the north of the site (on Lots 11 and 27) has High-Risk Area for protected plants mapping (refer **Appendix C** for Environmental Searches). In accordance with the Protected Plants Guidelines, a flora survey must be undertaken of the clearing impact area, inclusive of a 100 m buffer, and a permit to clear or an exemption confirmation must be obtained from the Department of Environment and Science (DES) prior to clearing.

## 3.3. Likelihood of Occurrence

Based upon the database searches, MNES identified as being of potential relevance to the proposed development include TECs and threatened flora and fauna species and migratory species. The following findings of the desktop assessment further narrow those MNES having the potential to occur on-site.

### 3.3.1 Threatened Ecological Communities

The PMST (refer **Appendix A)** returned the following seven (7) TECs, listed under the EPBC Act as having potential to occur within 5 km of the subject site:

- Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community.
- Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland.
- Grey box-grey gum wet forest of subtropical eastern Australia.

- Lowland Rainforest of Subtropical Australia.
- Poplar Box Grassy Woodland on Alluvial Plains.
- Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions.
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

The likelihood of occurrence for each TEC within the subject site, as presented in **Table 5**, referred to State Government Regional Ecosystem mapping within the locality and known distributions of the TECs, to identify those TECs with potential to occur in the subject site or recorded during field surveys. Regional Ecosystems associated with the Grey box-grey gum wet forest of subtropical eastern Australia and the Subtropical Eucalypt floodplain Forest and Woodland of the New South Wales North Coast and South East Queensland Bioregions are mapped onsite. All other TECs were identified as having low potential to occur within the proposed alignment, based features and characteristics. Post-field assessment, the likelihood of occurrence for these is reviewed and cross checked with on ground features and ecological attributes with a more accurate, site-specific outcome presented in **Section 4.4**. The full Likelihood of Occurrence Assessment is provided in **Appendix D.**

**Table 5: Desktop Likelihood of Occurrence of Threatened Ecological Communities On-site.**

| TEC | EPBC Act status | Likelihood of occurrence | Analysis |
|---|---|---|---|
| Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community | Endangered | Unlikely | The site is not mapped as containing any regional ecosystems associated with this threatened ecological community, nor does it contain features indicative of this TEC. |
| Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland | Endangered | Unlikely | The site is not mapped as containing any regional ecosystems associated with this threatened ecological community, nor does it contain features indicative of this TEC. |
| Grey box-grey gum wet forest of subtropical eastern Australia. | Endangered | Low | RE12.9-10.3 which is associated with this TEC is mapped within and adjoining the proposed alignment. |
| Lowland Rainforest of Subtropical Australia | Critically Endangered | Unlikely | The site is not mapped as containing any regional ecosystems associated with this threatened ecological community, nor does it contain features indicative of this TEC. |

| TEC | EPBC Act status | Likelihood of occurrence | Analysis |
|---|---|---|---|
| Poplar Box Grassy Woodland on Alluvial Plains | Endangered | Unlikely | The site is not mapped as containing any regional ecosystems associated with this threatened ecological community, nor does it contain features indicative of this TEC. |
| Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions | Endangered | Moderate | Desktop analysis identified the majority of the assessment area as non-remnant vegetation with polygons of Category B remnant and Category C re-growth vegetation. Based on desktop assessments, some polygons of this remnant and re-growth vegetation are composed of regional ecosystem 12.3.7 (*Eucalyptus tereticornis, Casuarina cunninghamiana subsp. cunninghamiana* +/- *Melaleuca spp.* fringing woodland), and a composite of regional ecosystems 12.3.7 and 12.3.3 (*Eucalyptus tereticornis* woodland on Quaternary alluvium). |
| White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland | Critically Endangered | Unlikely | The site is not mapped as containing any regional ecosystems associated with this threatened ecological community, nor does it contain features indicative of this TEC. |

### 3.3.2 Threatened Flora Species

Database searches identified twenty (20) flora species, listed as threatened under the EPBC Act, as having been previously recorded or with potential to occur within 5 km of the subject site, as presented in **Appendix A**. To increase the robustness of the desktop assessment, these PMST results are cross-checked with the NCA records within proximity to the subject site and presented in **Appendix B**. One (1) flora species (*Melaleuca irbyana*) listed as threatened under the NCA was identified as having been previously recorded or with potential to occur within 5 km of the subject site.

The desktop assessment identified two threatened flora species with a 'moderate' likelihood of occurrence (refer **Table 6**), with all other records assigned 'low' or 'unlikely', attributable to historic modification and lack of records.

**Table 6: Desktop Likelihood of Occurrence of Threatened Flora On-site.**

| Scientific Name | Common Name | EPBC Act status | NCA Status | Likelihood of occurrence | Analysis |
|---|---|---|---|---|---|
| *Melaleuca irbyana* | Bushhouse Paperbark | - | Endangered | Moderate | Suitable habitat for *Melaleuca irbyana* was present within the subject site in the form of flat periodically waterlogged floodplains. |
| *Rhaponticum australe* | Austral Cornflower | Vulnerable | - | Moderate | Suitable habitat for this species is present across the site in the form of eucalypt open forest with a grassy understory. |

The subject site is mapped within the Protected Plants Flora Survey Trigger Map which identifies potential 'high risk areas' for potential threatened flora species listed under the NCA (Qld). The detailed likelihood of occurrence assessment is presented in **Appendix D**.

### 3.3.3 Threatened Fauna Species

Database searches identified thirty-two (32) fauna species, listened as threatened under the EPBC Act, as having been previously recorded or predicted to occur within 5 km of the subject site, as presented in **Appendix A**. These species have been captured within the buffer of the search tool. Habitat to support these species is limited throughout the alignment and surrounds, with the majority of area consisting of cleared paddocks used for cattle agistment. Therefore, habitat of high enough quality to support these species is limited due to the level of disturbance throughout and adjoining the alignment. To increase the robustness of the desktop assessment, these PMST results were cross-checked with the NCA records within proximity to the subject site and presented in **Appendix B**, which include an additional two (2) threatened fauna species.

Based on the presence of species records within the locality and habitat identified on-site, a likelihood of occurrence assessment was completed to identify threatened species having the potential to occur on or proximal to the site. The assessment determined four (4) threatened fauna species listed under the EPBC Act and one (1) threatened fauna species listed under the NCA having a likelihood of occurrence of 'moderate'. These species are listed in **Table 7** below and were targeted for assessment during the field surveys. All other threatened fauna species were assessed as having a 'low' or 'unlikely' likelihood of occurrence.

The complete likelihood of occurrence assessment is presented in **Appendix D**.

**Table 7: Likelihood of Occurrence of Fauna Species On-site Based on Desktop Assessment.**

| Scientific name | Common name | EPBC Status | NCA Status | Desktop Likelihood of occurrence | Analysis |
|---|---|---|---|---|---|
| *Anthochaera phrygia* | Regent Honeyeater | CE | CE | Moderate | Potential habitat attributes to support the Regent Honeyeater are present within the subject site in the form of dry sclerophyll forests and mature trees. The closest Regent Honeyeater record is 4.5 km north-east of the site. However, majority of the site has been cleared, with limited suitable habitat remaining. |
| *Ninox strenua* | Powerful Owl | - | V | Moderate | Possible habitat for the species occurs in the form of open sclerophyll vegetation however woodland is limited across the site due to historic clearing. Records of the species from 2011 and 2010 occur within 5 km north of the site. |
| *Phascolarctos cinereus* | Koala | E | E | Moderate | Potential habitat attributes to support the Koala are present within the alignment in the form of remnant RE12.3.7 and RE12.9-10.2 along with regrowth composite RE12.3.3/12.3.7 and RE12.-9-10.2/12.9-10.7/12.9-10.3/12.9-10.17 to scattered mature *Eucalyptus tereticornis* trees. |
| *Pteropus poliocephalus* | Grey-headed Flying-fox | V | LC | High | The site contains scattered Eucalypt species within cleared paddocks along with patches of regrowth and remnant vegetation including *Melaleuca viminalis* (Weeping Bottlebrush). Notably, there is a record within 1 km of the referral site in the last 20 years. |

## 3.4. Vegetation Management Act 1999

The *Vegetation Management Act 1999* (VMA) is the key mechanism by which the Queensland Government protects the state's environmental resources pertaining to vegetation. Under the VMA, a series of maps delineate vegetation features across the landscape, which are each assigned a conservation value directly related to the remaining extent of these features in the landscape. The VMA also protects 'essential habitat' vegetation where listed threatened species have been known to occur.

Regulated vegetation management mapping (shows vegetation categories used to determine clearing requirements). While areas shown on the map as Category X are not regulated under the VMA, those shown as Category A, B, C or R are subject to clearing requirements. The latter vegetation categories can only be cleared in accordance with an exemption, self-assessable vegetation clearing code, area management plan or

development approval. A supporting map defining regional ecosystems, wetlands, waterway features and essential habitat, is provided with the regulated vegetation management map. Approval for clearing of native vegetation is required under the *Planning Act 2016*, specifically assessment is required against State Code 16: Native Vegetation Clearing of the State Development Assessment Provisions (SDAP) which are administered by the State Referral Assessment Agency (SARA) which is a division of the Department of Infrastructure, Local Government and Planning (DILGP). Clearing of native vegetation under the VMA within a priority development area is exempt. However, Implementation Guideline 14 states that "development delivers protection of remnant 'endangered' vegetation where proven by ground-truthing to be viable". Therefore, development must avoid the removal of 'remnant' 'endangered' vegetation, where ground-truthed to be viable.

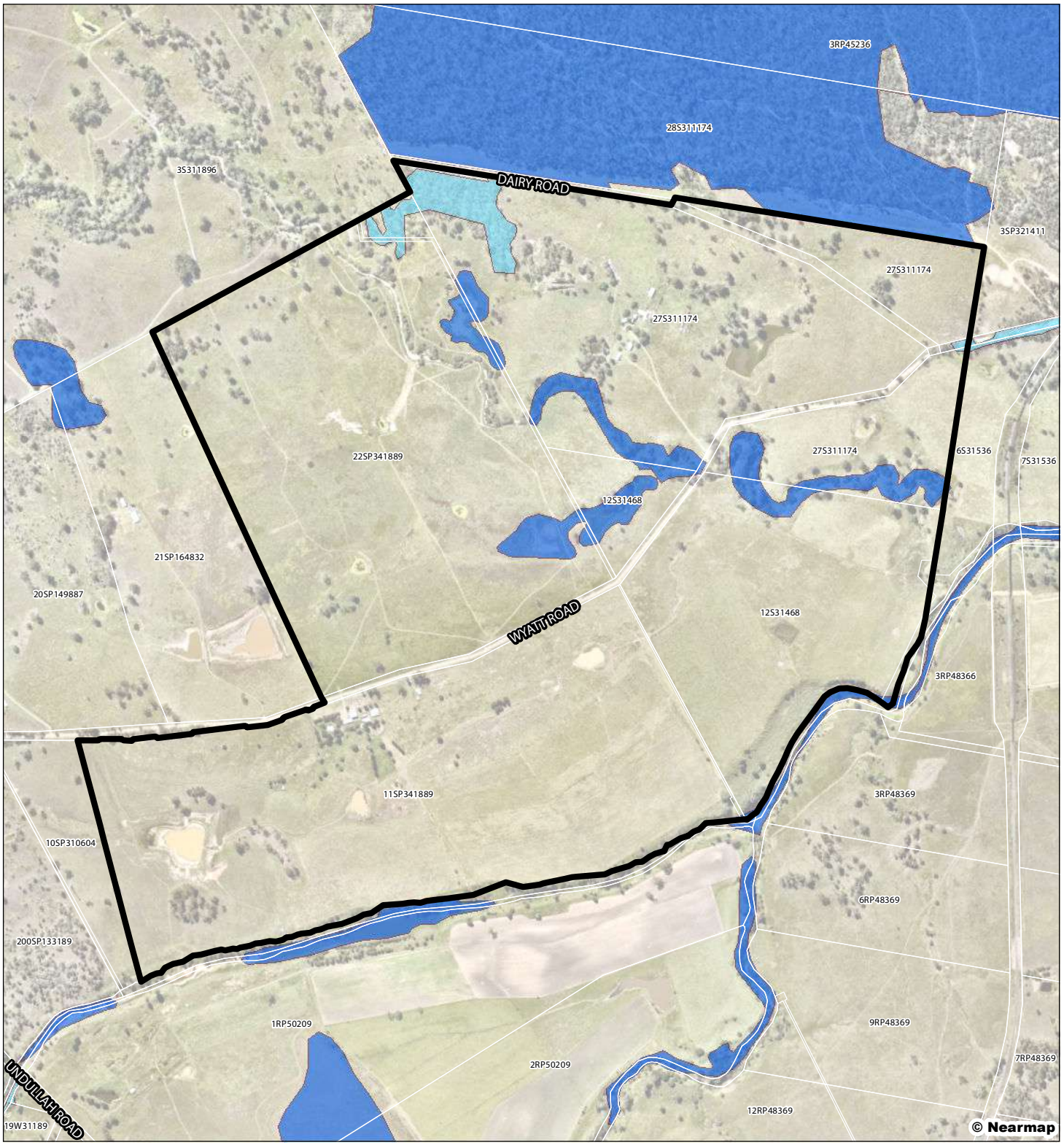
A property search of the regulated vegetation management map identified the site as containing Category X vegetation (non-remnant), Category C (high-value regrowth) and Category B (remnant) vegetation (**Figure 3**). At the northern extent of Lot 22 and Lot 27, a small area of vegetation is mapped as Category C (high value regrowth) described as composite RE12.3.3 / RE12.3.7 containing the 'endangered' RE12.3.3 which is '*Eucalyptus tereticornis* woodland on Quaternary alluvium'. In addition, there is a polygon of mapped Category C 'of concern' composite RE12.9-10.2 / 12.9-10.7 / 12.9-10.3 / 12.9-10.17 at the northern extent of Lot 27 (refer **Table 8** for details of mapped Regional Ecosystems). Further Category C RE12.3.3 and composite RE12.9-10.2 / 12.9-10.7 / 12.9-10.3 / 12.9-10.17 are mapped at the eastern extent of the site along the current alignment of Wyatt Road. The mapped Category B vegetation contains 'of concern' RE12.3.8 and 'least concern' 12.3.7 associated with the waterway through the centre of the site within Lots 22, 12 and 27.

The supporting vegetation management map shows a stream order 3 watercourse traversing through the centre of the site and intersecting the mapped Category B 'least concern' RE12.3.7 polygons and adjoining the 'of concern' RE12.3.8 polygons. Across the site, several drainage features are mapped as stream orders 1 and 2 (**Figure 4**)**.** Whilst the provisions of the VMA do not apply within a PDA, the mapping provides guidance with respect to areas of potential significance.

**Table 8: Regional Ecosystem Descriptions**

| Regional Ecosystem | VMA Status | Description |
|---|---|---|
| 12.3.3 | Endangered | *Eucalyptus tereticornis* woodland on Quaternary alluvium. *Eucalyptus tereticornis* woodland. *Eucalyptus crebra* and *E. moluccana* are sometimes present and may be relatively abundant in places, especially on edges of plains and higher-level alluvium. Other species that may be present as scattered individuals or clumps include *Angophora subvelutina* or *A. floribunda*, *Corymbia clarksoniana*, *C. intermedia*, *C. tessellaris*, *Lophostemon suaveolens* and *E. melanophloia*. Occurs on Quaternary alluvial plains, terraces and fans where rainfall is usually less than 1000mm/y. Not a Wetland. (BVG1M: 16c). |
| 12.9-10.3 | Of Concern | *Eucalyptus moluccana* open forest. Other canopy species include *Eucalyptus siderophloia* or *E. crebra*, *E. tereticornis* and *Corymbia citriodora subsp. variegata*. Understorey generally sparse but can become shrubby in absence of fire. Occurs on Cainozoic and Mesozoic sediments, especially shales. Prefers lower slopes. Not a Wetland. (BVG1M: 13d). |
| 12.9-10.7 | Of Concern | *Eucalyptus crebra* +/- *E. tereticornis*, *Corymbia tessellaris*, *Angophora leiocarpa*, *E. melanophloia* woodland. Occurs on Cainozoic and Mesozoic sediments. Not a Wetland. (BVG1M: 13c). |
| 12.3.8 | Of Concern | Swamps with characteristic species including *Cyperus spp.*, *Schoenoplectus spp.*, *Philydrum lanuginosum*, *Eleocharis spp.*, *Leersia hexandra*, *Cycnogeton procerus*, *Nymphaea spp.*, *Nymphoides indica*, *Persicaria spp.*, *Phragmites australis*, *Typha spp.* and a wide range of sedges grasses or forbs. Emergent *Melaleuca spp.* may sometimes occur. Occurs in freshwater swamps associated with floodplains. Palustrine. (BVG1M: 34c). |
| 12.3.7 | Least Concern | Narrow fringing woodland of *Eucalyptus tereticornis*, *Casuarina cunninghamiana subsp. cunninghamiana* +/- *Melaleuca viminalis*. Other species associated with this RE include *Melaleuca bracteata*, *M. trichostachya*, *M. linariifolia*. North of Brisbane *Waterhousea floribunda* commonly occurs and may at times dominate this RE. *Melaleuca fluviatilis* occurs in this RE in the north of the bioregion. *Lomandra hystrix* often present in stream beds. Occurs on fringing levees and banks of rivers and drainage lines of alluvial plains throughout the region. Riverine. (BVG1M: 16a). |
| 12.9-10.17 | Least Concern | Open forest to woodland complex generally with a variety of stringybarks, grey gums, ironbarks and in some areas spotted gum. Canopy trees include *Eucalyptus siderophloia*, *E. propinqua* or *E. major*, *E. acmenoides* or *E. portuensis*, *E. carnea* and/or *E. microcorys* and/or *Corymbia citriodora subsp. variegata*. Other species that may be present locally include *Corymbia intermedia*, *C. trachyphloia*, *Eucalyptus tereticornis*, *E. biturbinata*, *E. moluccana*, *E. longirostrata*, *E. fibrosa subsp. fibrosa* and *Angophora leiocarpa*. *Lophostemon confertus* or Whipstick *Lophostemon confertus* often present in gullies and as a sub-canopy or understorey tree. Mixed understorey of grasses, shrubs and ferns. Hills and ranges of Cainozoic and Mesozoic sediments. Not a Wetland. (BVG1M: 9a). |
| 12.9-10.2 | Least Concern | *Corymbia citriodora subsp. variegata* open forest or woodland usually with *Eucalyptus crebra*. Other species such as *Eucalyptus tereticornis*, *E. moluccana*, *E. acmenoides* and *E. siderophloia* may be present in scattered patches or in low densities. Understorey can be |

| Regional Ecosystem | VMA Status | Description |
|---|---|---|
| | | grassy or shrubby. Shrubby understorey of *Lophostemon confertus* (whipstick form) often present in northern parts of bioregion. Occurs on Cainozoic and Mesozoic sediments. Not a Wetland. (BVG1M: 10b). |




## Legend

- Site Boundary
- Qld DCDB

**Regulated Vegetation**

- Category B area - *Remnant vegetation*
- Category C area - *High value regrowth vegetation*
- Category X area - *Vegetation not regulated under the VMA*

# Figure 3

Regulated Vegetation Management Map

WelCo Group Pty Ltd

***File ref.*** 11560 E Figure 3 SBAR RVM A
***Date*** 6/08/2024
***Project*** Wyatt Road, Kagaru

0 100 200 300 400 500 m

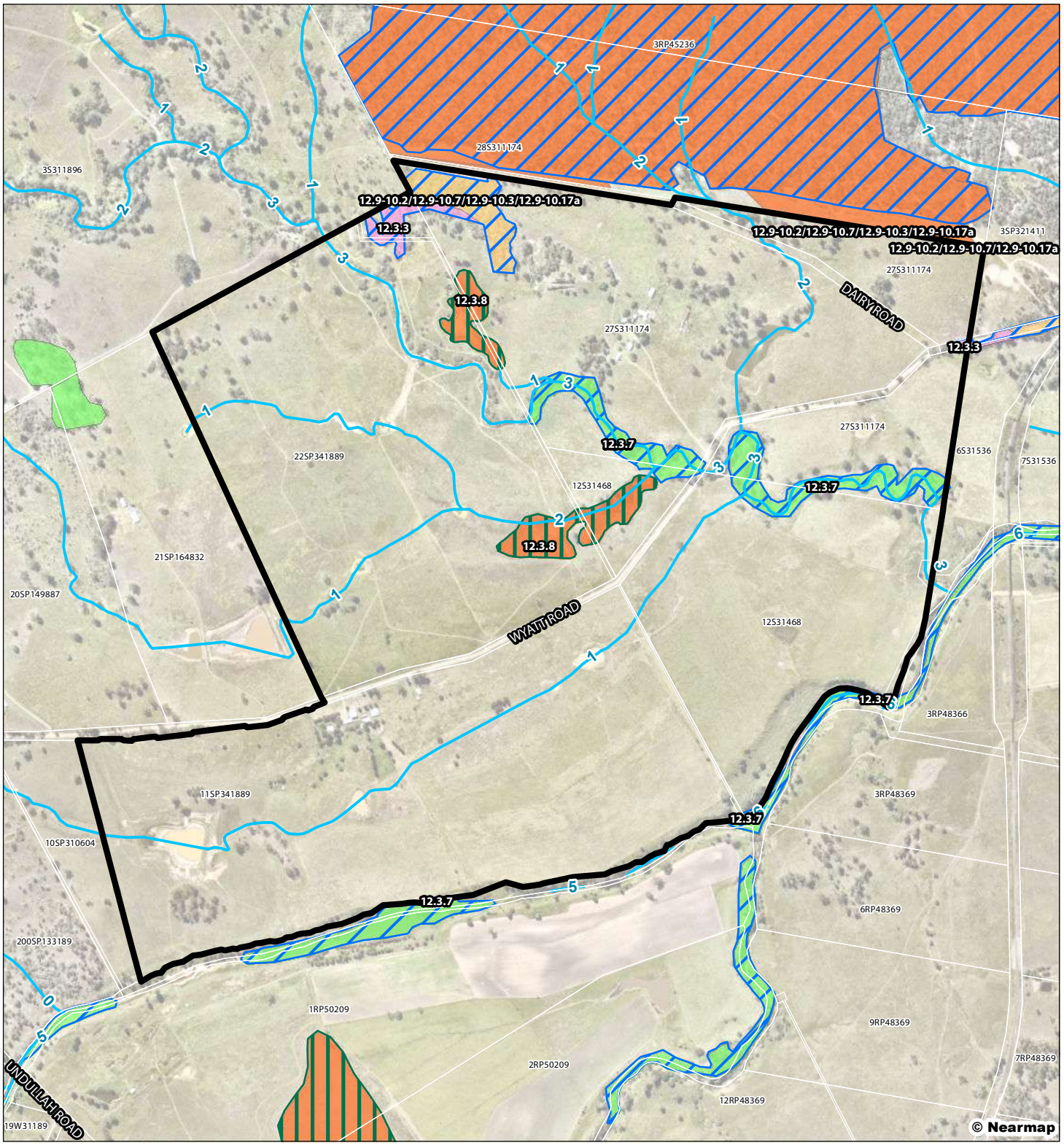
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*Scale (A4): 1:14,000 [GDA 2020 MGA Z56]*

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## Legend

- Site Boundary
- Qld DCDB
- VM Watercourses
- VM Essential Habitat
- VM Wetland

**Vegetation Management Regional Ecosystems Map**

- Category A or B area containing endangered regional ecosystems
- Category A or B area containing of concern regional ecosystems
- Category A or B area that is a least concern regional ecosystem
- Category C area containing endangered regional ecosystems
- Category C area containing of concern regional ecosystems
- Category C area that is a least concern regional ecosystem

# Figure 4

Vegetation Management Regional Ecosystem Map

WelCo Group Pty Ltd

***File ref.*** 11560 E Figure 4 SBAR VMRE A
***Date*** 6/08/2024
***Project*** Wyatt Road, Kagaru

0 100 200 300 400 500 m

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## 3.5. *Nature Conservation and Other Legislation (Koala Protection) Amendment Regulation 2020*

The *Nature Conservation and Other Legislation (Koala Protection) Amendment Regulation* commenced on 7 February 2020 and amends the *Environmental Offsets Regulation 2014, Planning Regulation 2017, Nature Conservation (Koala) Plan 2017* and *Vegetation Management Regulation 2012* to provide increased protection to koala habitat areas in South East Queensland. The new planning framework introduces strict clearing restrictions, prohibiting the clearing of koala habitat and Koala Priority Areas. The State Government will assume responsibility for assessing development proposing clearing of koala habitat areas outside Koala Priority Areas, against a new State code for Development in South East Queensland Koala Habitat Areas.

Schedule 10 Part 10 Division 1 of the Regulation outlines what is and is not prohibited development within Koala Priority Area and Koala Habitat Area. Schedule 11 of the Regulation sets the benchmarks for assessment in Koala Priority Area. The *Nature Conservation and Other Legislation (Koala Protection) Amendment Regulation 2020* stipulates that PDA related development is 'exempt development'. The site is mapped with KHA (core), outside a Koala Priority Area (refer **Figure 5**).

## 3.6. *Biosecurity Act 2014*

The Biosecurity Act 2014, which commenced on 1 July 2016, establishes a framework to regulate and control invasive plants and animals. Under the act, land owners are responsible for taking all reasonable and practical steps to minimise the risks associated with invasive plants and animals under their control. This is known as the general biosecurity obligation (GBO).

The act categorises restricted matter (restricted plants and animals) into the following:

- Category 1: must be reported to an inspector within 24 hours (includes Red Imported Fire Ants, amongst others)
- Category 2: must be reported within 24 hours Biosecurity Queensland on 13 25 23.
- Category 3: must not be distributed either by sale or gift, or released into the environment.
- Category 4: must not be moved.
- Category 5: must not be kept.
- Category 6: must not be fed (animals).
- Category 7: Must be euthanised (animals).

Restricted matters observed in the site area discussed in Section 4.

## 3.7. *Fisheries Act 1994*

The Fisheries Act 1994 deals with the use, conservation and improvement of Queensland's fisheries resources and fish habitats. The legislation deals with the impact from coastal development on marine fish habitat, including protected marine plants and declared fish habitat areas. Development proposals that modify, or

have a temporary or permanent loss of fish habitat are assessed by the Department of Agriculture and Fisheries (DAF).

Under SARA's Development Assessment Mapping System (DAMS), the site is mapped with a *high risk* (red) waterway for waterway barrier works (WWBW) as the main watercourse on site, along with *moderate risk* (orange) and *low risk* (green) WWBW associated with the drainage features and tributaries through the western and southern extents (refer **Figure 6**). Teviot Brook / Woollaman Creek bordering the south of the site is mapped as a *major risk* (purple) WWBW. Should any works be undertaken within the mapped waterways that do not meet Accepted Development Requirements, a response to *State Code 18: Waterway Barrier Works* and referral may be required.

## 3.8. Other Queensland Environmental Legislation

Other Queensland environmental legislation has been reviewed in the context of the proposed development. **Table 9** lists other relevant Queensland legislation that is not triggered by the proposed development, the purpose of the legislation, and its relevance to the proposed development site.

**Table 9: Site Relevant to Other Queensland Environmental Legislation**

| Legislation | Purpose | Relevance to Development Site |
|---|---|---|
| ***Coastal Protection and Management Act 1995*** | The act seeks to protect the coastal resources of the coastal zone. | The site does not contain any coastal areas. Therefore, a response to State Code 8 is not required. |
| ***Water Act 2000*** | The act provides a framework for sustainable management of Queensland's water resources and quarry material. Under the Water Act a riverine protection permit is required to be obtained if works within a waterway result in filling or excavation unless these works meet an exemption. | The site contains a waterway mapped under the *Water Act 2000* being Teviot Brook / Woollaman Creek on the southern boundary. The proposed development will not interfere with Teviot Brook / Woollaman Creek (refer **Figure 7**). |
| **State Planning Policy 2017 (SPP)** | Provides interim development assessment requirements which ensures that state interests are considered by local government when assessing development applications where the local government planning scheme does not yet integrate the State interests in the SPP. Matters of State Environment Significance (MSES) include Biodiversity, Coastal Environment, and Water Quality. | The site is mapped as containing MSES – wildlife habitat (special least concern), MSES wildlife habitat (koala habitat area – core), MSES – Regulated Vegetation (Category B, Category C, intersecting a watercourse and essential habitat, wetland) and MSES – High ecological significance wetlands. This mapping does not trigger any specific requirements for development due to the location of the site within the Greater Flagstone PDA. |

Refer to environmental searches in **Appendix C** for the location of the development site in regards to the above mapping layers.

## 3.9. Australian Soil Resource Information System

The Australian Soil Resource Information System (ASRIS) collates and maintains the best available, nationally consistent soil and land resource information for Australia. It provides a scientific information for assessing and monitoring the condition of Australia's soil and land resources and contains a set of spatial and temporal databases that maintain national soil and land information in a consistent and usable format. The Atlas of Australia soils maps the site as containing Kurosols, Dermosols and Chromosols (refer **Figure 8**). A description of these soil types is presented in **Table 10**.

**Table 10: Soil Description**

| Soil type | Soil description |
|---|---|
| Kurosol | Kurosols are soils that have strong texture contrast between the surface (A) horizons and the clay subsoil (B) horizons. The subsoil is strongly acid, i.e. pH is 5.4 or less in water, and non-sodic (at least in the upper horizons). |
| Dermosol | Dermosols are red, brown, yellow, grey or black and have loam to clay textures. This type of soil covers higher-rainfall coastal and sub-coastal regions. |
| Chromosol | Chromosols are texture contrast soils with a sandy or loamy surface horizon overlying a clay-textured B horizon. The subsoil (B) horizon is not strongly acid (pH greater than 5.5) and it is not sodic in the upper 20 cm. The structure of the subsoil may range from massive to strongly structured. |

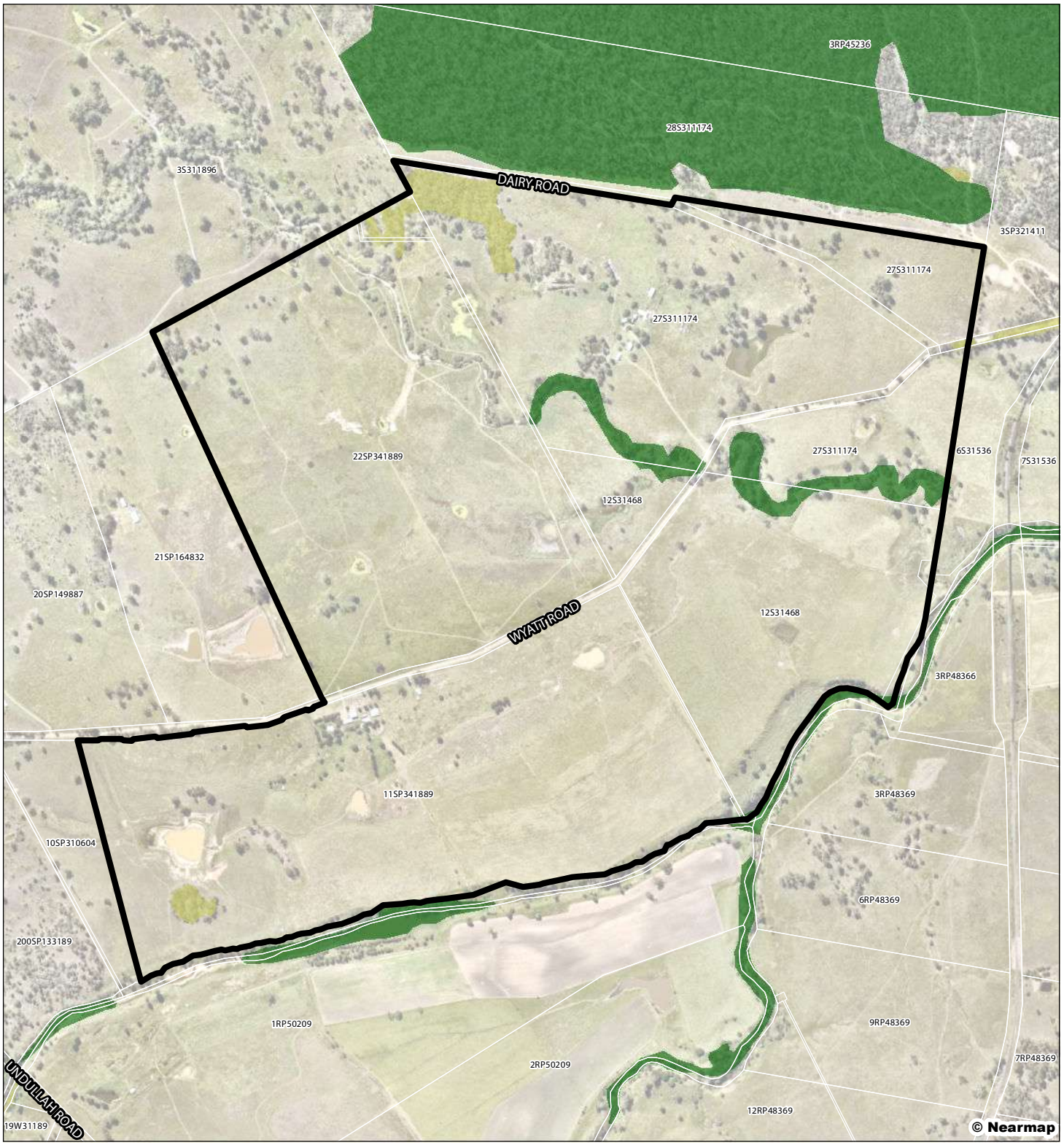
## 3.10. Town Planning Instruments

The development proposal occurs within the Greater Flagstone PDA, declared under the *Urban Land Development Authority Act 2007*, now replaced by the *Economic Development Act 2012* (ED Act). This legislation supersedes the requirements of Local Government planning provisions (in this case, the Logan Planning Scheme) and selective other state legislation (e.g. PA, VMA, and others).

On 8 October 2011, the Greater Flagstone PDA Development Scheme (Development Scheme) was approved by the State Government. The Development Scheme is the primary planning instrument which regulates development within the Greater Flagstone PDA. The Development Scheme zones the investigation area as Urban Living (refer **Figure 9**). The Development Scheme also maps the Investigation Area as Greenspace (refer **Figure 10**).

The proposed development provides Greenspace across the allotment, almost equal to the Development Scheme zoning of 240.3 ha (providing 215.10 ha of biodiversity / conservation corridor) and provides connectivity to the west and north of the subject site. A comparison of the Development Scheme greenspace and the context green space is expanded on in **Section 5**. Development applications referred to Economic Development Queensland (EDQ) for assessment against the Development Scheme will be assessed against the EDQ's Implementation Guidelines. Specifically, *Guideline 14 – Environment and Natural Resource*

*Sustainability* and *Guideline 17 – Remnant vegetation and koala habitat obligations in Greater Flagstone and Yarrabilla PDAs*.




## Legend

- Site Boundary
- Qld DCDB

**Koala Habitat Areas**

- Core Remnant Koala Habitat Areas
- Core Regrowth Koala Habitat Areas

# Figure 5

Koala Priority Areas and Koala Habitat Areas

WelCo Group Pty Ltd

***File ref.*** 11560 E Figure 5 SBAR Koala 2019 A
***Date*** 6/08/2024
***Project*** Wyatt Road, Kagaru

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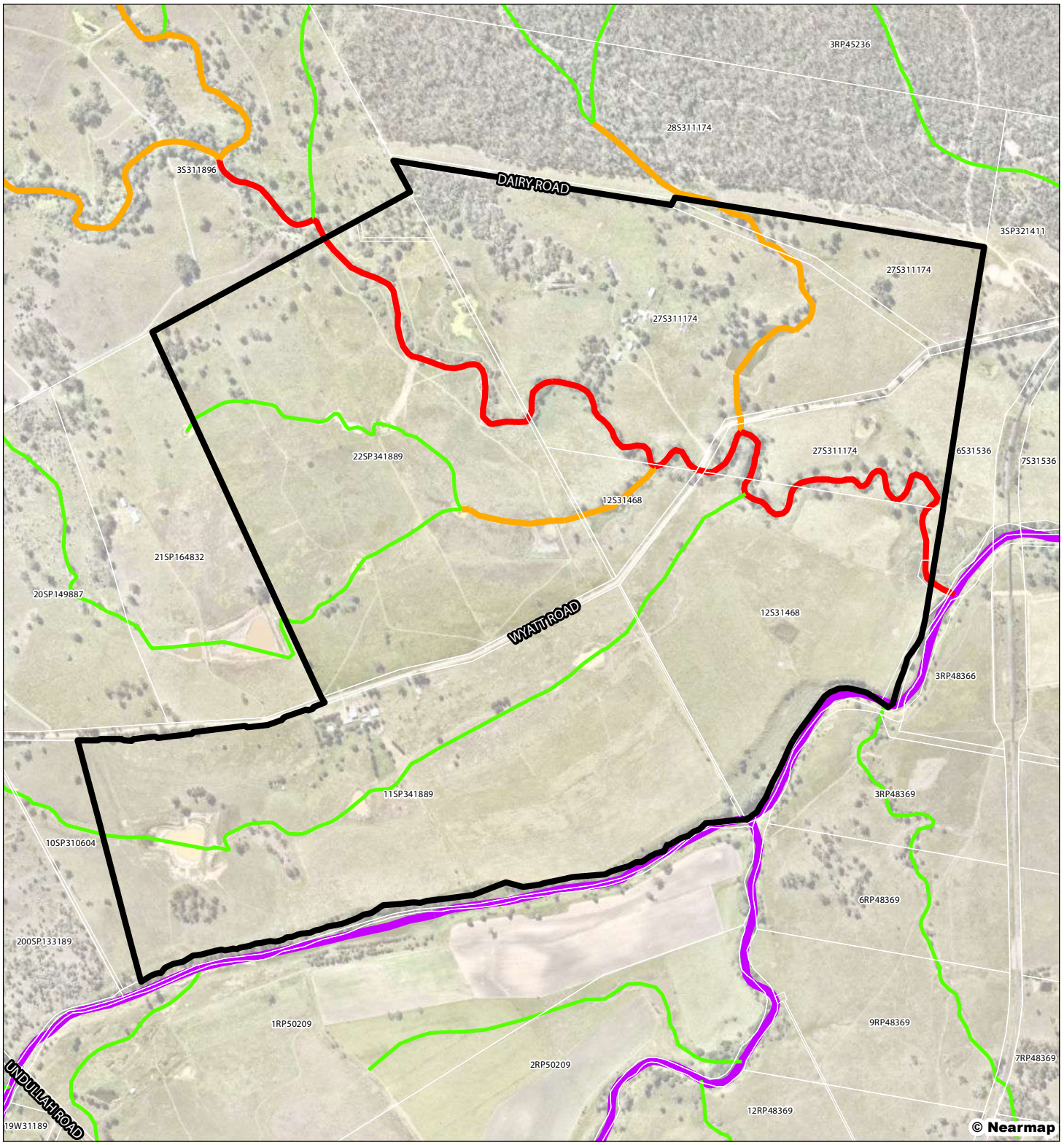
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## Legend

- Site Boundary
- Qld DCDB

**Waterways**

*Risk of Impact*

- 1 - Low
- 2 - Moderate
- 3 - High
- 4 - Major

# Figure 6

Fisheries - Waterways for Waterway Barrier Works

WelCo Group Pty Ltd

***File ref.*** 11560 E Figure 6 SBAR Fisheries A
***Date*** 6/08/2024
***Project*** Wyatt Road, Kagaru

0 100 200 300 400 500 m

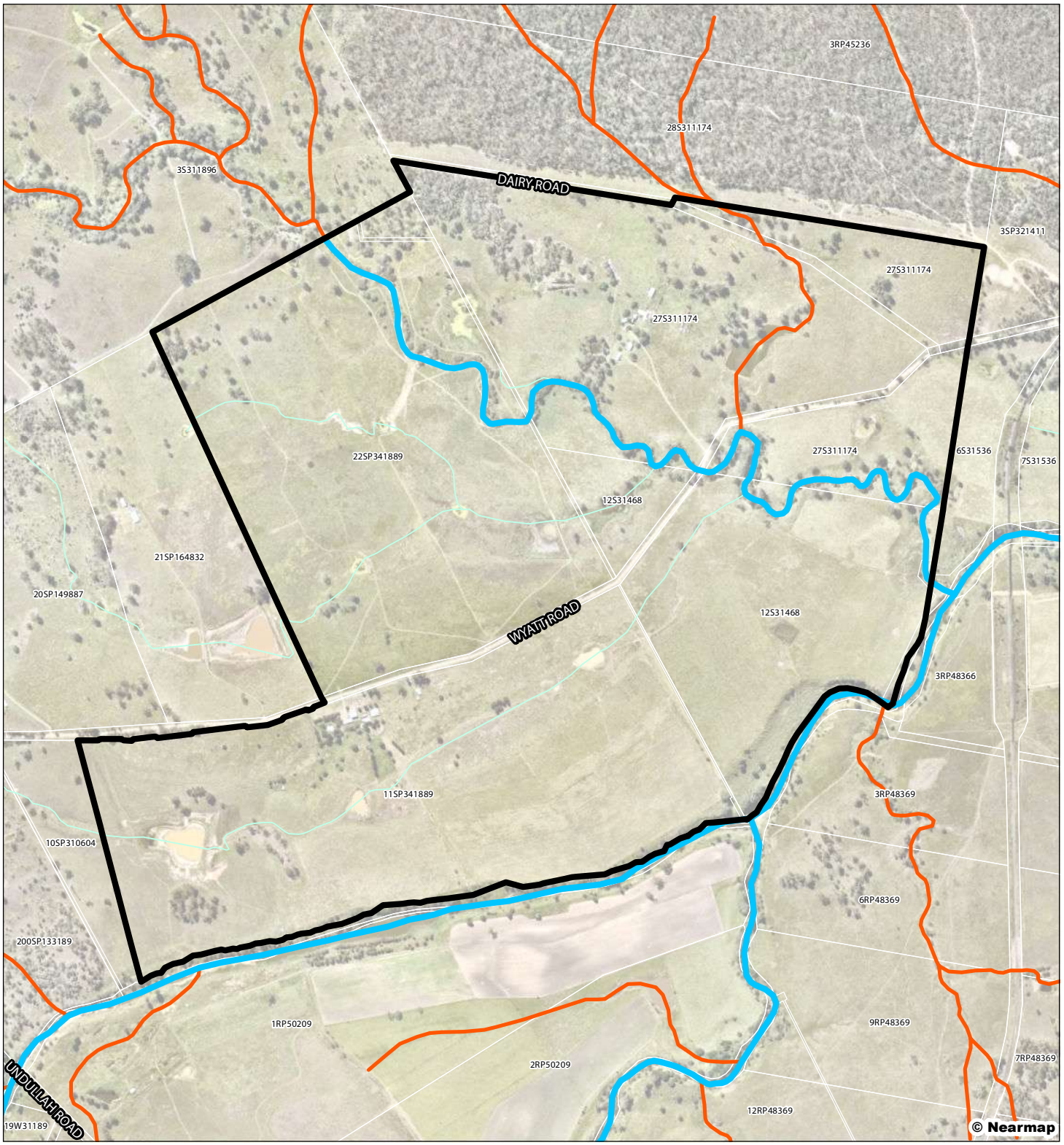
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## Legend

- Site Boundary
- Qld DCDB
- Drainage Feature [defined by Water Act 2000]
- Watercourse [defined by Water Act 2000]
- No determination

# Figure 7

Water Act Waterways

WelCo Group Pty Ltd

***File ref.*** 11560 E Figure 7 SBAR Water Act Waterways A
***Date*** 6/08/2024
***Project*** Wyatt Road, Kagaru

0 140 280 420 560 m

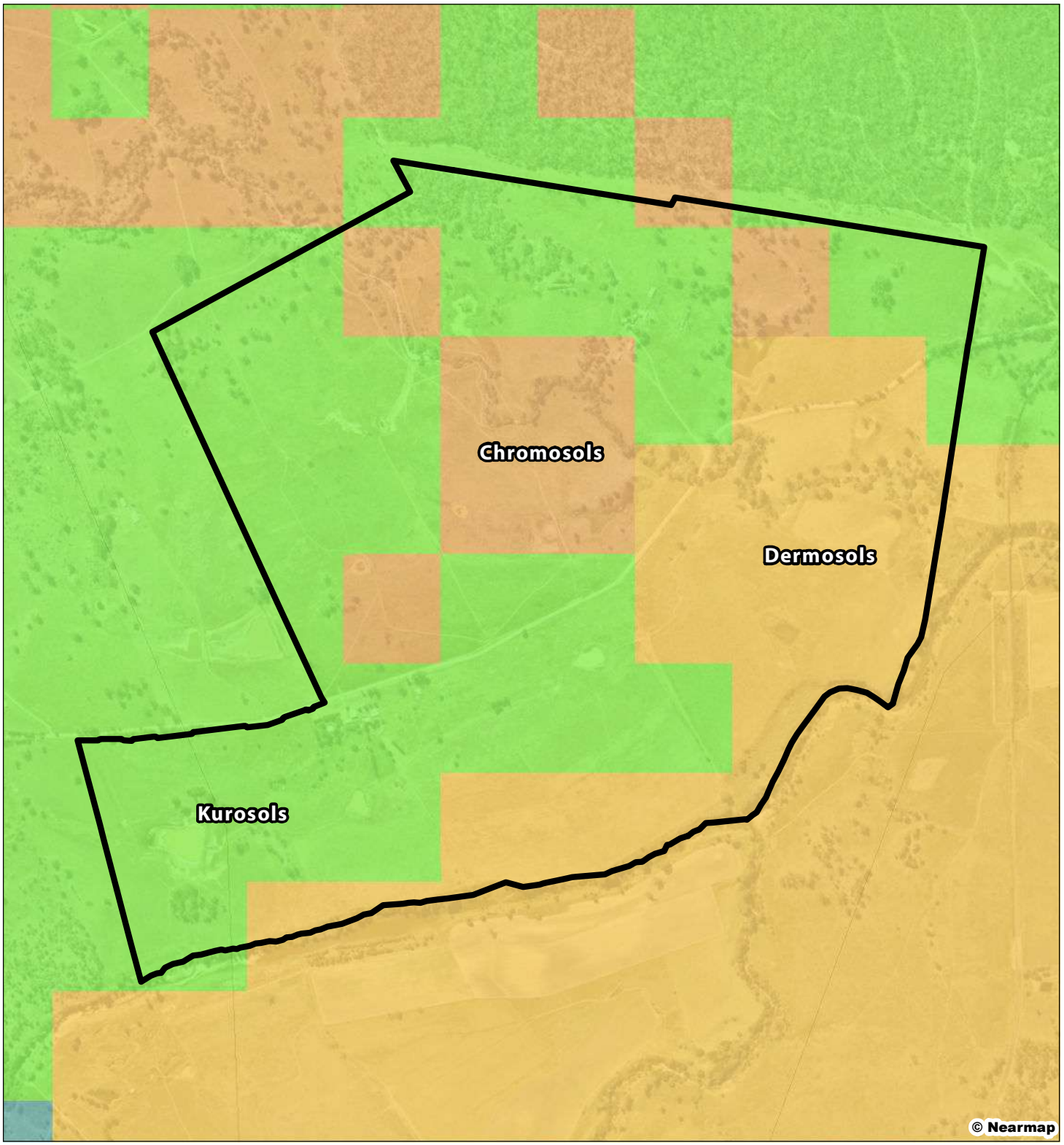
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**Legend**

Site Boundary

**Australian Soil Classification**

- Chromosols
- Dermosols
- Kurosols
- Sodosols

# Figure 8

ASIRIS Soil Classification (Level 5)

WelCo Group Pty Ltd

***File ref.*** 11560 E Figure 8 SBAR ASRIS Soils A
***Date*** 6/08/2024
***Project*** Wyatt Road, Kagaru

0 100 200 300 400 500 m

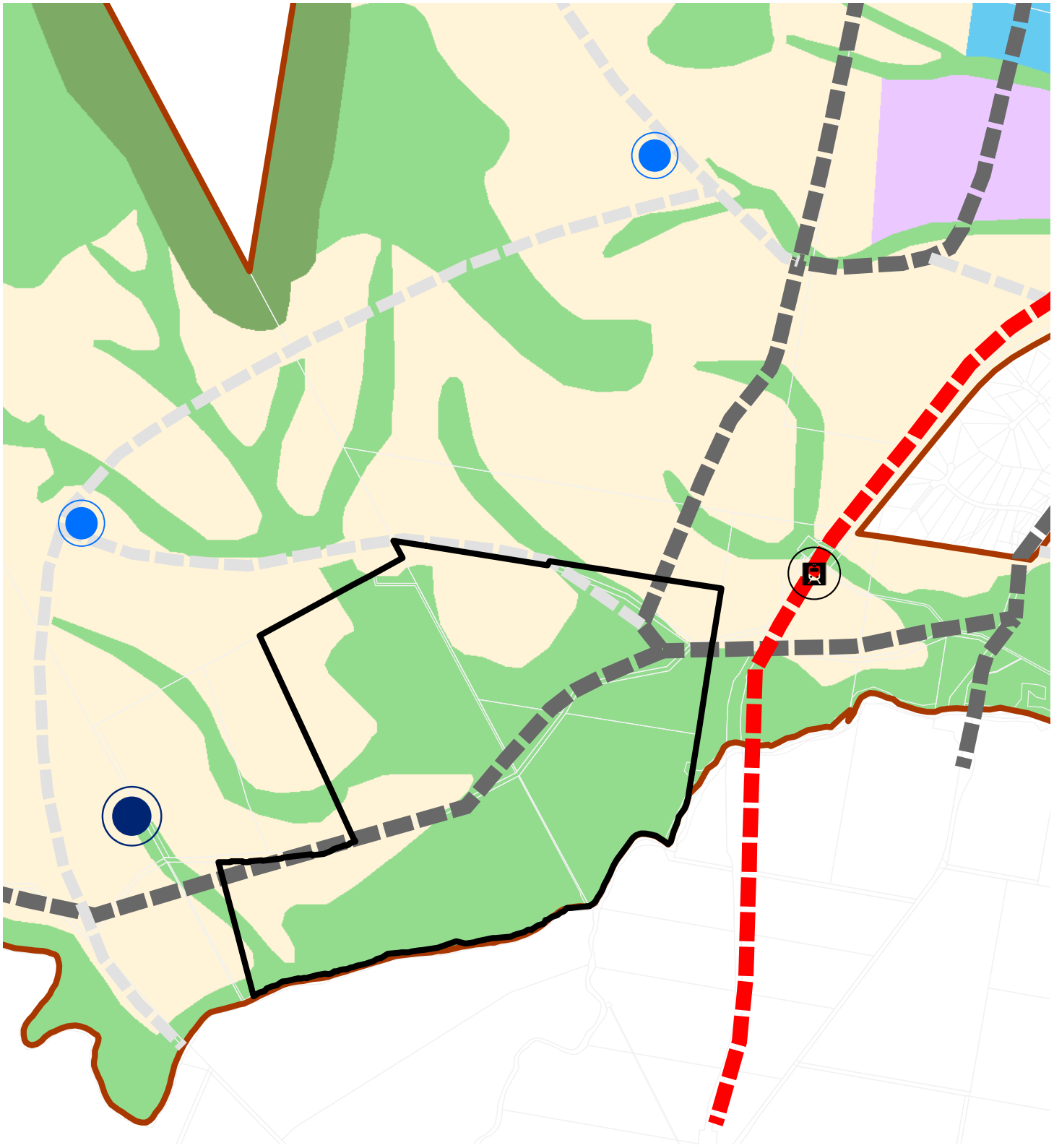
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**Legend**

- Site Boundary
- Qld DCDB
- Greater Flagstone Boundary

**Land Use Zones**

- Conservation
- Greenspace
- Industry & Business
- Major Centre
- Urban Living
- Utilities

**Centres**

- District Centre
- Neighbourhood Centre
- Potential Rail Station

**Roads and Rail**

- Primary Road
- Rail
- Regional Road

# Figure 9

Greater Flagstone PDA - Zoning

WelCo Group Pty Ltd

***File ref.*** 11560 E Figure 9 SBAR EDQ GF PDA Zoning A
***Date*** 6/08/2024
***Project*** Wyatt Road, Kagaru

0 200 400 600 800 1,000 m

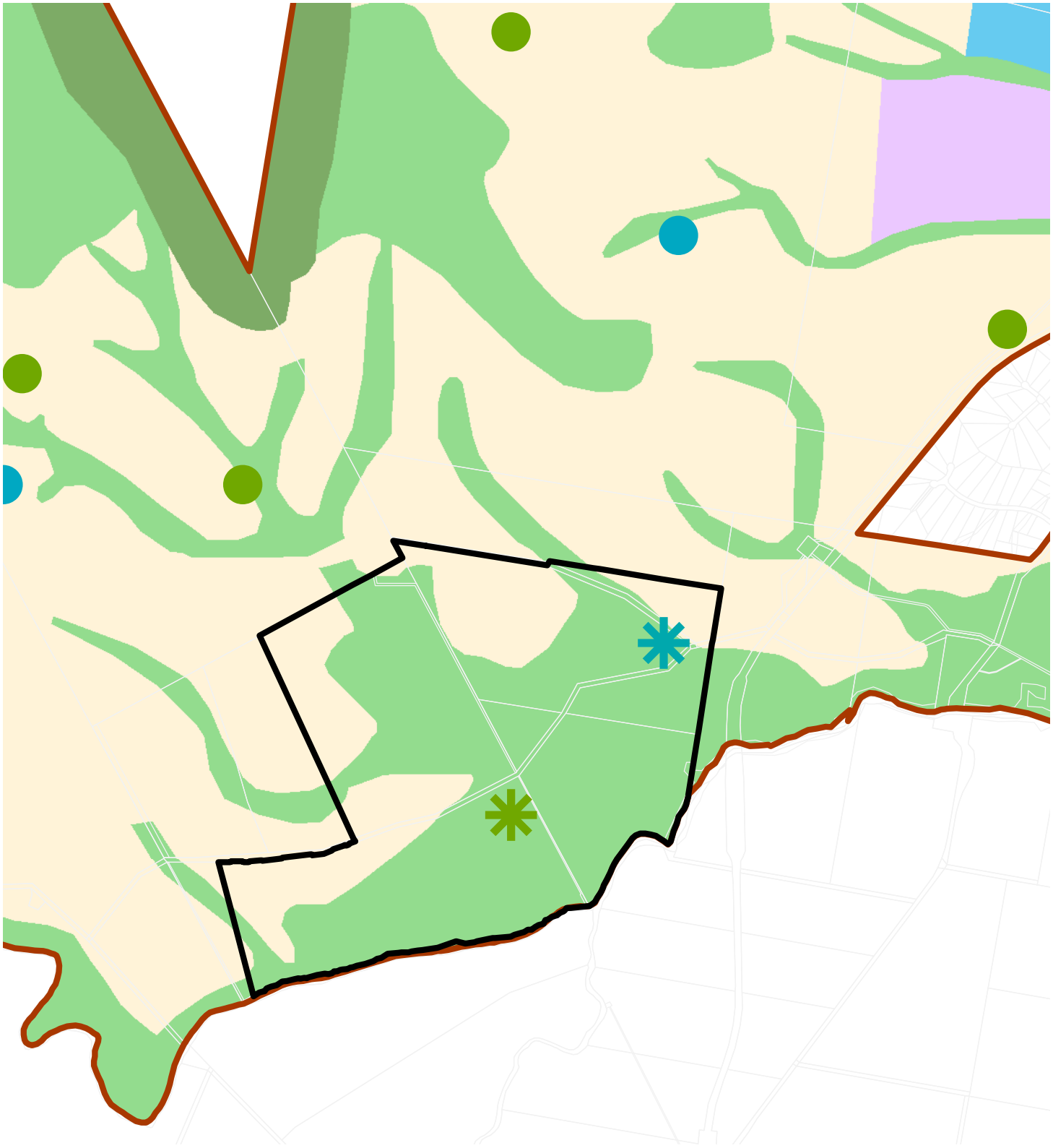
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**Legend**

- Site Boundary
- Qld DCDB
- Greater Flagstone Boundary

**Land Use Zones**

- Conservation
- Greenspace
- Industry & Business
- Major Centre
- Urban Living
- Utilities

- Regional sports park
- District sports park
- Regional recreation park
- District recreation park

# Figure 10

Greater Flagstone PDA - Green Space

WelCo Group Pty Ltd

***File ref.*** 11560 E Figure 10 SBAR EDQ GF PDA GS A
***Date*** 6/08/2024
***Project*** Wyatt Road, Kagaru

0 200 400 600 800 1,000 m

*Scale (A4): 1:25,000 [GDA 2020 MGA Z56]*

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# 4. Ecological Survey Results

## 4.1. General Site Observations

The site has been assessed by Ecologists from the **Saunders Havill Group** as part of a detailed ecological assessment in May 2023 and July 2023. This assessment was conducted on multiple days and involved recording ecological values within the application area in accordance with Commonwealth and State ecological survey guidelines to understand environmental constraints to development (refer **Plan 3** for Field Survey Effort). **Table 11** summarises the field surveys that were conducted for the site.

**Table 11: Field Survey Methods Summary**

| Date | Weather Conditions | Methods |
|---|---|---|
| **8 May 2023** | 3.5°C min – 22.9°C max, 0 mm rainfall | Deploy motion cameras; Vegetation Survey; Incidental Fauna Survey; MHQT and targeted fauna surveys (koala). |
| **9 May 2023** | 0.7°C min – 23.1°C max, 0 mm rainfall | Vegetation Survey; Incidental Fauna Survey; MHQT and targeted fauna surveys (koala). |
| **10 May 2023** | X°C min – 24.5°C max, 0 mm rainfall | Vegetation Survey; Incidental Fauna Survey, targeted fauna surveys (koala) and Nocturnal Spotlighting survey. |
| **22 May 2023** | X°C min – 22.7°C max, 0 mm rainfall | Pick up motion cameras; Vegetation Survey; Incidental Fauna Survey and targeted fauna surveys (koala). |
| **23 May 2023** | X°C min – 24.7°C max, 0 mm rainfall | Pick up motion cameras. Nocturnal Spotlighting survey. |
| **4 July 2023** | 12.8°C min – 17.6°C max, 6 mm rainfall | Deploy motion cameras; Vegetation Survey and Incidental Survey. |
| **17 July 2023** | 5°C min – 21.3°C max, 0 mm rainfall | Vegetation Survey; Incidental Fauna Survey, targeted fauna surveys (koala); MHQT and Nocturnal Spotlighting Survey. |
| **31 July 2023** | 8.3°C min – 27.5°C max, 0 mm rainfall | Pick up motion cameras, Waterway Assessment and Vegetation Survey. |

Source: Bureau of Meteorology (BoM) Station 040983 Beaudesert Drumley Street for temperature and Station 040934 Romani Alert for rainfall.

The investigation area covers Lot 11 on SP341889, Lot 12 on S31468, Lot 22 on SP341889 and Lot 27 on S311174. The subject site area totals 301.93 ha, of which the majority has been exposed to historical clearing and is currently being used for horse and cattle agistment. VMA mapping reflects historical imagery with the remnant vegetation on site being two small polygons through the centre, two polygons at the north-western extent and vegetation associated with the tributary of Woollaman Creek. Across the site the ground layer is dominated by exotic grass species including *Sporobolus pyramidalis* (Giant Rat's Tail Grass) and *Chloris gayana* (Rhodes Grass).

Vegetation surrounding the house on Lot 11 consists of planted *Grevillea robusta* (Silky Oak) and *Jacaranda mimosifolia* (Jacaranda), among other species. A patch of *Eucalyptus moluccana* (Gum-topped Box) is present

south of the large dam. The balance of the site comprises cleared paddock with scattered *Eucalyptus tereticornis* (Forest Red Gum) trees. Similarly, Lot 22 contains primarily cleared paddocks which are dominated by *Sporobolus pyramidalis* (Giant Rat's Tail Grass) with some scattered mature Eucalypt trees. Patches of vegetation exist in the north-eastern and north-western corner of this lot. The southern extent of Lot 12 comprises entirely of a cleared paddock, with the northern extent characterised by moderately disturbed wetland area. Lot 27 contains a patch of Eucalypt dominated regrowth vegetation in the north, with scattered mature Eucalypt trees throughout cleared paddocks across much of the remaining area in the balance of the site.

Category C (high-value regrowth) 'endangered' RE12.3.3/12.3.7 is mapped in the northern extent of Lot 22 and is associated with *Eucalyptus tereticornis*, *Eucalyptus crebra* (Narrow-leaved Ironbark) and *Eucalyptus moluccana*. This area was ground-truthed and indicator species of the mapped RE were recorded. Significant disturbance is present at the ground layer, however, which is dominated by *Sporobolus pyramidalis* (Giant Rat's Tail Grass). This area is representative of regrowth vegetation with scattered mature canopy trees. Category B (remnant vegetation) 'of concern' RE12.3.8 is mapped associated with the two wetland areas onsite and is also considered to be accurate in terms of the indicator species. Patches of Category B 'least concern' vegetation described as RE12.3.7 are associated with the waterway areas onsite and contain species indicative of this mapped ecosystem.

The project area contains one (1) main watercourse through the centre of the site which is a tributary of Teviot Brook mapped as a stream order 3. This waterway is lined with *Melaleuca viminalis* (Weeping Bottlebrush) and some *Eucalyptus tereticornis* trees and was confirmed to have defined bed and bank features throughout. Several additional drainage features as tributaries of the main watercourse are present on site mapped as stream orders 1 and 2. These features are considered to be drainage lines as they lack defined bed and bank features in many areas and consist of significant disturbance and disruption in the flow path due to constructed dams. Teviot Brook (stream order 6) which transitions to Woollaman Creek (stream order 5) borders the site to the south.

As a result of historic clearing on the surrounding allotments, connectivity to the site is limited to Woollaman Creek / Teviot Brook connecting vegetation to the east and west and to a lesser extent the watercourse connecting vegetation to the north and east. Cleared paddocks adjoin the site directly to the north, east and west. The site retains connectivity through narrow corridors of vegetation lining the mapped waterways. The Interstate Railway line is located approximately 150 m to the east of the site, posing a significant barrier to fauna movement. A large cleared area is located 1 km north-east of the site which is earmarked for a significant residential development of Flagstone City (refer **Plan 2** for the surrounding development).

The following general observations were made across the site:

- The EPBC Act Online PMST listed seven (7) Threatened Ecological Communities (TECs) as likely to occur within the area and within five (5) kilometres of the site. No TECs were recorded on or immediately adjacent to the application site.
    - The Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community occurs in coastal catchments, mostly at elevations of less than 20 m above

sea level that are typically found within 30 km of the coast, however, distance can vary by catchment. The canopy layer is dominated by *Casuarina glauca* (Swamp Oak) and in Queensland is represented by RE12.1.1 or RE12.3.20. Neither *Casuarina glauca* (Swamp Oak) nor RE12.1.1 or RE12.3.20 were identified on-site, and therefore the TEC is not present.

- The Coastal Swamp Sclerophyll Forests of South-eastern Australia is a type of forest or scrub associated with freshwater (to brackish) wetlands on low-lying coastal areas. The ecological community typically occurs in low-lying coastal alluvial areas with minimal relief, such as swamps, floodplain pockets, depressions, alluvial flats, back-barrier flats, fans, terraces, and behind fore-dunes. Several regional ecosystem communities coincide with this TEC, including Least Concern RE 12.2.7, Of Concern RE 12.3.4/12.3.4a, Least Concern RE12.3.5, Least Concern RE 12.3.6 and Endangered RE 12.3.20, none of which are located within or adjacent to the application area.
- The Grey Box-grey Gum Wet Forest of Subtropical Eastern Australia ecological community is limited to the NSW north coast and south eastern Queensland IBRA Bioregions, occurring on escarpment slopes and foothills, on inland hills and ranges between 100 m and 600 m altitude, in areas with mean annual rainfall between 1000 and 1260 mm. The Grey box-grey gum wet forest at maturity typically has a tall to very tall open canopy dominated by the characteristic Eucalyptus species, *Eucalyptus moluccana* (grey box) and/ or a grey gum species (*E. propinqua* (small-fruited grow gum), with or without hoop pine (*Araucaria cunninghammii*) and *E. siderophloia* (grey ironbark). It can have a simple to structurally complex understorey which typically includes flora with drier vine-forest (rainforest) affiliations, with vines often prominent. Regional Ecosystems which coincide with this TEC are 12.9-10.3 and 12.8.14a.
    - RE 12.9-10.3 is mapped at the northern extent within the Category C 'of concern' composite RE 12.9-10.2 / 12.9-10.7 / 12.9-10.3 / 12.9-10.17. This area contains a patch of vegetation dominated by *Eucalyptus tereticornis* and *Eucalyptus crebra* (narrow-leaved ironbark) with significant disturbance to the ground layer and weed incursion from *Lantana camara* (Lantana). In addition, a patch of mapped Category X vegetation on Lot 11 is dominated by the indicative species *Eucalyptus moluccana* (Gum-topped Box). Due to historic clearing these areas lack understorey vegetation characteristic of drier rainforest species and therefore are not considered to represent the Grey Box-grey Gum Wet Forest TEC.
- The Lowland Rainforest of Subtropical Australia has typically relatively low abundance of species from the genera *Eucalyptus, Melaleuca* and *Casuarina*. Buttresses are common as is an abundance and diversity of vines. This community is usually associated with Regional Ecosystems 12.3.1, 12.5.13, 12.8.3, 12.8.4, 12.8.13, 12.11.1, 12.11.10, 12.12.1, and 12.12.16, none of which are located within or adjacent to the application site.
- Poplar Box Grassy Woodland on Alluvial Plains ecological community is typically a grassy woodland with a canopy dominated by *Eucalyptus populnea* and understorey mostly of grasses and other herbs. This community is usually associated with RE11.3.2, 11.3.17, 11.4.7, 11.4.12 and 12.3.10, none of which are located within or adjacent to the investigation area.
- The Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions TEC contains canopy trees that characterise the ecological

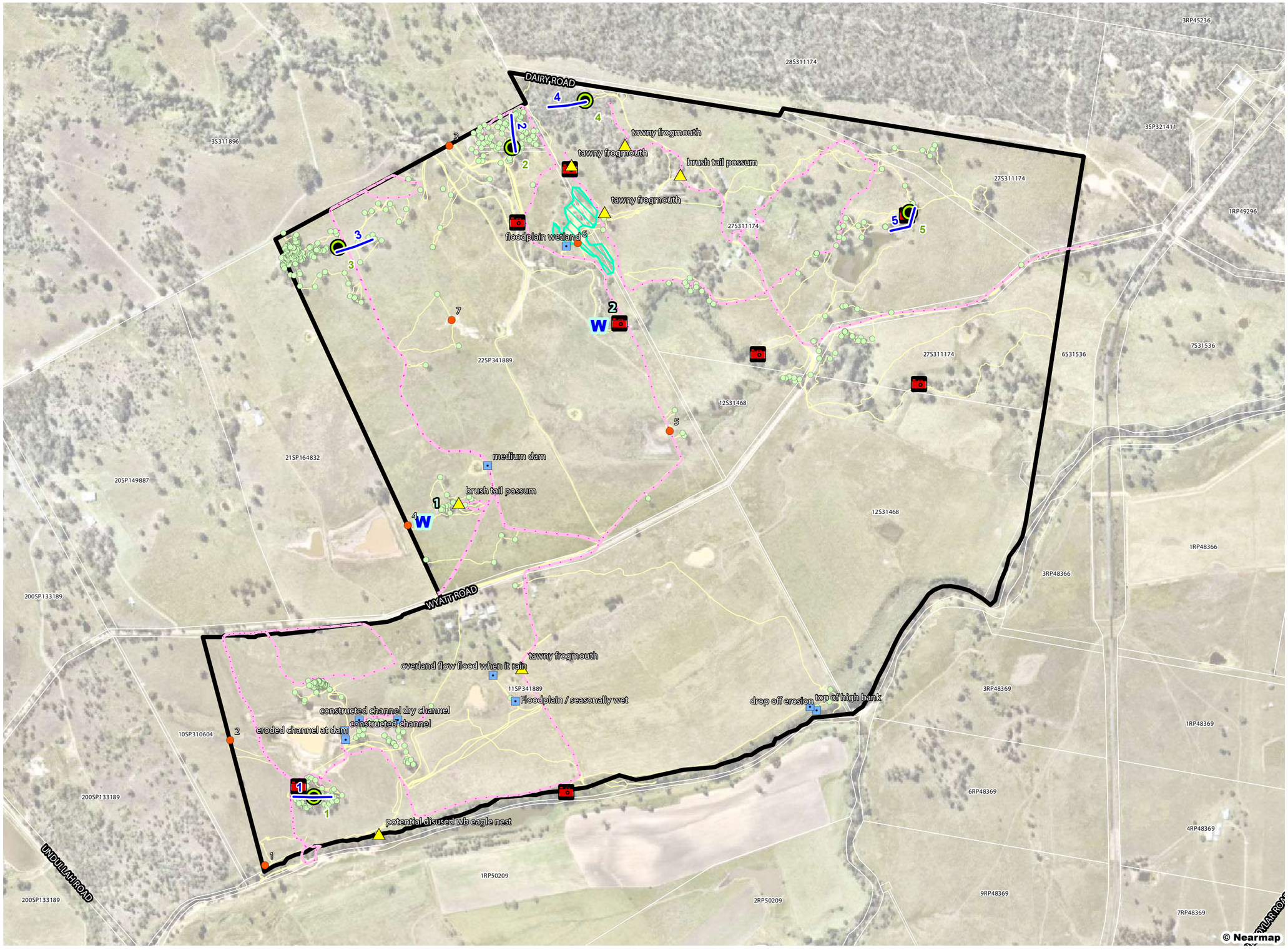
community include Angophora, Corymbia, Eucalyptus, Lophostemon and Syncarpia. In Queensland, this TEC is part of a number of RE communities including RE 12.3.2, 12.3.2a, 12.3.3, 12.3.3a, 12.3.3b, 12.3.3d, 12.3.4a, 12.3.7, 12.3.7c, 12.3.7d, 12.3.10, 12.3.11, 12.3.11a, 12.3.11b, 12.3.12, 12.3.14a, 12.3.15, 12.3.19.

        - The subject site is mapped with Category C 'endangered' vegetation containing RE12.3.3 / 12.3.7 and Category B 'least concern' vegetation described as RE12.3.7 associated with the main waterway onsite. The patch of 'endangered' Category C vegetation contains characteristic canopy species of RE12.3.3 being *Eucalyptus tereticornis*, however due to significant weed coverage in the ground layer, lacks the native species diversity required to be considered a TEC. The vegetation mapped as RE12.3.7 associated with the main waterway lacks indicative canopy dominated by eucalypts and/or other myrtaceous trees such as Angophora, Corymbia, Lophostemon and Syncarpia, however these areas contain sub-canopy species *Melaleuca viminalis* indicative of the TEC. Due to the lack of significant defining features onsite, it is considered this TEC is not present onsite.

    - The White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland TEC is characterised by a species-rich understorey of native tussock grasses, herbs and scattered shrubs and the dominance of White Box, Yellow Box, or Blakely's Red gum trees. This community is usually associated with RE11.8.2a, 11.8.8, 11.9.9a, 13.3.1, 13.11.8 and 13.12.9. It can also be a small component of RE11.3.23, 12.8.16, 13.3.4, 13.11.3 and 13.11.4, none of which are located within or adjacent to the application site.

- The PMST listed fifty-two (52) threatened native flora and fauna species as possibly occurring within five (5) km of the application site. Aside from possible habitat for Koala (*Phascolarctos cinereus*) and foraging habitat for Grey-headed Flying-fox (*Pteropus poliocephalus*), no EPBC listed threatened species were recorded or considered likely to occur due to the absence of suitable habitat (i.e. wetlands, rock outcrops etc.).
- The PMST also listed sixteen (16) migratory species as possible occurrences. No migratory species were recorded by field surveys. No migratory species are considered likely to occur due to the absence of suitable habitat features (i.e. marine wetlands).
- The Wildlife Online Database Search lists four (4) threatened species as possibly occurring within five (5) km of the application site. No evidence of these species was recorded within the subject site and the extreme level of disturbance over a prolong period suggests that it is unlikely that any of these species utilise the site in a significant way.
- The investigation area contains mapped Category B remnant vegetation. On-ground field surveys confirm these areas mapped as RE12.3.8 and RE12.3.7 are accurately mapped although heavily degraded in most cases. Cattle have access to all areas of the property and the waterways show evidence of disturbance from cattle trampling.

# 3. Field Survey Effort




Notes:
This plan was prepared as a desktop assessment tool. The information on this plan is not suitable for any other purpose. Property dimensions, areas, numbers of lots and contours and other physical features shown have been compiled from existing information and may not have been verified by field survey. These may need verification if the development application is approved and development proceeds, and may change when a full survey is undertaken or in order to comply with development approval conditions. No reliance should be placed on the information on this plan for detailed design or for any financial dealings involving the land. Saunders Havill Group therefore disclaims any liability for any loss or damage whatsoever or howsoever incurred, arising from any party using or relying upon this plan for any purpose other than as a document prepared for the sole purpose of accompanying a development applicatoin and which may be subject to alteration beyond the control of the Saunders Havill Group. Unless a development approval states otherwise, this is not an approved plan.

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*Updated data available at*
*http://qldspatial.information.qld.gov.au/catalogue/*

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## Legend

- Qld DCDB
- Site Boundary
- Waterway assessment
- Fauna sighting
- General Observation site
- waterway observation
- Motion detection camera
- Native tree
- Koala SAT
- Modified habitat quality transect
- Spotlighting
- Wetland
- GPS survey tracklog

| Issue | Date | Description | Drawn | Checked |
|---|---|---|---|---|
| B | 11/03/2024 | Preliminary | TC | MD |
| C | 6/08/2024 | Updated Layout | LS | KM |

0 100 200 300 m

Transverse Mercator | GDA 2020 | Zone 56 | 1:10,000 @ A3

saunders havill group

WelCo Group Pty Ltd

*Address / RPD: Lot 11 on SP310604*

Wyatt Road, Kagaru

*6/08/2024 | 11560 E 03 SBAR Field Survey C*

## 4.2. Site BioCondition Values

Five BioCondition Assessment transects were conducted on the site to evaluate the site's level of disturbance relative to benchmark reference (refer **Plan 3**). The raw data is provided as **Appendix E**. The BioCondition transects indicate the site has high levels of disturbance with Site condition scores of 36.5, 29.5, 29, 32 and 19.5 for transects 1, 2, 3, 4 and 5 respectively. The maximum score for a non-disturbed reference site is 80.

The site condition assessment recorded below benchmark values for several attributes relating to the tree canopy for all transects except transect 4. Specifically, native tree species richness and canopy height, although native tree species richness was higher than the benchmark (6) for transect 4 (7) (refer **Table 12 – 16**). Elevated tree species diversity is not uncommon for vegetation patches that are mapped as a composite RE containing canopy species from various REs.

In general, the scores for attributes relating to canopy trees align with the regrowth and non-remnant status of the vegetation. In Transect 2, 3, and 4, disturbance within the canopy layer was recorded in the relatively low numbers of large trees compared to benchmarks. The low numbers of large trees relative to the regional ecosystem benchmark is presumably a result of historical clearing. Transect 1, however recorded 48 trees per hectare, which is well above the benchmark of 26 trees per hectare.

The diversity of native species of shrubs and forbs was below RE benchmarks across all transects (refer **Table 12 – 16**). The depressed level of native plant species richness is likely a result of the historical land use for cropping and cattle grazing and the dominance of exotic grass in the ground layer. Only five (5) species of native shrubs were recorded across the entire site during the site condition surveys and most of these were recruiting canopy tree species. The native shrubs recorded were *Eucalyptus tereticornis* (Forest Red Gum), *Corymbia citriodora* (Spotted Gum), *Acacia leiocalyx* (Early-flowering Wattle), *Acacia disparrima* (Hickory Wattle) and *Alphitonia excelsa* (Soap Tree). Native forb species included *Eremophila debilis* (Winter Apple), *Einadia hasta* (Fish Weed), *Chrysocephalum apiculatum* (Yellow Buttons), *Lobelia purpurascens* (White Root), *Dichondra repens* (Kidney Weed) and *Velleia spathulata* (Wild Pansies).

Non-native plant cover was dominated by *Sporobolus pyramidalis* (Giant Rat's Tail Grass) which covers up to 70% of the areas surveyed (refer **Table 12 – 16**). Other abundant weed species recorded at the site included *Lantana camara* (Lantana), *Senecio madajascariensis* (Fireweed), *Gomphocarpus physocarpus* (Balloon Cotton Bush) and *Chloris gayana* (Rhodes Grass).

**Table 12: BioCondition Assessment of Transect 1**

| Lot 11 Southern | Transect 1 – Non-remnant (RE12.9-10.3) | | | |
|---|---|---|---|---|
| **Attribute** | **RE12.9-10.3 Benchmark** | **Transect 1 Value** | **% Benchmark** | **Score** |
| **Recruitment of woody perennial species in EDL** | **100** | 0 | 0 | **0** |
| **Native plant species richness - trees** | **5** | 3 | 60.00 | **2.5** |
| **Native plant species richness - shrubs** | **5** | 0 | 0.00 | **0** |
| **Native plant species richness - grasses** | **9** | 1 | 11.11 | **0** |
| **Native plant species richness - forbs** | **17** | 2 | 11.76 | **0** |
| **Tree canopy height (Canopy)** | **26** | 18 | 69.23 | **3** |
| **Tree canopy height (Sub-canopy)** | **12** | 14 | 116.67 | **5** |
| **Average tree canopy height score** | | | | **4.0** |
| **Tree canopy cover (Canopy)** | **50** | 47 | 94.00 | **5** |
| **Tree canopy cover (Sub-canopy)** | **15** | 10.8 | 72.00 | **5** |
| **Average tree canopy cover score** | | | | **5.0** |
| **Shrub canopy cover** | **9** | 0 | 0.00 | **0** |
| **Native perennial grass cover** | **40** | 76 | 190.00 | **5** |
| **Organic litter** | **40** | 20 | 50.00 | **3** |
| **Large trees (per ha)** | **26** | 48 | 184.62 | **15** |
| **Coarse woody debris (per ha)** | **620** | 222 | 35.81 | **2** |
| **Non-native plant cover** | **0** | 30 | 82.50 | **0** |
| **Site Condition Score (/80)** | | | | **36.50** |



**Photo set 1**: Transect 1 photos from centre point looking north (left) and south (right).



**Photo set 2**: Transect 1 photos from centre point looking east (left) and west (right).

**Table 13: BioCondition Assessment of Transect 2**

| Lot 11 Northern | Transect 2 – Regrowth Category C (RE12.3.3 / 12.3.7) | | | |
|---|---|---|---|---|
| **Attribute** | **RE12.3.3 Benchmark** | **Transect 2 Value** | **% Benchmark** | **Score** |
| **Recruitment of woody perennial species in EDL** | **100** | 50 | 50 | **3** |
| **Native plant species richness - trees** | **5** | 4 | 80.00 | **2.5** |
| **Native plant species richness - shrubs** | **5** | 3 | 60.00 | **2.5** |
| **Native plant species richness - grasses** | **9** | 5 | 55.56 | **2.5** |
| **Native plant species richness - forbs** | **25** | 3 | 12.00 | **0** |
| **Tree canopy height (Canopy)** | **25** | 16 | 64.00 | **3** |
| **Tree canopy height (Sub-canopy)** | **9** | 14 | 155.56 | **5** |
| **Average tree canopy height score** | | | | **4.0** |
| **Tree canopy cover (Canopy)** | **40** | 40.3 | 100.75 | **5** |
| **Tree canopy cover (Sub-canopy)** | **8** | 31.1 | 388.75 | **3** |
| **Average tree canopy cover score** | | | | **4.0** |
| **Shrub canopy cover** | **4** | 0 | 0.00 | **0** |
| **Native perennial grass cover** | **52** | 30 | 57.69 | **3** |
| **Organic litter** | **20** | 70 | 350.00 | **3** |
| **Large trees (per ha)** | **14** | 2 | 14.29 | **5** |
| **Coarse woody debris (per ha)** | **588** | 35 | 5.95 | **0** |
| **Non-native plant cover** | **0** | 70 | 82.50 | **0** |
| **Site Condition Score (/80)** | | | | **29.50** |



**Photo set 3:** Transect 2 photos from centre point looking north (left) and south (right).



**Photo set 4:** Transect 2 photos from centre point looking east (left) and west (right).

**Table 14: BioCondition Assessment of Transect 3**

| Lot 11 Northern | Transect 3 – Non-remnant (RE12.9-10.2) | | | |
|---|---|---|---|---|
| **Attribute** | **RE12.9-10.2 Benchmark** | **Transect 3 Value** | **% Benchmark** | **Score** |
| **Recruitment of woody perennial species in EDL** | **100** | 100 | 100 | **5** |
| **Native plant species richness - trees** | **6** | 2 | 33.33 | **2.5** |
| **Native plant species richness - shrubs** | **7** | 4 | 57.14 | **2.5** |
| **Native plant species richness - grasses** | **7** | 3 | 42.86 | **2.5** |
| **Native plant species richness - forbs** | **13** | 3 | 23.08 | **0** |
| **Tree canopy height (Canopy)** | **21** | 16 | 76.19 | **5** |
| **Tree canopy height (Sub-canopy)** | **12** | 0 | 0.00 | **0** |

| Lot 11 Northern | Transect 3 – Non-remnant (RE12.9-10.2) | | | |
|---|---|---|---|---|
| **Average tree canopy height score** | | | | **2.5** |
| **Tree canopy cover (Canopy)** | **64** | 24.1 | 37.66 | **2** |
| **Tree canopy cover (Sub-canopy)** | **20** | 0 | 0.00 | **0** |
| **Average tree canopy cover score** | | | | **1.0** |
| **Shrub canopy cover** | **6** | 0.4 | 6.67 | **0** |
| **Native perennial grass cover** | **21** | 43 | 204.76 | **5** |
| **Organic litter** | **48** | 6 | 12.50 | **3** |
| **Large trees (per ha)** | **38** | 4 | 10.53 | **5** |
| **Coarse woody debris (per ha)** | **506** | 10 | 1.98 | **0** |
| **Non-native plant cover** | **0** | 50 | 82.50 | **0** |
| **Site Condition Score (/80)** | | | | **29.00** |



**Photo set 5**: Transect 3 photos from centre point looking north (left) and south (right).



**Photo set 6**: Transect 3 photos from centre point looking east (left) and west (right).

**Table 15: BioCondition Assessment of Transect 4**

| Lot 27 Northern | Transect 4 – Regrowth Category C (RE12.9-10.2 / 12.9-10.7 / 12.9-10.3 / 12.9-10.17) | | | |
|---|---|---|---|---|
| **Attribute** | **RE12.9-10.2 Benchmark** | **Transect 4 Value** | **% Benchmark** | **Score** |
| **Recruitment of woody perennial species in EDL** | **100** | 100 | 100 | 5 |
| **Native plant species richness - trees** | **6** | 7 | 116.67 | 5 |
| **Native plant species richness - shrubs** | **7** | 1 | 14.29 | 0 |
| **Native plant species richness - grasses** | **7** | 5 | 71.43 | 2.5 |
| **Native plant species richness - forbs** | **13** | 7 | 53.85 | 2.5 |
| **Tree canopy height (Canopy)** | **21** | 12 | 57.14 | 3 |
| **Tree canopy height (Sub-canopy)** | **12** | 7 | 58.33 | 3 |
| **Average tree canopy height score** | | | | **3** |
| **Tree canopy cover (Canopy)** | **64** | 26.4 | 41.25 | 2 |
| **Tree canopy cover (Sub-canopy)** | **20** | 0 | 0.00 | 0 |
| **Average tree canopy cover score** | | | | **1.0** |
| **Shrub canopy cover** | **6** | 7.3 | 121.67 | 5 |
| **Native perennial grass cover** | **21** | 52 | 247.62 | 5 |
| **Organic litter** | **48** | 10 | 20.83 | 3 |
| **Large trees (per ha)** | **38** | 0 | 0.00 | 0 |
| **Coarse woody debris (per ha)** | **506** | 0 | 0.00 | 0 |
| **Non-native plant cover** | **0** | 80 | 82.50 | 0 |
| **Site Condition Score (/80)** | | | | **32.00** |



**Photo set 7**: Transect 3 photos from centre point looking north (left) and south (right).



**Photo set 8**: Transect 3 photos from centre point looking east (left) and west (right).

**Table 16: BioCondition Assessment of Transect 5**

| Lot 27 Northern | Transect 5 – Non-remnant (RE12.3.3) | | | |
|---|---|---|---|---|
| **Attribute** | **RE12.3.3 Benchmark** | **Transect 5 Value** | **% Benchmark** | **Score** |
| **Recruitment of woody perennial species in EDL** | **100** | 50 | 50 | 3 |
| **Native plant species richness - trees** | **5** | 3 | 60.00 | 2.5 |
| **Native plant species richness - shrubs** | **5** | 0 | 0.00 | 0 |
| **Native plant species richness - grasses** | **9** | 1 | 11.11 | 0 |
| **Native plant species richness - forbs** | **25** | 2 | 8.00 | 0 |
| **Tree canopy height (Canopy)** | **25** | 18 | 72.00 | 5 |
| **Tree canopy height (Sub-canopy)** | **9** | 5 | 55.56 | 3 |

| Lot 27 Northern | Transect 5 – Non-remnant (RE12.3.3) | | | |
|---|---|---|---|---|
| **Average tree canopy height score** | | | | **4** |
| **Tree canopy cover (Canopy)** | **40** | 2.5 | 6.25 | 0 |
| **Tree canopy cover (Sub-canopy)** | **8** | 0 | 0.00 | 0 |
| **Average tree canopy cover score** | | | | **0** |
| **Shrub canopy cover** | **4** | 0 | 0.00 | 0 |
| **Native perennial grass cover** | **52** | 58 | 111.54 | 5 |
| **Organic litter** | **20** | 1 | 5.00 | 0 |
| **Large trees (per ha)** | **14** | 6 | 42.86 | 5 |
| **Coarse woody debris (per ha)** | **588** | 0 | 0.00 | 0 |
| **Non-native plant cover** | **0** | 80 | 82.50 | 0 |
| **Site Condition Score (/80)** | | | | **19.50** |



**Photo set 9**: Transect 3 photos from centre point looking north (left) and south (right).



**Photo set 10**: Transect 3 photos from centre point looking east (left) and west (right).

## 4.3. Watercourse Analysis

A search of the Development Assessment Mapping System (DAMS) identified several Fisheries Waterways for Waterway Barrier Works (WWBW) consisting of Teviot Brook / Woollaman Creek (Purple - major), Teviot Brook tributary (Red – High) and adjacent tributaries (Amber – Moderate and Green – Low) (**Figure 6**). Teviot Brook which transitions to Woollaman Creek bounds the southern boundary of the site. The red waterway flows from the north of site through to the eastern extent of the site. Additional waterways traverse the site flowing in from the west and north east to join the red mapped waterway. These watercourses and drainage features are also identified as stream order watercourses under the VMA. An assessment of the mapped stream order watercourses was conducted during field surveys to identify bed and bank features throughout. In addition, high bank marks of the major stream order 6 and 5 Teviot Brook / Woollaman Creek were identified and marked along the southern boundary of the site (refer **Plan 4**).

**Lot 11**

The watercourse through the centre of the southern lots is mapped as stream order 1 on the VMA and is reflective of a drainage feature in a low-lying area with a series of constructed dams along its extent (refer **Figure 4**). A large dam has been constructed at the western extent of the site. A section of the dam wall has been removed which has significantly reduced the capacity of the dam (refer **Photo set 11**). Along the extent of the drainage feature the surrounding landscape is dominated by pasture grasses and scattered exotic grasses including *Chloris gayana* (Rhodes Grass) and *Sporobolus pyramidalis* (Giant Rat's Tail Grass).

The drainage feature continues to the east, into a floodplain past a patch of *Eucalyptus tereticornis* (Forest Red Gum) (refer **Photo set 12**). There is a constructed channel approximately 2 m wide through the floodplain, presummably to direct dam overflow. The channel contains some freshwater vegetation including *Juncus usitatus* (Common Rush), *Persicaria decipiens* (Slender Knotweed), and *Ludwigia peploides* (Water Primrose) (refer **Photo set 13**). Downstream of the channel are low lying depressions connected to two constructed dams (refer **Photo set 14**). Vegetation is limited within the cleared floodplain extending to the east, with Rhodes Grass and Giant Rat's Tail Grass dominating the ground layer. There is a small patch of *Corymbia torelliana* (Cadaghi) and *Eucalyptus tereticornis* adjacent to the drainage line, along with scattered planted figs.



**Photo set 11:** Large constructed dam at the western extent of Lot 11.




**Photo set 12:** Floodplain with large mature *E. tereticornis* east of the large dam.




**Photo set 13:** Eroded dam wall (left) and constructed watercourse channel (right).




**Photo set 14:** Drainage feature within floodplain (left) connecting to second constructed dam (right).

Teviot Brook which transitions to Woollaman Creek borders the southern boundary of the lot. Scattered large mature *E. tereticornis* species are present along the high bank of Teviot Brook / Woollaman Creek waterway. Other vegetation along the creek bank includes *Aphananthe philippinensis* (Rough-leaved Elm), *Casuarina cunninghamiana* (River She-Oak), *Melaleuca viminalis* (Weeping Bottlebrush) and *Ficus rubignosa* (Rock Fig). The waterway is characterised by a double U shaped bank structure with a relatively high top bank and a secondary lower bank at the low flow path. The waterway contained pooling water in some areas at the time of survey and permanent water downstream within a wider channel (refer **Photo set 15**).



**Photo set 15:** Woollaman Creek waterway south of the subject site.

**Lot 12 Northern**

A tributary of the main watercourse is mapped through the centre of the northern portion of Lot 12. This represents a low-lying wetland area that connects to a dam and drainage feature that continues through Lot 22 to the west. The wetland contains semi-permanent water that would flow into the main waterway east during high rainfall events (refer **Photo set 16**).



**Photo set 16:** Wetland within the northern portion of Lot 12.

**Lot 27 Southern & Northern**

The major watercourse flows through the site from the north to east into Woollaman Creek. This waterway is mapped as a high-value WWBW under the *Fisheries Management Act 1991* and a watercourse order 3 on the *Vegetation Management Act 1999*. The waterway is lined with scattered mature *Eucalyptus tereticornis* and *Melaleuca viminalis* along its extent. The waterway includes defined bed and bank features and contained scattered small pools north of Wyatt Road at the time of survey (refer **Photo set 17 and 18**). The waterway crosses underneath Wyatt Road through four (4) square culverts (refer **Photo set 19**).



**Photo set 17:** Watercourse characteristics south of Wyatt Road, through the southern portion of Lot 27.



**Photo set 18:** Watercourse characteristics north of Wyatt Road with some pooling water present.



**Photo set 19:** Culverts crossing underneath Watercourse south of Wyatt Road, through the southern portion of Lot 27.

**Lot 22**

The northern section of the major watercourse through Lot 22, is lined with *Melaleuca viminalis* (Weeping Bottlebrush) and scattered *Ficus coronata* (Sandpaper Fig). The vegetation beyond the channel is dominated by Giant Rat's Tall Grass with scattered mature Eucalypt species (refer **Photo set 20**).

The waterway has continuous bed and bank features with a width of approximately 6 – 8 m, narrowing in sections, and bank height up to 1 m (refer **Photo set 21**). The waterway contains sandy substrate and no water was present at the time of surveying. Channel shading is limited to 5-10% and the bank contains minimal macrophytes.



**Photo set 20:** Major waterway with well defined channel, surrounded by *M. viminalis* along the bank.



**Photo set 21:** Upstream (top left), downstream (top right), left bank (bottom left) and right bank (bottom right) at Waterway Assessment Point 1 (refer **Plan 3**).

The mapped watercourse in the southern portion of Lot 22 north of Wyatt Road traverses from west of the site through to a wetland area which extends into Lot 12. A track crosses the flow path and a small depression has form upstream of the track bund (refer **Photo set 22**). No canopy trees are present through the drainage feature which is domminated by exotic grasses. Further west the channel becomes more defined with some scoured channels and cut-outs connecting to another dam onsite (refer **Photo set 23**). Upstream of the onsite dam the drainage feature becomes largely indistingishable for the surrunding paddock area (refer **Photo set 24**).




**Photo set 22:** Wetland area at the south-eastern corner of the southern lot (left) and depression formed by the track bund (right).




**Photo set 23:** Scour pool and large dam wall on adjacent lot to the west of the site (left) and medium dam towards the western extent of the southern watercourse on Lot 22 (right).






**Photo set 24:** Upstream (top left), downstream (top right), left bank (bottom left) and right bank (bottom right) at Waterway Assessment Point 2 within Lot 22 (refer **Plan 3**).

A stream order 1 mapped watercourse flows from the north west through the centre of Lot 22, which is described as a drainage feature. This drainage feature contains some scoured pools formed by an erosion pathway (refer **Photo set 25**).



**Photo set 25:** Erosion channels through the centre of the northern area of lot 22.

**Lot 27 Northern**

The waterway passing through the north eastern portion of Lot 27 contains a large dam and a series of scour pools that contained water at the time of survey (refer **Photo set 26**). No native macrophytes were observed, however *Eichhormia crassipes* (Common Water Hyacinth) and *Ludwigia peploides* (Water Primrose) were present in some of the scour pools. A patch of scattered mature *Eucalyptus tereticornis* trees are present north of this dam. This waterway contained limited bed and bank connectivity, where the scour pools are likely filled by overland flow during high rainfaill events.



**Photo set 26:** Large dam (left) and scour pools (right) associated with the northeastern waterway in Lot 27.

## 4.4. Vegetation Communities

### 4.4.1 Category X Non-Remnant Vegetation

The majority of the subject site is mapped as Category X (non-remnant) vegetation. These areas are characterized by cleared paddocks on low-lying floodplains with scattered mature Eucalypt canopy trees, patches of retained trees and moderately disturbed vegetation surrounding the watercourses and drainage features onsite. Refer to **Plan 4** for the extent of ground-truthed vegetation communities.

**Lot 11**

A house is located at the northern boundary of Lot 11 adjacent to Wyatt Road, which is surrounded by a patch of vegetation. Vegetation around the house is considered to contain minimal habitat value, primarily containing planted ornamental and native species including *Grevillea robusta* (Silky Oak), *Jacaranda mimosifolia* (Jacaranda), *Ficus rubignosa* (Rock Fig) and *Flindersia collina* (Leopard Ash). The house is surrounded by sheds, paddocks and other ancillary infrastructure for horse and cattle agistment (refer **Photo set 27**).




**Photo set 27:** Planted ornamental and native species, paddocks, sheds, and ancillary infrastructure surrounding the house on Lot 11.

**Lot 22**

Lot 22 contains cleared paddocks on low-lying floodplain area through much of the centre of lot, with drainage features through the central and southern extents. The paddocks are dominated on the ground layer by exotic *Sporobolus pyramidalis* (Giant Rat's Tail Grass). Within the Category X vegetation, patches of Eucalypt dominated vegetation are present in the north-western and towards the south-western extent. Scattered mature habitat trees, primarily *Eucalyptus tereticornis* and *Eucalyptus moluccana* exist across the site, containing hollows and stick nests (refer **Photo set 28**). Several dams are present across the site, with high levels of disturbance from cattle grazing.




**Photo set 28:** Scattered mature Eucalypt species within cleared paddocks dominated by *Sporobolus pyramidalis* (Giant Rat's Tail Grass) on Lot 22.

**Lot 12 Southern**

The majority of Lot 12, south of Wyatt road, contains cleared paddocks dominated by *Chloris gayana* with some scattered Eucalypt trees (refer **Photo set 29**).



**Photo 29:** Cleared paddock within the southern extent of Lot 12.

**Lot 27 Northern**

The Category X area within the northern portion of Lot 27 contains cleared paddock areas with scattered mature Eucalypt trees (refer **Photo set 30**). The centre of the lot contains a residential house along with sheds and additional ancillery infrastructure for horse and cattle agistment.





**Photo set 30:** Cleared paddock areas throughout the northern portion of Lot 27.

### 4.4.2 Category B Remnant Vegetation

**RE12.3.8 (Of Concern)**

Two areas of Category B (remnant) vegetation described as RE12.3.8 characterised by *Swamps with Cyperus spp., Schoenoplectus spp. and Eleocharis spp.* are located on the banks of the central waterway north of the current alignment of Wyatt Road. Both wetland areas straddle the eastern boundary of Lot 22 (refer **Figure 4**). The southern-most wetland area contains semi-permanent water and vegetation species characteristic of the mapped RE 12.3.8 with *Juncus usitatus* (Common Rush) along with the introduced *Eichhormia crassipes* (Common Water Hyacinth) (refer **Photo set 31**). The area contains habitat for bird life including *Pelecanus conspicillatus* (Australian Pelican), *Phalacrocorax varius* (Australian Pied Cormarant), *Egretta novaehollandiae*

(White-faced Heron) and *Platalea regia* (Royal Spoonbill). The eastern extent of the wetland extending into Lot 12 contains scattered canopy *E. tereticornis* specimens retaining hollows.



**Photo set 31:** Wetland with permanent water at the south-eastern extent of Lot 22, extending into Lot 12.

Another patch of mapped wetland is present further north. This area has no direct connection to a flow path and is best described as flood plain depresion that is fed by overland flow. The mapped wetland contains vegetation characteristics of mapped RE12.3.8 including *Persicaria decipiens* (Slender Knotweed), *Juncus usitatus* (Common Rush) and *Cyperus gracilis* (Slender Sedge) (refer **Photo set 32**). The weed species *Nymphaea caerulea* (Blue Water Lily) and *Eichhormia crassipes* (Common Water Hyacinth) dominated the deeper portions of the depression. No canopy trees or shrubs were observed at the wetland and there is very significant disturbance by cattle throughout that use the area as a water source following rain events. There is with no fence surrounding the area. Scattered *Melaleuca viminalis* and *Lophostemon suaveolens* (Swamp Box) were present around the edges of the water.

During field surveys, birds associated with wetlands were observed including *Egretta novaehollandiae* (White-faced Heron), *Ephippiorhynchus asiaticus* (Black-necked Stork), *Himantopus himantopus* (Black-winged Stilt) and *Platalea regia* (Royal Spoonbill). Some woody debris was present within the wetland in the form of tree stumps indicating the broadscale historical clearing of the area. An assessmnt of the wetland against the AquaBAMM criteria is provided in **Section 5.4** below.




**Photo set 32:** Northern wetland area at the eastern boundary of northern Lot 22, extending into Lot 27.

**RE12.3.7 (Least Concern)**

Areas of Category B vegetation described as RE12.3.7 which is *Eucalyptus tereticornis, Casuarina cunninghamiana subsp. cunninghamiana +/- Melaleuca spp. fringing woodland*, are located through the central and eastern extents of the site, associated with the main watercourse (refer **Photo set 33**). This vegetation associated with the waterway is dominated by *Melaleuca viminalis* with some mature *Eucalyptus tereticornis* and *Angophora subvelutina* (Broad-leaved Apple) scattered throughout.




**Photo set 33:** Vegetation characteristics of the mapped RE12.3.7 associated with the major watercourse.

### 4.4.3 Category C Regrowth Vegetation

**RE12.3.3 (Endangered)**

A polygon of Category C (high-value regrowth) vegetation described as 'endangered' RE12.3.3 is located in the northeastern corner of Lot 22. This area is also mapped as Koala Habitat Area and contains Koala food trees including a canopy of scattered *Eucalyptus tereticornis* and *Corymbia citriodora* (Spotted Gum) with an understorey dominated by exotic grasses, *Sporobolus pyramidalis* (Giant Rat's Tail Grass) and *Chloris gayana*

(Rhodes Grass) (refer **Photo set 34**). The area contains canopy species representative of the mapped RE12.3.3 however on-ground surveys confirm the vegetation is regrowth with scattered mature trees.





**Photo set 34:** Mapped Category C vegetation and Koala Habitat Area in north-eastern corner of Lot 22.

Following ground-truthing surveys the Category C (high value regrowth) categorisation of the vegetation community is deemed accurate, with the vegetation representative of 'endangered' RE12.3.3 of regrowth status. For regrowth vegetation to be reclassified as 'remnant' it must meet the VMA definition of at least 70% of the benchmark for canopy height (70% of 25m) and 50% of the benchmark for canopy cover (50% of 40%). The vegetation community representative of RE12.3.3 has an average canopy height of 16 m and canopy cover of 40.3 %, which is 64 % of the benchmark height and 100.75 % of the benchmark canopy cover. While the canopy cover value for this area is equal to the benchmark of 40%, the canopy height of 16 m suggests the vegetation community representative of 'endangered' RE12.3.3 maintains regrowth status and does not meet the definition of 'remnant.'

As per the Economic Development Queensland Implementation Guideline No. 14 – *Environmental values and sustainable resource use*, development does not necessitate the protection of this vegetation as on-site investigations failed to yield evidence that the vegetation is 'viable' remnant 'endangered' vegetation. The area of mapped Category C vegetation is smaller than 5 ha (approximately 1.21 ha) and has greater than 50% weed species through the understorey and ground layer (70%). As such, this patch of vegetation also meets the definition of a non-viable area of remnant vegetation containing endangered regional ecosystems even if it did meet the remnant threshold.

Refer to **Plan 4** for the extent of ground-truthed vegetation communities and **Plan 6** for the development layout.

**RE12.9-10.2/12.9-10.7/12.9-10.3/12.9-10.17a (Of Concern)**

The north-western corner of Lot 27 contains a patch of vegetation mapped as Of Concern RE12.9-10.2/12.9-10.7/12.9-10.3/12.9-10.17a. This area contains a mix of canopy and regrowth trees consisting of *Eucalyptus tereticornis, Corymbia tereticornis* and *Eucalyptus crebra*. The understorey is dominated by *Lantana camara*, which reflects the regrowth status of this area. A patch of Category C Of Concern composite RE12.9-10.2/12.9-

10.7/12.9-10.3/12.9-10.17a also occurs along the existing Wyatt Road alignment. In this area, there is a mix of large mature canopy species and regrowth vegetation.

## 4.5. Habitat Values

Cleared paddocks and scattered large mature Eucalypt trees comprise the majority of the habitat onsite. Hollows and stick nests were observed within the retained large habitat trees onsite providing roosting habitat (refer **Plan 4**). Ground level habitat such as hollow logs are largely absent from the site, presumably a result of land uses for cattle agistment and there are no rocky outcrops or other physical environmental structures for fauna. Opportunities to retain significant habitat trees containing hollows and stick nests, as well as relocating significant hollows to retained areas exist within the large contiguous patch of greenspace in the biodiversity / conservation corridor (refer **Plan 6** for Development Assessment Layout). Notably, a large stick nest is located at the southern boundary of Lot 11 believed to be that of a raptor species, likely *Haliaeetus leucogaster* (White-bellied Sea-eagle) (refer **Photo set 35**). The tree this nest is located in is on the high-bank of the Teviot Brook / Woollaman Creek waterway, which is located within the biodiversity / conservation corridor and will be retained as part of the proposed development.



**Photo set 35:** Large suspected sea eagle nest along the southern boundary of Lot 11.

Of the listed species considered as having potential to occur, vegetation structure on-site only contained potential suitable habitat for the Koala and foraging habitat for the Grey-headed Flying-fox. The site is unlikely to be utilised by foraging Powerful Owl because of the absence of bushland to provide suitable prey items or roosting locations.

The site contains non-juvenile koala habitat trees throughout the vegetated areas and non-remnant vegetation in the form of scattered mature Eucalypt trees. Species are predominantly *Eucalyptus tereticornis* and *Corymbia citriodora*. Impacts to non-juvenile koala habitat trees will need to be addressed in accordance with *PDA Guideline No. 17 – Remnant vegetation and koala habitat obligations in Greater Flagstone and Yarrabilba PDAs.*

## 4.6. Flora Survey Results

### 4.6.1 Threatened Flora Species

Seven (7) TECs and twenty (20) flora species listed as threatened under the EPBC Act were identified as potentially occurring on-site or within the surrounding area (refer **Table 3**). No TECs or threatened flora species under the EPBC Act were recorded on site nor considered likely to occur. One (1) threatened flora species listed as endangered under the NCA, *Melaleuca irbyana* (Swamp Tea-tree), was identified as potentially occurring on-site or in the vicinity (refer **Table 4**). No protected plants of conservation status were located on-site.

### 4.6.2 Native Flora

A total of seventy-three (73) flora species were identified across the investigation area, during the BioCondition assessment and habitat tree survey. Fifty (50) of the species identified are native flora and twenty-three (23) are introduced or weed species (refer **Table 17** and **Table 18**, respectively). No threatened flora species were recorded nor are they considered likely to occur. As discussed in **Section 4.2**, the number of native shrub and ground layer species recorded are relatively low compared benchmark levels. The native flora that was recorded is consistent with mapped remnant and pre-clear vegetation communities.

**Table 17: Native Flora Species List**

| Scientific Name | Common Name |
|---|---|
| *Acacia disparrima* | Hickory Wattle |
| *Acacia leiocalyx* | Early Black Wattle |
| *Alchornia ilicifolia* | Native Holly |
| *Allocasuarina littoralis* | Black She-oak |
| *Alphitonia excelsa* | Soap Tree |
| *Angophora leiocarpa* | Smooth-barked Apple |
| *Angophora subvelutina* | Broad-leaved Apple |
| *Aphananthe philippinensis* | Rough-leaved Elm |
| *Aristida calycina* | Dark Wiregrass |
| *Aristida ramosa* | Purple Wiregrass |
| *Capillipedium parviflorum* | Scented-top Grass |
| *Castanospermum australe* | Blackbean |
| *Casuarina cunninghamiana* | River She-oak |
| *Centella asiatica* | Pennywort |
| *Cheilanthes distans* | Bristle Cloak Fern |
| *Chrysocephalum apiculatum* | Yellow Buttons |
| *Corymbia citriodora* | Spotted Gum |

| Scientific Name | Common Name |
|---|---|
| *Corymbia intermedia* | Pink Bloodwood |
| *Corymbia tessellaris* | Moreton Bay Ash |
| *Corymbia torelliana* | Cadaghi |
| *Cynodon dactylon* | Common couch |
| *Cyperus gracilis* | Slender Sedge |
| *Desmodium varians* | Native Desmodium |
| *Dichondra repens* | Kidney Weed |
| *Einadia hasta* | Fish Weed |
| *Eragrostis brownii* | Brown's Lovegrass |
| *Eremophila debilis* | Winter Apple |
| *Eucalyptus crebra* | Narrow-leaved Ironbark |
| *Eucalyptus melanophlioa* | Silver-leaved Ironbark |
| *Eucalyptus moluccana* | Gum-topped Box |
| *Eucalyptus tereticornis* | Forest Red Gum |
| *Ficus coronata* | Sandpaper Fig |
| *Ficus rubignosa* | Rock Fig |
| *Flindersia collina* | Leopard Ash |
| *Grevillea robusta* | Silky Oak |
| *Heteropogon contortus* | Black Speargrass |
| *Imperata cylindrica* | Blady Grass |
| *Juncus acutus* | Spiny Rush |
| *Juncus usitatus* | Common Rush |
| *Lobelia purpurascens* | White Root |
| *Lomandra multiflora* | Many Flowered Mat Rush |
| *Lophostemon suaveolens* | Swamp Box |
| *Maclura cochinchinensis* | Cockspur Vine |
| *Melaleuca viminalis* | Weeping Bottlebrush |
| *Oxalis perennans* | Yellow Wood Sorrel |
| *Panicum decompositum* | Native Millet |
| *Parsonsia straminea* | Monkey Rope |
| *Persicaria decipiens* | Slender Knotweed |
| *Phyllanthus microcladus* | Small-leaved Phyllanthus |

| Scientific Name | Common Name |
|---|---|
| *Velleia spathulata* | Wild Pansies |

### 4.6.3 Introduced Species

The following observations have been made based on field survey:

- Of the seventy-three (73) flora species recorded across the site, twenty-three (23) are considered introduced flora species to the area (refer **Table 18**).
- Five (5) of these species are listed as restricted matters under the *Biosecurity Act 2014* (the Act) (discussed in **Section 3.5**). Under the Act, restricted matters are to be managed at the Local Government level through a biosecurity plan that covers invasive plants and animals in its area.

**Table 18: Introduced Flora Species List**

| Scientific Name | Common Name | Restricted under Biosecurity Act 2014 (Category) |
|---|---|---|
| *Arctium minus* | Lesser Burdock | |
| *Cardiospermum graniflorum* | Balloon Vine | |
| *Chloris gayana* | Rhodes Grass | |
| *Conyza sumatrensis* | Tall Fleabane | |
| *Cucumis myriocarpus* | Camel Melon | |
| *Cyperus polystachyos* | Bunchy Sedge | |
| *Eichhormia crassipes* | Common Water Hyacinth | Restricted Matter Category 3 |
| *Gamochaeta pensylvanica* | Pennsylvania Cudweed | |
| *Gomphocarpus physocarpus* | Balloon Cotton Bush | |
| *Jacaranda mimosifolia* | Jacaranda | |
| *Lantana camara* | Lantana | Restricted Matter Category 3 |
| *Ludwigia peploides* | Water Primrose | |
| *Malva sylvestris* | Mallow | |
| *Marrubium vulgare* | White Horehound | |
| *Nymphaea caerulea* | Blue Water Lily | |
| *Onopordum acanthium* | Scotch Thistle | |
| *Opuntia tomentosa* | Velvet Tree Pear | Restricted Matter Category 3 |
| *Senecio madagascariensis* | Fireweed | Restricted Matter Category 3 |
| *Solanum chrysotrichum* | Giant Devil's Fig | |

| Scientific Name | Common Name | Restricted under Biosecurity Act 2014 (Category) |
|---|---|---|
| *Solanum mauritianum* | Wild Tobacco | |
| *Soliva sessilis* | Bindi | |
| *Sporobolus pyramidalis* | Giant Rat's Tail Grass | Restricted Matter Category 3 |
| *Verbena bonariensis* | Purple-top Verbena | |

### 4.6.4 Ecologically Dominant and Habitat Tree Plot

A partial Tree Plot Survey was carried out on the investigation area to locate and identify all native ecologically dominant trees and trees with habitat features. Additional trees were also plotted within the proposed impact areas as shown on **Plan 3**. A tree was considered ecologically dominant if it was significantly larger than the surrounding canopy trees. In general, these were trees with a DBH greater than 400 mm (when measured at 1.4 m above ground), the Tree Schedule for the GPS Tree Plot Survey is included in **Table 19** and summarised below. **Plan 4** shows trees identified across the site which contain habitat features in the form of hollows and / or nests.

- A total of five-hundred and eight (508) trees were recorded in the survey. Eighty-three (83) trees were recorded to contain hollows and *Eucalyptus tereticornis* accounted for over half (48) the trees with hollows, followed by *Eucalyptus moluccana* (18) and dead stags (11). Two (2) *Corymbia citriodora* and two (2) *Eucalyptus crebra* retained hollows as potential habitat for fauna and a single (1) *Angophora leiocarpa* and single (1) *Lophostemon suaveolens* contained hollows. A total of 227 hollows from eighty-three (83) trees were recorded within the site (refer **Table 19** and **Plan 4**).
- Nine (9) species of tree was recorded in the survey of ecologically dominant trees. *Eucalyptus tereticornis* (Forest Red Gum) and *Eucalyptus moluccana* were the dominant species with one *Eucalyptus crebra* (Narrow-leaved Ironbark) and *Corymbia citriodora* (Spotted Gum) also recorded in high numbers.

**Table 19: Ecologically Dominant and Habitat Features Tree Plot Summary**

| Scientific Name | Common Name | Tree Count | Percent of Total Trees | Hollows Recorded | Nest / Termite Nest Recorded |
|---|---|---|---|---|---|
| *Angophora leiocarpa* | Smooth-barked Apple | 2 | 0.39% | 1 – Medium | None |
| *Angophora subvelutina* | Broad-leaved Apple | 2 | 0.39% | 0 | None |
| *Corymbia citriodora* | Spotted Gum | 16 | 3.15% | 3 – Small<br>2 – Medium | 1 Small stick nest |
| *Corymbia intermedia* | Pink Bloodwood | 3 | 0.59% | 0 | None |
| *Corymbia tessellaris* | Moreton Bay Ash | 1 | 0.20% | 0 | None |

| | | | | | |
|---|---|---|---|---|---|
| *DEAD/STAG* | - | 21 | 4.13% | 17 – Small<br>12 – Medium<br>3 – Large | 2 Small stick nests and 1 termite nest |
| *Eucalyptus crebra* | Narrow-leaved Ironbark | 21 | 4.13% | 2 – Small | 2 Termite nests |
| *Eucalyptus moluccana* | Gum-topped Box | 49 | 9.65% | 26 – Small<br>13 – Medium<br>2 – Large | 1 Small and 1 large stick nest |
| *Eucalyptus tereticornis* | Forest Red Gum | 387 | 76.18% | 77 – Small<br>54 – Medium<br>13 – Large | 14 Small stick nests, 1 large stick nest and 2 termite nests |
| *Lophostemon suaveolens* | Swamp Box | 6 | 1.18% | 1 – Small<br>1 – Medium | None |
| | **Total** | **508** | **100%** | **227 Hollows in 83 trees** | **20 Stick nests**<br>**5 Termite nests** |

**Table 20: GPS tree plot, DBH thresholds**

| DBH (mm) thresholds | Count | Percentage of total |
|---|---|---|
| 100-300 | 186 | 36.61% |
| 300-500 | 134 | 26.38% |
| 500-700 | 54 | 10.63% |
| 700-900 | 65 | 12.80% |
| 900-1100 | 31 | 6.10% |
| 1100-1300 | 24 | 4.72% |
| 1300-1500 | 9 | 1.77% |
| 1500-1700 | 3 | 0.59% |
| 1900-2100 | 1 | 0.20% |
| 2100-2300 | 1 | 0.20% |
| | **508** | **100%** |

## 4.7. Fauna Surveys

A fauna assessment was conducted across the site to identify and describe on-ground habitat features (e.g. habitat trees, fallen logs, termite mounts, roosting sites etc.), signs of fauna activity (e.g. scats, tracks, scratch marks on trees, nests etc.) and observations of species present within the area. Consideration was also given to the ecological significance of the site in the context of the local area and the broader region. The following observations were made during site surveys regarding fauna. Diurnal surveys were completed during all

survey dates (refer **Table 10**) and spotlighting surveys to identify foraging or flying individuals were completed on 10th and 23rd May and 17th July 2023 (refer **Plan 3**).

The site is identified as containing vegetated areas of Koala Habitat as per the 2020 Koala Plan aligned with the South East Queensland Koala Conservation Strategy 2020–2025. However, the site is not mapped as contained areas mapped as having High Value Bushland on the relevant State Planning Policy 2/10: Koala Conservation in South East Queensland (SPP) Koala Habitat Values maps (superseded). The site contains areas mapped under the Koala Conservation Policy as 'Low value rehabilitation' and 'Medium value rehabilitation'.

Eight (8) motion sensing cameras were deployed across the site to detect fauna activity in the absence of observers (refer **Plan 3**). Camera trapping involves setting up a fixed digital camera to camera images or video of animals that pass in front of a camera with an infrared trigger. It is a non-invasive technique designed to detect medium to large sized animals as they pass across it, although it is possible to detect smaller animals depending on the set-up. This method identifies fauna activity beyond the scope of direct observational studies and with the absence of potential observer impacts. Cameras were attached 30-100 cm from the ground on a tree or post and directed towards landscape features. The cameras were baited with an oat and peanut butter mix to target fauna in the broader area.

A total of seventy-one (71) fauna species were recorded across the site with sixty (60) of these native species (refer **Table 21**) and eleven (11) of these considered introduced species (refer **Table 22**). Overall, two (2) amphibians, fifty (50) birds, fifteen (15) mammals, one (1) reptile and two (2) marsupial species were recorded (refer **Table 21-22**). The vast majority of fauna species recorded on-site are considered common to the local area. No listed threatened species under the EPBC Act or NCA were identified onsite.

Feral mammal species, such as *Canis lupus familiaris* (Dog), *Lepus europaeus* (European Hare) and *Vulpes* (Red Fox) were also recorded on-site (refer **Table 22**). Both Dogs and Foxes are considered threats to the Koala and other native species. Further, the noxious amphibian *Rhinella marina* (Cane Toad) was very common on-site.

**Table 21: Native Fauna Species Recorded**

| Scientific Name | Common Name | Taxa | Survey Method |
|---|---|---|---|
| *Crinia parinsignifera* | Eastern Sign-bearing Froglet | Amphibian | Heard Calling |
| *Anas superciliosa* | Pacific Black Duck | Bird | Camera collection |
| *Anthus novaeseelandiae* | Australian Pipit | Bird | Sighting |
| *Aquila audax* | Wedge-tail Eagle | Bird | Sighting |
| *Ardea intermedia* | Intermediate Egret | Bird | Sighting |
| *Cacatua galerita* | Sulphur-crested Cockatoo | Bird | Sighting |
| *Cacatua sanguinea* | Little Corella | Bird | Sighting |
| *Centropus phasianinus* | Pheasant Cuckoo | Bird | Sighting |
| *Chenonetta jubata* | Australian Wood Duck | Bird | Sighting |

| Scientific Name | Common Name | Taxa | Survey Method |
|---|---|---|---|
| *Cheramoeca leucosterna* | White-backed Swallow | Bird | Sighting |
| *Circus approximans* | Swamp Harrier | Bird | Sighting |
| *Cisticola exilis* | Golden-headed Cisticola | Bird | Camera collection |
| *Coracina novaehollandiae* | Black-faced Cuckooshrike | Bird | Sighting |
| *Corvus coronoides* | Australian Raven | Bird | Sighting |
| *Corvus orru* | Torresian Crow | Bird | Sighting / Camera Collection |
| *Coturnix ypsilophora* | Brown Quail | Bird | Sighting |
| *Cracticus torquatus* | Grey Butcherbird | Bird | Sighting |
| *Dacelo novaeguineae* | Laughing Kookaburra | Bird | Sighting / Camera Collection |
| *Egretta novaehollandiae* | White-faced Heron | Bird | Sighting |
| *Eolophus roseicapilla* | Galah | Bird | Sighting |
| *Ephippiorhynchus asiaticus* | Black-necked Stork | Bird | Sighting |
| *Grallina cyanoleuca* | Magpie-lark | Bird | Sighting / Camera Collection |
| *Gymnorhina tibicen* | Australian Magpie | Bird | Sighting |
| *Haliaeetus leucogaster* | White-bellied Sea Eagle | Bird | Sighting |
| *Himantopus himantopus* | Black-winged Stilt | Bird | Sighting |
| *Himantopus leucocephalus* | Pied Stilt | Bird | Sighting |
| *Himantopus mexicanus* | Black-necked Stilt | Bird | Sighting |
| *Hirundo neoxena* | Welcome Swallow | Bird | Sighting |
| *Hirundo rustica* | Barn Swallow | Bird | Sighting |
| *Malurus cyaneus* | Superb Fairy-wren | Bird | Sighting / Camera Collection |
| *Manorina melanocephala* | Noisy Minor | Bird | Sighting |
| *Ocyphaps lophotes* | Crested Pigeon | Bird | Camera collection |
| *Pardalotus striatus* | Striated Pardalote | Bird | Sighting |
| *Pelecanus conspicillatus* | Pelican | Bird | Sighting |
| *Phalacrocorax varius* | Australian Pied Cormarant | Bird | Sighting |
| *Philemon corniculatus* | Noisy Friarbird | Bird | Sighting |
| *Platalea flavipes* | Yellow-billed Spoonbill | Bird | Sighting |
| *Platalea regia* | Royal Spoonbill | Bird | Sighting |
| *Platycercus adscitus* | Pale-headed Rosella | Bird | Sighting |
| *Podargus strigoides* | Tawny Frogmouth | Bird | Spotlighting Sighting |
| *Porphyrio melanotus* | Swamphen | Bird | Sighting / Camera Collection |
| *Rhipidura albiscapa* | Grey Fantail | Bird | Camera collection |

| Scientific Name | Common Name | Taxa | Survey Method |
|---|---|---|---|
| *Rhipidura drownei* | Brown Fantail | Bird | Camera collection |
| *Rhipidura leucophrys* | Willie Wagtail | Bird | Sighting / Camera Collection |
| *Spilopelia chinensis* | Spotted Dove | Bird | Camera collection |
| *Strepera graculina* | Pied Currawong | Bird | Sighting |
| *Threskiornis spinicollis* | Straw-necked Ibis | Bird | Sighting |
| *Todiramphus sanctus* | Sacred Kingfisher | Bird | Sighting |
| *Trichoglossus moluccanus* | Rainbow Lorikeet | Bird | Sighting |
| *Vanellus miles* | Masked Lapwing | Bird | Sighting |
| *Isoodon macrourus* | Northern Brown Bandicoot | Mammal | Camera collection |
| *Macropus giganteus* | Eastern Grey Kangaroo | Mammal | Camera collection |
| *Macropus rufogriseus* | Red-necked Wallaby | Mammal | Sighting / Camera Collection |
| *Petaurus breviceps* | Sugar Glider | Mammal | Camera collection |
| *Phascogale tapoatafa* | Brush-tailed Phascogale | Mammal | Camera collection |
| *Pseudomys delicatulus* | Little Native Mouse | Mammal | Camera collection |
| *Trichosurus caninus* | Short-eared Brushtail Possum | Mammal | Camera collection |
| *Sminthopsis murina* | Slender-tailed Dunnart | Marsupial | Camera collection |
| *Trichosurus vulpecula* | Common Brushtail Possum | Marsupial | Sighting |
| *Pseudechis porphyriacus* | Red-bellied Black Snake | Reptile | Sighting / Camera collection |

**Table 22: Invasive / Introduced Fauna Species Recorded**

| Scientific Name | Common Name | Taxa | Survey Method |
|---|---|---|---|
| *Rhinella marina* | Cane Toad | Amphibian | Sighting |
| *Ardea ibis* | Cattle Egret | Bird | Sighting |
| *Pavo cristatus* | Indian Peafowl | Bird | Camera collection |
| *Bos taurus* | Cow | Mammal | Sighting / Camera Collection |
| *Canis lupus dingo* | Wild Dog | Mammal | Camera collection |
| *Canis lupus familiaris* | Domestic Dog | Mammal | Sighting |
| *Equus africanus asinus* | Donkey | Mammal | Sighting |
| *Equus sp.* | Horse | Mammal | Sighting |
| *Lepus europaeus* | European Hare | Mammal | Sighting / Camera Collection |
| *Rattus norvegicus* | Brown Rat | Mammal | Camera collection |
| *Vulpes vulpes* | Fox | Mammal | Camera collection |

### 4.7.1 Threatened Fauna Species

A number of threatened fauna species were identified as having the potential to occur within the area surrounding the site under the EPBC Act and NCA (refer **Appendices A & B** for full search list). Likelihood of Occurrence analyses were undertaken to assess site characteristics for suitable habitat for listed threatened species (refer **Appendix D**). A field confirmed Likelihood of Occurrence is presented in **Table 23**.

Koala's have been recorded on the broader landscape north and west of the project area and it is acknowledged that the site contains trees that are considered Koala food trees. No fauna species listed as threated under the EPBC Act nor NCA were directly observed on site. *Phascolarctos cinereus* (Koala) and *Pteropus poliocephalus* (Grey Headed Flying Fox) are the only two threatened species listed that were identified as having potential to utilise the site in its current form (refer **Table 23**).

**Table 23: Field Confirmed Likelihood of Occurrence Assessment**

| Species | Common Name | EPBC Status | NCA Status | Field Confirmed Likelihood of Occurrence |
|---|---|---|---|---|
| *Anthochaera phrygia* | Regent Honeyeater | CE | CE | **Low**<br><br>Field surveys found potential foraging habitat to be largely absent or highly limited adjacent the site. Although Eucalypt species were recorded within the assessment area these are in the linear areas of vegetation associated with waterways with most of the site consisting largely of cleared paddock. As this species prefers areas with significant mature trees, the site is not considered suitable to support this species. Additionally, limited mistletoes were recorded at the time of assessment, therefore the site is limited in resources essential to the Regent Honeyeaters survival.<br><br>Furthermore, large areas of intact bushland that offer higher quality habitat to support this species are present to the north and west of the site. The closest Regent Honeyeater record is 4.5 km north-east of the site. Given the highly disturbed vegetation on site and proximity to more suitable habitat, it is considered a low likelihood this species would occur on site. |
| *Ninox strenua* | Powerful Owl | - | V | **Low**<br><br>Woodland is limited across the site due to historical clearing. Records of the species from 2011 and 2010 occur north of the site in more vegetated areas. |

| Species | Common Name | EPBC Status | NCA Status | Field Confirmed Likelihood of Occurrence |
|---|---|---|---|---|
| *Phascolarctos cinereus* | Koala | E | E | **Moderate**<br><br>The vegetation on site contains Koala food and habitat trees. Scattered patches of Eucalypt vegetation are present within the site, with dominate species including *Eucalyptus tereticornis* (Forest Red Gum) and *Corymbia citriodora* (Spotted Gum).<br><br>Although a single scat was found onsite, no koalas were observed at the time of survey. There are multiple local sightings within 5 km of the site. Whilst potential habitat to support the species onsite is considered highly disturbed, recent records indicate the presence of the species within the area and therefore may utilize the site. |
| *Pteropus poliocephalus* | Grey-headed Flying-fox | V | LC | **Moderate**<br><br>The site contains scattered Eucalypt species within cleared paddocks along with patches of regrowth and remnant vegetation including *Melaleuca viminalis* (Weeping Bottlebrush). The Grey-headed Flying-fox was not seen utilising this vegetation. In addition, there was no observed roosts on site. Notably, there is only one record within 1 km of the referral site in the last 20 years. |

### 4.7.2 Koala (Phascolarctos cinereus)

Opportunistic searches and targeted surveys for koala usage were conducted across the site to assess the likelihood the occurrence. Tools for determining localised levels of use by *Phascolarctos cinereus* (Koala) included the Spot Assessment Technique (SAT), spotlighting, motion sensing cameras as well as direct observations for Koala and Koala activity throughout the field survey period. SAT surveys were undertaken on-site in accordance with the methodology developed by the AKF (refer **Section 2.2.5**) and specified in the EPBC Act Referral Guidelines for the Vulnerable Koala (specifically, the *Survey Guidelines for Australia's Threatened Mammals* was incorporated where relevant). Five (5) SAT surveys were completed during the survey period in May and July 2023. Raw data is provided as **Appendix E**.

The Australian Koala Foundation koala activity level classification table (following Philips and Callaghan 2011) provides an estimate of koala utilisation based on defined Activity Categories. The East Coast (med-high) Activity Category is appropriate for the subject site. Evidence of 'low' koala usage was recorded on site (refer **Table 24**).

**Table 24: Koala SAT Survey Results**

| SAT Survey Number | Evidence of Koala Use (%) | East Coast (Med-High) Koala Use (Low, Medium, High) |
|---|---|---|
| **1** | 0.00% | Low |
| **2** | 0.00% | Low |

| SAT Survey Number | Evidence of Koala Use (%) | East Coast (Med-High) Koala Use (Low, Medium, High) |
|---|---|---|
| **3** | 0.00% | Low |
| **4** | 0.00% | Low |
| **5** | 3.33% | Low |

### 4.7.3 Grey-headed Flying-fox (*Pteropus poliocephalus*)

*Pteropus poliocephalus* (Grey-headed Flying-fox) requires foraging resources and roosting sites to persist. The species is known to use a wide variety of habitats including subtropical and temperate rainforests, tall sclerophyll forest and woodlands, heaths, swamps and also urban and agricultural areas where food trees have been cultivated. Exact requirements for the establishment of flying fox roosts are largely unknown.

The species is highly adaptive with its diverse native diet, which it can supplement with introduced species. It is known to forage within a variety of habitat areas as each resource does not produce food throughout the entire year. The closest active GHFF roost is approximately 6 km west of the site, being Cedar Grove (148) last surveyed in 2022 to contain a GHFF category 1 (1-499 individuals). An additional GHFF roost is located 5 km north-east of the site, being Undullah, Homestead Drive (Flagstone, 464), which was last surveyed in 2013. Opportunistic and targeted surveys did not locate roosting sites on the subject site or within the immediate vicinity of the site. No Grey-headed Flying-fox individuals were recorded during field surveys.

## 4.8. Connectivity Assessment

A connectivity assessment was conducted across the site to identify the areas mapped on The Greater Flagstone PDA Greenspace Plan in relation to the proposed park areas for the development (**Plan 5**). The Flagstone PDA Development Scheme Zoning contains approximately 240.3 ha of parks mapped onsite. The project will provide park areas of approximately 215.10 ha across the site (25.2 ha less) which is almost equal to the zoning of 240.3 ha.

**Lot 11**

*Observation Point 1*

The greenspace connecting corridor at the south-western corner of Lot 11 contains an area of cleared paddock with a series of depressions and eroded channels (refer **Photo set 36**). Woollaman creek to the south retains some connectivity values, with scattered vegetation within the creek corridor including *Allocasuarina littoralis* (Black She-oak), *Eucalyptus tereticornis* (Forest Red Gum) and *Eucalyptus moluccana* (Gum-topped Box). The creek has a high, steep upper bank, dropping approximately 5 – 10 m into the main waterway area. Several drainage lines extend into the creek and neighbouring lot where regrowth vegetation is present. The lower creek bank contains substantive impacts from cattle grazing. This area is proposed to be retained and restored as part of the biodiversity / conservation corridor which will provide habitat value and connectivity to retained vegetation offsite to the west.

The lot directly to the west of the site is cleared with a fence approximately 100 m to the west. Beyond the fence, vegetation is characterized by regrowth and mature *E. tereticornis* dominated patches. Vegetation on

the subject site is connected to this patch of vegetation through the scattered mature and regrowth trees within the the Woollaman Creek vegetation corridor.




**Photo set 36:** Creek (left) and drainage features (right) with associated vegetation features within the south-western Greenspace corridor.

*Observation Point 2*

The mapped greenspace connecting corridor at the centre of Lot 11 contains limited to no connectivity features in its current state (refer **Photo set 37**). This area is characteristic of cleared open paddock dominated by pasture grasses, with a drainage feature in a low-lying depression through the centre of the corridor. The drainage line flows to a large dam to the east, and further upstream is cleared paddock. It is likely that the drainage feature fills only with high rainfall events. Being a low-lying depression with no obvious bed and bank features, this area does not contain permanent water. The proposed development does not propose to keep this mapped greenspace area due to the lack of ecological features.




**Photo set 37:** Upstream (left) and downstream (right) of the drainage line within the greenspace corridor.

**Lot 22**

*Observation Point 3*

The greenspace connecting corridor at the western border of northern Lot 11 comprises a drainage feature with some scour pools throughout (refer **Photo set 38**). No clear waterway channel is present in this area and no water was present within the scour pools at the time of survey. A large dam adjoins the drainage feature flow path to the east. This area is proposed to be retained as a linear park as part of the development, which will allow some connectivity to scattered vegetation to the west. It is assumed that the constructed farm dams will be removed as part of the development within the PDA.



**Photo set 38:** Open paddock (left) and dam wall in adjacent lot within greenspace connecting corridor (right).

*Observation Point 4*

The northern boundary of Lot 22 contains a mapped Greenspace Corridor which aligns with the main waterway onsite where the waterway traverses into allotments north of the subject site. At the site boundary where the greenspace connects further into the northern allotments, vegetation is limited through the waterway aside from exotic *Chloris gayana* lining the waterway banks. Few scattered mature *Eucalyptus tereticornis* trees are present, with additional scattered *Melaleuca viminalis* and *Eucalyptus tereticornis* further upstream and downstream (refer **Photo set 39**). Although highly degraded, the waterway provides some connectivity value onsite to vegetation upstream within neighbouring northern lots.



**Photo set 39:** Scattered *Eucalyptus tereticornis* to the west of main waterway (left) and upstream of the waterway facing north (right) within the northern Greenspace Corridor.

**Lot 27 Northern**

*Observation Point 5*

The Greenspace Corridor at the northern extent of Lot 27 connects to a highly degraded waterway north of the site. A patch of mature Eucalypt vegetation is retained within the survey lot which may provide opportunities for fauna movement (refer **Photo set 40**). Immediately north of the site is cleared land that will be developed into a major road.




**Photo set 40:** Patch of mature and regrowth vegetation onsite bounded by cleared area offsite (left) and degraded drainage feature (right) within the northern greenspace corridor.

**Lot 27 Southern and Lot 12**

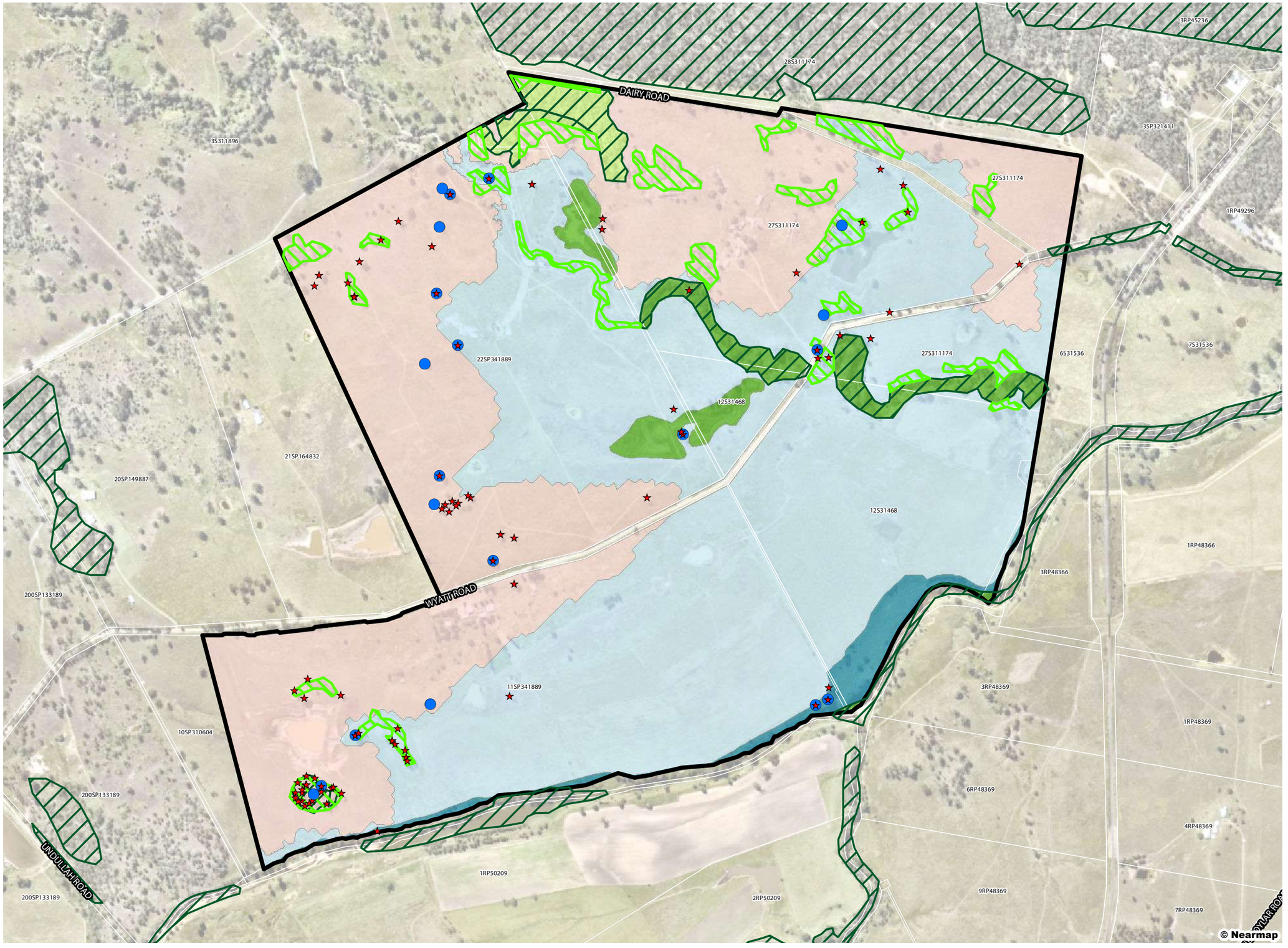
*Observation Point 6*

The connecting greenspace corridor along the eastern extent of the site aligns with a large patch of proposed environmental open space to facilitate a biodiversity corridor. The area contains cleared paddocks as well as linear strips of vegetation along the waterway (refer **Photo set 41**). Retaining and rehabilitating the large cleared areas will provide connectivity to vegetation along the Teviot Brook corridor for fauna movement within the site and offsite to the east.




**Photo set 41:** Eastern major linear park area containing cleared paddocks (left) and linear vegetation associated with the major waterway onsite (right).

# 4. Ground-truthed Vegetation Communities




Notes:
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## Legend

- Qld DCDB
- Site Boundary
- Core Koala Habitat Areas

**Vegetation communities**

- Cleared Land - Developable
- Cleared Land - Floodplain
- High Bank of Teviot Brook
- Regrowth Vegetation
- Watercourse Remnant Vegetation
- Scattered habitat (non-remnant)
- Nest in tree
- Hollow bearing tree

| Issue | Date | Description | Drawn | Checked |
|---|---|---|---|---|
| B | 11/03/2024 | Preliminary | TC | MD |
| C | 6/08/2024 | Updated Layout | LS | KM |

0 100 200 300 m

Transverse Mercator | GDA 2020 | Zone 56 | 1:10,000 @ A3

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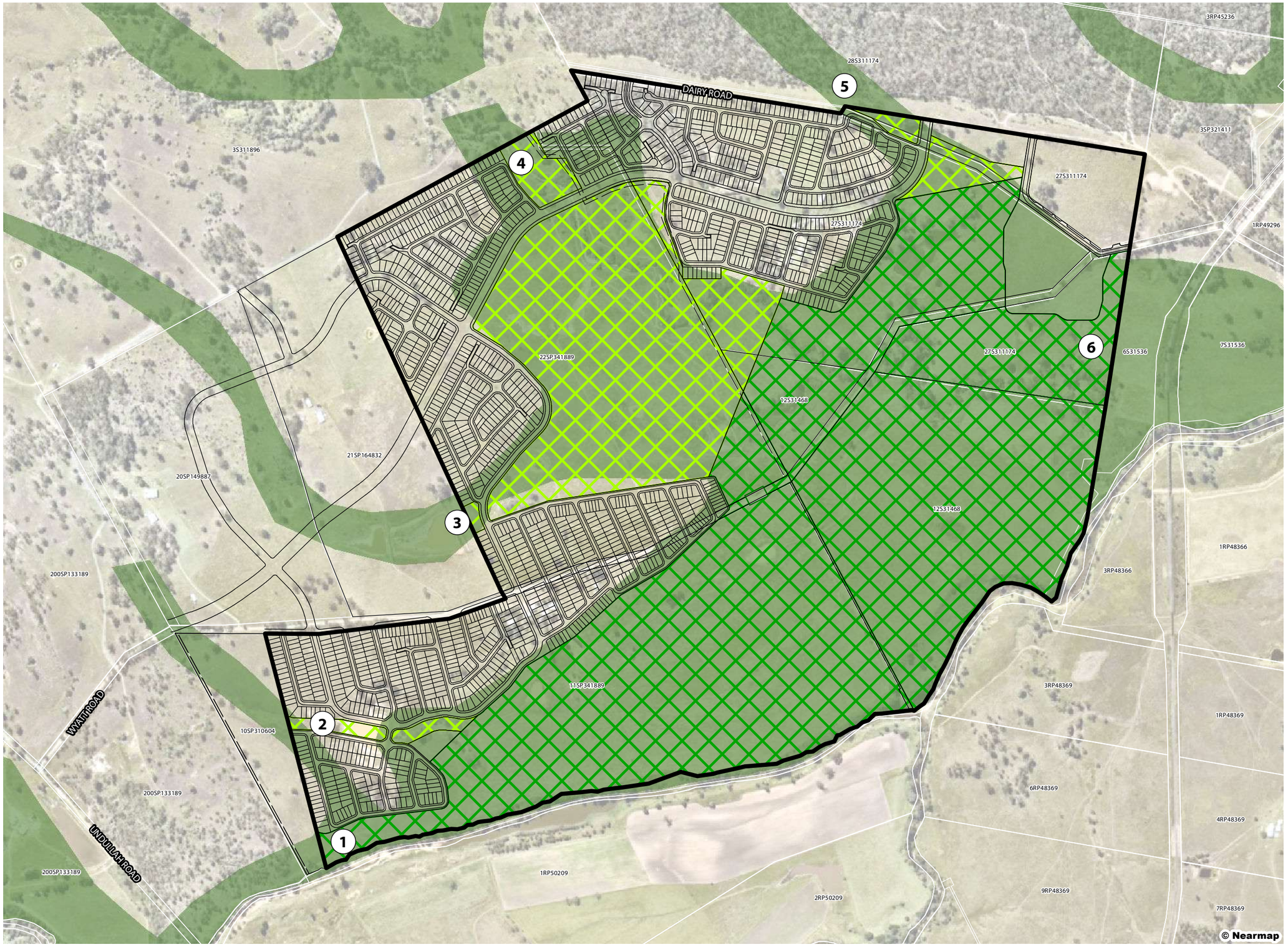
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Wyatt Road, Kagaru

*Address / RPD: Lot 11 on SP310604*

*6/08/2024 | 11560 E 04 SBAR Vegetation Communities C*

# 5. Greenspace Connectivity Assessment




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## Legend

- Qld DCDB
- Site Boundary
- Greater Flagstone Greenspace network

**Context Plan details**

- Proposed design
- Proposed collector roads

**Master Plan Greenspace Network**

- Proposed Parks
- Proposed Openspace

| Issue | Date | Description | Drawn | Checked |
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# 5. Impact Assessment and Development Analysis

## 5.1. Proposed Development

The proposed development footprint will occupy approximately 116 ha of the 303.26 ha subject site (refer **Plan 6**). The 116 ha proposed development will include medium density residential and low-density residential areas with the remaining 187 ha dedicated to various park areas.

The site is located within LCC but lies within the Greater Flagstone PDA, and as such a has been earmarked for development by the State. The proposed development will result in the removal of vegetation across approximately 32 ha of the 303.26 ha site based on ground-truthed vegetation communities, with the majority of this vegetation mapped as Category X and Category C vegetation containing scattered patches of Eucalypt dominated vegetation with a small portion of Category B vegetation being removed (refer **Plan 5**).

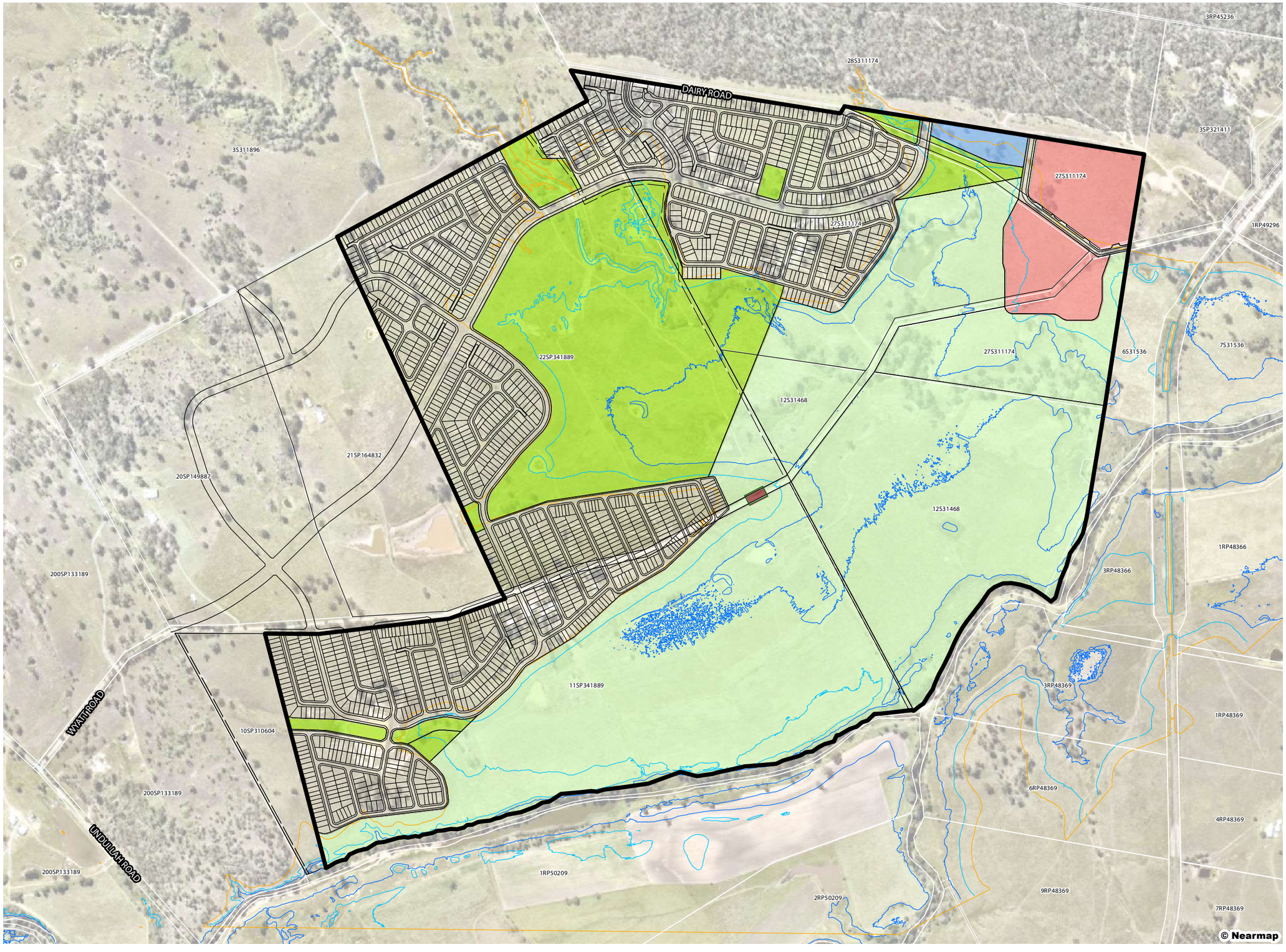
Notably, Wyatt Road is proposed to be shifted north to reduce impacts to existing vegetation and provide a contiguous major linear park within the southern extent of the site. The current Wyatt Road alignment intersects and splits the proposed major linear park which presents a significant threat to safe fauna movement through the proposed biodiversity corridor. The proposed realignment is discussed further in **Section 5.2** below.

The proposed development will retain and rehabilitate an area of approximately 187 ha as park to provide a large biodiversity corridor through the southern portion of the site. This area includes waterway buffer zones from Teviot Brook / Woollaman Creek to ensure there is a sufficient riparian corridor as well as retention and rehabilitation of the main watercourse through the centre of the site. Further details on impacts to the receiving waterways onsite is outlined in **Section 5.3** below.

Given the extent of historical and on-going disturbances on-site, the proposed development is not considered to have an impact on any significant or unique ecological features. Further, the site is constrained by surrounding development and infrastructure and sites with EPBC approvals that will be developed in the short to medium term. Significant development is approved to the north which consist of master planned residential communities. Surrounding major and infrastructure provide barriers to fauna connectivity throughout the landscape, particularly the Interstate Railway Line to the east and the trunk road proposed to the north east. These barriers increase the value of the proposed major linear park. Connectivity remains primarily through the Teviot Brook / Woollaman creek linear corridor on the southern border and through the major watercourse onsite to the east and north.

Low indirect evidence of koala activity was recorded within the site. No evidence of any other NCA or EPBC listed threatened species was found onsite. Based on the advice provided within this SBAR, the clearing is considered appropriate given the planning intent of the area and the retention of significant amounts of the site for environmental purposes (refer **Plan 6**).

# 6. Development Layout




Notes:
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## Legend

- Qld DCDB
- Site Boundary

**Context Plan details**

- Proposed design
- ARI 5 - RL 29.8m AHD
- ARI 20 - RL 32.6m AHD
- RL35.2m
- Medium Density Residential
- Neighbourhood Centre
- Local Park
- Environmental Park
- Utility

| Issue | Date | Description | Drawn | Checked |
|---|---|---|---|---|
| B | 11/03/2024 | Preliminary | TC | MD |
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Wyatt Road, Kagaru

*Address / RPD: Lot 11 on SP310604*

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## 5.2. Wyatt Road Realignment

Wyatt Road is a future trunk Urban Arterial road (4 lane ultimate, 2 lane interim configuration) in accordance with the Flagstone Development Charges and Offset Plan. It is part of the main north-south access through the Greater Flagstone PDA, linking up with New Beith Road which eventually provides access to Greenbank-Springfield Arterial. Upon ultimate development of the PDA, Wyatt Road is forecast to accommodate up to 40,000 vehicles per day. The interim configuration would consist of a 2-lane road and partial median. The ultimate configuration consists of a 4-lane road which is median separated and forecast to have a speed limit of 80 km/hr.

Constructing the road in its current alignment through the floodplain will require significant earthworks to raise the level of road 6-8 m to make it flood proof. The resulting impact corridor to construct the road in its current alignment is predicted to be 100 m when the road as well as the batters are considered. The floodplain that the current alignment of Wyatt Road intersects is proposed to become one of the largest areas of rehabilitated biodiversity corridor in the Greater Flagstone PDA. The constructed road will result in a significant disturbance to proposed major park and open space area.

Realigning Wyatt Road north of its existing position and locating it adjacent to the residential development will reduce direct impacts of construction and ongoing indirect impacts. Placing the road through areas of higher elevation reduced the width of the construction corridor through areas of green space and moves the edge effects associated with a 4-lane road to align with what would have already been proposed by the residential area. The proposed alignment will still cross the biodiversity corridor but will do so at a much narrower point at the northern extent of Lot 22 where the road crosses over the main waterway onsite. Fauna movement solutions will be installed where the proposed alignment crosses fauna movement corridors and waterways. The fauna movement solutions will need to be appropriate to the fauna likely to use the corridors and meet engineering requirements. Realigning Wyatt Road has a number of benefits, but the most significant ecological result would be creating a single contiguous area of biodiversity corridor rather than two patches intersected by a major road. The realignment of such a large piece of infrastructure north of the proposed biodiversity corridor will greatly increase the ability of fauna to disperse and decrease the frequency of interactions between fauna and Wyatt Road reducing vehicle strike.

The proposed Wyatt Road alignment traverses the north of the context area through mostly cleared cattle grazing land with minimal ecological values. The dominant vegetation within the cattle grazing land is exotic grasses. Scattered mature trees are present within the impact corridor of the proposed alignment, predominantly associated with the proposed biodiversity corridor. The proposed alignment for Wyatt Road crosses three (3) waterways; first, the waterway running north south at the northern extent of Lot 27 S311174, second, the main waterway onsite at the northern portion of the context area within Lot 22 SP341889 and, finally on the western side of the context area on the boundary of lots 21 SP164832 and 20 SP149887.

The proposed road alignment has been positioned to avoid impacts to a mapped wetland area. Ground surveys have indicated that the mapped area collects overland flow from the surrounding area and contains permanent water, although almost all shrubs and trees have been removed and the exotic grass *Chloris Gayana* (Rhodes Grass) dominates the area. The wetland is not connected to the adjacent waterway and is

regarded as a relict floodplain depression that acts as a water source for cattle. Some native wetland vegetation species are present and the surveys recorded aquatic avi-fauna utilising the site. Revegetation and rehabilitation of this wetland will occur to mitigate any construction impacts which occur due to the realignment of Wyatt Road. Development impacts to this wetland area are discussed further in **Section 5.4**.

## 5.3. Receiving Waterways

The proposed development works have avoided encroaching within the waterway buffer of Teviot Brook / Woollaman Creek and the eastern extent of the Stream Order 3 watercourse where possible. Within Lot 27, the development adjoins the Stream Order 3 watercourse towards the northern extent. Impacts to the waterway will be mitigated through rehabilitation measures and appropriate buffer zones. In addition, appropriate culverts and rehabilitation of the waterway where the Wyatt Road alignment crosses the waterway will be implemented. A District Recreation Park and Linear Park are proposed at the northern extent of the Stream Order 3 watercourse to allow the waterway to be retained. Encroachment into the south-western Stream Order 1 watercourse is proposed as part of the development, however on-ground surveys confirmed this area was a low-lying drainage feature with limited ecological value and waterway features.

Notably, the Stream Order 3 waterway through the centre of the site is mapped as a red 'high-risk' WWBW under the *Fisheries Act 1994*. The Stream Order 2 watercourses adjoining the central waterway are mapped as orange 'moderate-risk' and green 'low-risk' WWBW. For works within these waterways, accepted development requirements are prepared under the *Planning Act 2016* and the *Fisheries Act 1994*. For a fisheries development to be considered accepted development, it must comply with the Accepted development Requirements.

Should any works be undertaken within these mapped waterways that do not meet Accepted development Requirements, a response to *State Code 18: Waterway Barrier Works* may be required. If it does not comply, it is an assessable development, and a development application lodged to the State Assessment and Referral Agency (SARA). Specifically, works associated with the re-alignment of Wyatt Road which traverses the red WWBW will need to comply with the accepted development requirements or be referred to SARA.

## 5.4. Northern Wetland – Mapped as High Ecological Significance

As discussed in **Section 4.4.2**, the site contains two wetland areas mapped as Category B remnant vegetation RE12.3.8. These areas are also mapped as 'wetland of high ecological significance' (refer **Figure 4**). The development proposes to retain and enhance the southern wetland area within the park areas through the southern extent of the site. The northern wetland is also proposed to be retained, however the new alignment of Wyatt Road will be re-positioned adjacent to this wetland. Ground surveys confirm the northern mapped wetland contains elements of the mapped regional ecosystem and contains semi-permanent water indicative of a wetland. As such an assessment against criteria that define wetlands as general or high ecological significance is required. Wetlands are assessed for ecological significance using the environmental values for wetlands in section 7 of the Environmental Protection (Wetland and Water Biodiversity) Policy 2019. There are five criteria listed below:

a) the health of the wetland's ecosystems;

b) the wetland's natural state and biological integrity;

c) the presence of distinct or unique features, endemic plants or animals and their habitats, including threatened wildlife and near threatened wildlife under the *Nature Conservation Act 1992*;

d) the wetland's natural hydrological cycle;

e) the natural interaction of the wetland with other ecosystems, including other wetlands.

The attributes of the wetland can also be assessed against criteria detailed within the Aquatic Biodiversity Assessment Mapping Method (AquaBAMM). AquaBAMM is a decision support tool developed by the Queensland Environmental Protection Agency that utilises existing information and expert input to assess conservation value in aquatic ecosystems.

Site features were assessed against criteria utilised under AquaBAMM. The results of the analysis are presented in **Table 25,** below.

**Table 25: Wetland assessment against AquaBAMM criteria**

| AquaBAMM criteria | Measure | Response |
|---|---|---|
| **Naturalness Aquatic** | **Moderate** | This wetland existed as a shallow pool, fed by overland flow. Water was present during all site visits. The wetland is positioned within a cattle grazing paddock and routinely used as a water source by the cattle. As a result of the unrestricted cattle movement throughout the wetland, the substrate is compacted, and vegetation trampled. Cattle faeces is deposited directly impacting the water quality.<br><br>The vegetation that is present consisted of native wetland indicator species and weeds.<br><br>The wetland has been assessed as being **Moderate** against the 'Naturalness Aquatic' criteria. |
| **Naturalness Catchment** | **Moderate** | As indicated in previous sections the wetland is part of a cattle grazing property where broadscale clearing has removed most of the woody vegetation. The result of the historical clearing is there is no riparian buffer to the wetland. The adjoining vegetation is pasture grass dominated by exotic weed species. Some riparian vegetation is associated with the waterway to the west of the wetland area, but the wetland is not connected to this waterway.<br><br>The 'Naturalness Catchment' criterion for the wetland was given a measure of **Moderate**. |
| **Diversity and Richness** | **Moderate** | Floral diversity recorded within the wetland was low *Persicaria decipiens* (Slender Knotweed), *Juncus usitatus* (Common Rush) and *Cyperus gracilis* (Slender Sedge) the dominant native vegetation. The weed species *Nymphaea caerulea* (Blue Water Lily) and *Eichhormia crassipes* (Common Water Hyacinth) dominated the deeper portions of the wetland and most of the weltand interface areas. During field surveys, birds associated with wetlands were observed including *Egretta novaehollandiae* (White-faced Heron), *Ephippiorhynchus asiaticus* (Black-necked Stork), *Himantopus himantopus* (Black-winged Stilt) and *Platalea regia* (Royal Spoonbill).<br><br>The 'Diversity and Richness' criterion for the wetland was given a measure of **Moderate**. |

| | | |
|---|---|---|
| **Threatened Species and Ecosystems** | **Moderate** | The wetland is mapped as consisting entirely of Of Concern Regional Ecosystem 12.3.8, palustrine wetland<br><br>Database searches for threatened species listed under the EPBC Act and NCA list a number of threatened species as potentially occurring within a 5 km radius of the site (**Appendix A and B**). No threatened flora species listed under the EPBC Act or NCA were observed during the multiple survey events over the site. No threatened fauna species listed as threatened under the EPBC Act or NCA were detected visually or audibly during site surveys.<br><br>The AquaBAMM analysis for this criterion considers three contributing indicators:<br>• **Presence** of rare or threatened aquatic ecosystem dependent fauna species<br>• **Presence** of rare or threatened aquatic ecosystem dependent flora species<br>• % area of 'of concern' or 'endangered' wetland REs in the spatial unit relative to preclear extent<br>Of the above, only the presence of 'of concern' wetland RE was confirmed on site and this feature was in a degraded state.<br><br>No rare or threatened aquatic ecosystem dependent species were confirmed onsite despite adequate surveys under the state targeted species survey guidelines.<br><br>The 'Threatened Species and Ecosystems' criterion for the wetland was given a measure of **Moderate**. |
| **Priority Species and Ecosystems** | **Moderate** | No threatened flora species listed under the EPBC Act or NCA were observed during the multiple survey events over the site. No threatened fauna species listed as threatened under the EPBC Act or NCA were detected visually or audibly during site surveys.<br><br>The AquaBAMM analysis for this criterion considers five contributing indicators:<br>• **Presence** of aquatic ecosystem dependent priority fauna<br>• **Presence** of aquatic ecosystem-dependent priority flora<br>• **Habitat for/presence** of migratory species<br>• **Habitat** for significant numbers of waterbirds<br>• **Presence** of priority aquatic ecosystem<br>Of the above, none were achieved with only individual waterbirds being observed during the site surveys. Presence of priority species of flora and fauna was not confirmed.<br><br>The 'Threatened Species and Ecosystems' criterion for the wetland was given a measure of **Moderate.** |
| **Special Features** | **Low** | The wetland does not contain any special features. The wetland contains typical characteristics of a palustrine wetland and due to the high level of disturbance surrounding the small patch of wetland on-site, it is not |

| | | |
|---|---|---|
| | | considered to provide any unique or substantial functions within the landscape.<br><br>The lack of connectivity to larger wetland areas lowers the overall importance of the limited habitat on-site as a refugia for wetland species.<br><br>The 'Special Features' criterion for the wetland was given a measure of **Low.** |
| **Connectivity** | **Low** | Connectivity potential within the surrounding landscape is limited as a result of the broadscale clearing that occurred within the local landscape. The wetland is fed by overland flow from the relatively cleared land to the east and would only drain into the waterway to the west under flood events.<br><br>The 'Connectivity' criterion for the wetland was given a measure of **Low.** |
| **Representativeness** | **Low** | The wetland on-site is not considered unique or rare for its geographic area. The flood plain where the wetland is located contains a number of depressions and low lying areas that provide similar habitat to the surveyed wetland. The wetland is not located within a protected area and is surrounded by Category X vegetation.<br><br>The 'Representativeness' criterion for the wetland was given a measure of **Low.** |

### 5.4.1 AquaBAMM Summary

The wetland adjoining Lot 22 on SP341889 and Lot 27 on S311174 appears natural in origin but broadscale clearing and prolonged cattle grazing have degraded its ecological value. Considering the degraded nature of the wetland it contains limited habitat attributes for wetland-specific fauna species, providing marginal habitat and non-breeding habitat for some species and limited amounts of breeding habitat for others.

Unique ecological values in the context of the local area are not present within the site and species diversity is considered relatively low as a result of the land use practices. Connectivity potential within the surrounding landscape is limited as a result of the broadscale clearing that occurred within the local landscape. The wetland is fed by overland flow from the relatively cleared land to the east and would only drain into the waterway to the west under flood events.

Cumulatively, the wetland is considered to have a **moderate -low value** to the overall protection of wetlands in the catchment rather than provide attributes of a wetland of High Ecological Significance.

Re-aligning Wyatt Road adjacent to the northern mapped wetland area is thus not in conflict with *PDA Guideline 14 – Environmental values and sustainable resource use* (refer **Section 5.8**) which states:

- *Provide adequate buffers between development and wetlands that are in and adjacent to the PDA (where feasible incorporate open space, storm water treatment or fauna corridors within wetland buffers).*
- *Where a wetland of high ecological significance occurs, a minimum buffer of 50 metres between the development proposal and the wetland is recommended.*

Because the wetland in question is not a wetland of high ecological significance based on ground truthed assessment. However, rehabilitation and appropriate batters will be instated to support and improve the ecological function of the northern wetland with the re-alignment of Wyatt Road (refer **Appendix F**).

## 5.5. Parks

As discussed throughout this report, the various parks will protect the highest ecological site values. This includes the main waterway that traverses through the centre of the site which is mapped as high-risk red WWBW. This waterway contains vegetated banks that provide wildlife connectivity through to Teviot Brook / Woollaman Creek in the south and continued connectivity as the waterway extends north out of the site (refer **Section 4.3**). In addition, the parks will also protect the two wetlands present on-site. As discussed in **Section 4.4.2** these wetlands provide habitat for a range of wetland bird species. Both wetlands are proposed to be retained within the parks onsite and the northern wetland will be rehabilitated where impacts due to the re-alignment of Wyatt Road occur. Enhancement of the northern wetland will occur through rehabilitation and weed management in accordance with the wetland management plan (**Plan 7** and **Appendix F**). These various parks on-site will provide a large potential wildlife movement corridor connecting to Teviot Brook and Woollaman Creek at the southern boundary of the site. This will support fauna movement through the broader landscape and entirety of the Flagstone PDA.

## 5.6. Potential impacts

The key potential ecological impacts associated with the development proposal are:

### 5.6.1 Vegetation clearing

Clearing of vegetation to support the development will reduce vegetation cover and habitat for flora and fauna dependent on those ecosystems. Ecological field surveys did not identify any unique or significant biodiversity values within the clearing area. As such, the impact to vegetation will be minor.

### 5.6.2 Weeds

Increased vehicle movement during the construction phase has the potential to increase the spread of weeds in the area, particularly during the vegetation clearing phase. With implementation of standard mitigation measures, the project is likely to result in a negligible impact to ecological values due to the potential introduction/spread of weeds. Rehabilitation through parks will assist to remove invasive *Sporobolus pyramidalis* and *Chloris gayana* which dominate the cleared paddocks across the site.

### 5.6.3 Vehicle movements

During construction, a large number of vehicles will be required on the subject site. Direct impact from vehicle movements on threatened species and vegetation communities include:

- Damage or destruction of vegetation or fauna habitat by vehicles traversing these areas; and
- Fauna strike.

Indirect impacts include:

- Interference of fauna through visual and noise impacts. This in turn can affect feeding, roosting, breeding or nesting behaviour;
- Introducing and/or spreading weeds or feral animals carried on or in vehicles, resulting in deterioration or loss of vegetation and important fauna habitat; and

- Damage or destruction of vegetation and fauna habitat through smothering by dust generated by vehicles traversing the project area.

With implementation of standard mitigation measures, the project is likely to result in a temporary and minor impact to ecological values due to vehicular movements. Further, ecological field survey confirmed only common avi-fauna are present on the site.

### 5.6.4 Earthworks

Construction activities have the potential to generate dust emissions. Dust emissions during construction will be temporary. The main sources of dust will be generated via:

- Wheel-generated dust from the haul roads created for the construction phase;
- Dust lift-off from exposed surfaces (e.g. construction roads and pads);
- Earthworks, including construction of the embankments, and moving, dumping and shaping material; and
- Vegetation and soil clearing of the land.

Excessive deposition of dust on leaves of plants can suppress the growth and photosynthesis, resulting in reduced habitat quality for fauna. High levels of airborne dust can irritate the respiratory systems of fauna and potentially result in ingestion of dust-coated seeds and other foods. Excessive deposition of dust on open water bodies may also degrade water quality and overall habitat quality for fauna. With implementation of standard mitigation measures, the project is likely to result in a temporary and minor impact to ecological values due to the generation of dust.

### 5.6.5 Light emissions during construction

Artificial light can affect both nocturnal and diurnal animals by disrupting behavioural patterns, with quality of light (e.g. wavelength, colour), intensity and duration potentially evoking different faunal responses. Impacts from increased light levels include disorientation from, or attraction toward, artificial sources of light; mortality from collisions with structures; and effects on light-sensitive cycles of species (e.g. breeding and migration for fauna and flowering in plants). An artificial increase in lighting can also affect abundance of predators.

Presence and intensity of artificial light in the project area will temporarily increase during the construction phase; however, night works will not be common. Lighting will be directed to construction areas within the project area. Some light spillage will be inevitable and is likely to be contained. Potential impacts associated with light emissions will be temporary and unlikely to be significant.

With implementation of standard mitigation measures, the project is likely to result in a negligible impact to ecological values due to the use of light pollution during construction.

### 5.6.6 Noise and vibration

Noise levels greater than existing ambient noise levels are expected during the construction within the project area. Sources of noise are likely to consist of noise in short, intense pulses from mobile plant equipment, and

more prolonged noise, with consistent vibration, pitch and volume from generators, excavators and pumps, in addition from noise from vehicles.

Both steady continuous and single noise events have the potential to lead to ecological impacts. Construction noise is expected to elicit some avoidance response from fauna using the surrounding vegetation though, with consideration of the extent of habitat available in the study area, this is likely to be a temporary and negligible to minor impact.

### 5.6.7 Waste disposal

Inappropriate disposal of non-hazardous wastes can attract vermin and other wildlife to site. This may exacerbate potential impacts (e.g. road mortality). Litter may also enter surrounding environments. With implementation of standard mitigation measures, the project is likely to result in a negligible impact to ecological values due to the generation and handling of waste.

### 5.6.8 Hazardous and dangerous goods

Spills and leaks from transfers (fuel, chemicals) and inadequate storage of dangerous goods and hazardous wastes could result in point-source contamination of surrounding land. Direct adverse impacts could include toxic impacts on vegetation (resulting in degradation or loss of vegetation and habitats), direct toxic impacts on fauna (from contact, inhalation or ingestion) or indirect impacts on threatened and migratory species from habitat loss. Direct adverse impacts on surface and groundwater quality are also possible.

With the application of standard mitigation and management measures, impacts from liquid and solid waste disposal will be avoided or localised and small in scale. Further to this, the likelihood of significant spillages is considered low. Therefore, the project is likely to result in a negligible impact to ecological values due to potential spills and leaks.

## 5.7. Ongoing disturbances

After completion of construction, the ongoing presence of infrastructure and increased human activity can continue to have potential for adverse direct and indirect impacts. The key continuing risks to ecological values include:

- Weed incursion;
- Vehicle movements;
- Noise and light; and
- Increased human presence.

Each potential impact associated with ongoing use of the site is described in detail in the following sections.

### 5.7.1 Weed incursion

Landscaped gardens will introduce a variety of new and exotic species to the area. Garden escapes have the potential to be introduced into adjacent bushland areas through vectors such as birds, wind and runoff. Weed incursion will be an ongoing and can be difficult to prevent. Nonetheless, the problem is often mostly constrained to edges of bushland that abut gardens and along urban drainage features.

With implementation of standard mitigation measures, the project is likely to result in a minor impact to ecological values due the introduction and spread of weeds. Rehabilitation through the environmental open space and biodiversity corridor will assist to remove invasive *Sporobolus pyramidalis* and *Chloris gayana* which dominate the cleared paddocks across the site.

### 5.7.2 Vehicle strike

Upon completion of the development, there will be a significant increase of vehicle traffic (compared to baseline conditions) and this will increase the likelihood of fauna strike. The probability of fauna strike is reduced because most fauna will generally avoid urban areas. Notwithstanding this, a low number of macropods, as well as reptiles (i.e. snakes and lizards attracted to heat on roads) may occasionally enter the area and be at risk of vehicular strike. However, given the lack of evidence of macropods both on-site and on adjoining allotments, the risk of vehicle strike is considered to be negligible.

### 5.7.3 Noise and light

Noise levels are likely to increase once the development is complete as there will be increased vehicular and pedestrian traffic. Road noise will be the primary source of noise impact. The establishment and use of garden paths through landscaped areas will also provide a source of noise and light due to pedestrian traffic. This is expected to be minor however.

Artificial light from residences may affect nocturnal and diurnal animals by disrupting patterns, with quality of light (e.g. wave length, colour), intensity and duration potentially evoking different responses. Impacts from increased light levels include disorientation from or attraction toward artificial sources of light; mortality from collisions with structures; and effects on light- sensitive cycles of species (e.g. breeding and migration for fauna and flowering in plants). The presence and intensity of artificial light will have most impact at the edges of adjacent vegetation. Furthermore, the project is likely to result in a negligible impact to wildlife due to light spillage. The realignment of Wyatt Road will significantly reduce the impacts of noise and light pollution through the greenspace area.

### 5.7.4 Increased human presence

Increased human activity associated with land uses within the development has the potential to disturb fauna that exist within the broader area. Examples of impacts included heightened vigilance and predator avoidance, which can disrupt foraging and roosting efficiency, or deter wildlife from using particular areas.

Increased human presence is expected to have a minor to moderate impact to wildlife and vegetation given the high level of disturbance currently impacting site.

## 5.8. Management and compensatory measures

A number of management and compensatory measures are proposed to minimise and offset impacts associated with the development. These include:

### 5.8.1 Preclearance surveys

Further to the assessment completed in this Report, additional pre-clearance surveys should be undertaken prior to the application of approved operational works management plans for Vegetation and Fauna.

### 5.8.2 Vegetation clearing and fauna management plan

A Vegetation Clearing and Fauna Management Plan (VCFMP) should form part of the broader management document submitted as part of any future operational works drawings for the development. The VCFMP should cover clearing of all vegetation listed in this report and include details on:

- Clearly show trees to be either removed or retained
- All civil works likely to impact on existing vegetation
- Temporary and permanent exclusion and protection fencing
- Roles and responsibilities for site contractors, proponent and the consultant group
- Stockpiling and site access locations
- A clearing sequence plan showing the commencement of clearing and direction of removal
- Links to weed management and revegetation proposals
- The stock piling and reuse of cleared vegetation
- Specific details on the management of identified potential fauna habitat trees
- Species surveyed as using the site with a focus on those most likely impacted by development works
- A list of relevant State and Commonwealth legislation constraints and controls for the above listed fauna
- A plan showing existing habitat opportunities and locations
- Details of the threats to existing fauna species
- Management and mitigation measures
- Fauna spotter role, contacts and certification

Refer to **Plan 6** for development assessment.

### 5.8.3 Wetland Rehabilitation Management Plan

A context area rehabilitation plan (**Plan 7**) has been developed to show the key areas of rehabilitations within the various on-site parks. The three areas of intensive rehabilitation are the northern wetland, the southern wetland and the riparian zone along the northern bank of Woolaman Creek. General weed control is proposed in all other areas of park land (**Plan 7**).

The northern wetland area has a more detailed plan (**Appendix F**) developed because of its proximity to development required greater levels of certainty that ecological function could still maintained. The exact

nature of the rehabilitation in each of the three rehabilitation areas will be presented at the time operational works applications are lodged for each of the neighbouring residential precincts.

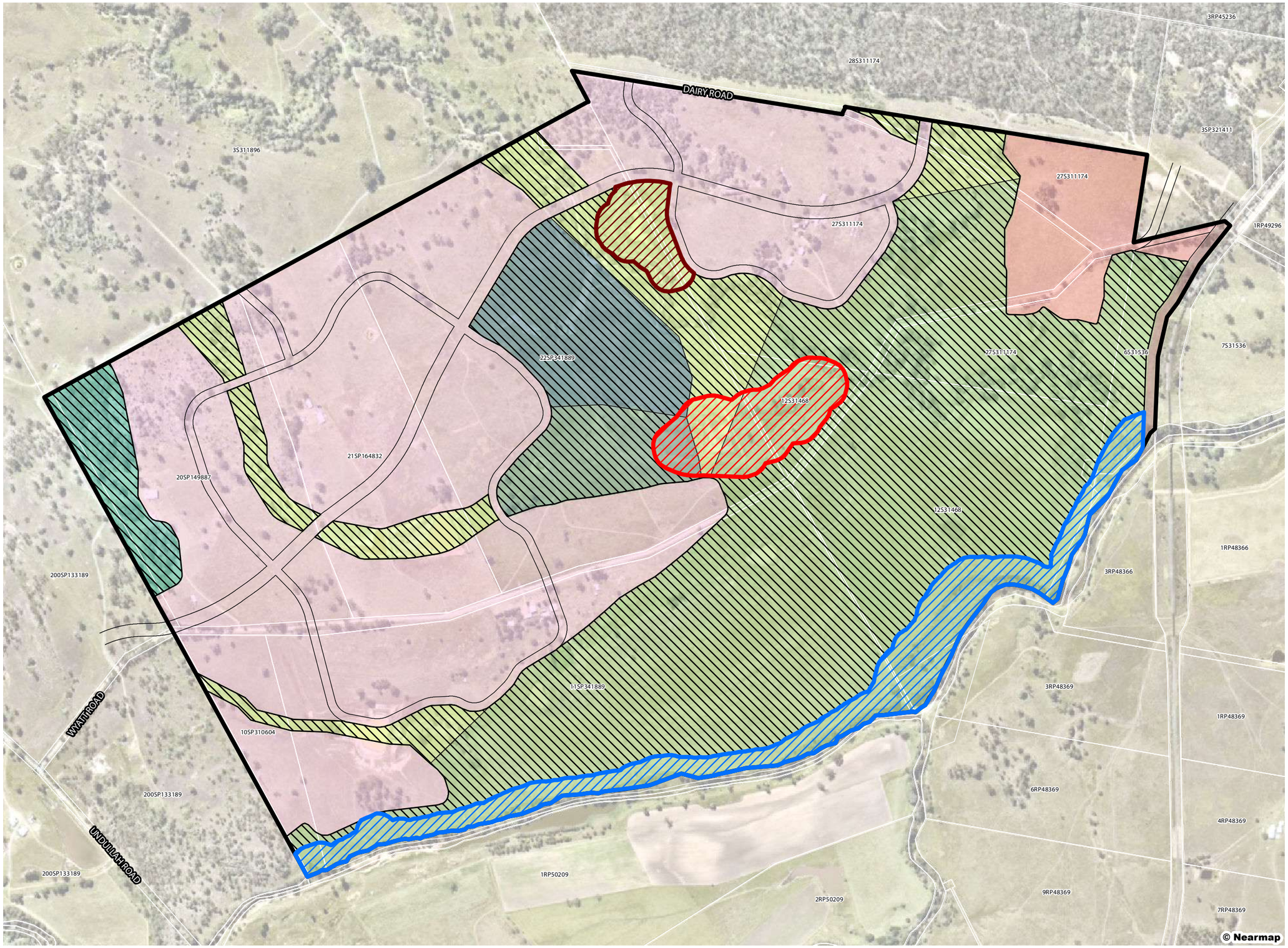
Northern Wetland Rehabilitation Management Plan

A concept Wetland Rehabilitation Management Plan has been developed for the northern wetland to mitigate impacts from the re-alignment of Wyatt Road. This is provided in **Appendix F**. Rehabilitation includes re-planting of wetland species, weed removal and road batters where the road adjoins the wetland boundary. Five (5) management zones are proposed as part of the rehabilitation which are summarized below.

**Table 26: Wetland Rehabilitation Management Zones**

| Management Zone | Details |
|---|---|
| **1 – RE 12.3.3 Interface Intensive Planting Area** | Weed management and intensive planting with species in accordance with RE12.3.3. |
| **2 – RE 12.3.3 Reconstruction** | Weed management, reconstruction and intensive planting with species in accordance with RE12.3.3. |
| **3 – RE 12.3.7 Assisted natural regeneration** | Retain existing native trees, shrubs and groundcovers and weed management to encourage natural regeneration. Planting of species from RE 12.3.7. |
| **4 – RE 12.3.7 Reconstruction** | Weed management, reconstruction and planting of species from RE 12.3.7. |
| **5 – RE 12.3.8 Wetland Reconstruction** | Weed management and planting of ground cover in accordance with RE 12.3.8. |

# 7.00 Context Area Concept Rehabilitation Plan




Notes:
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## Legend

- Qld DCDB
- Site Boundary
- Northern Wetland Rehabilitation Area
- Southern Wetland Rehabilitation Area
- Woolaman Creek Rehabilitation Area
- Weed Control Areas

**Context Plan details**

- Proposed design
- 30m Railway Corridor Widening
- Environmental Park (retain existing vegetation)
- Local Linear Park
- Urban Residential
- Major Linear Park
- Medium Density Residential
- Potential Regional Sports Park
- Regional Recreation Park

| Issue | Date | Description | Drawn | Checked |
|---|---|---|---|---|
| C | 16/07/2024 | Updated Layout | LS | KM |
| D | 19/09/2024 | Updated Layout | LS | AR |

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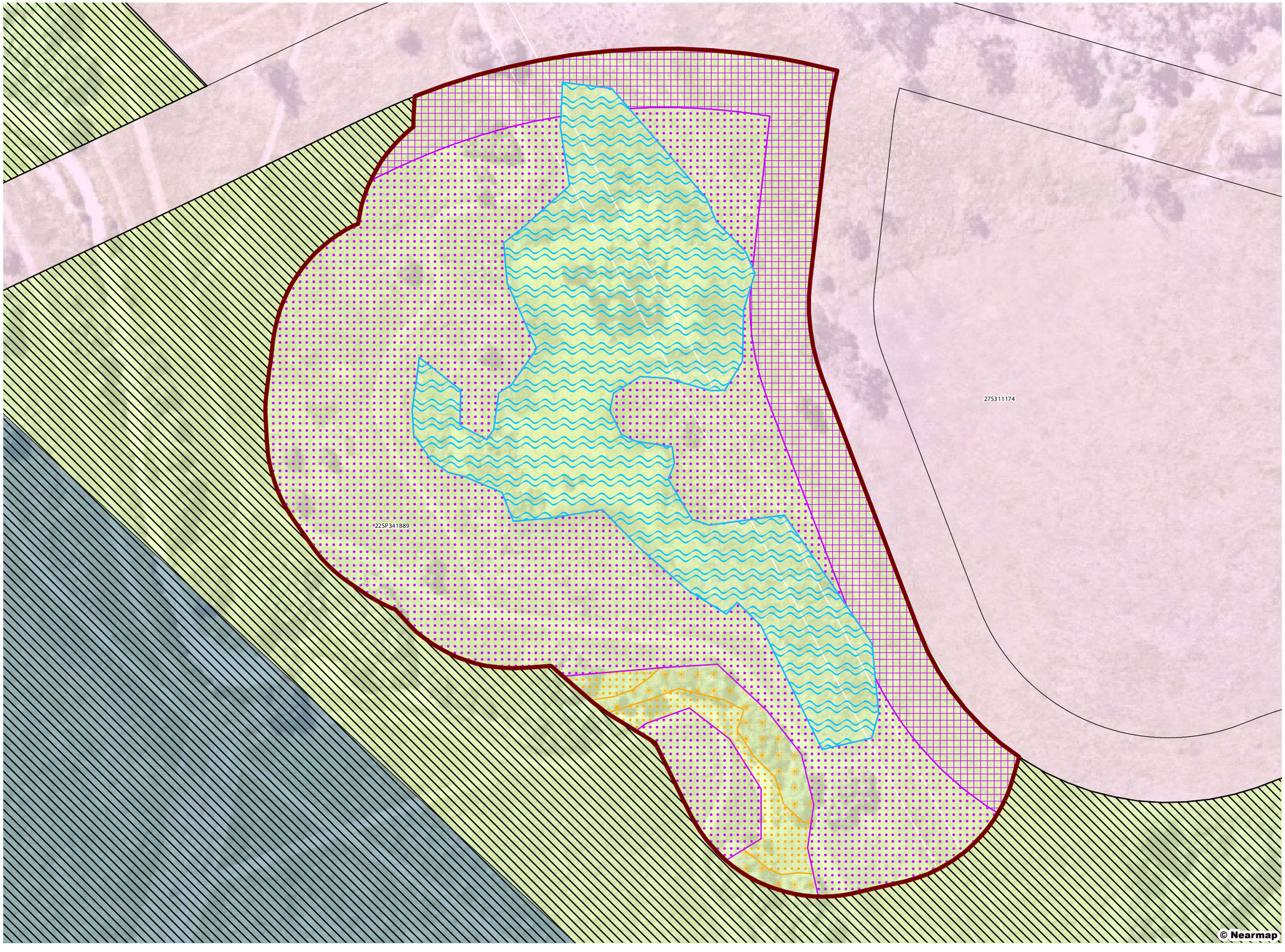
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Wyatt Road, Kagaru

*Address / RPD: Lot 11 on SP310604*

*19/09/2024 | 11560 E 07 SBAR Context CRP A*

# 7.01 Context Area Concept Rehabilitation Plan




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## Legend

- Qld DCDB
- Site Boundary
- Northern Wetland Rehabilitation Area
- Weed Control Areas

**Context Plan details**

- Proposed design
- Local Linear Park
- Urban Residential
- Potential Regional Sports Park

**Rehabilitation Management Zones (MZ)**

- MZ1 - RE 12.3.3 Interface Intensive Planting Area
- MZ2 - RE 12.3.3 Reconstruction
- MZ3 - RE 12.3.7 Assissted Natural Regeneration
- MZ4 - RE 12.3.7 Reconstruction
- MZ5 – RE 12.3.8 Wetland Reconstruction

| Issue | Date | Description | Drawn | Checked |
|---|---|---|---|---|
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| D | 17/09/2024 | Updated Layout | LS | AR |

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# 7.02 Context Area Concept Rehabilitation Plan




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## Legend

- Qld DCDB
- Site Boundary
- Southern Wetland Rehabilitation Area
- Weed Control Areas

**Context Plan details**

- Proposed design
- Local Linear Park
- Urban Residential
- Major Linear Park
- Potential Regional Sports Park
- Regional Recreation Park

**Rehabilitation Management Zones (MZ)**

- MZ1 - RE 12.3.3 Reconstruction
- MZ2 - RE 12.3.7 Reconstruction
- MZ3 - RE 12.3.7 Assissted Natural Regeneration
- MZ4 – RE 12.3.8 Wetland Reconstruction
- MZ5 - RE 12.9-10.2/12.9-10.7/12.9-10.3/ 12.9-10.17a Reconstruction
- Fence to be Removed
- Road Bund to be Removed

| Issue | Date | Description | Drawn | Checked |
|---|---|---|---|---|
| C | 16/07/2024 | Updated Layout | LS | KM |
| D | 17/09/2024 | Updated Layout | LS | AR |

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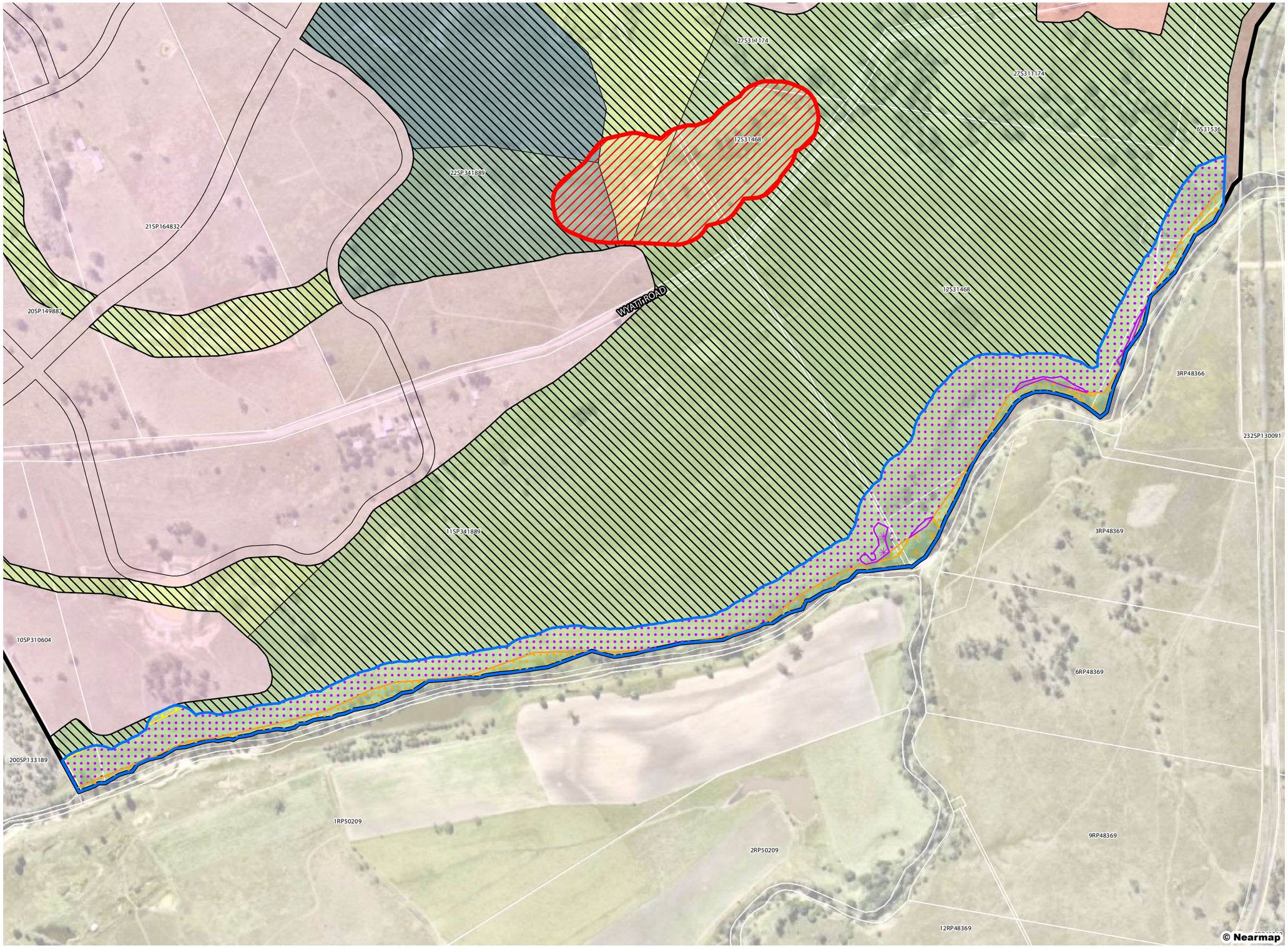
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# 7.03 Context Area Concept Rehabilitation Plan




Notes:
This plan was prepared as a desktop assessment tool. The information on this plan is not suitable for any other purpose. Property dimensions, areas, numbers of lots and contours and other physical features shown have been compiled from existing information and may not have been verified by field survey. These may need verification if the development application is approved and development proceeds, and may change when a full survey is undertaken or in order to comply with development approval conditions. No reliance should be placed on the information on this plan for detailed design or for any financial dealings involving the land. Saunders Havill Group therefore disclaims any liability for any loss or damage whatsoever or howsoever incurred, arising from any party using or relying upon this plan for any purpose other than as a document prepared for the sole purpose of accompanying a development application and which may be subject to alteration beyond the control of the Saunders Havill Group. Unless a development approval states otherwise, this is not an approved plan.

*Layer Sources*
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*Updated data available at*
*http://qldspatial.information.qld.gov.au/catalogue/*

* This note is an integral part of this plan/data. Reproduction of this plan or any part of it without this note being included in full will render the information shown on such reproduction invalid and not suitable for use.

## Legend

- Qld DCDB
- Site Boundary
- Southern Wetland Rehabilitation Area
- Woolaman Creek Rehabilitation Area
- Weed Control Areas

**Context Plan details**

- Proposed design
- 30m Railway Corridor Widening
- Local Linear Park
- Urban Residential
- Major Linear Park
- Potential Regional Sports Park
- Regional Recreation Park

**Rehabilitation Management Zones (MZ)**

- MZ1 - RE 12.3.3 Reconstruction
- MZ2 - RE 12.3.3 Assissted Natural Regeneration
- MZ3 - RE 12.3.7 Reconstruction
- MZ4 - RE 12.3.7 Assissted Natural Regeneration
- MZ5 - RE 12.9-10.2/12.9-10.7/12.9-10.3/ 12.9-10.17a Reconstruction

| Issue | Date | Description | Drawn | Checked |
|---|---|---|---|---|
| C | 16/07/2024 | Updated Layout | LS | KM |
| D | 19/09/2024 | Updated Layout | LS | AR |

0 80 160 240 m

Transverse Mercator | GDA 2020 | Zone 56 | 1:7,300 @ A3

saunders havill group

WelCo Group Pty Ltd

Wyatt Road, Kagaru

*Address / RPD: Lot 11 on SP310604*

*19/09/2024 | 11560 E 07_3 SBAR Context CRP A*

## 5.9. Guideline 14 – Environmental values and sustainable resource use

Guideline 14 outlines the values and strategies for protecting the environment and optimizing resource use in PDAs and includes the following strategies:

- Environmental values
- Pollution sources
- Climate change issues
- Natural resources

As such, a response to Guideline 14 is presented below in **Table 27** and **Table 28**.

**Table 27: Ecological processes and systems**

| Values | Strategies | Comments |
|---|---|---|
| 1. Significant terrestrial biodiversity values<br><br>Areas of significant biodiversity value may include:<br>▪ Land mapped in the applicable PDA development scheme as having significant biodiversity values<br>▪ Mapped biodiversity corridors identified in the applicable PDA development scheme<br>▪ Other areas of significance identified in the applicable PDA development scheme<br>▪ Viable areas of remnant vegetation containing endangered regional ecosystems as defined in Appendix 1<br>▪ Listed threated species habitat | Identify significant terrestrial biodiversity values within and adjoining the development area by undertaking:<br>▪ Robust field surveys<br>▪ Desktop assessments using local, state and commonwealth environment databases and mapping searches<br><br>Demonstrate how the development minimises impacts on significant biodiversity values by minimising vegetation clearing generally within the area and by specifically:<br>▪ Retaining and enhancing areas of viable remnant vegetation containing endangered regional ecosystems as defined in Appendix 1<br>▪ Avoiding, minimising or off-setting the clearing of non-viable remnant vegetation containing endangered regional ecosystems as defined in Appendix 1<br>▪ Minimising the clearing of remnant and regulated regrowth vegetation within the area<br>▪ Providing adequate buffers between development and any identified significant biodiversity value within or adjoining the development site<br>▪ Providing management plans to reduce and control clearing and manage other development and construction impacts in the area. | The proposed development area has been subject to a number of on ground surveys by SHG to identify existing ecological values at the site.<br>These have been carried out using multiple survey methods to describe various on-site habitat and vegetation characteristics to identify the potential presence of listed threatened species and locate ecologically significant areas. The results of this survey assisted in informing the development proposal.<br><br>A Significant Biodiversity Assessment Report (SBAR) for the entire property within the Greater Flagstone Priority Development Area has been prepared. As part of this reporting, desktop and ground truthing flora and fauna habitat were completed over the clearing area.<br><br>As discussed in this SBAR, ecologically significant areas are mapped on site such as the significant riparian corridor associated with Teviot Brook / Woollaman Creek, the main waterway and wetland areas.<br><br>The proposed development footprint has been strategically located to avoid the most significant ecological values on site, situated on the northern extent of the site.<br><br>While some portions of the proposed clearing area are mapped within Environmental Protection Areas under the GFPDA Development Scheme, a large portion of the site is to be retained as park (187 ha) which is almost equal to the mapped greenspace onsite in accordance with the Greater Flagstone Greenspace Network (213 ha). Importantly, the proposed clearing area is mainly located within the Urban Living precinct under the Development Scheme, which has been strategically identified to minimise impacts on landscape scale significant biodiversity values.<br><br>The proposed development footprint does not contain areas of remnant endangered vegetation as on ground assessments concluded that endangered regrowth vegetation did not meet the minimum requirements of remnant vegetation. |

| | | |
|---|---|---|
| 2. Ecological connectivity | ▪ Identify priority vegetation patches, fauna habitat features and fauna movement corridors in and beyond the application site through detailed site assessments completed in accordance with the relevant local government authority guidelines or planning scheme policies for ecological assessment<br>▪ Retain vegetation connections between priority vegetation patches, fauna habitat features and fauna linkages to ensure ecological connectivity is maintained or enhanced<br>▪ Minimise locating major infrastructure through identified corridor linkages<br>▪ Undertake strategic rehabilitation of degraded land where required to improve or create functioning corridors. | Ecological assessments completed by SHG in accordance with Guideline 14 requirements did not identify any high priority vegetation patches, habitat features or fauna corridors within the proposed Development Area, which has been largely set to avoid the removal or impact on Significant Biodiversity Areas.<br><br>The re-alignment of Wyatt Road will see the road pass relatively close to the northern mapped wetland, however on-ground surveys confirmed this area is unfenced and contains substantial damage from cattle and weed incursion. Assessment against the AquaBAAM criteria resulted in the wetland considered the wetland to have moderate value to the overall protection of wetlands in the catchment rather than provide attributes of a wetland of High Ecological significance. To mitigate the impacts of re-aligning Wyatt Road, rehabilitation is to occur within the northern wetland.<br><br>The proposed development clearing area does not contain areas of remnant endangered vegetation and instead predominantly contains Category C high value regrowth vegetation and Category B Least Concern. Approximately 6.8 ha of Category B Least Concern RE12.3.7 mapped in the centre of the site associated with the southern wetland and waterway will be retained within the proposed environmental and greenspace corridor and 4.84 ha of Category B Of Concern RE12.3.8 Remnant vegetation is present in the southern extent of the site, associated with Teviot Brook / Woollaman Creek. Development will be setback from this area to provide a suitable buffer to the riparian corridor.<br><br>Rehabilitation will be carried out to improve ecosystem function for both wetland areas on the site as well as the riparian zone along Woolaman Creek (see **Plan 7** within SBAR).<br><br>The proposed Wyatt Road realignment will traverse the mapped Greenspace corridor at the north-eastern corner, through the centre of the site and at the western extent. Field surveys confirm the western extent of the mapped greenspace contains limited ecological value due to a constructed dam on the lot to the east. A district reaction park and local park are proposal within the greenspace corridor where Wyatt Road crosses the greenspace through the centre of the site. At the north-eastern extent, Wyatt Road crossed the greenspace through predominantly cleared paddock with scattered trees. |

| | | | |
|---|---|---|---|
| | | | Currently, Wyatt Road traverses through the centre of the site and the area is bound by the Interstate Railway Line to the east. Consequently, connectivity values are severed in these directions. Land parcels adjoining to the north, east and northwest contain current EPBC approvals / determinations. Should these EPBC approvals be acted on, the area of connected habitat is significantly reduced specifically to the north of the site. |
| 3. | Sustainable landscaping practices | ▪ Incorporate biodiversity friendly landscape principles and practices such as retaining habitat trees in road reserves and opens space areas<br>▪ Maximise use of locally occurring native species in landscaping<br>▪ Identified opportunities for revegetation and rehabilitation along drainage features and biodiversity corridors | Sustainable landscape principles and practices will be incorporated within the development area under the Proposal. These will include plantings from a localised native species pallet and the retention of trees within the environment park.<br><br>Setbacks for development will be established from the southern major waterway Teviot Brook / Woollaman creek as well as the retention of surrounding vegetation. The riparian zone will be rehabilitated (see **Plan 7**). Buffers for the central waterway onsite will be implemented where possible along the eastern extent. including within the northern wetland, southern wetland and riparian area along Woolaman Creek. Consequently, ecological values in this area will be improved as a result of this development. |
| 4. | Bushfire risk management | ▪ Ensure significant biodiversity values are protected from exempt clearing by ensuring new built infrastructure is adequately set back from identified biodiversity areas<br>▪ Where a firebreak is required to protect new infrastructure ensure clearing associated with the firebreaks is located external to significant biodiversity areas. | A Bushfire Management Plan is to be addressed at the ROL stage of this proposed development. Due to the proposed development and post development vegetation settings bushfire is not considered to pose a risk to the retained vegetation on the site or the proposed development. |

**Table 28: Waterway features and wetlands.**

| Values | Strategies | Comments |
|---|---|---|
| 1. Wetlands | ▪ Identify and accurately map the extent of, and describe the values for, any identified wetlands of high ecological significance and referrable wetlands<br>▪ Provide adequate buffers between development and wetlands that are in and adjacent to the PDA (where feasible incorporate open space, storm water treatment or fauna corridors within wetland buffers)<br>▪ Where a wetland of high ecological significance occurs, a minimum buffer of 50 metres between the development proposal and the wetland is recommended | SARA Wetland Protection Area mapping and SPP MSES mapping identifies two protected wetlands within the proposal area which are mapped as 'high ecological significance wetlands'.<br><br>Surveys by SHG confirmed that some wetland species were present in these areas along with permanent water. The wetlands provide habitat for a number of aquatic bird species.<br><br>Proposed development will be situated outside the area mapped as wetland in the south which will be incorporated and rehabilitated within the various parks and biodiversity corridor to improve its ecological value (**Plan 7**).<br><br>The development proposes to retain the northern mapped 'high ecological significance' wetland, however the re-alignment of Wyatt Road will directly adjoin this wetland. Field surveys mapped this area (refer **Plan 3**) and confirm the area contains wetland features in the form of native vegetation and permanent water. However, assessment against the AquaBAAM criteria resulted in the wetland considered to have moderate value to the overall protection of wetlands in the catchment rather than provide attributes of a wetland of High Ecological significance. Rehabilitation of the northern wetland will also allow for mitigation of impacts resulting from the adjacent Wyatt Road re-alignment.<br><br>The southern wetland will also be rehabilitated with a 50 m buffer to the edge of the wetland extent. The bund currently installed crossing the wetland area will be removed as will a fence. The removal of the bund and fence will improve connectivity within the wetland and the restoration efforts will increase ecological function of the wetland area. |

| Values | Strategies | Comments |
|---|---|---|
| 2. Waterway features | ▪ Identify and accurately waterways in accordance with DES' stream order hierarchy (1-5).<br>▪ Determine existing and proposed waterway values of site stream orders (e.g. Intact remnant vegetation, riparian values, fauna connectivity, natural water quality function, waterway stability)<br>▪ Retain waterways in their undisturbed condition by minimising disturbance to natural waterways. Where this is not proposed provide a waterways feature assessment report justifying encroachment or removal of waterway areas.<br>▪ Provide adequate buffers between development and retained waterways to provide waterways protection including temperature, bank stability, light, aquatic habitat, terrestrial habitat.<br>▪ Where waterways have been designated or identified to provide dual use (fauna corridor, open space connection, stormwater conveyance) provide additional buffer setback. | The site contains several watercourses, one through the centre (stream order 3), one adjoining to the north (stream order 2) and one adjoining to the west (stream order 2). Additional stream order 1 tributaries connect to the major watercourse however these were confirmed onsite to consist of drainage features with minimal ecological values.<br><br>The development has been positioned to avoid encroachment or removal of waterway areas where possible. The majority of the eastern extent of the main waterway through the centre of the site is located within the proposed environmental open space which will allow for the waterway to be retained and rehabilitated through this area. Through the northern extents of the main waterway, some encroachment is proposed. This will be a result of the realignment of Wyatt Road. Additionally, a district recreation park and local park are proposed at the northern extent of the waterway.<br><br>As part of the ecological on-ground assessment, the 'top of bank' was identified for Teviot Brook / Woollaman Creek and recorded to establish suitable setback requirements. Vegetation associated with this major waterway will be retained and a riparian zone will be rehabilitated within the southern linear park area. In addition, vegetation within the area between the mapped waterways will be retained.<br><br>Stormwater Management and Erosion and Sediment Control Plans will be prepared as part of and operational works application. |

| Values | Strategies | Comments |
|---|---|---|
| 3. Water Quality | ▪ Water discharge to on-site and adjacent water systems (freshwater, estuarine and marine) must meet water quality standards under current Queensland legislation.<br>▪ Soil disturbance must be managed to avoid associated contaminants entering adjacent water systems.<br>▪ Identify nutrient hazard areas and appropriately manage soil and groundwater disturbance to avoid or minimise nutrient mobilisation that may increase the risk of coastal algal blooms.<br>▪ Avoid or minimise waste water discharge from the site in accordance with a waste water management plan prepared by a suitably qualified person.<br>▪ Avoid areas with highly permeable soils or a high water table when locating waste disposal activities or facilities.<br>▪ Provide adequate buffers for water quality between development and retained waterways. | Stormwater Management and Erosion and Sediment Control Plans will be prepared as part of any operational works application. |

# 6. Conclusion

This Significant Biodiversity Assessment Report was prepared on behalf of **WelCo Group Pty Ltd** who seek to develop land at Wyatt Road, Kagaru for the purposes of a master planned residential community. This SBAR provides a contemporary review of the ecological values across the site in accordance with Commonwealth, State and Local Government Legislation.

Overall, the following conclusions can be made:

- The site is typical of rural properties in the area, having been historically cleared and containing infestations of weeds due to historical and current land uses, and impacts from use for cropping and cattle agistment.
- The site is significantly disturbed due to past agricultural practices, clearing and site maintenance. Cattle damage is present throughout the watercourses and drainage features across the site. Exotic flora was prevalent across the site, dominating the cleared paddocks to the northwest and south.
- The EPBC Act PMST listed seven (7) TECs considered to have potential to be found within the area (refer **Section 3.1**). These are described as Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community; Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland; Grey box-grey gum wet forest of subtropical eastern Australia; Lowland Rainforest of Subtropical Australia; Poplar Box Grassy Woodland on Alluvial Plains; Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland Bioregions; and White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland. No evidence of these TEC's were found onsite.
- The EPBC Act PMST search listed twenty (20) threatened flora species as possible occurring within the area. No EPBC Act listed flora species were recorded within the application area.
- A search of the NCA Wildlife Online database listed one (1) threatened flora species as possibly occurring within the area. *Melaleuca irbyana* was not identified within the site.
- Of the threatened fauna species listed under EPBC Act and NC Act, field surveys recorded potential for site utilisation by Koala and Grey-headed Flying-fox due to potential foraging resources within the site and local records within the surrounding area. No direct observations of the Koala or Grey-headed Flying-fox were made within the site during field survey.
- The site contains vegetation that is consistent with the EPBC Act Koala Guideline definition of critical habitat for the Koala. Based on aerial photography, the site has been subject to substantial clearing particularly in the central and southern portions of the site. As a result, the majority of the site is mapped as Category X vegetation and Category C (high value regrowth) where some areas have reached the threshold to be considered 'non-juvenile Koala habitat trees.'
- Connectivity values in the immediate vicinity of the site are limited due to historic clearing and land use change. The site is connected to vegetation to the west through the Teviot Brook / Woollaman Creek corridor. Similarly, in the north, vegetation surrounding the waterway through the centre of the

site allows connectivity to the north and east. Despite this, due to its location within a PDA, much of this area is earmarked for development and thus connectivity values are considered likely to be further reduced into the future.

- Regional Ecosystem mapping shows the site as containing four (4) separate areas of Category B remnant vegetation. Two (2) being vegetation associated with the main watercourse through the centre of the site mapped as Least Concern RE12.3.7. Remnant vegetation described as Of Concern RE12.3.8 is mapped in associated with two wetland areas. Remnant vegetation adjacent to the main watercourse will be retained through the various parks. The remainder of the site consists of Category C high value regrowth including Endangered RE12.3.3/12.3.7 and Of Concern composite RE12.9-10.2/12.9-10.7/12.9-10.3/12.9-10.17 which corresponds to patches of Eucalypt dominated vegetation in the northern extent of the site. A patch of Category C Of Concern composite RE12.9-10.2/12.9-10.7/12.9-10.3/12.9-10.17 also occurs along the existing Wyatt Road alignment.
- The two wetland areas present onsite contain permanent water and wetland vegetation species including *Persicaria decipiens* (Slender Knotweed), *Juncus usitatus* (Common Rush) and *Cyperus gracilis* (Slender Sedge) along with few *Melaleuca viminalis* (Weeping Bottlebrush) trees. The northern wetland area is proposed to be retained, however the new Wyatt Road alignment will directly adjoin this area, therefore rehabilitation will be completed where impacts occur. Assessment against the AquaBAAM criteria resulted in the wetland considered to have moderate value to the overall protection of wetlands in the catchment. Both wetlands will be retained and rehabilitated as part of the onsite parks (**Plan 7**).
- One (1) main waterway is mapped onsite as a tributary of Teviot Brook / Woollaman Creek through the center of the site. Several additional drainage features extend from the main waterway. On-ground surveys confirm the main waterway has substantial watercourse bed and bank features with *Melaleuca viminalis* and *Eucalyptus tereticornis* trees lining the bank throughout its extent. Rehabilitation of the watercourse within the major linear park will help support and improve ecological value. As part of the ecological on-ground assessment, the 'top of bank' mark of Teviot Brook / Woollaman Creek was identified and recorded to ascertain development setback requirements. A minimum buffer of 50 m for Teviot Brook / Woollaman Creek has been implemented into the development plan.
- The project area contains a diverse array of flora species typically found within a rural setting consisting of native canopy species with invasive species present within the shrub and ground layer.
- Fauna recorded across the site included common mammals, reptiles and avifauna, which are likely to utilise the application area as part of a much broader home range. These species are considered common to the surrounding area.

# 7. Appendices

## Appendix A

Environment Protection and Biodiversity Conservation Act 1999

Protected Matters Search Tool Results

## Appendix B

Nature Conservation Act 1992

Wildlife Online Search Results

## Appendix C

Environmental Searches

## Appendix D

Likelihood of Occurrence Assessment

## Appendix E

Site BioCondition Transect Data and SAT Survey Results

## Appendix F

Northern Wetland Rehabilitation Plan

# Appendix A

## Environment Protection and Biodiversity Conservation Act 1999 Protected Matters Search Tool Results

Australian Government

Department of Climate Change, Energy, the Environment and Water

# EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 07-Mar-2024


Summary

Details

- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat

Acknowledgements

# Summary

## Matters of National Environment Significance

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

| | |
|---|---|
| World Heritage Properties: | None |
| National Heritage Places: | None |
| Wetlands of International Importance (Ramsar | 1 |
| Great Barrier Reef Marine Park: | None |
| Commonwealth Marine Area: | None |
| Listed Threatened Ecological Communities: | 7 |
| Listed Threatened Species: | 54 |
| Listed Migratory Species: | 15 |

## Other Matters Protected by the EPBC Act

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

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

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

| | |
|---|---|
| Commonwealth Lands: | None |
| Commonwealth Heritage Places: | None |
| Listed Marine Species: | 22 |
| Whales and Other Cetaceans: | None |
| Critical Habitats: | None |
| Commonwealth Reserves Terrestrial: | None |
| Australian Marine Parks: | None |
| Habitat Critical to the Survival of Marine Turtles: | None |

## Extra Information

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

| | |
|---|---|
| State and Territory Reserves: | 1 |
| Regional Forest Agreements: | None |
| Nationally Important Wetlands: | None |
| EPBC Act Referrals: | 25 |
| Key Ecological Features (Marine): | None |
| Biologically Important Areas: | None |
| Bioregional Assessments: | None |
| Geological and Bioregional Assessments: | None |

# Details

## Matters of National Environmental Significance

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

| Ramsar Site Name | Proximity | Buffer Status |
|---|---|---|
| Moreton bay | 30 - 40km upstream from Ramsar site | In feature area |

### Listed Threatened Ecological Communities [ Resource Information ]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

| Community Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community | Endangered | Community may occur within area | In feature area |
| Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland | Endangered | Community likely to occur within area | In buffer area only |
| Grey box-grey gum wet forest of subtropical eastern Australia | Endangered | Community likely to occur within area | In buffer area only |
| Lowland Rainforest of Subtropical Australia | Critically Endangered | Community may occur within area | In feature area |
| Poplar Box Grassy Woodland on Alluvial Plains | Endangered | Community may occur within area | In feature area |
| Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions | Endangered | Community likely to occur within area | In feature area |
| White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland | Critically Endangered | Community likely to occur within area | In feature area |

### Listed Threatened Species [ Resource Information ]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| BIRD | | | |

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| Anthochaera phrygia<br>Regent Honeyeater [82338] | Critically Endangered | Foraging, feeding or related behaviour may occur within area | In feature area |
| Botaurus poiciloptilus<br>Australasian Bittern [1001] | Endangered | Species or species habitat may occur within area | In feature area |
| Calidris acuminata<br>Sharp-tailed Sandpiper [874] | Vulnerable | Species or species habitat may occur within area | In feature area |
| Calidris ferruginea<br>Curlew Sandpiper [856] | Critically Endangered | Species or species habitat may occur within area | In feature area |
| Calyptorhynchus lathami lathami<br>South-eastern Glossy Black-Cockatoo [67036] | Vulnerable | Species or species habitat likely to occur within area | In feature area |
| Charadrius leschenaultii<br>Greater Sand Plover, Large Sand Plover [877] | Vulnerable | Species or species habitat may occur within area | In buffer area only |
| Climacteris picumnus victoriae<br>Brown Treecreeper (south-eastern) [67062] | Vulnerable | Species or species habitat may occur within area | In feature area |
| Cyclopsitta diophthalma coxeni<br>Coxen's Fig-Parrot [59714] | Critically Endangered | Species or species habitat may occur within area | In feature area |
| Erythrotriorchis radiatus<br>Red Goshawk [942] | Endangered | Species or species habitat likely to occur within area | In feature area |
| Falco hypoleucos<br>Grey Falcon [929] | Vulnerable | Species or species habitat likely to occur within area | In feature area |
| Gallinago hardwickii<br>Latham's Snipe, Japanese Snipe [863] | Vulnerable | Species or species habitat known to occur within area | In feature area |

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| Geophaps scripta scripta | | | |
| Squatter Pigeon (southern) [64440] | Vulnerable | Species or species habitat may occur within area | In feature area |
| Grantiella picta | | | |
| Painted Honeyeater [470] | Vulnerable | Species or species habitat may occur within area | In feature area |
| Hirundapus caudacutus | | | |
| White-throated Needletail [682] | Vulnerable | Species or species habitat known to occur within area | In feature area |
| Lathamus discolor | | | |
| Swift Parrot [744] | Critically Endangered | Species or species habitat likely to occur within area | In feature area |
| Rostratula australis | | | |
| Australian Painted Snipe [77037] | Endangered | Species or species habitat likely to occur within area | In feature area |
| Stagonopleura guttata | | | |
| Diamond Firetail [59398] | Vulnerable | Species or species habitat may occur within area | In feature area |
| Tringa nebularia | | | |
| Common Greenshank, Greenshank [832] | Endangered | Species or species habitat likely to occur within area | In feature area |
| Turnix melanogaster | | | |
| Black-breasted Button-quail [923] | Vulnerable | Species or species habitat likely to occur within area | In feature area |
| FISH | | | |
| Maccullochella mariensis | | | |
| Mary River Cod [83806] | Endangered | Translocated population known to occur within area | In feature area |
| INSECT | | | |
| Argynnis hyperbius inconstans | | | |
| Australian Fritillary [88056] | Critically Endangered | Species or species habitat may occur within area | In feature area |
| MAMMAL | | | |
| Chalinolobus dwyeri | | | |
| Large-eared Pied Bat, Large Pied Bat [183] | Endangered | Species or species habitat may occur within area | In feature area |

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| Dasyurus maculatus maculatus (SE mainland population) | | | |
| Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184] | Endangered | Species or species habitat likely to occur within area | In feature area |
| Macroderma gigas | | | |
| Ghost Bat [174] | Vulnerable | Species or species habitat may occur within area | In feature area |
| Petauroides volans | | | |
| Greater Glider (southern and central) [254] | Endangered | Species or species habitat likely to occur within area | In feature area |
| Petaurus australis australis | | | |
| Yellow-bellied Glider (south-eastern) [87600] | Vulnerable | Species or species habitat known to occur within area | In feature area |
| Petrogale penicillata | | | |
| Brush-tailed Rock-wallaby [225] | Vulnerable | Species or species habitat may occur within area | In feature area |
| Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) | | | |
| Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104] | Endangered | Species or species habitat known to occur within area | In feature area |
| Potorous tridactylus tridactylus | | | |
| Long-nosed Potoroo (northern) [66645] | Vulnerable | Species or species habitat may occur within area | In feature area |
| Pseudomys novaehollandiae | | | |
| New Holland Mouse, Pookila [96] | Vulnerable | Species or species habitat may occur within area | In buffer area only |
| Pteropus poliocephalus | | | |
| Grey-headed Flying-fox [186] | Vulnerable | Roosting known to occur within area | In feature area |
| PLANT | | | |
| Arthraxon hispidus | | | |
| Hairy-joint Grass [9338] | Vulnerable | Species or species habitat likely to occur within area | In feature area |
| Bosistoa transversa | | | |
| Three-leaved Bosistoa, Yellow Satinheart [16091] | Vulnerable | Species or species habitat likely to occur within area | In feature area |

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| Coleus habrophyllus listed as Plectranthus habrophyllus [91378] | Endangered | Species or species habitat likely to occur within area | In buffer area only |
| Cryptostylis hunteriana Leafless Tongue-orchid [19533] | Vulnerable | Species or species habitat may occur within area | In feature area |
| Cupaniopsis shirleyana Wedge-leaf Tuckeroo [3205] | Vulnerable | Species or species habitat may occur within area | In feature area |
| Cupaniopsis tomentella Boonah Tuckeroo [3322] | Vulnerable | Species or species habitat likely to occur within area | In feature area |
| Dichanthium setosum bluegrass [14159] | Vulnerable | Species or species habitat likely to occur within area | In feature area |
| Fontainea venosa [24040] | Vulnerable | Species or species habitat may occur within area | In feature area |
| Macadamia integrifolia Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326] | Vulnerable | Species or species habitat likely to occur within area | In buffer area only |
| Macadamia tetraphylla Rough-shelled Bush Nut, Macadamia Nut, Rough-shelled Macadamia, Rough-leaved Queensland Nut [6581] | Vulnerable | Species or species habitat may occur within area | In buffer area only |
| Notelaea lloydii Lloyd's Olive [15002] | Vulnerable | Species or species habitat likely to occur within area | In feature area |
| Notelaea x ipsviciensis listed as Notelaea ipsviciensis Cooneana Olive [93460] | Critically Endangered | Species or species habitat may occur within area | In feature area |
| Picris evae Hawkweed [10839] | Vulnerable | Species or species habitat may occur within area | In feature area |

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| Planchonella eerwah<br>Shiny-leaved Condoo, Black Plum, Wild Apple [17340] | Endangered | Species or species habitat likely to occur within area | In feature area |
| Rhaponticum australe<br>Austral Cornflower, Native Thistle [22647] | Vulnerable | Species or species habitat may occur within area | In feature area |
| Rhodamnia rubescens<br>Scrub Turpentine, Brown Malletwood [15763] | Critically Endangered | Species or species habitat may occur within area | In feature area |
| Rhodomyrtus psidioides<br>Native Guava [19162] | Critically Endangered | Species or species habitat may occur within area | In feature area |
| Samadera bidwillii<br>Quassia [29708] | Vulnerable | Species or species habitat likely to occur within area | In feature area |
| Sophora fraseri<br>[8836] | Vulnerable | Species or species habitat may occur within area | In buffer area only |
| Thesium australe<br>Austral Toadflax, Toadflax [15202] | Vulnerable | Species or species habitat may occur within area | In feature area |
| REPTILE | | | |
| Delma torquata<br>Adorned Delma, Collared Delma [1656] | Vulnerable | Species or species habitat may occur within area | In feature area |
| Furina dunmalli<br>Dunmall's Snake [59254] | Vulnerable | Species or species habitat may occur within area | In feature area |
| Hemiaspis damelii<br>Grey Snake [1179] | Endangered | Species or species habitat likely to occur within area | In feature area |

| Listed Migratory Species | | | [ Resource Information ] |
|---|---|---|---|
| Scientific Name | Threatened Category | Presence Text | Buffer Status |
| Migratory Marine Birds | | | |

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| [Apus pacificus](#)<br>Fork-tailed Swift [678] | | Species or species habitat likely to occur within area | In feature area |
| **Migratory Terrestrial Species** | | | |
| [Cuculus optatus](#)<br>Oriental Cuckoo, Horsfield's Cuckoo [86651] | | Species or species habitat may occur within area | In feature area |
| [Hirundapus caudacutus](#)<br>White-throated Needletail [682] | Vulnerable | Species or species habitat known to occur within area | In feature area |
| [Monarcha melanopsis](#)<br>Black-faced Monarch [609] | | Species or species habitat likely to occur within area | In feature area |
| [Motacilla flava](#)<br>Yellow Wagtail [644] | | Species or species habitat may occur within area | In feature area |
| [Myiagra cyanoleuca](#)<br>Satin Flycatcher [612] | | Species or species habitat known to occur within area | In feature area |
| [Rhipidura rufifrons](#)<br>Rufous Fantail [592] | | Species or species habitat likely to occur within area | In feature area |
| [Symposiachrus trivirgatus as Monarcha trivirgatus](#)<br>Spectacled Monarch [83946] | | Species or species habitat may occur within area | In feature area |
| **Migratory Wetlands Species** | | | |
| [Actitis hypoleucos](#)<br>Common Sandpiper [59309] | | Species or species habitat may occur within area | In feature area |
| [Calidris acuminata](#)<br>Sharp-tailed Sandpiper [874] | Vulnerable | Species or species habitat may occur within area | In feature area |
| [Calidris ferruginea](#)<br>Curlew Sandpiper [856] | Critically Endangered | Species or species habitat may occur within area | In feature area |

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| Calidris melanotos | | | |
| Pectoral Sandpiper [858] | | Species or species habitat may occur within area | In feature area |
| Charadrius leschenaultii | | | |
| Greater Sand Plover, Large Sand Plover [877] | Vulnerable | Species or species habitat may occur within area | In buffer area only |
| Gallinago hardwickii | | | |
| Latham's Snipe, Japanese Snipe [863] | Vulnerable | Species or species habitat known to occur within area | In feature area |
| Tringa nebularia | | | |
| Common Greenshank, Greenshank [832] | Endangered | Species or species habitat likely to occur within area | In feature area |

## Other Matters Protected by the EPBC Act

| Listed Marine Species | | | [ Resource Information ] |
|---|---|---|---|
| Scientific Name | Threatened Category | Presence Text | Buffer Status |
| Bird | | | |
| Actitis hypoleucos | | | |
| Common Sandpiper [59309] | | Species or species habitat may occur within area | In feature area |
| Anseranas semipalmata | | | |
| Magpie Goose [978] | | Species or species habitat may occur within area overfly marine area | In feature area |
| Apus pacificus | | | |
| Fork-tailed Swift [678] | | Species or species habitat likely to occur within area overfly marine area | In feature area |
| Bubulcus ibis as Ardea ibis | | | |
| Cattle Egret [66521] | | Species or species habitat may occur within area overfly marine area | In feature area |
| Calidris acuminata | | | |
| Sharp-tailed Sandpiper [874] | Vulnerable | Species or species habitat may occur within area | In feature area |

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| Calidris ferruginea<br>Curlew Sandpiper [856] | Critically Endangered | Species or species habitat may occur within area overfly marine area | In feature area |
| Calidris melanotos<br>Pectoral Sandpiper [858] | | Species or species habitat may occur within area overfly marine area | In feature area |
| Charadrius leschenaultii<br>Greater Sand Plover, Large Sand Plover [877] | Vulnerable | Species or species habitat may occur within area | In buffer area only |
| Gallinago hardwickii<br>Latham's Snipe, Japanese Snipe [863] | Vulnerable | Species or species habitat known to occur within area overfly marine area | In feature area |
| Haliaeetus leucogaster<br>White-bellied Sea-Eagle [943] | | Species or species habitat known to occur within area | In feature area |
| Hirundapus caudacutus<br>White-throated Needletail [682] | Vulnerable | Species or species habitat known to occur within area overfly marine area | In feature area |
| Lathamus discolor<br>Swift Parrot [744] | Critically Endangered | Species or species habitat likely to occur within area overfly marine area | In feature area |
| Merops ornatus<br>Rainbow Bee-eater [670] | | Species or species habitat may occur within area overfly marine area | In feature area |
| Monarcha melanopsis<br>Black-faced Monarch [609] | | Species or species habitat likely to occur within area overfly marine area | In feature area |
| Motacilla flava<br>Yellow Wagtail [644] | | Species or species habitat may occur within area overfly marine area | In feature area |

| Scientific Name | Threatened Category | Presence Text | Buffer Status |
|---|---|---|---|
| Myiagra cyanoleuca<br>Satin Flycatcher [612] | | Species or species habitat known to occur within area overfly marine area | In feature area |
| Pterodroma cervicalis<br>White-necked Petrel [59642] | | Species or species habitat may occur within area | In feature area |
| Rhipidura rufifrons<br>Rufous Fantail [592] | | Species or species habitat likely to occur within area overfly marine area | In feature area |
| Rostratula australis as Rostratula benghalensis (sensu lato)<br>Australian Painted Snipe [77037] | Endangered | Species or species habitat likely to occur within area overfly marine area | In feature area |
| Sterna striata<br>White-fronted Tern [799] | | Migration route may occur within area | In buffer area only |
| Symposiachrus trivirgatus as Monarcha trivirgatus<br>Spectacled Monarch [83946] | | Species or species habitat may occur within area overfly marine area | In feature area |
| Tringa nebularia<br>Common Greenshank, Greenshank [832] | Endangered | Species or species habitat likely to occur within area overfly marine area | In feature area |

## Extra Information

| State and Territory Reserves | | | [ Resource Information ] |
|---|---|---|---|
| Protected Area Name | Reserve Type | State | Buffer Status |
| Undullah | Nature Refuge | QLD | In buffer area only |

| EPBC Act Referrals | | | | [ Resource Information ] |
|---|---|---|---|---|
| Title of referral | Reference | Referral Outcome | Assessment Status | Buffer Status |
| | | | | |
| DT0018 Matt Court Wastewater Conveyance | 2023/09529 | | Assessment | In buffer area only |

| Title of referral | Reference | Referral Outcome | Assessment Status | Buffer Status |
|---|---|---|---|---|
| | | | | |
| Kagaru to Acacia Ridge and Bromelton Inland Rail Project | 2021/8927 | | Completed | In feature area |
| New Beith Road Upgrade | 2023/09505 | | Assessment | In buffer area only |
| Controlled action | | | | |
| Bushman Drive Residential Development, Jimboomba, Qld | 2018/8376 | Controlled Action | Further Information Request | In feature area |
| Casino Ipswich Pipeline | 2007/3877 | Controlled Action | Completed | In feature area |
| Cedar Grove Connector Pipeline | 2011/6013 | Controlled Action | Completed | In buffer area only |
| Flagstone West Urban Development Project, QLD | 2014/7206 | Controlled Action | Post-Approval | In buffer area only |
| Flinders Residential Development, Undullah Road, Undullah, Qld | 2017/8109 | Controlled Action | Further Information Request | In buffer area only |
| Greater Flagstone master planned residential development, Undullah, Qld | 2015/7530 | Controlled Action | Post-Approval | In feature area |
| Inland Rail Calvert to Kagaru Project | 2017/7944 | Controlled Action | Assessment Approach | In feature area |
| Residential Development, Lot 4 RP45728, New Beith, Qld | 2019/8398 | Controlled Action | Further Information Request | In buffer area only |
| Residential development, Lots 3, 200 and 1, approx 6.5km SW Undullah, Qld | 2016/7772 | Controlled Action | Further Information Request | In feature area |
| Residential development, Teviot Road, north Beaudesert, Qld | 2016/7724 | Controlled Action | Post-Approval | In buffer area only |
| Residential Development (Lot30, SP309195) Mountain Ridge Rd, South Maclean, Qld | 2019/8408 | Controlled Action | Post-Approval | In buffer area only |
| Southern Regional Water Pipeline | 2006/2593 | Controlled Action | Post-Approval | In feature area |
| Tarnbrae Greater Flagstone Residential Development, New Beith, QLD | 2019/8412 | Controlled Action | Further Information Request | In buffer area only |
| Wyaralong Dam | 2006/3157 | Controlled Action | Post-Approval | In buffer area only |
| Not controlled action | | | | |

| Title of referral | Reference | Referral Outcome | Assessment Status | Buffer Status |
|---|---|---|---|---|
| Not controlled action | | | | |
| Cedar Grove Weir | 2006/2731 | Not Controlled Action | Completed | In buffer area only |
| Construction and upgrade of approximately 7km of external road corridor, Flagstone, Qld | 2014/7319 | Not Controlled Action | Completed | In feature area |
| Flagstone Central to Cedar Grove WWTP Conveyance Pipeline | 2018/8190 | Not Controlled Action | Completed | In feature area |
| Greenbank to Flagstone Central Conveyance Pipeline Project, Qld | 2018/8344 | Not Controlled Action | Completed | In buffer area only |
| Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia | 2015/7522 | Not Controlled Action | Completed | In feature area |
| South West Pipeline and Wyaralong Tanks Project, Qld | 2018/8320 | Not Controlled Action | Completed | In buffer area only |
| Upgraded sewerage infrastructure in the Helensvale/Coombabah catchment | 2004/1427 | Not Controlled Action | Completed | In buffer area only |
| Not controlled action (particular manner) | | | | |
| Construction & Operation 275/330kV Transmission Line | 2006/2820 | Not Controlled Action (Particular Manner) | Post-Approval | In feature area |

# Caveat

## 1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

## 2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

## 3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

## 4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

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

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

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

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

# Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

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

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

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

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Canberra ACT 2601 Australia
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# Appendix B

## Nature Conservation Act 1992 Wildlife Online Search Results

Queensland Government

# WildNet species list

Search Criteria: Species List for a Specified Point
Species: All
Type: Native
Queensland status: Rare and threatened species
Records: Confirmed
Date: All
Latitude: -27.8409
Longitude: 152.9145
Distance: 5
Email: xandergwynn-jones@saundershavill.com
Date submitted: Friday 08 Mar 2024 09:01:03
Date extracted: Friday 08 Mar 2024 09:10:02

The number of records retrieved = 4

**Disclaimer**
Information presented on this product is distributed by the Queensland Government as an information source only. While every care is taken to ensure the accuracy of this data, the State of Queensland makes no statements, representations or warranties about the accuracy, reliability, completeness or suitability of any information contained in this product.
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Information about your Species lists request is logged for quality assurance, user support and product enhancement purposes only.
The information provided should be appropriately acknowledged as being derived from WildNet database when it is used. As the WildNet Program is still in a process of collating and vetting data, it is possible the information given is not complete. Go to the WildNet database webpage (https://www.qld.gov.au/environment/plants-animals/species-information/wildnet) to find out more about WildNet and where to access other WildNet information products approved for publication. Feedback about WildNet species lists should be emailed to wildlife.online@des.qld.gov.au.

| Kingdom | Class | Family | Scientific Name | Common Name | I | Q | A | Records |
|---|---|---|---|---|---|---|---|---|
| animals | amphibians | Limnodynastidae | *Adelotus brevis* | tusked frog | | V | | 1 |
| animals | birds | Strigidae | *Ninox strenua* | powerful owl | | V | | 1 |
| animals | mammals | Phascolarctidae | *Phascolarctos cinereus* | koala | | E | E | 13 |
| plants | land plants | Myrtaceae | *Melaleuca irbyana* | | | E | | 3 |

CODES

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

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992.*
The codes are Extinct (EX), Extinct in the Wild (PE), Critically Endangered (CR), Endangered (E), Vulnerable (V), Near Threatened (NT), Special Least Concern (SL) and Least Concern (C).

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

Records - The first number indicates the total number of records of the taxon (wildlife records and species listings for selected areas).
This number is output as 99999 if it equals or exceeds this value. A second number located after a / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.

# Appendix C

## Environmental Searches



saunders havill group

# Environmental searches

325 Wyatt Road,
Kagura
Queensland 4285
WelCo Group Pty Ltd
8 March 2024

11560

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| **Property attributes** | | **8 March 2024** |
|---|---|---|
| Address | 325 Wyatt Road, Kagura, Queensland 4285 | |
| Lot/plan(s) | Lot 11 on SP341889<br>Lot 12 on S31468<br>Lot 27 on S311174<br>Lot 20 on SP149887<br>Lot 21 on SP164832<br>Lot 10 on SP310604<br>Lot 22 on SP341889<br>Lot 6 on S31536<br>Lot 3 on SP321411 | |
| Area (ha) | 88.94 ha<br>48.562 ha<br>80.93 ha<br>40.09 ha<br>33.44 ha<br>9.087 ha<br>83.94 ha<br>8.503 ha<br>19.89 ha | Total: 413.382 ha |
| Local government area | Logan City Council / Greater Flagstone PDA | |

## 1. Federal Matters of National Environmental Significance

| A Protected Matters Report was generated from the environment.gov.au website and returned the following results. These matters may occur within a 5 km radius of the site and are protected under the *Environment Protection and Biodiversity Conservation Act 1999*. | |
|---|---|
| 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: | 7 | |
| ***Community*** | ***Status*** | ***RE Mapped*** |
| Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community | Endangered | No |
| Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland | Endangered | No |
| Grey box-grey gum wet forest of subtropical eastern Australia | Endangered | Yes: 12.9-10.3 |
| Lowland Rainforest of Subtropical Australia | Critically Endangered | No |
| Poplar Box Grassy Woodland on Alluvial Plains | Endangered | No |
| Subtropical Eucalypt Floodplain Forest and Woodland of the New South Wales North Coast and South East Queensland Bioregions | Endangered | No |
| White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland | Critically Endangered | No |
| Listed Threatened Species: | 54 | |
| Listed Migratory Species: | 15 | |

## 2. State Matters

### *2.1 Nature Conservation Act 1992 and subordinate legislation*

| | |
|---|---|
| Protected Plants Flora Survey Trigger Map | Partially within high risk area |

### *2.2 Vegetation Management Act 1999 and subordinate legislation*

Regulated Vegetation Management Map and Vegetation Management Supporting Map

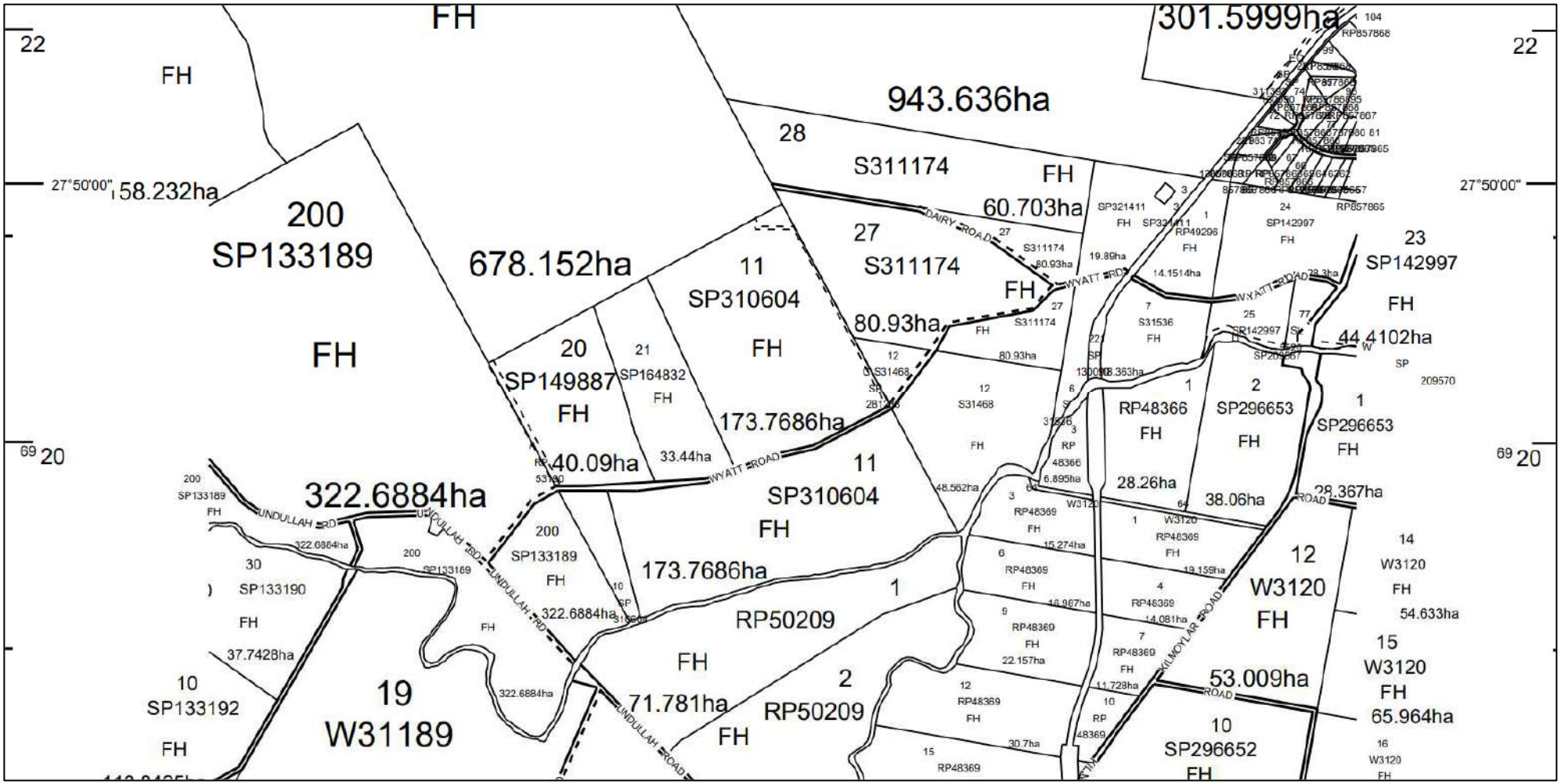
| Regional Ecosystem | VMA status | Category | Area (ha) | Lot |
|---|---|---|---|---|
| 12.3.3 | Endangered | C | 0.8<br><0.01<br>0.36<br>0.90 | 6S31536<br>3SP321411<br>27S311174<br>22SP341889 |
| 12.3.7 | Least Concern | B | 0.01<br>5.16<br>0.01<br>1.55<br>0.08 | 6S31536<br>27S311174<br>22SP341889<br>12S31468<br>11SP341889 |
| 12.3.8 | Of Concern | B | 0.60<br>2.96 | 27S311174<br>22SP341889 |

| | | | | |
|---|---|---|---|---|
| | | | 1.28 | 12S31468 |
| 12.9-10.17 | Least Concern | B | 0.02 | 3SP321411 |
| 12.9-10.17 | Least Concern | C | 0.01<br>0.01<br>0.28<br><0.01 | 6S31536<br>3SP321411<br>27S311174<br>22SP341889 |
| 12.9-10.2 | Least Concern | B | 0.13<br>5.19<br>1.11 | 3SP321411<br>20SP149887<br>21SP164832 |
| 12.9-10.2 | Least Concern | C | 0.03<br>0.02<br>1.13<br><0.01 | 6S31536<br>3SP321411<br>27S311174<br>22SP341889 |
| 12.9-10.3 | Of Concern | B | 0.01 | 3SP321411 |
| 12.9-10.3 | Of Concern | C | 0.01<br>0.01<br>0.56<br><0.01 | 6S31536<br>3SP321411<br>27S311174<br>22SP341889 |
| 12.9-10.7 | Of Concern | B | 0.05 | 3SP321411 |
| 12.9-10.7 | Of Concern | C | 0.02<br>0.02<br>0.85<br><0.01 | 6S31536<br>3SP321411<br>27S311174<br>22SP341889 |
| Non-remnant | None | X | 8.37<br>19.64<br>72.12<br>80.13<br>45.03<br>35.21<br>32.36<br>9.23<br>88.93 | 6S31536<br>3SP321411<br>27S311174<br>22SP341889<br>12S31468<br>20SP149887<br>21SP164832<br>10SP310604<br>11SP341889 |
| Essential Habitat | | *Phascolarctos cinereus* (Koala) | | |
| Wetland/s | | Present | | |
| Bioregion | | Coastal bioregions and sub-regions | | |
| ***2.3 Koala priority area and koala habitat areas*** | | | | |
| Koala Priority Area (KPA) | | Not within KPA | | |

| | |
|---|---|
| Koala Habitat Area | Koala Habitat Area (core) |
| ***2.4 State Planning Policy Interactive Mapping System (selected environmental matters)*** | |
| SPP — Biodiversity | MSES – Wildlife habitat (special least concern animal)<br>MSES – Wildlife habitat (koala habitat areas – core)<br>MSES – Regulated vegetation (category B)<br>MSES – Regulated vegetation (category C)<br>MSES – Regulated vegetation (essential habitat)<br>MSES – Regulated vegetation (wetland)<br>MSES – Regulated vegetation (intersecting a watercourse)<br>MSES – High ecological significance wetlands |
| SPP — Coastal Environment | Not within coastal management district |
| SPP — Water Quality | Water supply buffer area<br>Water resource catchments<br>High ecological value water area |
| SPP — Natural Hazards Risk and Resilience | Flood hazard area - Local Government flood mapping area<br>Bushfire prone area<br>High Potential Bushfire Intensity<br>Medium Potential Bushfire Intensity<br>Potential Impact Buffer |
| ***2.5 Development Assessment Mapping System*** | |
| DAMS — Coastal Protection | Does not apply |
| DAMS — Fish Habitat Areas | Queensland waterways for waterway barrier works<br>• 1 – Low<br>• 2 – Moderate<br>• 3 – High<br>• 4 – Major |
| 3. Local matters — Logan City Council | |
| Zoning | Urban Living |
| Precinct | Greater Flagstone |
| Neighbourhood Plan | Does not apply |
| Overlay — Acid sulphate soils | Does not apply |
| Overlay — Biodiversity Areas Trigger | Biodiversity Area |
| Overlay — Vegetation Management Areas | Primary vegetation management area<br>Secondary vegetation management area |
| Overlay — Biodiversity Corridors | Biodiversity corridor |

| | |
|---|---|
| Overlay — Locally Significant Vegetation | Does not apply |
| Overlay — Matters of State and Local Significance | Matters of both State and Local environmental significance<br>Matters of Local environmental significance |
| Overlay — Ecological Significance | >0 and <=12<br>>12 and <=22<br>>22 and <=32<br>>32 and <=62 |
| Overlay — Bushfire Hazard | High potential<br>Medium potential<br>Potential Impact Buffer |
| Overlay — Landslide Hazard | Steep slope area |
| Overlay — Flood Hazard | High flood risk area<br>Moderate flood risk area<br>Low flood risk area<br>Very low flood risk area |
| Overlay — Heritage | Does not apply |
| Overlay — Waterway Corridors and Wetlands Trigger | Waterway corridor<br>Major wetland<br>Wetland buffer<br>Minor waterway<br>Medium waterway<br>River waterway |

# Map 1 — Lot/plan(s)


22
FH
58.232ha
200
SP133189
FH
678.152ha
943.636ha
28
S311174
FH
60.703ha
301.5999ha
104
RP857868
27°50'00"
DAIRY ROAD
27
S311174
80.93ha
FH
WYATT RD
11
SP310604
FH
173.7686ha
20
SP149887
FH
40.09ha
21
SP164832
FH
33.44ha
WYATT ROAD
322.6884ha
UNDULLAH RD
30
SP133190
FH
37.7428ha
10
SP133192
FH
19
W31189
322.6884ha
200
SP133189
FH
322.6884ha
200
SP133169
UNDULLAH ROAD
173.7686ha
1
RP50209
FH
71.781ha
2
RP50209
FH
322.6884ha
UNDULLAH ROAD
69 20
22
23
SP142997
FH
44.4102ha
RP48366
FH
28.26ha
2
SP296653
FH
38.06ha
1
SP296653
FH
28.367ha
ROAD
12
W3120
FH
53.009ha
14
W3120
FH
54.633ha
15
W3120
FH
65.964ha
10
SP296652
FH
KILMOYLAR ROAD
RP48369
FH
22.157ha
RP48369
FH
15.274ha
RP48369
FH
19.159ha
RP48369
FH
16.967ha
RP48369
FH
14.081ha
RP48369
FH
11.728ha
RP48369
FH
30.7ha
RP48369
15
RP48369
12
RP48369
FH
10
RP
48369
48.562ha
6.895ha
RP
48366
W3120
SP321411
FH
RP49296
FH
14.1514ha
19.89ha
S31536
FH
SP142997
FH
SP209567
209570
S31468
FH
80.93ha
S31468
FH
S311174
80.93ha
FH
S311174
FH
SP321411
FH
RP857865
RP857867
RP857866
RP857869
RP857870
RP857871
RP857872
RP857873
RP857874
RP857875
RP857876
RP857877
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RP857904
RP857905
RP857906
RP857907
RP857908

# Map 2 — Aerial image (current)




Source: Qld Globe 2022 (captured: 07/03/2024)

# Map 3 — Aerial image (historical)




Source: Qld Globe 2022 (captured: 07/03/2024)

# Map 4 — Locality




Source: Qld Globe 2022 (captured: 07/03/2024)

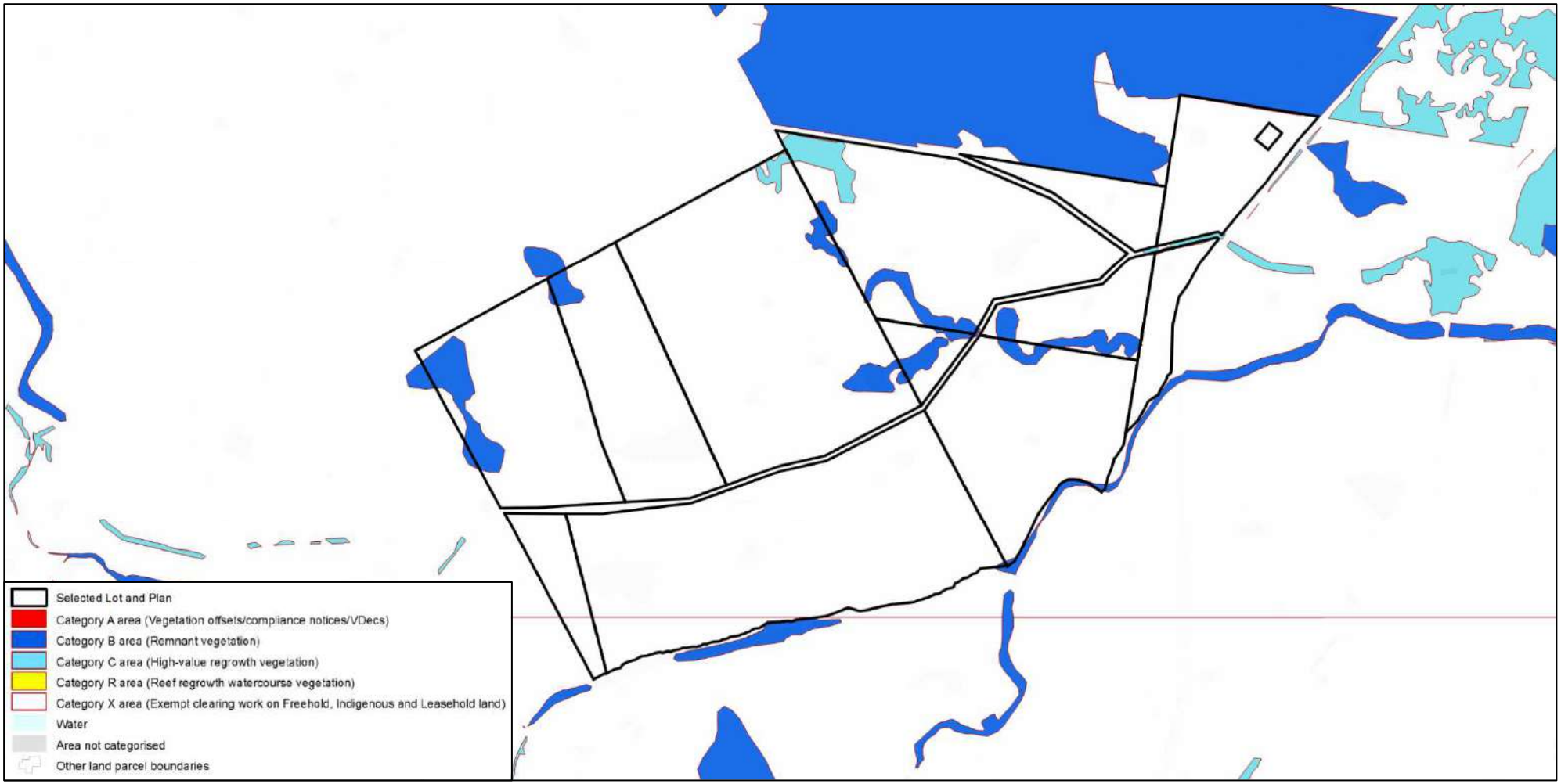
# State matters

# Map 5 — Protected Plants Flora Survey Trigger Map



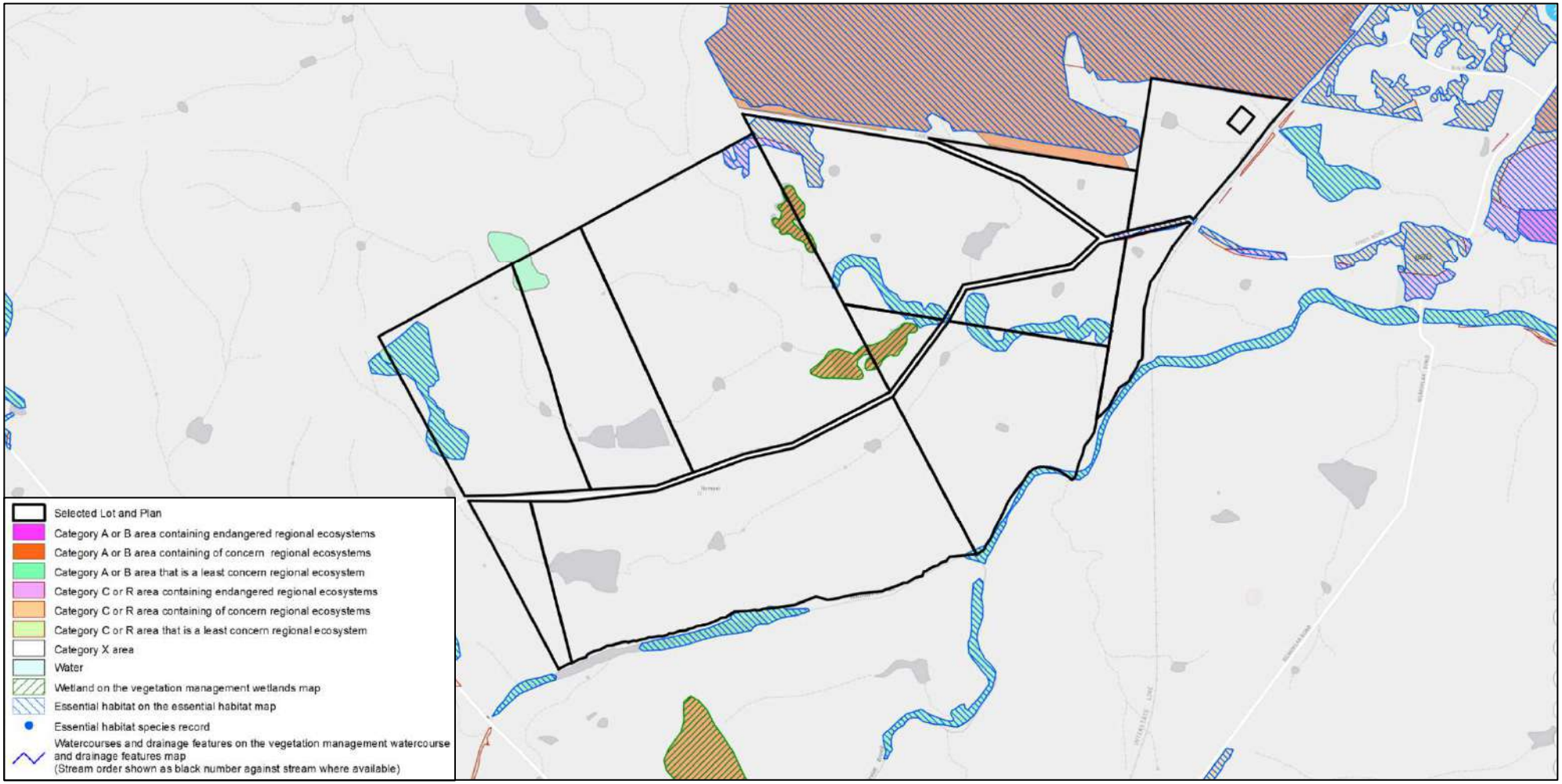

Source: Qld Globe 2022 (captured: 07/03/2024)

# Map 6 — Regulated Vegetation Management Map



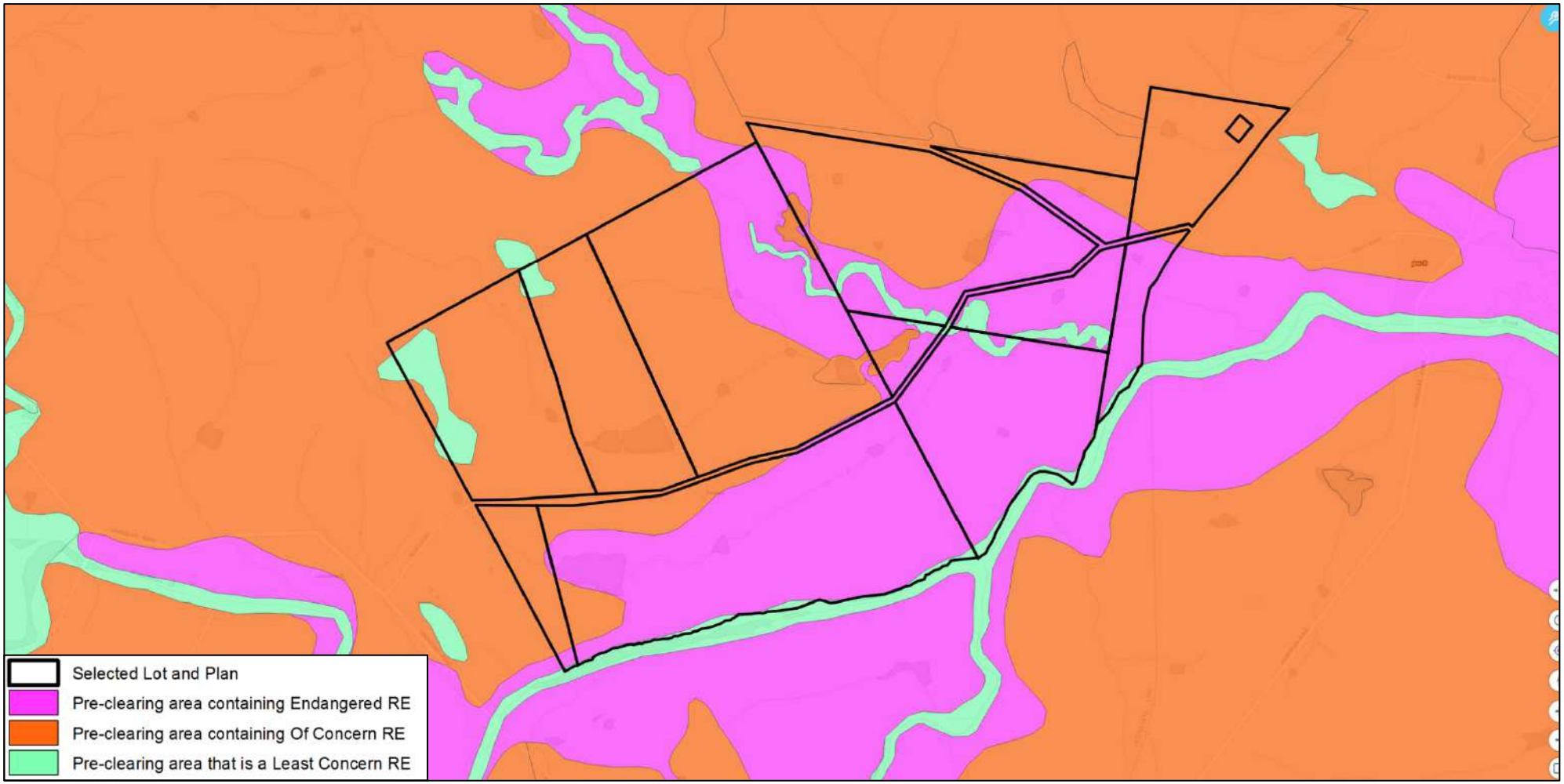

Source: Qld Globe 2022 (captured: 07/03/2024)

# Map 7 — Vegetation Management Supporting Map




Source: Qld Globe 2022 (captured: 07/03/2024)

# Map 8 — Preclear Regional Ecosystem



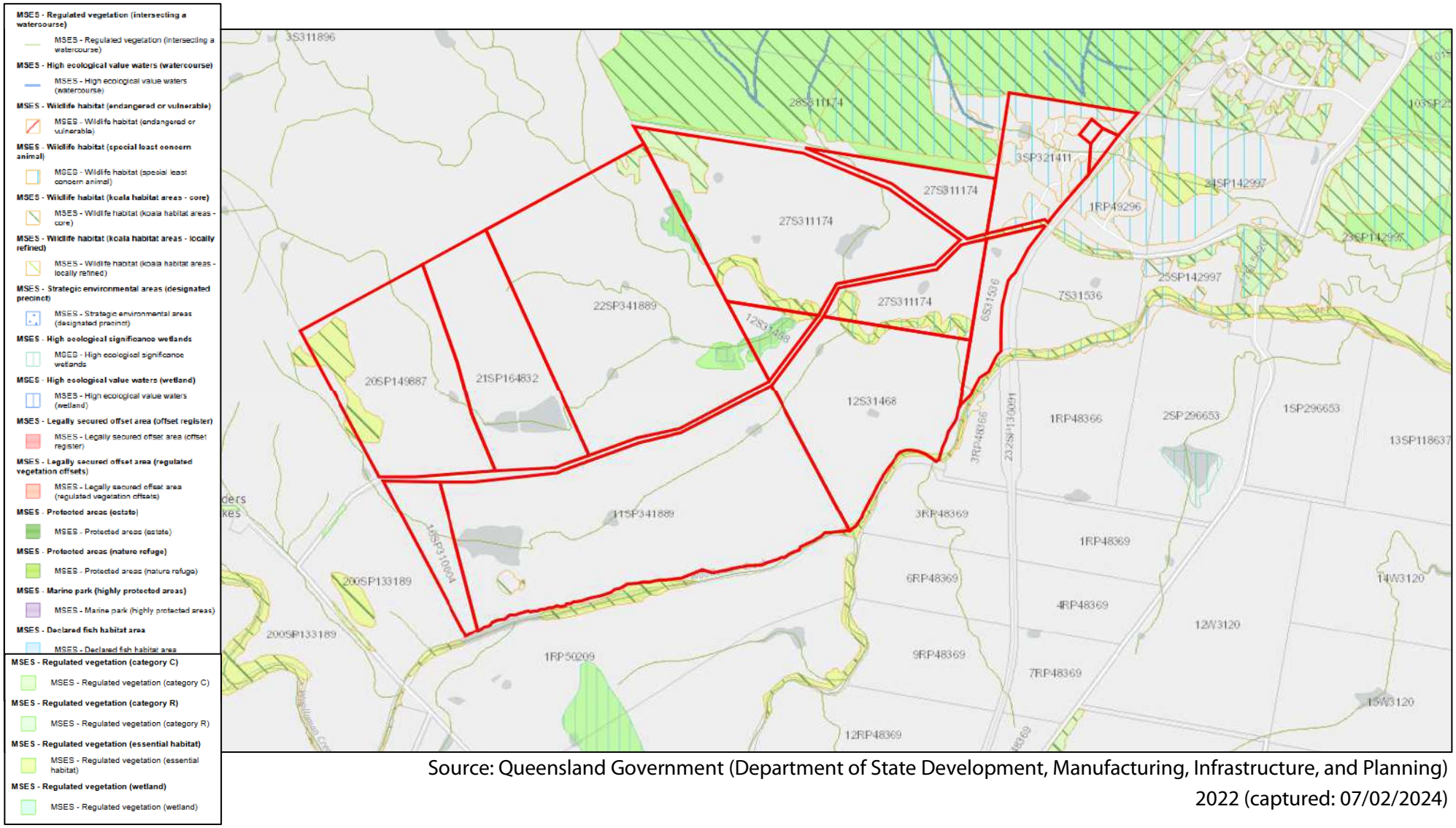

Source: Qld Globe 2022 (captured: 07/03/2024)

## Map 9 — Koala priority area and koala habitat areas



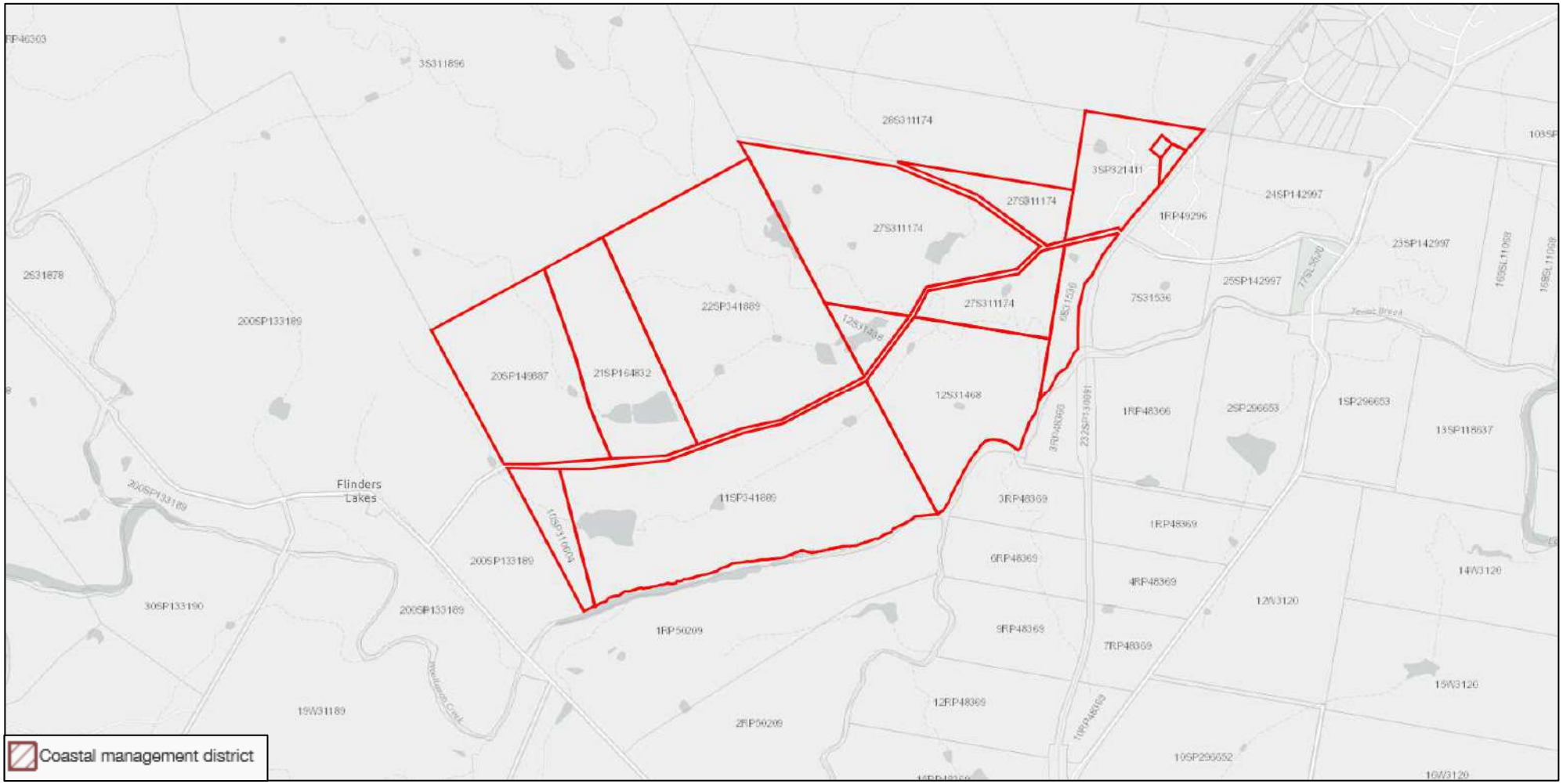

Source: Qld Globe 2022 (captured: 07/03/2024)

# Map 10 — SPP — Biodiversity



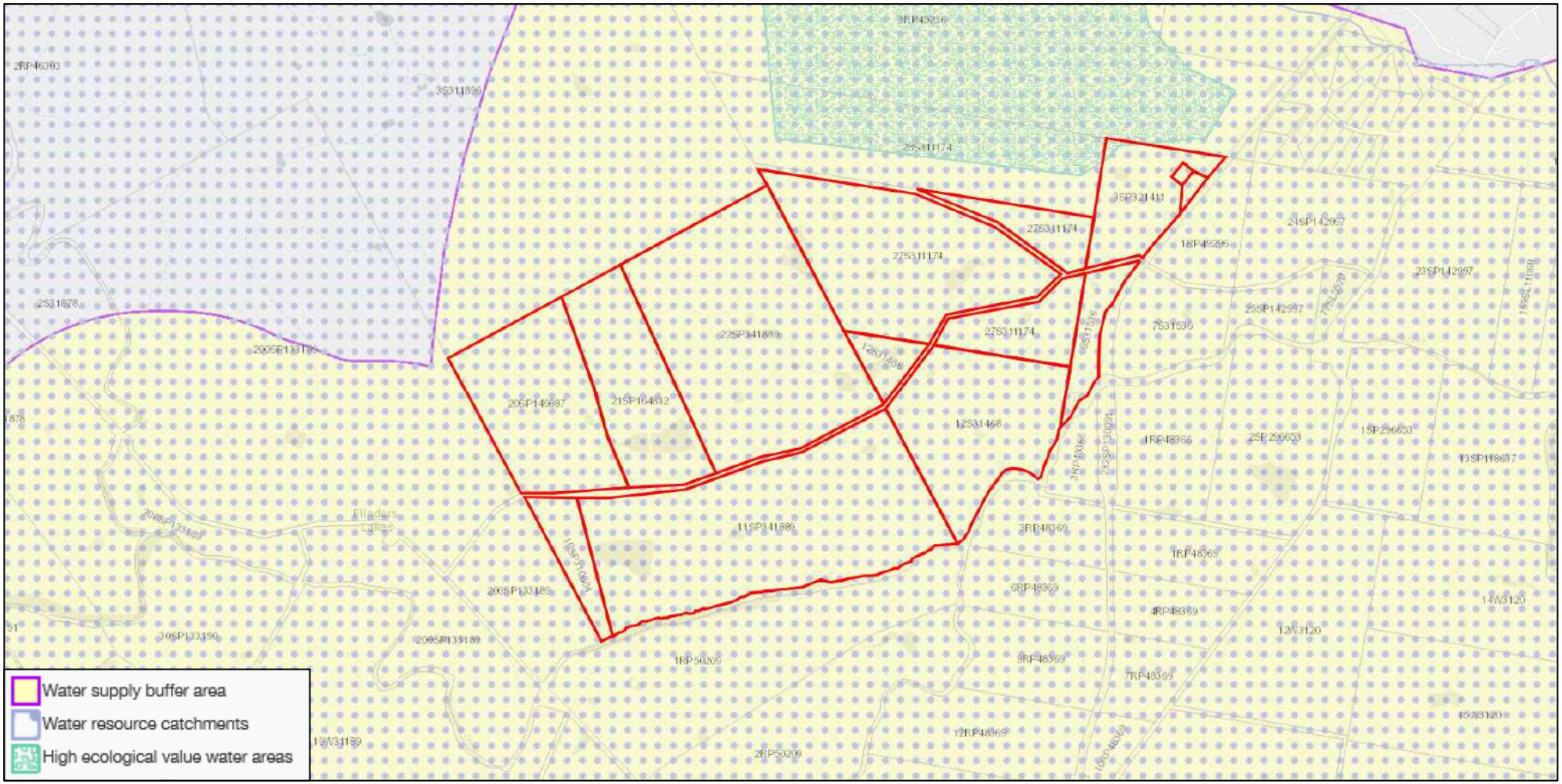

Source: Queensland Government (Department of State Development, Manufacturing, Infrastructure, and Planning) 2022 (captured: 07/02/2024)

# Map 11 — SPP — Coastal Environment



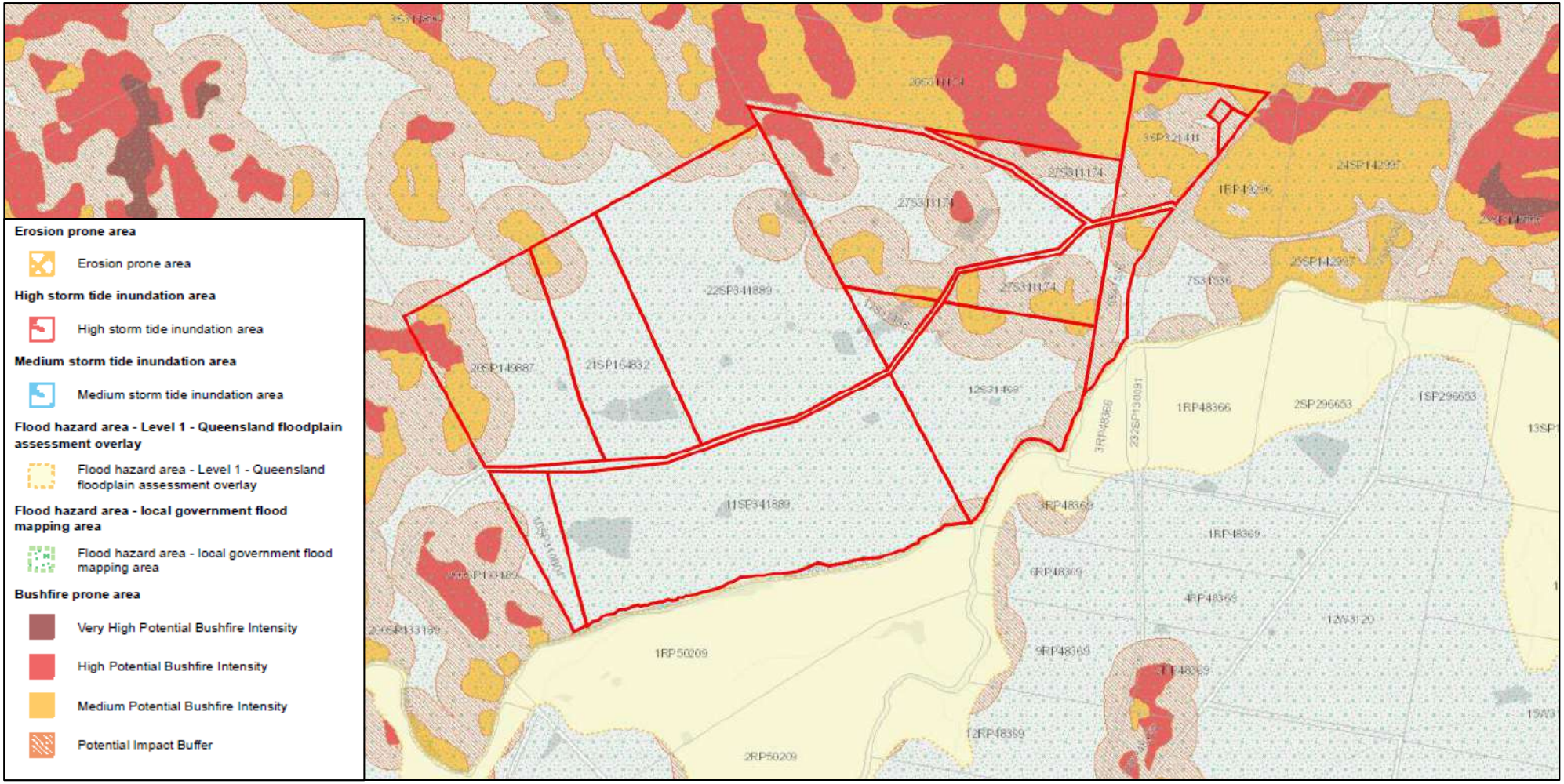

Source: Queensland Government (Department of State Development, Manufacturing, Infrastructure, and Planning) 2022 (captured: 07/03/2024)

# Map 12 — SPP — Water Quality



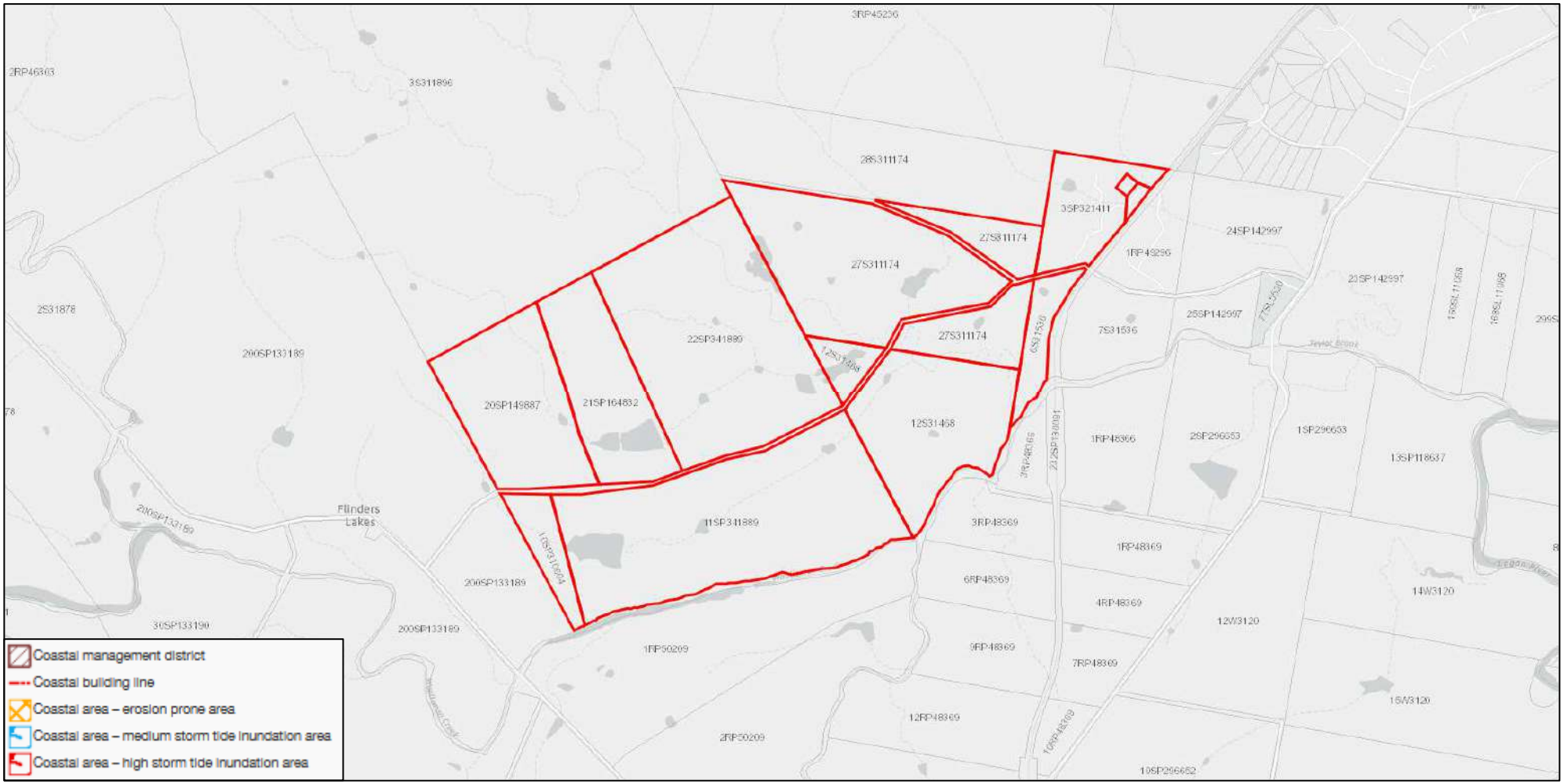

Source: Queensland Government (Department of State Development, Manufacturing, Infrastructure, and Planning) 2022 (captured: 07/03/2024)

# Map 13 — SPP — Natural Hazards Risk and Resilience



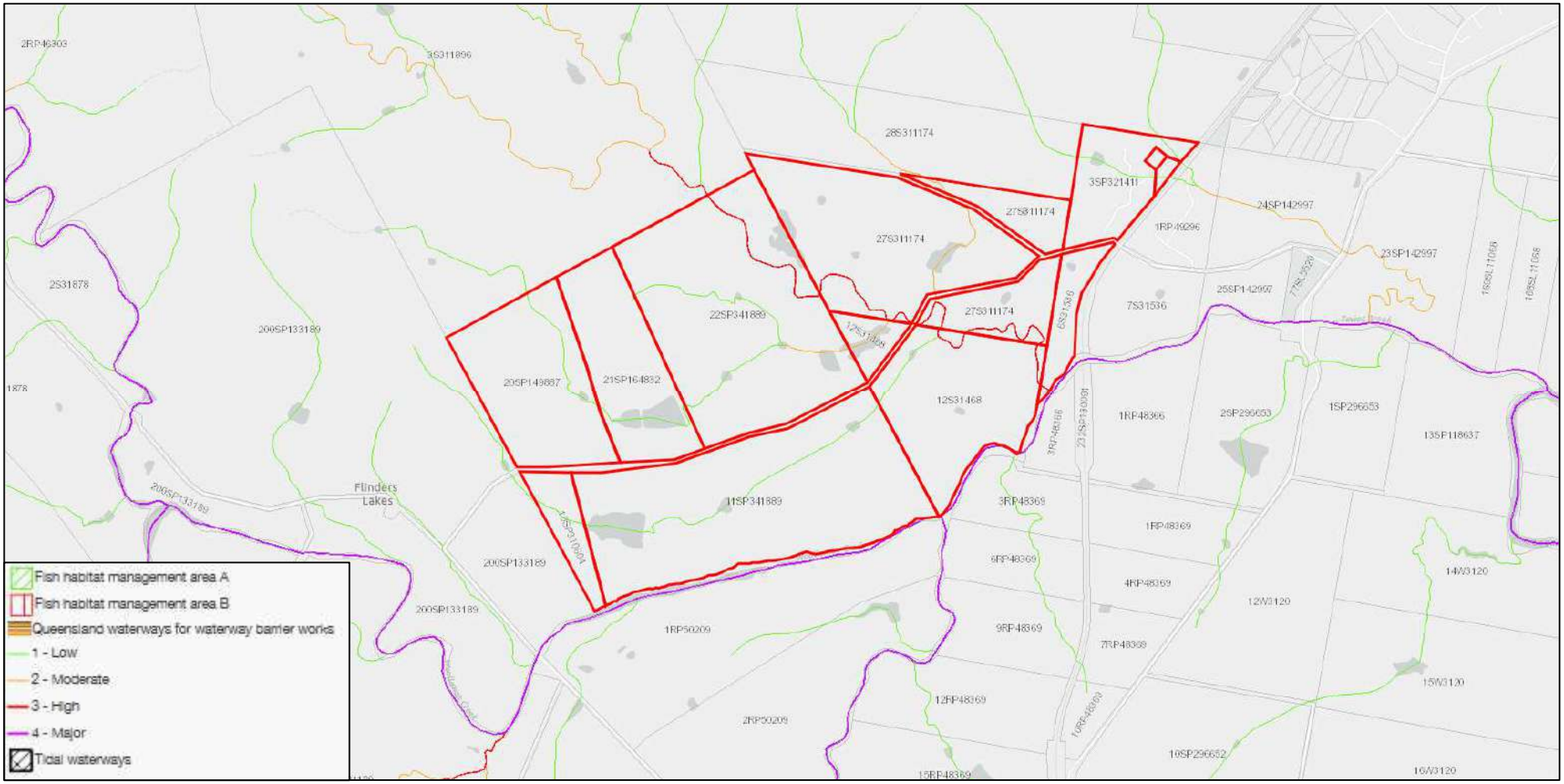

Source: Queensland Government (Department of State Development, Manufacturing, Infrastructure, and Planning) 2022 (captured: 07/03/2024)

# Map 14 — DAMS — Coastal Protection



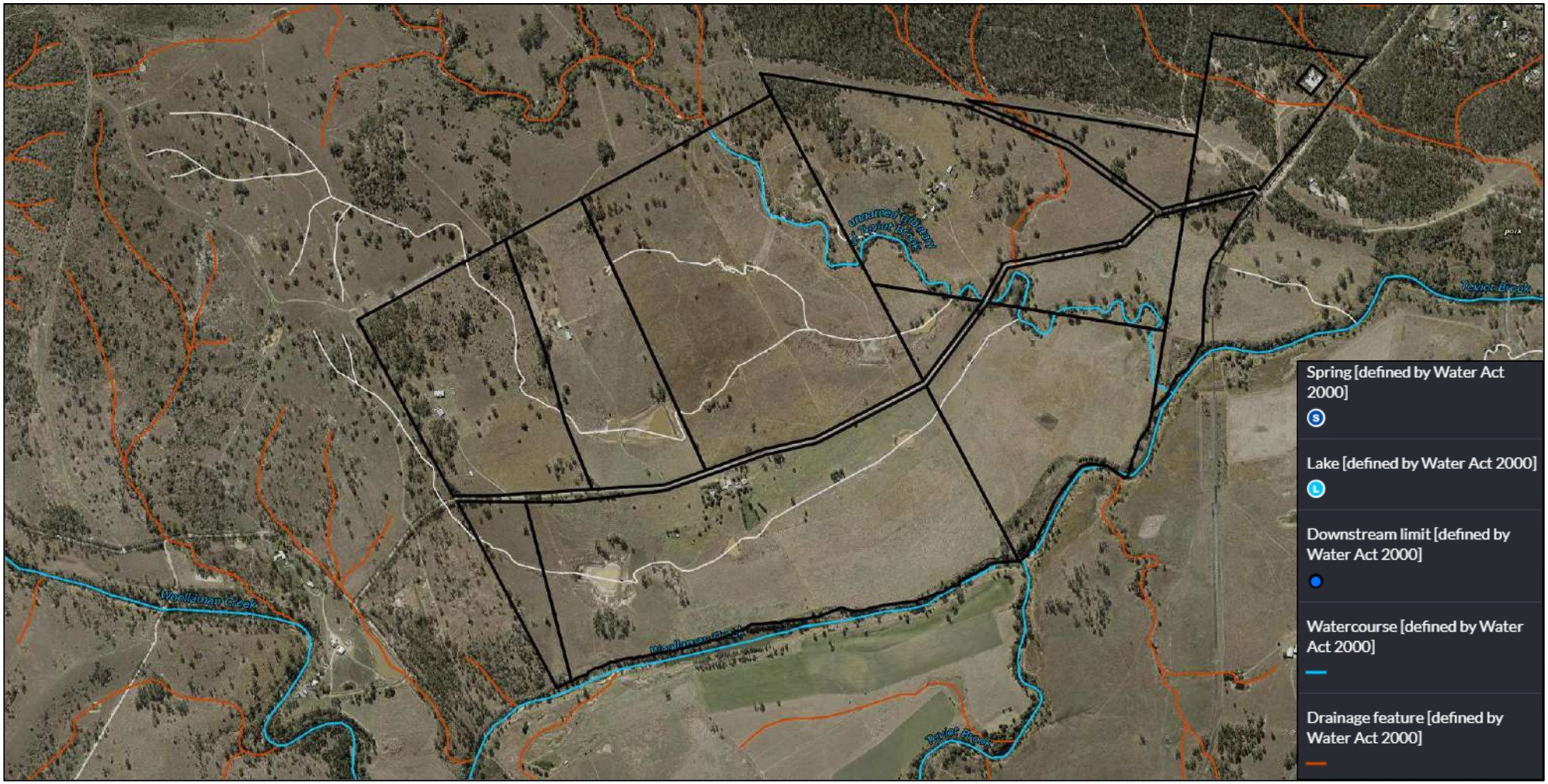

Source: Queensland Government (Department of State Development, Manufacturing, Infrastructure, and Planning) 2022 (captured: 07/03/2024)

# Map 15 — DAMS — Fish Habitat Areas




Source: Queensland Government (Department of State Development, Manufacturing, Infrastructure, and Planning) 2022 (captured: 07/03/2024)

# Map 16 — Water Act 2000 – Watercourse Identification




Source: Qld Globe (captured: 07/03/2024)

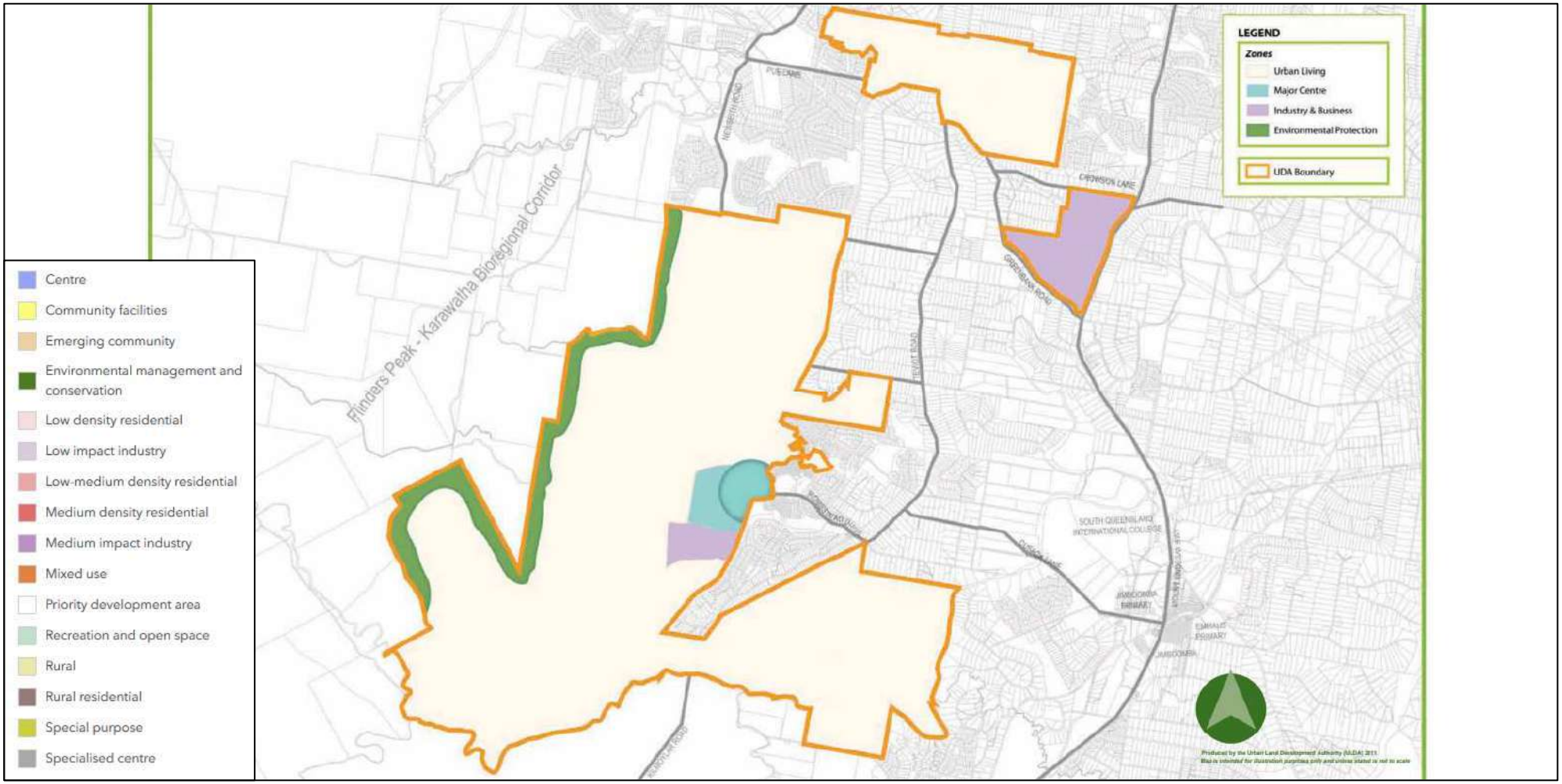
# Map 17 — Highest Astronomical Tide




Source: Qld Globe (captured: 07/03/2024)

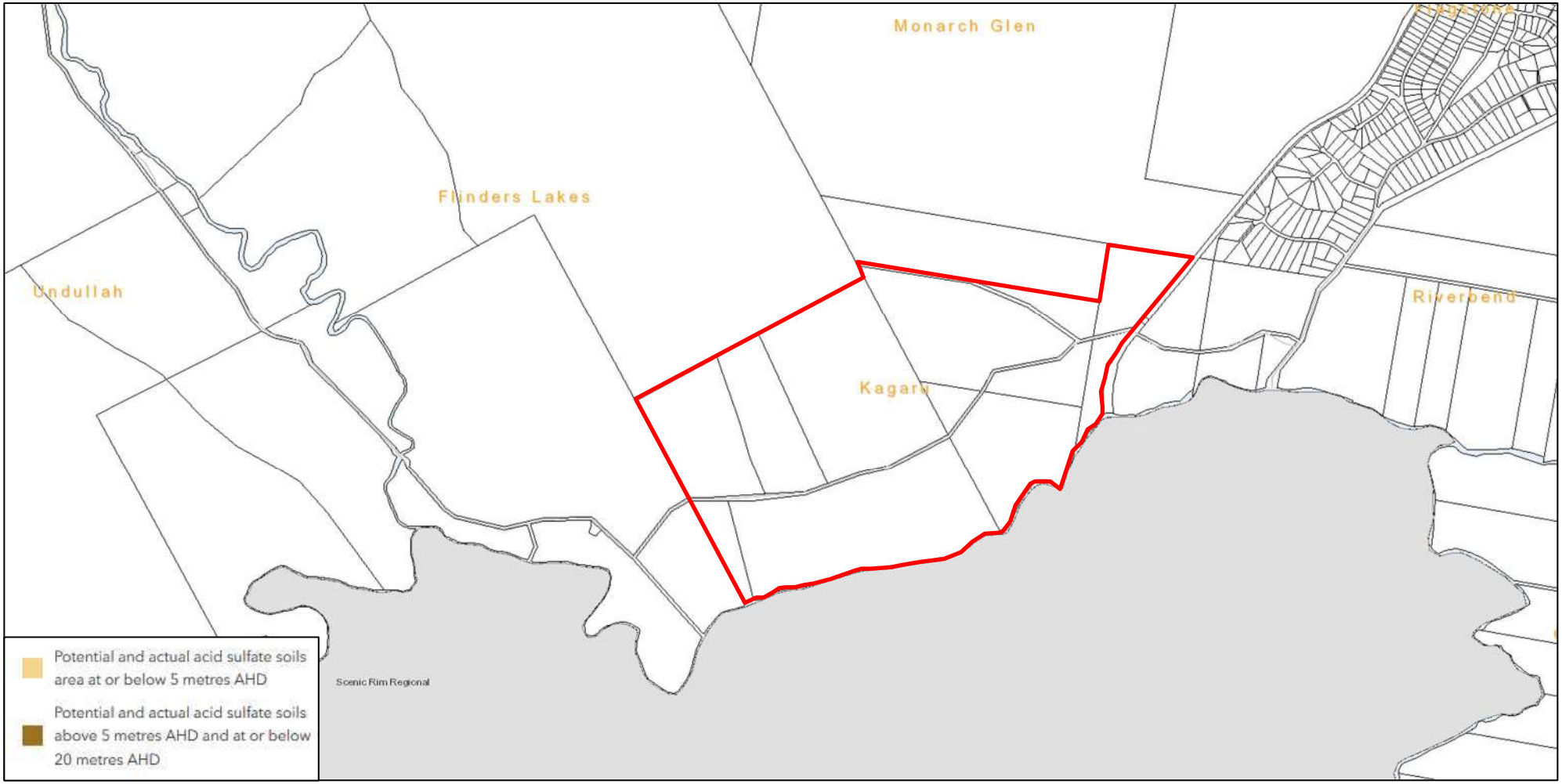
# Local matters — Logan City Council

# Map 18 — Zoning (Greater Flagstone PDA)




Source: Greater Flagstone Development Scheme (captured: 07/03/2024)

# Map 19 - Overlay — Acid sulfate soils



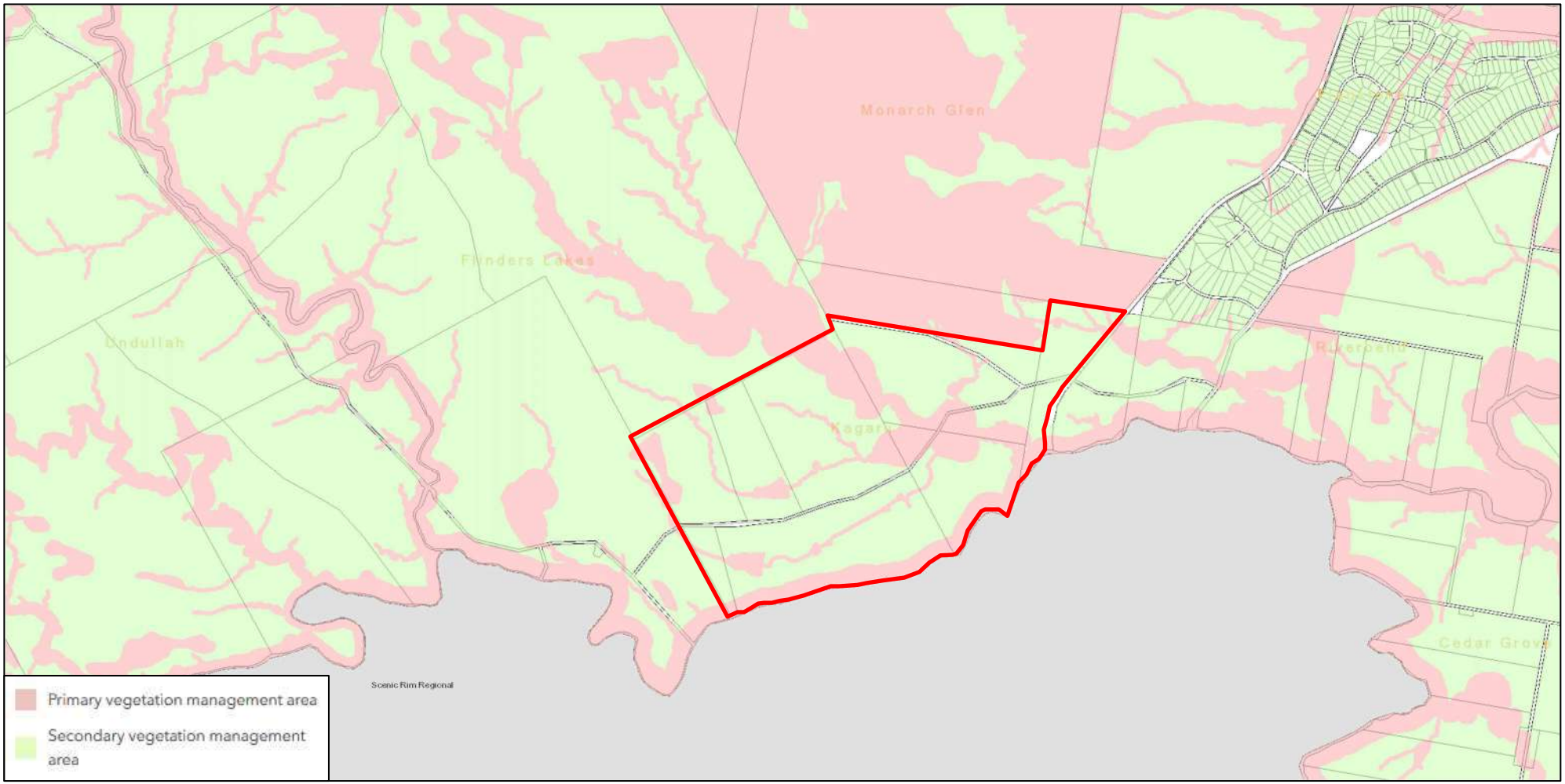

Source: Logan Planning Scheme 2015 (captured: 07/03/2024)

# Map 20 - Overlay — Biodiversity Areas Trigger



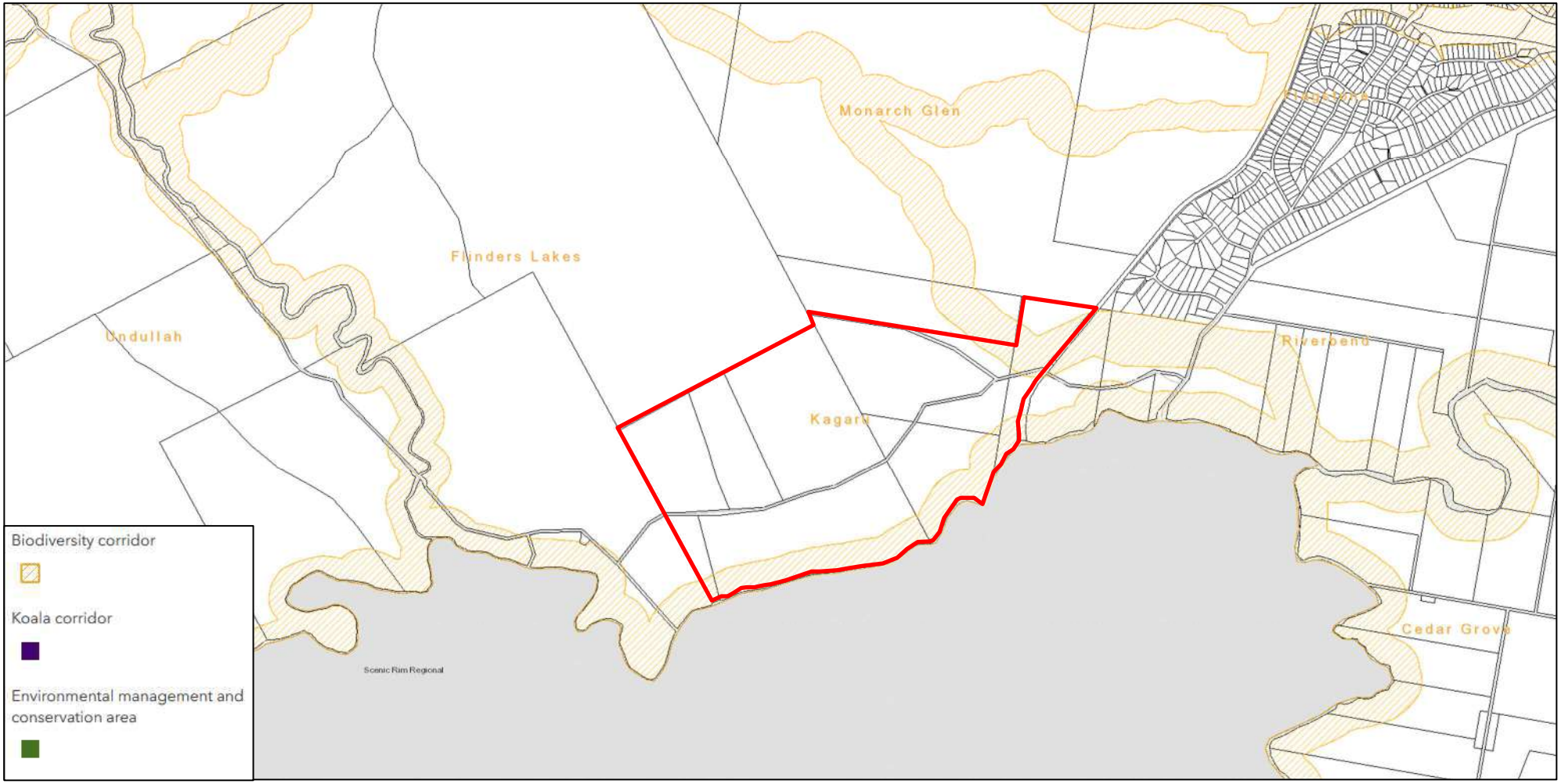

Source: Logan Planning Scheme 2015 (captured: 07/03/2024)

# Map 21 - Overlay — Vegetation Management Areas



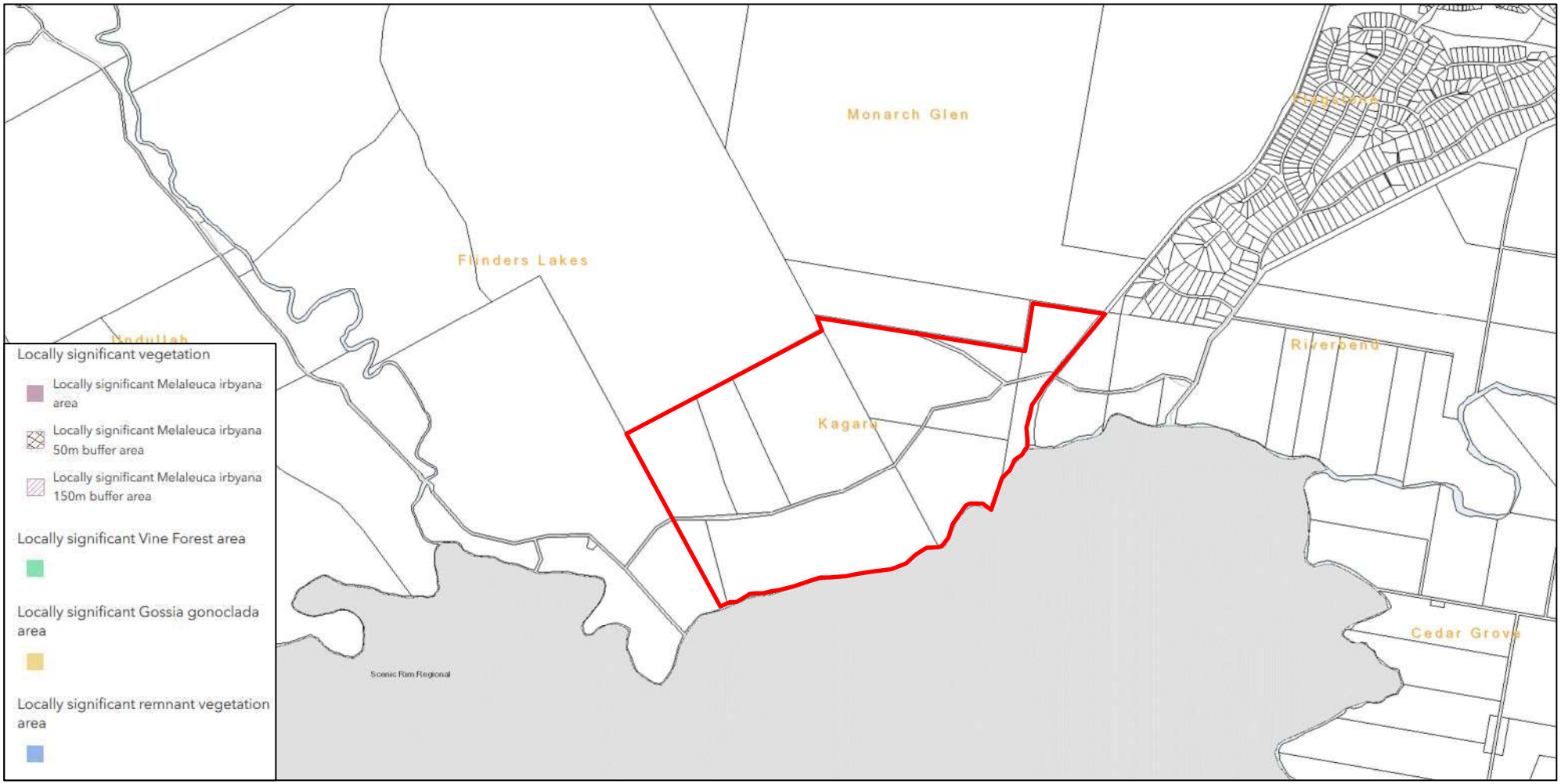

Source: Logan Planning Scheme 2015 (captured: 07/03/2024)

# Map 22 - Overlay — Biodiversity Corridors



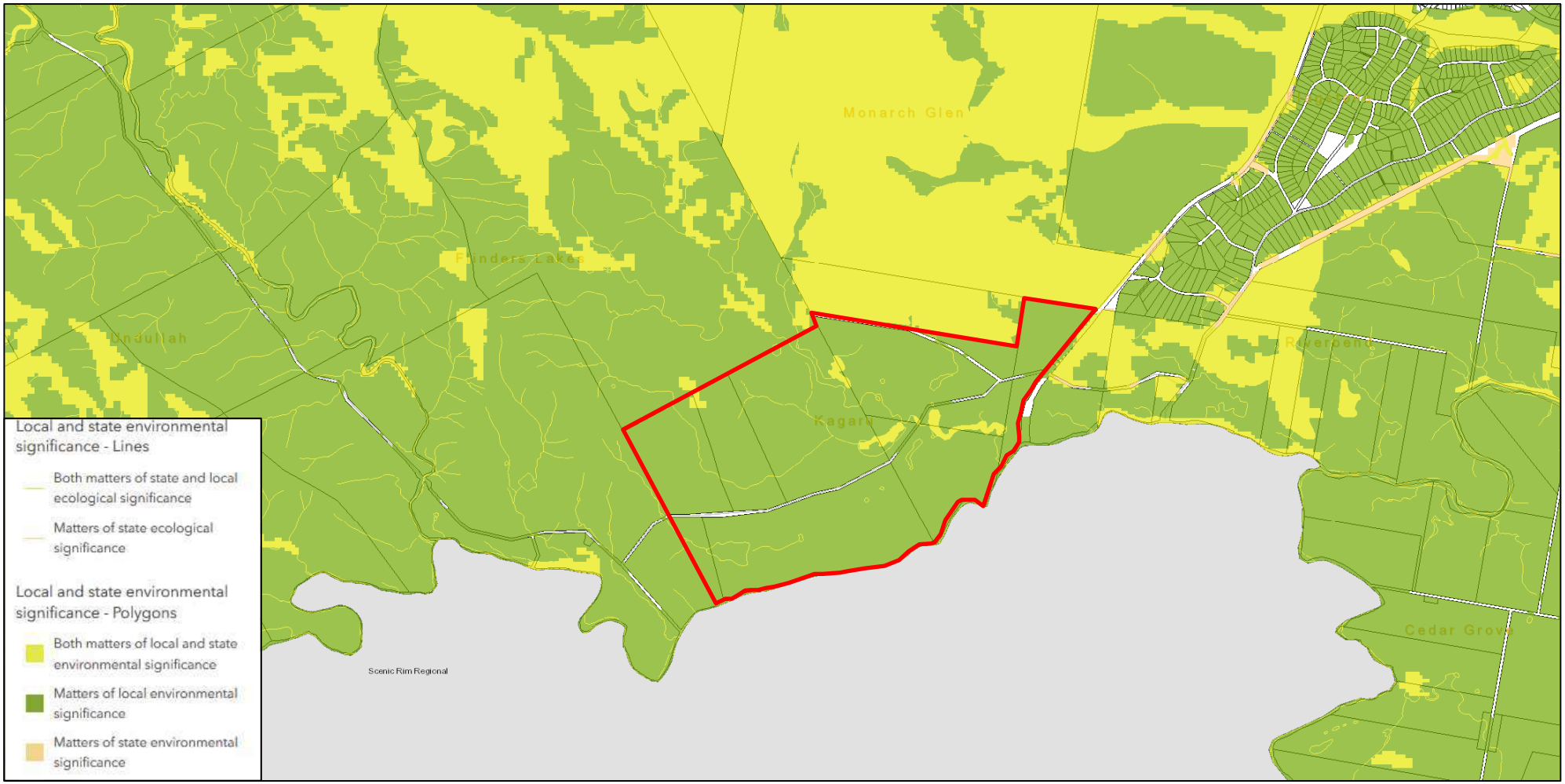

Source: Logan Planning Scheme 2015 (captured: 07/03/2024)

# Map 23 - Overlay — Locally Significant Vegetation



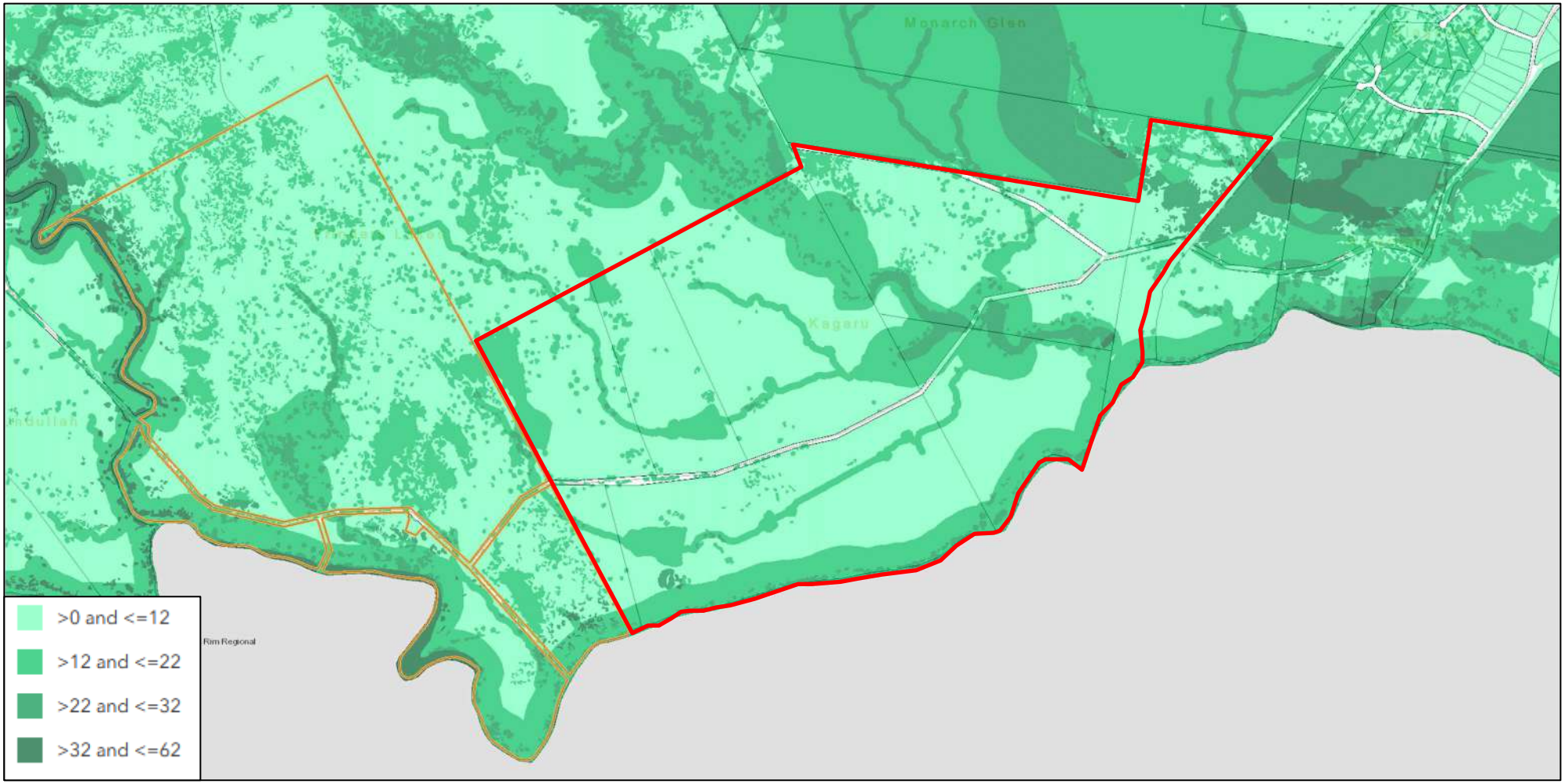

Source: Logan Planning Scheme 2015 (captured: 07/03/2024)

# Map 24 - Overlay — Matters of State and Local Significance



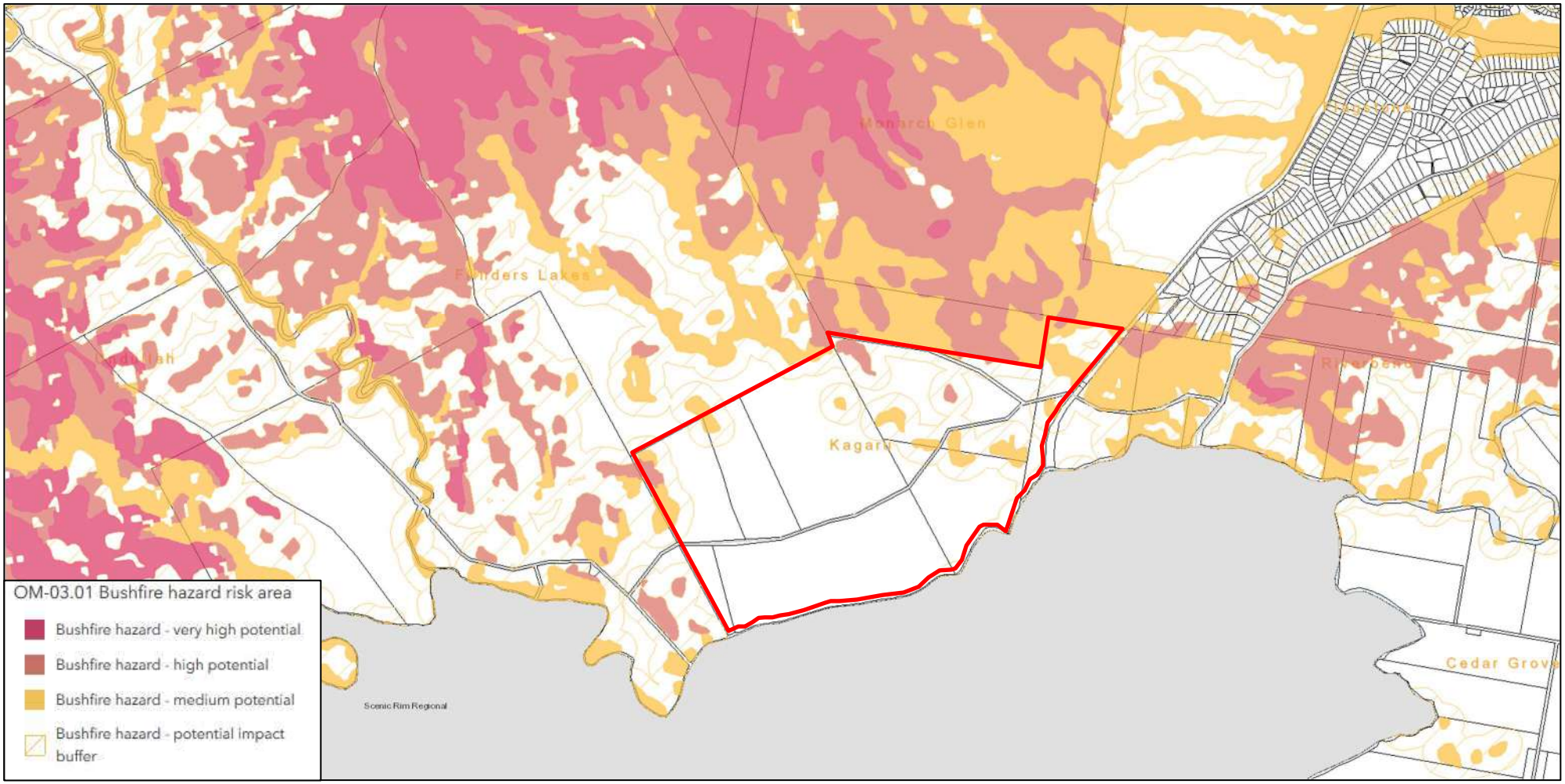

Source: Logan Planning Scheme 2015 (captured: 07/03/2024)

# Map 25 - Overlay — Ecological Significance



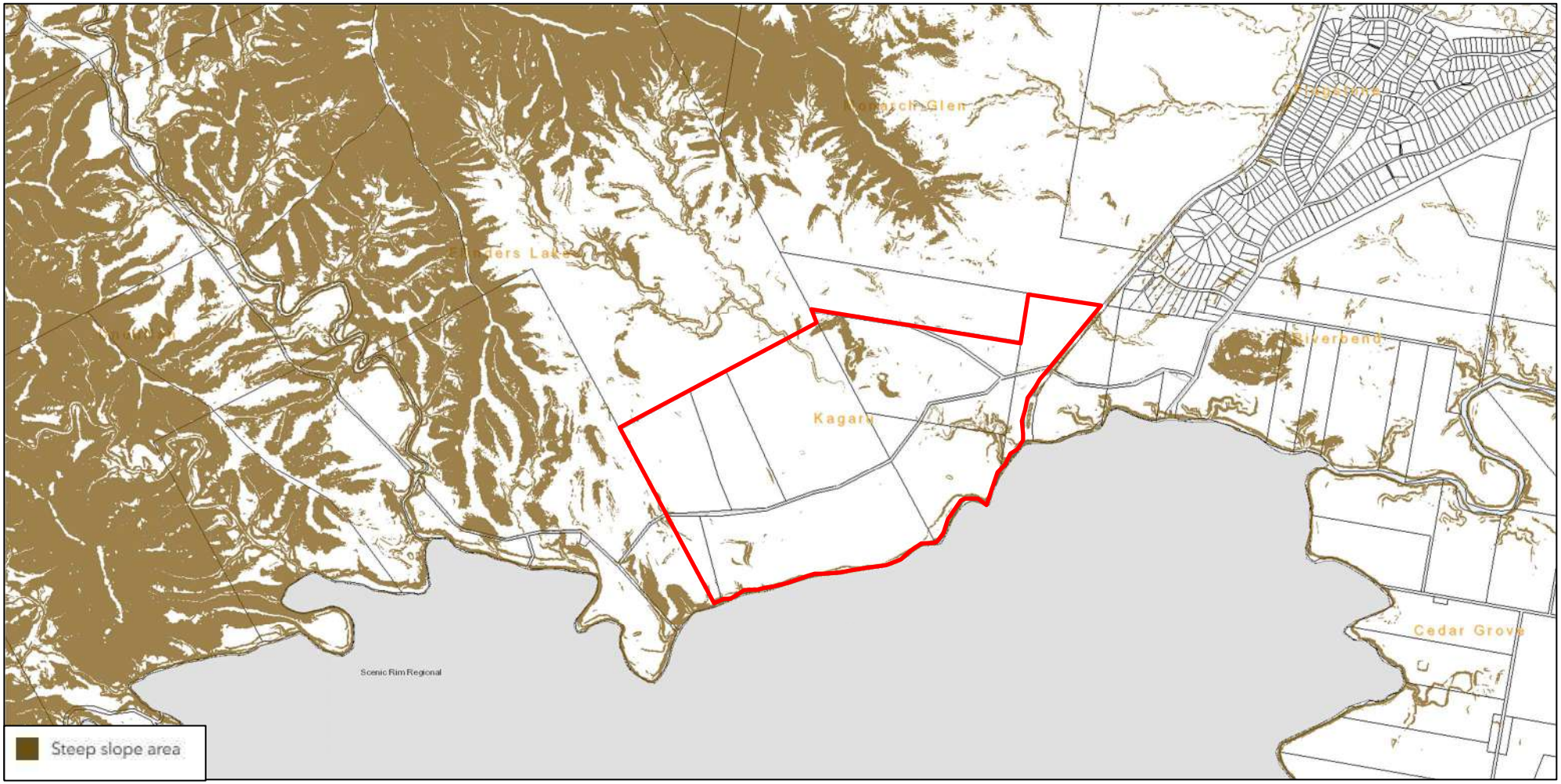

Source: Logan Planning Scheme 2015 (captured: 07/03/2024)

# Map 26 – Overlay — Bushfire Hazard



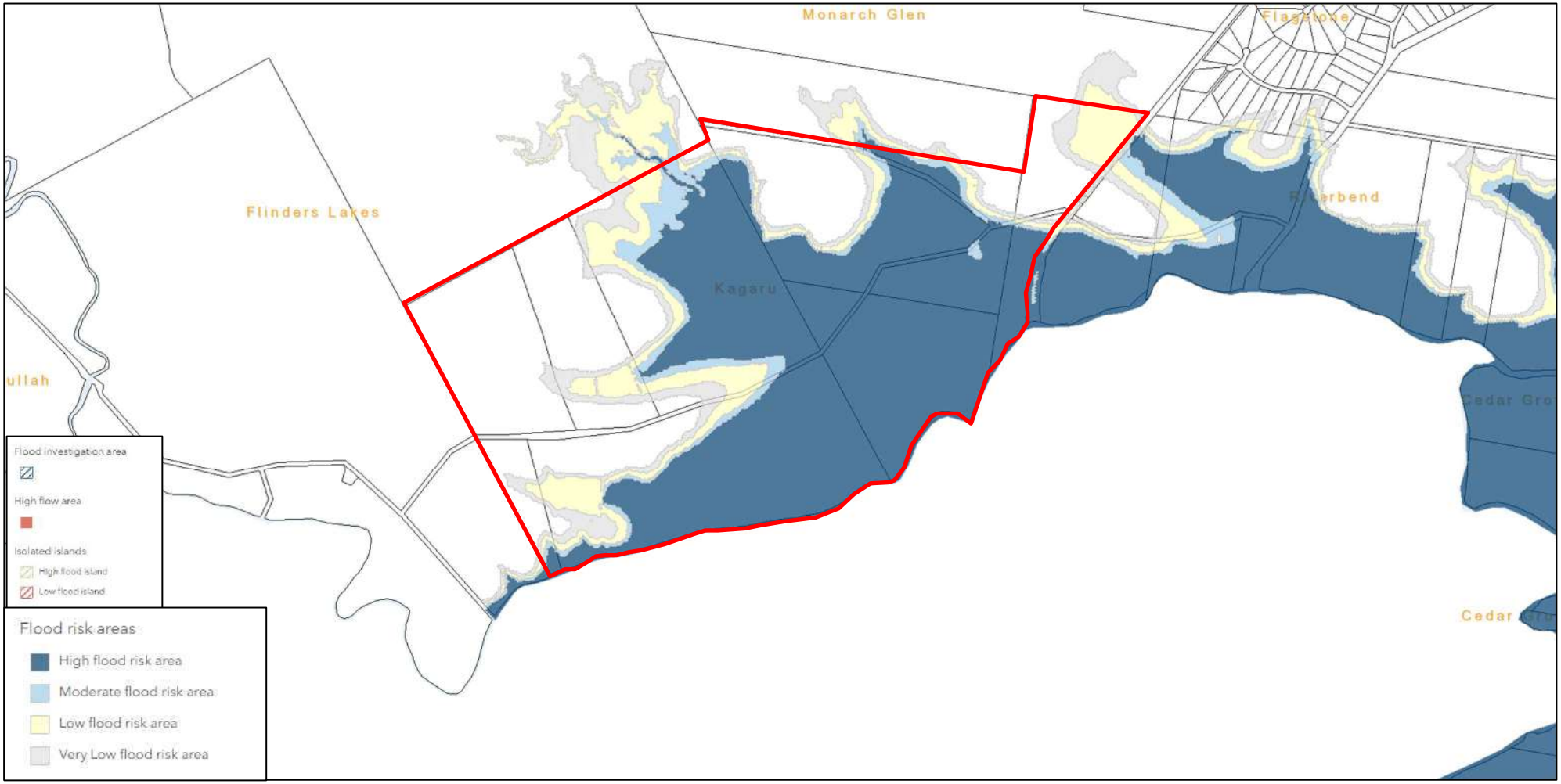

Source: Logan Planning Scheme 2015 (captured: 07/03/2024)

# Map 27 - Overlay — Landslide Hazard



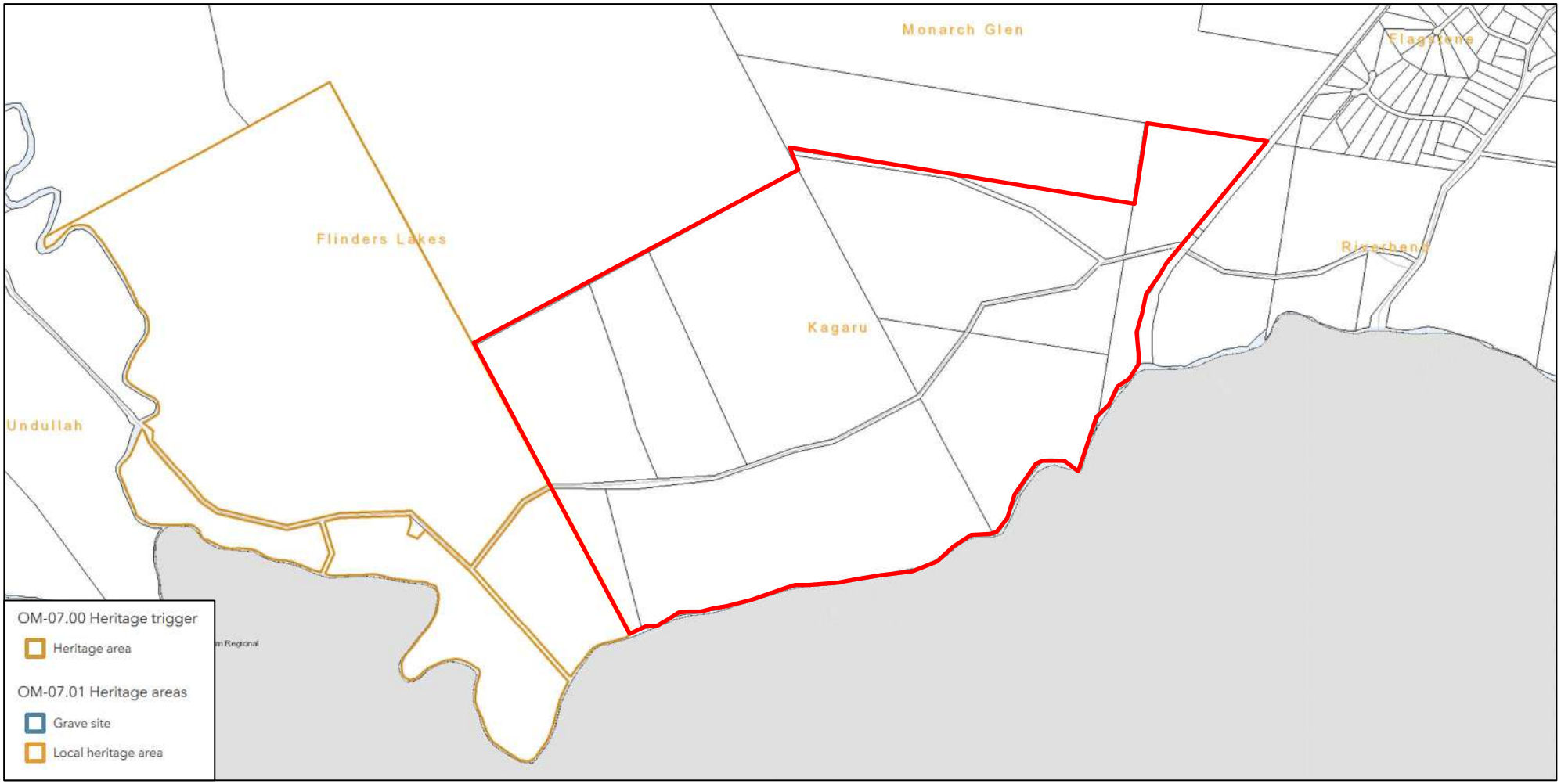

Source: Logan Planning Scheme 2015 (captured: 07/03/2024)

# Map 28 - Overlay — Flood Hazard



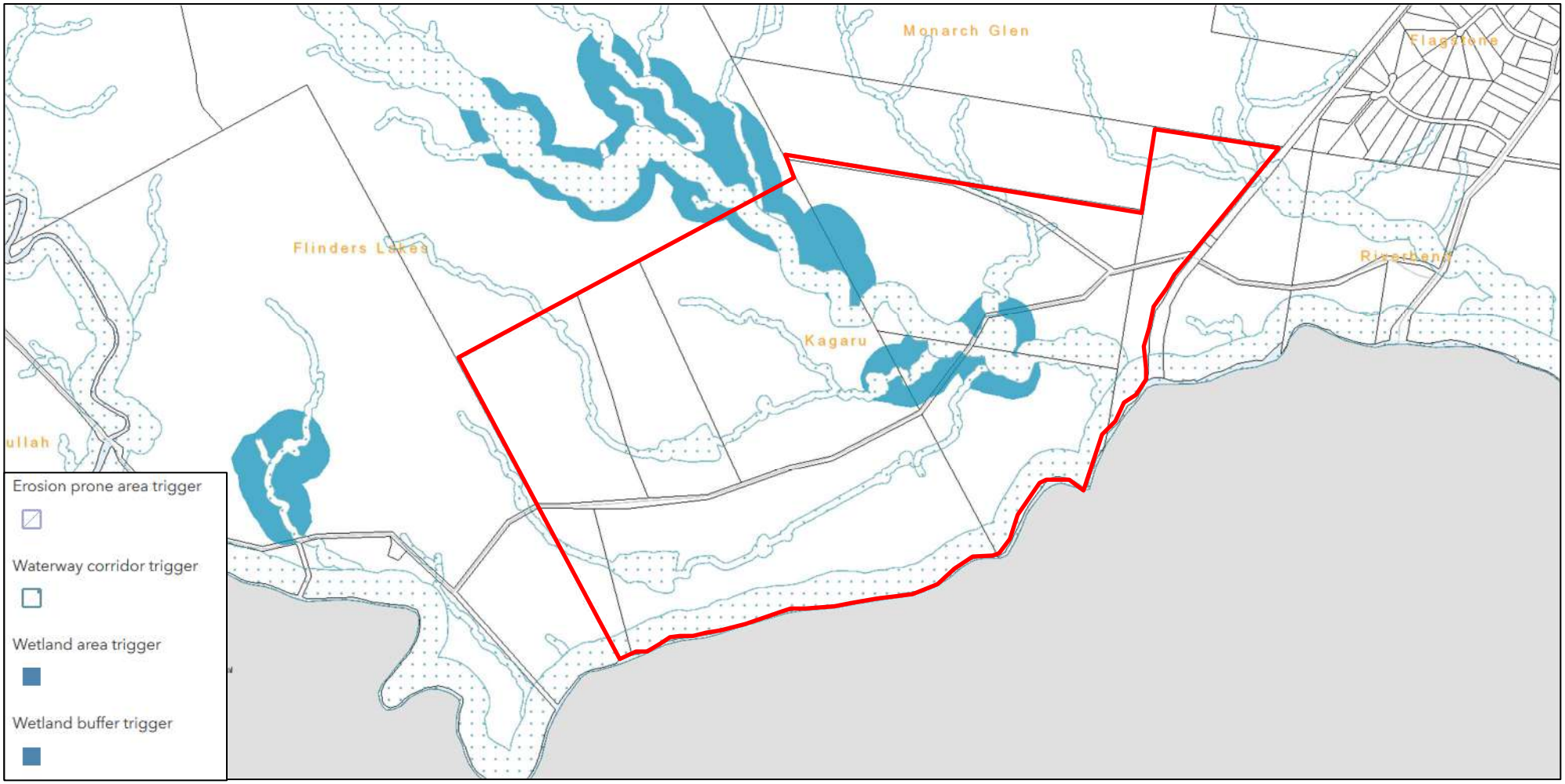

Source: Logan Planning Scheme 2015 (captured: 07/03/2024)

# Map 29 - Overlay — Heritage



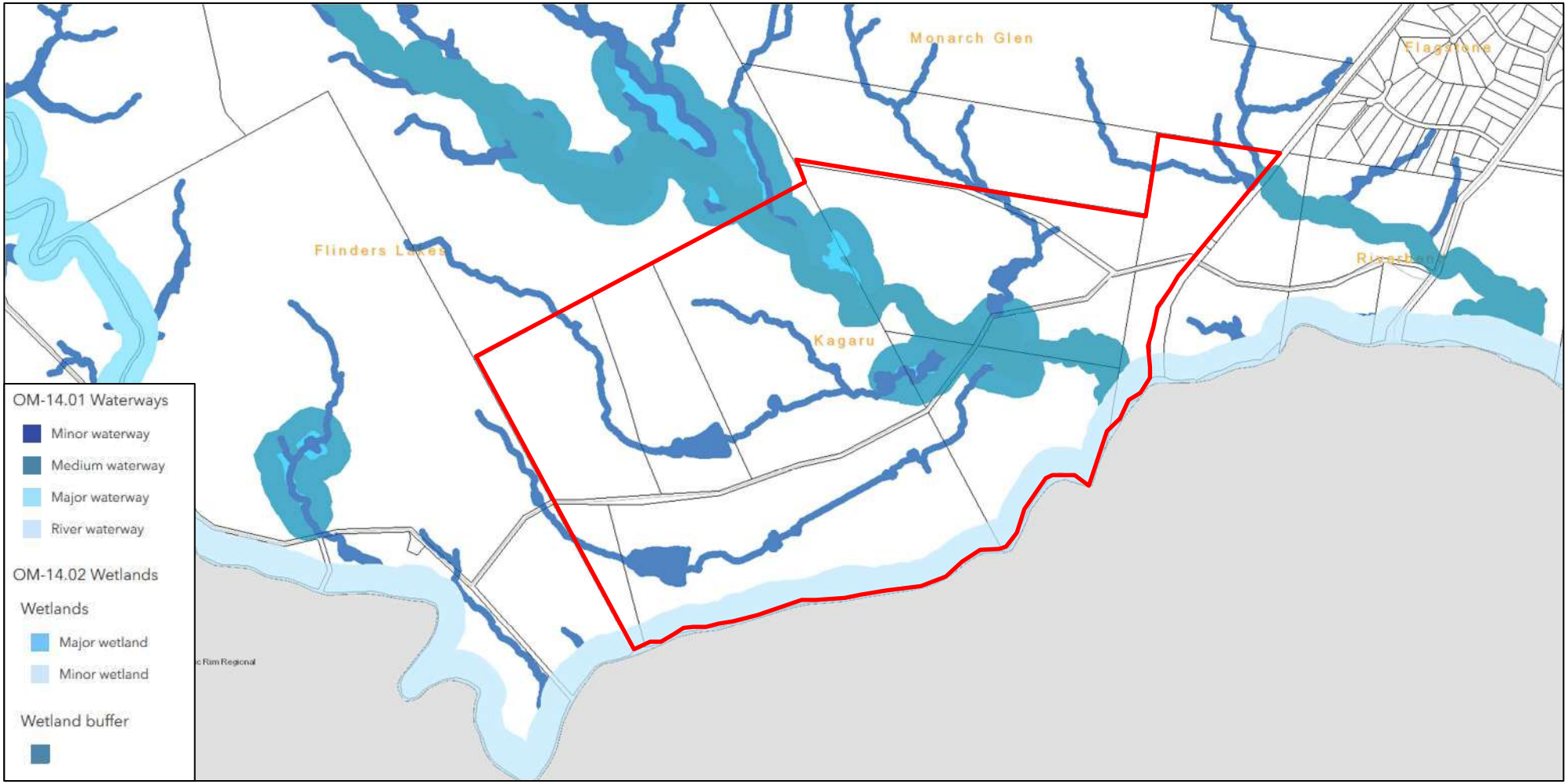

Source: Logan Planning Scheme 2015 (captured: 07/02/2024)

# Map 30 - Overlay — Waterway Corridors and Wetlands Trigger




Source: Logan Planning Scheme 2015 (captured: 07/03/2024)

# Map 31 - Overlay — Waterway Corridors and Wetlands Trigger cont.




Source: Logan Planning Scheme 2015 (captured: 07/03/2024)

# Appendix D

## Likelihood of Occurrence Assessment

Likelihood of occurrence assessment

| Likelihood of occurrence | Assessment criteria |
|---|---|
| **Unlikely** | No previous records of the species within the locality and one or more of the following criteria is met:<br>• Not previously recorded on the referral area and surrounds and the referral area is beyond the current known geographic range; or<br>• Dependent on specific habitat types or resources that are not present on the referral area; or<br>• Considered extinct in the wild. |
| **Low** | No previous records of the species within the locality and one or more of the following criteria is met:<br>• Site and local connectivity contains marginal habitat excluding suitable/critical habitat attributes;<br>• Lack of recent records exist in a regional context (use 1980 as a delineation); or<br>• Potential for vagrant or individual of the species to survive short-term; |
| **Moderate** | Species previously recorded within the locality and one or more of the following criteria is met:<br>• Previously recorded in proximity to the referral area (*i.e.,* vagrant individuals); or<br>• Potential habitat typologies or resources are present on the referral area. |
| **High** | Species previously recorded within the locality and one or more of the following criteria is met:<br>• Previously recorded on the referral area;<br>• Dependent on habitats or habitat resources that are available on the referral area; or<br>• Suitable habitats are available on the referral area that are capable of supporting a resident population or individuals of the species. |
| **Known** | Flora species or ecological community positively identified during field surveys within the referral area.<br><br>Fauna species positively recorded during field surveys within the referral area or adjacent habitats. |

| Matters of National Environmental Significance | | | | | | |
|---|---|---|---|---|---|---|
| **Name** | **Status** | **Type of presence** | **Description of the community/preferred habitat** | **Likelihood of Occurrence Analysis** | **Desktop Likelihood of occurrence (on-site)** | **Field Survey Confirmed Likelihood of occurrence (on-site)** |
| **Wetlands of International Importance (Ramsar)** | | | | | | |
| Moreton Bay | | | The site is located approximately 30-40 kilometres south-west of Moreton Bay. | There will be no measurable affect to Moreton Bay. | Unlikely | Unlikely |
| **Threatened Ecological Communities** | | | | | | |
| Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community | E | Community may occur within area | In Queensland, this ecological community coincides with two regional ecosystem communities including Of Concern RE12.1.1 (*Casuarina glauca* +/- mangroves woodland) as well as areas where the canopy is dominated by *Casuarina glauca* within 12.3.20 (*Melaleuca quinquenervia, Casuarina glauca +/- Eucalyptus tereticornis, Eucalyptus siderophloia* open forest on low coastal alluvial plains). | Desktop analysis and field surveys confirmed that regional ecosystem 12.1.1 and 12.3.20 do not occur on-site. | Unlikely | Unlikely |
| Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland | E | Community likely to occur within area | The Coastal Swamp Sclerophyll Forests of South-eastern Australia is a type of forest or scrub associated with freshwater (to brackish) wetlands on low-lying coastal areas. Several regional ecosystem communities coincide with this TEC, including Least Concern RE 12.2.7 (*Melaleuca quinquenervia* or rarely *M. dealbata* open forest on sand plains), Of Concern RE 12.3.4/12.3.4a (*Melaleuca quinquenervia*, *Eucalyptus robusta* woodland on coastal alluvium/*Eucalyptus bancroftii* open woodland often with *Melaleuca quinquenervia*), Least Concern RE 12.3.5 (*Melaleuca* | Desktop analysis and field surveys confirmed that regional ecosystems 12.2.7, 12.3.4/12.3.4a, 12.3.5, 12.3.6 and 12.3.20 do not occur on-site. | Unlikely | Unlikely |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | *quinquenervia* open forest on coastal alluvium), Least Concern RE 12.3.6 (*Melaleuca quinquenervia +/- Eucalyptus tereticornis, Lophostemon suaveolens, Corymbia intermedia* open forest on coastal alluvial plain) and Endangered RE 12.3.20 (*Melaleuca quinquenervia, Casuarina glauca +/- Eucalyptus tereticornis, E. siderophloia* open forest on low coastal alluvial plain). | | | |
| Grey box-grey gum west forest of subtropical eastern Australia | E | Community likely to occur within area | This TEC is a type of forest associated with escarpment slopes and foothills, on inland hills and ranges. Several regional ecosystem communities coincide with this TEC, including Of Concern RE 12.9-10.3 (*Eucalyptus moluccana* open forest on sedimentary rocks), Least Concern RE12.8.14a (*Eucalyptus moluccana* open forest +/- *Eucalyptus tereticornis*, *Eucalyptus siderophloia*, or *Eucalyptus crebra*), and Of Concern RE 12.8.8a (*Eucalyptus siderophloia*, *Eucalyptus microcorys*, *Corymbia intermedia*, +/- *Eucalyptus propinqua*, *Eucalyptus carnea* open forest on Cainozoic rocks). | Desktop analysis identified the majority of the assessment area as non-remnant vegetation with polygons of Category B remnant and Category C re-growth vegetation. Based on desktop assessments, a polygon of this re-growth vegetation is composed of a composite regional ecosystem containing 12.9-10.3 (*Eucalyptus moluccana* open forest on sedimentary rocks).<br><br>Field surveys of this re-growth vegetation found it to contain highly modified elements with invasive species dominating the shrub and ground cover layers. Although rainforest species were identified on-site, including *Ficus* spp. (figs) and *Aphananthe philippinensis* (Rough Leaved Elm), these species largely do not align with those in the TEC description. Therefore, it is considered unlikely this community exists within the bounds of the proposed development area. | Low | Unlikely |

| | | | | | | |
|---|---|---|---|---|---|---|
| Lowland rainforest of subtropical Australia | CE | Community may occur within area | This TEC occurs mainly on basalt and alluvial soils and is characteristic of a low abundance of *Eucalyptus, Melaleuca* and *Casuarina* species. Specimens with buttress roots and a diversity of vines are common throughout this TEC. This community is usually associated Regional Ecosystems 12.3.1, 12.5.13, 12.8.3, 12.8.4, 12.8.13, 12.11.1, 12.11.10, 12.12.1, and 12.12.1. | Desktop analysis and field surveys confirmed that regional ecosystem 12.3.1, 12.5.13, 12.8.3, 12.8.4, 12.8.13, 12.11.1, 12.11.10, 12.12.1, and 12.12.1 do not occur on-site. | Unlikely | Unlikely |
| Poplar Box Grassy Woodland on Alluvial Plains | E | Community may occur within area | The Poplar Box Grassy Woodland on Alluvial Plains ecological community is typically a grassy woodland with a canopy dominated by *Eucalyptus populnea* and understorey mostly of grasses and other herbs. The ecological community mostly occurs in gently undulating to flat landscapes and occasionally on gentle slopes on a wide range of soil types of alluvial and depositional origin. In Queensland, this TEC corresponds with 11.3.2, 11.3.17, 11.3.7, 11.4.12 and 12.3.10. | Desktop analysis and field surveys confirmed that regional ecosystems 11.3.2, 11.3.17, 11.3.7, 11.4.12 and 12.3.10 do not occur on-site. | Unlikely | Unlikely |
| Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions | E | Community likely to occur within area | This TEC is associated with eucalypt forests and woodlands, on the floodplains of the eastern watershed of the Great Dividing Range, predominantly in the New South Wales North Coast and South Eastern Queensland bioregions. It is a floodplain forest community with a canopy dominated by eucalypts and other myrtaceous tree species. In Queensland, this TEC corresponds with Regional Ecosystems 12.3.2, 12.3.3, 12.3.4, 12.3.7, 12.3.10, 12.3.11, 12.3.12, 12.3.14, 12.3.15, and 12.3.19. | Desktop analysis and field surveys confirmed that regional ecosystem, 12.3.2, 12.3.4, 12.3.10, 12.3.11, 12.3.12, 12.3.14, 12.3.15, and 12.3.19 do not occur on-site.<br><br>Desktop analysis identified the majority of the assessment area as non-remnant vegetation with polygons of Category B remnant and Category C re-growth vegetation. Based on desktop assessments, some polygons of this remnant and re-growth vegetation are composed of regional ecosystem 12.3.7 (*Eucalyptus tereticornis, Casuarina cunninghamiana subsp. cunninghamiana +/- Melaleuca* | Moderate | Low |

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| | | | | *spp*. fringing woodland), and a composition of regional ecosystems 12.3.7 and 12.3.3 (*Eucalyptus tereticornis* woodland on Quaternary alluvium).<br><br>Field surveys of the remnant vegetation found it to contain highly modified elements with invasive species dominating the shrub and ground cover layers. Large areas of the site have been cleared for agricultural uses and the remnant 12.3.7 vegetation contains substantial disturbance from cattle grazing. Field surveys confirm the presence of *Melaleuca sp*. characteristic of this TEC, however the area is lacking canopy species due to historic clearing. Therefore, it is considered unlikely this community exists within the bounds of the proposed development area. | | |
| White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland | CE | Community likely to occur within area | Box – Gum Grassy Woodlands and Derived Grasslands are characterised by a species-rich understorey of native tussock grasses, herbs and scattered shrubs, and the dominance, or prior dominance, of White Box, Yellow Box or Blakely's Red Gum trees. In Queensland the ecological community is a primary component of the following Regional Ecosystems: 11.8.2a, 11.8.8, 11.9.9a, 13.3.1, 13.11.8, 13.12.8 and 13.12.9. It can also be a smaller component of the following regional ecosystems: 11.3.23, 12.8.16 (only at the far western edge of the bioregion), 13.3.4, 13.11.3 and | Desktop analysis and field surveys confirmed that regional ecosystems 11.8.2a, 11.8.8, 11.9.9a, 13.3.1, 13.11.8, 13.12.8 and 13.12.9, 11.3.23, 12.8.16, 13.3.4, 13.11.3 and 13.11.4 do not occur on-site. | Unlikely | Unlikely |

13.11.4. These regional ecosystems range in conservation status from ‘not of concern at present’ to ‘endangered’.

*Listed Threatened Species*

| ***Scientific name*** | **Common name** | **Listing Status*** | | **EPBC code** | **Habitat and Distribution** | **Microhabitat keywords** | **Likelihood of Occurrence Analysis** | **Desktop Likelihood of occurrence (on-site)** | **Field Survey Confirmed Likelihood of occurrence (on-site)** |
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| | | **EPBC Act** | **NC Act** | | | | | | |
| **Birds** | | | | | | | | | |
| *Anthochaera phrygia* | Regent Honeyeater | CE | CE | 82338 | Regent Honeyeaters mostly occur in dry Box-Ironbark Eucalypt woodland and dry sclerophyll forest associations in areas of low to moderate relief, wherein they prefer moister, more fertile sites. These areas are generally associated with creek flats and river valleys and foothills. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. They are a generalist forager, which mainly feed on nectar from a wide range of eucalypts and mistletoes. | *Corymbia citriodora* forest | Field surveys found potential foraging habitat to be largely absent or highly limited adjacent the site.<br><br>Although *Eucalypt* species were recorded within the assessment area these are in the linear areas of vegetation associated with waterways with most of the site consisting largely of cleared paddock. As this species prefers areas with significant mature trees, the site is not considered suitable to support this species. Additionally, limited mistletoes were recorded at the time of assessment, therefore the site is limited in resources essential to the Regent Honeyeaters survival.<br><br>Furthermore, large areas of intact bushland that offer higher quality habitat to support this species are | Moderate | Low |

| *Scientific name* | Common name | Listing Status* | | EPBC code | Habitat and Distribution | Microhabitat keywords | Likelihood of Occurrence Analysis | Desktop Likelihood of occurrence (on-site) | Field Survey Confirmed Likelihood of occurrence (on-site) |
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| | | EPBC Act | NC Act | | | | | | |
| | | | | | | | present to the north and west of the site.<br><br>The closest Regent Honeyeater record is 4.5 km north-east of the site. Given the highly disturbed vegetation on site and proximity to more suitable habitat, it is considered a low likelihood this species would occur on site. | | |
| *Botaurus poiciloptilus* | Australasian Bittern | E | E | 1001 | The Australasian Bittern occurs in terrestrial wetlands and, rarely, estuarine habitats, mainly in the temperate south-east and south-west. 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. It favours permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes and / or reeds or cutting grass growing over muddy or peaty substrate. The Australasian Bittern occurs in the far south-east of Queensland; it has been reported North to Baralaba and West | Wetlands, permanent water, freshwater dam | The majority of the site is dominated by cleared paddock and disturbed vegetation. Several flow paths and two wetland areas exist throughout the site. However, the vegetation surrounding the drainage areas are highly disturbed and does not form the tall dense native vegetation communities this species prefers.<br><br>Furthermore, the closest Australasian Bittern record is 16 km south-east of the site. Given the highly disturbed vegetation on site and lack of local records, it is | Low | Low |

| *Scientific name* | Common name | Listing Status* | | EPBC code | Habitat and Distribution | Microhabitat keywords | Likelihood of Occurrence Analysis | Desktop Likelihood of occurrence (on-site) | Field Survey Confirmed Likelihood of occurrence (on-site) |
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| | | EPBC Act | NC Act | | | | | | |
| | | | | | to Wyandra, although in most years it is probably confined to a few coastal swamps. It is rarely recorded in Queensland, and possibly survives only in protected areas such as the Cooloola and Fraser regions. | | considered a low likelihood this species would occur on site. | | |
| *Calidris ferruginea* | Curlew Sandpiper | CE | CE | 856 | Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. In Queensland, scattered records occur in the Gulf of Carpentaria, with widespread records along the coast south of Cairns. | | No suitable foraging or breeding habitat occurs on-site. | Unlikely | Unlikely |
| *Calyptorhynchus lathami lathami* | Glossy Black-cockatoo | V | V | 67036 | This species prefers woodland areas dominated by she-oak Allocasuarina, or open sclerophyll forests and woodlands with a stratum of Allocasuarina beneath Eucalyptus, Corymbia or Angophora. | Allocasuarina, Casuarina | According to Wildnet, one (1) record of this species exists 7.5km to the west of the site from 1973. | Low | Low |

| *Scientific name* | Common name | Listing Status* | | EPBC code | Habitat and Distribution | Microhabitat keywords | Likelihood of Occurrence Analysis | Desktop Likelihood of occurrence (on-site) | Field Survey Confirmed Likelihood of occurrence (on-site) |
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| | | EPBC Act | NC Act | | | | | | |
| | | | | | Glossy black-cockatoos have also been observed in mixed Allocasaurina, Casuarina, cypress Callitris and brigalow *Acacia harpophylla* woodland assemblages. In SEQ west of the Great Dividing Range, they have been observed feeding in remnant belah Casuarina cristata and bulloak *Allocasuarina luehmannii* forests. This species is also known to utilise appropriate remnant woodlands, and individual or small pockets of Allocasuarina and Casuarina feed trees in urban areas | | Although Allocasuarina and Casuarina species were recorded within the assessment area these are in the linear areas of vegetation with the sites consisting largely of cleared paddock. As this species prefers areas dominated by these species, the site is not considered suitable to support this species.<br><br>Therefore, it is unlikely this species would utilise the vegetation on-site for breeding or foraging but a low likelihood it would occur as a fly-over species | | |
| *Charadrius leschenaultii* | Greater Sand Plover | V | V | 877 | In the non-breeding grounds in Australasia, the Greater Sand Plover is almost entirely coastal, inhabiting littoral and estuarine habitats. They mainly occur on sheltered sandy, shelly or muddy beaches with large intertidal mudflats or sandbanks, as well as sandy estuarine lagoons. They seldom occur at shallow freshwater wetlands. | | No suitable foraging or breeding habitat occurs on-site. | Unlikely | Unlikely |

| *Scientific name* | Common name | Listing Status* | | EPBC code | Habitat and Distribution | Microhabitat keywords | Likelihood of Occurrence Analysis | Desktop Likelihood of occurrence (on-site) | Field Survey Confirmed Likelihood of occurrence (on-site) |
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| | | EPBC Act | NC Act | | | | | | |
| *Climacteris picumnus victoriae* | Brown Treecreeper | V | - | 67062 | The Brown Treecreeper occurs in areas of relatively undisturbed grassy woodland with native understorey. The species prefers an open habitat structure that is quite open at ground level. The required degree of openness is mostly likely to be created by moderate levels of disturbance by fire and/or grazing. The species requires large living and dead trees with hollows for roosting and nesting sites and for foraging. Fallen timber also provides essential foraging habitat. | | Although the site contains areas of open grassy woodland, the understorey is dominated by exotic species, not the native species preferred by the Brown Treecreeper.<br><br>The closest Brown Treecreeper record is approximately 70 km south-east of the site. Given the highly disturbed vegetation on site and lack of local records, it is considered a low likelihood this species would occur on site. | Low | Low |
| *Cyclopsitta diophthalma coxeni* | Coxen's Fig Parrot | E | E | 59714 | The Coxen's Fig Parrot occurs in rainforest habitats including subtropical rainforest, dry rainforest, littoral and developing littoral rainforest, and vine forest. Food is mainly taken from figs however other species fruit have been recorded in their diet including *Elaeocarpus grandis, Syzygium corynanthum, Litsea reticulata* and *Grevillea robusta*. | | Field surveys found potential foraging habitat to be largely absent. Although fig species and *Grevilliea robusta* were recorded within the area, there was a lack of suitable food sources in the form of *Elaeocarpus grandis Syzygium corynanthum,* and *Litsea reticulata.*<br><br>Furthermore, there are no records of the Coxen's Fig Parrot within 30km of the site. | Low | Low |

| *Scientific name* | Common name | Listing Status* | | EPBC code | Habitat and Distribution | Microhabitat keywords | Likelihood of Occurrence Analysis | Desktop Likelihood of occurrence (on-site) | Field Survey Confirmed Likelihood of occurrence (on-site) |
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| | | EPBC Act | NC Act | | | | | | |
| *Erythrotriorchis radiatus* | Red Goshawk | V | E | 942 | A wide ranging and highly mobile species generally observed over eucalypt habitats. This species prefers forest and woodland with a mosaic of vegetation types, large prey populations (birds) and permanent water. The vegetation types include eucalypt woodland, open forest, tall open forest, gallery rainforest, swamp sclerophyll forest and rainforest margins. Habitat has to be open enough for fast attack and manoeuvring in flight, but provide cover for ambushing of prey. | | This site does not contain the mosaic of vegetation types that this species favours. There is no evidence of permanent residence, and due to the scarcity of this species and lack of local records, its occurrence is highly unlikely. | Unlikely | Unlikely |
| *Falco hypoleucos* | Grey Falcon | V | V | 929 | The Grey Falcon is a medium-sized, compact, pale falcon with a heavy, thick-set, deep-chested appearance. Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey. Preys primarily on birds, especially parrots and pigeons, using high-speed chases and stoops; reptiles and mammals are also taken. Like other falcons it utilises old nests of other birds of prey and ravens, usually high in a living | | The site is highly disturbed with the majority of the area containing disturbed open paddock space. Vegetated areas do not represent the open woodlands this species prefers.<br><br>Records of the Grey Falcon within the wider region are lacking, with sightings adjacent the coast much less frequent. The absence of contemporary records within the site and surrounds makes it unlikely this species utilises the site. | Unlikely | Unlikely |

| *Scientific name* | Common name | Listing Status* | | EPBC code | Habitat and Distribution | Microhabitat keywords | Likelihood of Occurrence Analysis | Desktop Likelihood of occurrence (on-site) | Field Survey Confirmed Likelihood of occurrence (on-site) |
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| | | EPBC Act | NC Act | | | | | | |
| | | | | | eucalypt near water or a watercourse; peak laying season is in late winter and early spring; two or three eggs are laid. The nests chosen are usually in the tallest trees along watercourses, particularly River Red Gum (*Eucalyptus camaldulensis*) and Coolibah (*E. coolabah*). | | | | |
| *Geophaps scripta scripta* | Squatter Pigeon (southern) | V | V | 64440 | This species inhabits open grasslands and woodlands typically with a native understorey although may occur in artificial pasture. | | This site does not contain suitable habitat, with the majority of the site largely modified with a limited native understorey. In addition, the species is very rarely observed in southern Queensland, and thus this species is not expected to occur onsite. | Unlikely | Unlikely |
| *Grantiella picta* | Painted Honeyeater | V | V | 470 | The species inhabits mistletoes in eucalypt forests/woodlands, riparian woodlands of black box and river red gum, box-ironbark-yellow gum woodlands, acacia-dominated woodlands, paperbarks, casuarinas, callitris, and trees on farmland or gardens. The species prefers woodlands which contain a higher number of mature trees, as these host more mistletoes. It is more common in wider blocks of remnant woodland than in narrower strips. | | Field surveys found potential foraging habitat to be largely absent or highly limited adjacent the site.<br><br>Although *Eucalypt* species were recorded within the assessment area these are in the linear areas of vegetation with the sites consisting largely of cleared paddock. As this species prefers areas with | Unlikely | Unlikely |

| *Scientific name* | Common name | Listing Status* | | EPBC code | Habitat and Distribution | Microhabitat keywords | Likelihood of Occurrence Analysis | Desktop Likelihood of occurrence (on-site) | Field Survey Confirmed Likelihood of occurrence (on-site) |
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| | | EPBC Act | NC Act | | | | | | |
| | | | | | | | significant mature trees, the site is not considered suitable to support this species. Additionally, limited mistletoes were recorded at the time of assessment, therefore the site is limited in resources essential to the Painted Honeyeaters survival.<br><br>Furthermore, large areas of intact bushland that offer higher quality habitat to support this species are present to the north and west of the site.<br><br>The closest Regent Honeyeater record is 28 km north of the site. Given the highly disturbed vegetation on site, proximity to more suitable habitat, and lack of local records it is considered unlikely this species would occur on site. | | |
| *Hirundapus caudacutus* | White-throated Needletail | V | V | 682 | Although they occur over most types of habitat, they are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly | | The majority of the site contains open paddock and therefore could not support this species in its current state. The areas of | Low | Low |

| *Scientific name* | Common name | Listing Status* | | EPBC code | Habitat and Distribution | Microhabitat keywords | Likelihood of Occurrence Analysis | Desktop Likelihood of occurrence (on-site) | Field Survey Confirmed Likelihood of occurrence (on-site) |
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| | | EPBC Act | NC Act | | | | | | |
| | | | | | between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland. They also commonly occur over heathland, but less often over treeless areas, such as grassland or swamps. | | vegetation on-site are relatively small and therefore unlikely to support a roosting area for the White-throated Needletail.<br><br>Notably there have been records of this species in the region. A review of Biomaps and ALA found that the majority of these records are from within the last 20 years, with the most recent in 2021.<br><br>For these reasons it is unlikely the species would utilise the site for breeding or roosting however given its high mobility over a variety of environments, there is a low - moderate likelihood it could occur as a fly-over species. | | |
| *Lathamus discolor* | Swift Parrot | CE | E | 744 | The Swift Parrot breeds in Tasmania during spring to early summer. During autumn and winter the species migrates to the mainland where it follows a nomadic existence linked to the availability and timing of flowering of trees in various locations. | | Key foraging species including *Eucalyptus tereticornis* (Forest Red Gum), were present within the assessment area. However, the vegetation on-site is highly modified and relatively small, offering low value foraging habitat. | Unlikely | Unlikely |

| *Scientific name* | Common name | Listing Status* | | EPBC code | Habitat and Distribution | Microhabitat keywords | Likelihood of Occurrence Analysis | Desktop Likelihood of occurrence (on-site) | Field Survey Confirmed Likelihood of occurrence (on-site) |
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| | | EPBC Act | NC Act | | | | | | |
| | | | | | | | Furthermore, the large areas of vegetation to west and north offer higher value and less disturbed vegetation for this species.<br><br>A review of Biomaps and ALA indicate that there are no records of the Swift Parrot in the local region, with the nearest observed 17 km north-east of the site.<br><br>Given the abundance of foraging habitat further north and west of the site and lack of sightings in the local region, it's considered a low likelihood that this species would utilise the site. | | |
| *Ninox strenua* | Powerful Owl | - | V | | The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. | | Possible habitat for the species occurs in the form of open sclerophyll vegetation however woodland is limited across the site due to historical clearing. | Moderate | Low |

| *Scientific name* | Common name | Listing Status* | | EPBC code | Habitat and Distribution | Microhabitat keywords | Likelihood of Occurrence Analysis | Desktop Likelihood of occurrence (on-site) | Field Survey Confirmed Likelihood of occurrence (on-site) |
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| | | EPBC Act | NC Act | | | | | | |
| | | | | | | | Records of the species from 2011 and 2010 occur within 5 km north of the site. | | |
| *Numenius madagascariensis* | Eastern Curlew | CE | E | 847 | The Eastern Curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The birds are often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes use the mangroves. The birds are also found in saltworks and sewage farms. | | No suitable habitat was observed throughout the assessment area. | Unlikely | Unlikely |
| *Rostratula australis* | Australian Painted-snipe | E | E | 77037 | The Australian Painted Snipe is usually found in shallow inland wetlands, either freshwater or brackish, that are either permanently or temporarily filled. The species has a scattered distribution throughout many parts of Australia, with a single record from Tasmania. | | The majority of the site is dominated by cleared paddock and disturbed vegetation. Several flow paths and two wetland areas exist throughout the site. However, the vegetation surrounding the drainage areas are highly disturbed.<br><br>The closet Australian Painted-snipe record is approximately 13 km | Low | Low |

| *Scientific name* | Common name | Listing Status* | | EPBC code | Habitat and Distribution | Microhabitat keywords | Likelihood of Occurrence Analysis | Desktop Likelihood of occurrence (on-site) | Field Survey Confirmed Likelihood of occurrence (on-site) |
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| | | EPBC Act | NC Act | | | | | | |
| | | | | | | | north-west of the site. Given the highly disturbed vegetation on site and lack of local records, it is considered a low likelihood this species would occur on site. | | |
| *Stagonopleura guttata* | Diamond Firetail | V | V | 59398 | The Diamond Firetail occurs in Eucalypt, acacia or casuarina woodlands, open forests and other lightly timbered habitats. The species is usually found in areas with low tree density, few large logs, and little litter cover but high grass cover for foraging, roosting and breeding. | | The majority of the site contains open paddock and therefore could not support this species in its current state. The areas of vegetation on-site consist of scattered *Eucalypt sp.* and patches of regrowth and remnant vegetation which may provide marginal suitable habitat for the Diamond Firetail.<br><br>No recent records of the species occur within proximity to the site; therefore it is considered unlikely the species would occur. | Low | Unlikely |
| *Turnix melanogaster* | Black-breasted Button Quail | V | V | 923 | Typical habitat occurs in dry rainforest and vegetation immediately adjacent to rainforest. However the species has also been recorded in a variety of low coastal heathlands around Fraser Island and nearby mainland. Deep leaf litter in which | | The site does not contain dry rainforest or vegetation immediately adjacent to rainforest, and no heathlands are present. Deep leaf litter is also absent over | Unlikely | Unlikely |

| *Scientific name* | Common name | Listing Status* | | EPBC code | Habitat and Distribution | Microhabitat keywords | Likelihood of Occurrence Analysis | Desktop Likelihood of occurrence (on-site) | Field Survey Confirmed Likelihood of occurrence (on-site) |
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| | | EPBC Act | NC Act | | | | | | |
| | | | | | the species can forage appears to be particularly favoured. | | the majority of the site. It is unlikely that this species will occur. | | |
| **Fish** | | | | | | | | | |
| *Maccullochella mariensis* | Mary River Cod | E | - | 83806 | Found in southeast Queensland in the Mary River system, their ideal habitat is described as deep, shaded, slow flowing pools with plenty of snags and log-piles. | | No river system is present within the assessment area. Teviot Brook creek borders the southern boundary of the site which is mapped outside the development area. This watercourse was observed to be somewhat disturbed by cattle grazing. In addition, the watercourses onsite were observed to be heavily disturbed with invasive grasses and shrubs and not considered suitable to support the Mary River Cod. No recent records of the species have been recorded within proximity to the site. | Unlikely | Unlikely |
| **Insects** | | | | | | | | | |
| *Argynnis hyperbius inconstans* | Australian Fritillary | CE | E | 88056 | Most specimens have been collected from river estuaries or swampy coastal areas at or near sea level. The Australian fritillary butterfly is restricted to open, swampy, coastal areas where the larval food plant, *Viola betonicifolia*, grows as a small, | | No suitable coastal habitat was observed throughout the assessment area. | Unlikely | Unlikely |

| *Scientific name* | Common name | Listing Status* | | EPBC code | Habitat and Distribution | Microhabitat keywords | Likelihood of Occurrence Analysis | Desktop Likelihood of occurrence (on-site) | Field Survey Confirmed Likelihood of occurrence (on-site) |
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| | | EPBC Act | NC Act | | | | | | |
| | | | | | insignificant ground herb in association with *Lomandra longifolia* (Long Leaved Matrush) and grasses, especially the grass *Imperata cylindrica* (Bladey Grass). This habitat is called *Melaleuca* wetlands, although the larval food plant does not occur in all sub-types of this plant community. | | | | |
| **Mammals** | | | | | | | | | |
| *Chalinolobus dwyeri* | Large-eared Pied Bat | V | V | 183 | The Large-eared Pied Bat roosts on sandstone cliffs and fertile woodland valley habitat within close proximity of each other. However, in South East Queensland habitat includes rainforest and moist eucalypt forest habitats at high elevations. | | No suitable high elevation habitat to support this species occurs on-site. | Unlikely | Unlikely |
| *Dasyurus maculatus maculatus* | Spot-tailed Quoll | E | V | 75184 | The Spot-tailed Quoll has a preference for 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. Individuals require an | | No suitable denning habitat to support this species occurs on-site, or in the nearby vicinity. | Unlikely | Unlikely |

| *Scientific name* | Common name | Listing Status* | | EPBC code | Habitat and Distribution | Microhabitat keywords | Likelihood of Occurrence Analysis | Desktop Likelihood of occurrence (on-site) | Field Survey Confirmed Likelihood of occurrence (on-site) |
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| | | EPBC Act | NC Act | | | | | | |
| | | | | | abundance of food such as birds and small mammals, and large areas of relatively intact vegetation through which to forage. | | | | |
| *Macroderma gigas* | Ghost Bat | V | E | 174 | Ghost Bats have been recorded in both arid regions (Pilbara region) and rainforest areas (north Queensland). *Macroderma gigas* roost in caves, old mine tunnels and in deep cracks in rocks. This species is distributed widely however patchily across the northern half of Australia, being found in a variety of tropical habitats. | | No suitable foraging or roosting habitat to support this species occurs on-site, or in the nearby vicinity. Additionally, it is known that habitat modification for livestock is attributable to the decline of this species habitat. The sites historical clearing for agricultural purposes makes it unlikely this species would be present within the site or surrounding vicinity. | Unlikely | Unlikely |
| *Petauroides volans* | Greater Glider | E | V | 254 | The Greater Glider is an arboreal nocturnal marsupial that is mostly restricted to eucalypt forests and woodlands, although it occurs in highest abundance in taller, montane, moist eucalypt forests with abundant (large) hollow-bearing trees for shelter and a variety of eucalypt species for feeding. Diet consists of eucalypt leaves, and occasionally flowers. Small home ranges and low dispersability make this species sensitive to clearing and | | A variety of eucalypt species occur over site, although this is largely regrowth vegetation with scattered mature trees amongst cleared paddocks. There are some hollow-bearing trees across the site, and the closest local records are approximately 9 km to the east of the site. | Low | Low |

| *Scientific name* | Common name | Listing Status* | | EPBC code | Habitat and Distribution | Microhabitat keywords | Likelihood of Occurrence Analysis | Desktop Likelihood of occurrence (on-site) | Field Survey Confirmed Likelihood of occurrence (on-site) |
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| | | EPBC Act | NC Act | | | | | | |
| | | | | | fragmentation, with low persistence in small forest fragments. | | | | |
| *Petaurus australis australis* | Yellow-bellied Glider | V | E | 87600 | The Yellow-bellied Glider largely occurs in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south. Denning occurs within hollows of large trees, with the species preferring to live in family groups of two to six individuals. This species is very mobile and occupy large home ranges of 20 to 85 ha to encompass dispersed and seasonally available food resources. | | Foraging and denning habitat required to support this species is not present within the site. Lack of recent and viable records as well as heavy disturbance indicates it is unlikely this species would utilise the site. | Unlikely | Unlikely |
| *Petrogale penicillata* | Brush-tailed Rock Wallaby | V | V | 225 | This species prefers rocky habitats, including loose boulder-piles, rocky outcrops, steep rocky slopes, cliffs, gorges and isolated rock stacks. It also utilises tree limbs. While it appears that most Brush-tailed Rock-wallaby colonies are on north-facing slopes and cliff lines, colonies have been found on south-facing cliffs in Kangaroo Valley, in the Macleay River | | No suitable habitat was observed throughout the assessment area.<br><br>Furthermore, large areas of intact bushland that offer higher quality habitat to support this species are present to the north-west of the site. | Unlikely | Unlikely |

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| | | EPBC Act | NC Act | | | | | | |
| | | | | | Gorge, in the Warrumbungles and at Mt Kaputar, although usually in lower densities. | | | | |
| *Phascolarctos cinereus* | Koala | E | E | 85104 | The Koala is found in a range of habitats, from coastal islands and tall eucalypt forests to low woodlands inland. | | The vegetation on site contains Koala food and habitat trees. Scattered patches of Eucalypt vegetation is present within the site, with dominate species including *Eucalyptus tereticornis* (Forest Red Gum) and *Corymbia citriodora* (Spotted Gum).<br><br>Although a single scat was found onsite, no koalas were observed at the time of survey. There are multiple local sightings within 5 km of the site. Whilst potential habitat to support the species onsite is considered highly disturbed, recent records indicate the presence of the species within the area and therefore may utilize the site. | Moderate | Moderate |
| *Potorous tridactylus tridactylus* | Long-nosed Potoroo | V | V | 66645 | The Long-nosed Potoroo inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and | | Given the lack of sightings within the local area and unsuitable habitat on-site, it's considered | Unlikely | Unlikely |

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| | | EPBC Act | NC Act | | | | | | |
| | | | | | may consist of grass-trees, sedges, ferns or heath, or of low shrub of tea-trees or melaleucas. A sandy loam soil is also a common feature. | | unlikely that this species would occur on-site. | | |
| *Pseudomys novaehollandiae* | New Holland Mouse | V | V | 96 | Across the species' range the New Holland Mouse is known to inhabit open heathlands, open woodlands with a heathland understorey and vegetated sand dunes. The New Holland Mouse is a social animal, living predominantly in burrows shared with other individuals. The home range of the New Holland Mouse ranges from 0.44 ha to 1.4 ha. The species peaks in abundance during early to mid stages of vegetation succession typically induced by fire. | | No suitable habitat to support this species occurs on-site. | Unlikely | Unlikely |
| *Pteropus poliocephalus* | Grey-headed Flying-fox | V | - | 186 | Species generally roosts in camps in trees adjacent to larger permanent watercourse. 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. It also feeds on commercial | | The site contains scattered Eucalypt species within cleared paddocks along with patches of regrowth and remnant vegetation including *Melaleuca viminalis* (Weeping Bottlebrush). The Grey-headed Flying-fox was not seen utilising this vegetation. In addition, there was no observed roosts on site. | High | Moderate |

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| | | EPBC Act | NC Act | | | | | | |
| | | | | | fruit crops. The primary food source is blossom from Eucalyptus and related genera. | | Notably, there is a record within 1 km of the referral site in the last 20 years. | | |
| **Plants** | | | | | | | | | |
| *Arthraxon hispidus* | Hairy-joint Grass | V | V | 9338 | Hairy-joint grass is found in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps, as well as woodland. | Rainforest; swamp | No suitable habitat to support this species occurs on-site. | Unlikely | Unlikely |
| *Bosistoa transversa* | Three-leaved Bosistoa | V | - | 16091 | The Three-leaved Bosistoa is conserved within Mt Warning National Park, Numbinbah Nature Reserve, Limpinwood Nature Reserve and Whian Whian State Forest. While population information is unavailable, it is thought to be common in its range. It generally grows in wet sclerophyll forest, dry sclerophyll forest and rainforest up to 3oo metres in altitude. It is commonly associated with *Argyrodendron trifoliolatum, Syzygium hodgkinsoniae, Endiandra pubens, Dendrocnide photinophylla, Acmena ingens, Diploglottis australis and Diospyros mabacea.* | | Rainforest/wet forest and the species that the Three-leaved Bosistoa is commonly associated with were not located on site. Unlikely to occur on-site due to lack of suitable habitat and local records. | Unlikely | Unlikely |

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| | | EPBC Act | NC Act | | | | | | |
| *Cryptostylis hunteriana* | Leafless Tongue-orchid | V | - | 19533 | Habitat occurring in a wide variety of habitats including heathlands, heathy woodlands, sedgelands, *Xanthorrheoa* spp. plains, dry sclerophyll forests (shrub/grass sub-formation and shrubby sub-formation), forested wetlands, freshwater wetlands, grasslands, grassy woodlands, rainforests and wet sclerophyll forests (grassy sub-formation. Soils are generally considered to be moist and sandy, however, this species is also known to grow in dry or peaty soils. | | No suitable habitat or soil types were observed throughout the assessment area. Associated *Xanthorrheoa spp.* Were also not present within the area. | Unlikely | Unlikely |
| *Cupaniopsis shirleyana* | Wedge-leaf Tuckeroo | V | V | 3205 | The Wedge-leaf Tuckeroo occurs in a variety of dry rainforest vegetation types, including vine thicket communities on hillsides, stream beds and along riverbanks at altitudes up to 550 m above sea level. This species is also likely to occur on the margins of native vegetation in scrubby urbanised areas. Predominately found on dark brown sandy loams and sandy clay loams (pH 5-7.5) and rocky scree slopes. Generally, these soils have formed from volcanic parent materials (mainly granites and granodiorites, basalt and andesitic flows, and pyroclastics). | | There are no local records of this species within the Queensland Wildlife Online sightings data, with the closest sighting in the Toowoomba and surrounds. This species is unlikely to occur on-site due to lack of suitable conditions. | Unlikely | Unlikely |

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| | | EPBC Act | NC Act | | | | | | |
| *Cupaniopsis tomentella* | Boonah Tuckeroo | V | V | 3322 | Boonah Tuckeroo is only known to occur between Boonah and Ipswich in South-east Queensland. It grows in vine thickets mostly on fertile clay soils. Only seven occurrences are known and are confined to small, isolated remnants on scree slopes and roadsides. | | No suitable habitat to support this species occurs on-site. | Unlikely | Unlikely |
| *Dichanthium setosum* | Bluegrass | V | - | 14159 | In Queensland, bluegrass has been reported from the Leichhardt, Morton, North Kennedy and Port Curtis regions. *Dichanthium setosum* is associated with heavy basaltic black soils and stony red-brown hardsetting loam with clay. It can be found in moderately disturbed areas such as cleared woodland, grassy roadside remnants, grazed land and highly disturbed pasture. The extent to which this species tolerates disturbance is unknown. | | There are no local records of this species within the Queensland Wildlife Online sightings data, with the closest sighting in the Toowoomba and surrounds. This species is unlikely to occur on-site due to lack of suitable conditions. | Unlikely | Unlikely |
| *Fontainea venosa* | | V | V | 24040 | Occurs in notophyll vine forest and vine thicket with a mean annual rainfall of 1000-1100 mm on soils derived from and containing abundant andesitic rocks, often on rocky outcrops or along creeks. | | No suitable habitat to support this species occurs on-site. | Unlikely | Unlikely |
| *Macadamia integrifolia* | Macadamia Bush | V | V | 7326 | The Macadamia Nut grows in remnant rainforest. It prefers to grow in mild frost-free areas with reasonably high rainfall. | | No suitable habitat to support this species occurs on-site. | Unlikely | Unlikely |

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| | | EPBC Act | NC Act | | | | | | |
| | | | | | Vegetation communities range from notophyll mixed forest, extremely tall closed forest, simple notophyll mixed very tall closed forest to simple microphyll-notophyll mixed mid-high closed forest with Araucaria and Argyrodendron emergents. | | | | |
| *Macadamia tetraphylla* | Rough-shelled Bush Nut | V | V | 6581 | This species generally occurs in subtropical rainforest and complex notophyll vineforest, at the margins of the forests and mixed sclerophyll forest. It occurs in restricted habitat, growing on moderate to steep hillslopes on alluvial soils at well drained sites. | | No suitable habitat to support this species occurs on-site. | Unlikely | Unlikely |
| *Melaleuca irbyana* | Bushhouse Paperbark | - | E | - | *Melaleuca irbyana* is found from Gatton in south-east Queensland, east to Brisbane and also north of Injune, south to near Casino in north-eastern New South Wales. *Melaleuca irbyana* grows in flat areas that are periodically waterlogged, in eucalypt forest, mixed forest and *Melaleuca* woodland with a sparse and grassy understorey. It grows on poorly draining, heavy clay soils. | | Suitable habitat for *Melaleuca irbyana* was present within the subject site in the form of flat periodically waterlogged floodplains. However due to significant disturbance from cattle agistment and clearing across the site, following field surveys it is considered unlikely this species would occur onsite. | Moderate | Unlikely |
| *Notelaea ipsviciensis* | Cooneana Olive | CE | CE | 81858 | The Cooneana Olive survives as an understorey plant in degraded, eucalypt | | There are no records of this species within the Queensland Wildlife | Unlikely | Unlikely |

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| | | EPBC Act | NC Act | | | | | | |
| | | | | | dominated dry sclerophyll vegetation communities. Soils in the area are of low fertility, depauperate and sandstone-based. This species prefers open woodland communities with open canopies. The known population is adjacent to subdivided, modified and developed land. | | Online sightings data in the local area with the closest record 25km north-west of the site. This species is unlikely to occur on-site due to lack of suitable conditions. | | |
| *Notelaea lloydii* | Lloyd's Olive | V | V | 15002 | The species occurs on undulating to hilly terrain either in moist gullies or on gentle to steep dry slopes, but is rarely found on rocky outcrops. Soil types are mostly shallow, well drained and stony to very rocky in texture. Found in the ecotone between eucalypt open forests and vine thickets at 80-480 m above sea level (asl). | | No suitable habitat to support this species occurs on-site. | Unlikely | Unlikely |
| *Picris evae* | Hawkweed | V | V | 10839 | Hawkweed predominantly occurs in open Eucalyptus woodland with a grassy understorey composed on *Dichanthium spp.* Upper stratum species include *Eucalyptus melliodora, E. crebra, E. populnea, E. albens, Angophora subvelutina, Allocasuarina torulosa, and Casuarina cunninghamiana.* The species has been collected along roadsides and in cultivated areas. | | No suitable habitat to support this species was observed on-site, with historical clearing resulting in a highly modified environment. Furthermore, no *Dichanthium spp., E. melliodora, E. populnea, E. albens, A. subvelutina* or *A. torulosa* specimens were recorded on-site.<br><br>There have been no records of this species within the local area. | Unlikely | Unlikely |

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| | | EPBC Act | NC Act | | | | | | |
| | | | | | | | For these reasons it is considered unlikely that Hawkweed is present within the assessment area and surrounds | | |
| *Planchonella eerwah* | Shiny-leaved Condoo | E | E | 17340 | The species grows in subtropical rainforest, dry rainforest and Hoop Pine (*Araucaria cunninghamii*) vine scrub. All known areas in which the Shiny-leaved Condoo occurs are warm and subtropical with an annual rainfall of between 650–1000 mm. Sixty percent of the annual rain falls in the summer months. | | No suitable habitat to support this species was observed on-site, with historical clearing resulting in a highly modified environment. Furthermore, no *Araucaria cunninghamii* specimens were recorded on-site. For these reasons it is considered unlikely that Shiny-leaved Condoo is present within the assessment area and surrounds.<br><br>Notably there have been records of this species in the region. A review of Biomaps and ALA found that the closes record was 6.5km from the site. However, the lack of suitable habitat within the site and no evidence of the species during field surveys suggests a low likelihood the Shiny-leaved Condoo occurs onsite. | Low | Low |

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| | | EPBC Act | NC Act | | | | | | |
| *Plectranthus habrophyllus* | - | E | - | 64589 | This species occurs on rocky outcrops of sandstone or chert in shaded locations in Eucalypt woodland often in close proximity to vine forest. The species is only known between Ipswich and Ormeau. | | No suitable habitat to support this species occurs on-site. | Unlikely | Unlikely |
| *Rhaponticum australe* | Austral Cornflower | V | - | 22647 | *Rhaponticum australe* is known from Mt Moffatt, Monto to Biloela, the eastern Darling Downs to Gatton in Queensland. *Rhaponticum australe* grows in eucalypt open forest with a grassy understory and in grasslands on black clay soil. It is often found on roadsides and on road or rail reserves associated with *Chloris gayana*, *Cirsium vulgare*, *Eucalyptus tereticornis* and *Angophora floribunda* | | Suitable habitat for this species is present across the site, however due to historic clearing and disturbance at the ground layer, field surveys confirm this species has a low likelihood of occurrence. | Low | Low |
| *Rhodamnia rubescens* | Scrub Turpentine | CE | CE | 15763 | Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils. | | No suitable habitat to support this species occurs on-site. | Unlikely | Unlikely |
| *Rhodomyrtus psidioides* | Native Guava | CE | CE | 19162 | Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines. | | No suitable habitat to support this species occurs on-site. | Unlikely | Unlikely |
| *Samadera bidwillii* | Quassia | V | V | 29708 | Quassia commonly occurs in lowland rainforest or on rainforest margins, but it | | This species favours lowland rainforest or rainforest margins | Unlikely | Unlikely |

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| | | EPBC Act | NC Act | | | | | | |
| | | | | | can also be found in other forest types, such as open forest and woodland. Quassia is commonly found in areas adjacent to both temporary and permanent watercourses in locations up to 510 m altitude. The species occurs on lithosols, skeletal soils, loam soils, sands, silts and sands with clay subsoils. | | which are absent from the site, and no local records exist, and thus Quassia is unlikely to be present on site. | | |
| *Sophora fraseri* | | V | V | 8836 | This species normally grows in wet sclerophyll forest and a range of rainforest types. Associated species include: *Corymbia citriodora, Eucalyptus carnea, E. microcorys, E. acmenoides, E. propinqua* and *Lophostemon confertus*. The shrub appears to prefer growing along rainforest margins, in eucalypt forests in the vicinity of rainforests or in large canopy gaps in closed forest communities | | No suitable habitat to support this species occurs on-site. | Unlikely | Unlikely |
| *Thesium australe* | Austral Toadflax | V | V | 15202 | Austral Toadflax is semi-parasitic on the roots of a range of grass species, notably *Themeda triandra* (Kangaroo Grass). It occurs in shrubland, grassland or woodland, often on damp sites. | | The species in which this plant is semi-parasitic to, *Themeda triandra* (Kangaroo Grass) was not recorded on-site, likely due to historical clearing and on-going slashing. It is therefore considered unlikely the Austral Toadflax could survive | Unlikely | Unlikely |

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| | | EPBC Act | NC Act | | | | | | |
| | | | | | | | within the proposed development site in order to occur there. | | |
| **Reptiles** | | | | | | | | | |
| *Delma torquata* | Collared Delma | V | V | 1656 | In general, the species occurs on rocky hillsides on basalt and lateritic soils supporting open eucalypt and Acacia woodland with a sparse understorey of shrubs and tussocks or semi-evergreen vine thicket. | | No suitable habitat was observed throughout the assessment area, with no rocky hillsides present on site. | Unlikely | Unlikely |
| *Furina dunmalli* | Dunmall's Snake | V | V | 59254 | Dunmall's Snake has been found in a broad range of habitats, including forests and woodlands on black alluvial cracking clay and clay loams dominated by Brigalow other Wattles, native Cypress or Bull-oak, and various Blue Spotted Gum, Ironbark, White Cypress Pine and Bull oak open forest and woodland associations on sandstone derived soils. Dunmall's Snake occurs primarily in the Brigalow Belt region in the south-eastern interior of Queensland. Records indicate sites at elevations between 200–500 m above sea level. The snake is very rare or secretive with limited records existing. It has been recorded at Archokoora, Oakey, Miles, Glenmorgan, Wallaville, Gladstone, Lake | | No suitable habitat to support this species occurs on-site. | Unlikely | Unlikely |

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| | | EPBC Act | NC Act | | | | | | |
| | | | | | Broadwater, Mount Archer, Exhibition Range National Park, roadside reserves between Inglewood and Texas, Rosedale, Yeppoon and Lake Broadwater Conservation Park. | | | | |
| *Hemiaspis damelii* | Grey Snake | E | E | 1179 | In Queensland, the Grey Snake occurs primarily along the Macintyre and Condamine Rivers and associated floodplains of the southern Brigalow Belt from Goondiwindi and Dalby west to Glenmorgan, on the Darling Downs and western Lockyer Valley, near Rockhampton on the central Queensland coast, and on the Darling Riverine Plains near Currawinya in south-western Queensland. The species occurs predominantly in areas below 300m above sea level. | | No suitable habitat to support this species occurs on-site. | Unlikely | Unlikely |
| **Amphibians** | | | | | | | | | |
| *Adelotus brevis* | Tusked Frog | - | V | - | Inhabits wet eucalypt forest, rainforest, and sometimes dry eucalypt forest, where it can be found in close proximity to suitable breeding habitat such as ponds and slow-moving sections of streams. | | Possible suitable habitat within the streams and watercourses occurs onsite. However due to significant disturbance from cattle grazing and habitat modification, it is unlikely the species would occur. | Low | Low |

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| | | | | | | | Records of the species occurs within 5 km northeast of the site from 2011. | | |

**Status abbreviations are as follows: CE = Critically Endangered, E = Endangered, V = Vulnerable, NT = Near Threatened, C = Least Concern, SL = Special Least Concern, - = Not Listed.*

*Listed migratory species (not listed above)*

| *Scientific name* | Common name | EPBC code | Habitat and Distribution | Microhabitat keywords | Likelihood of Occurrence Analysis | Desktop Likelihood of Occurrence (on-site) | Field Survey Confirmed Likelihood of Occurrence (on-site) |
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| **Migratory marine birds** | | | | | | | |
| *Apus pacificus* | Fork-tailed Swift | 678 | This species is almost exclusively aerial and mostly occur over inland plains but sometimes above foothills or in coastal areas. | | No suitable habitat to support this species occurs on-site. | Unlikely | Unlikely |
| **Migratory terrestrial species** | | | | | | | |
| *Cuculus optatus* | Oriental Cuckoo | 86651 | Non-breeding habitat only: monsoonal rainforest, vine thickets, wet sclerophyll forest or open Casuarina, Acacia or Eucalyptus woodlands. Frequently at edges or ecotones between habitat types | | No suitable habitat to support this species occurs on-site. | Unlikely | Unlikely |

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| *Hirundapus caudacutus* | White-throated Needletail | 682 | The White-throated needle tail is almost exclusively aerial. This species has been recorded roosting in trees in forests and woodlands, both among dense foliage in the canopy or in hollows. The species breeds in wooded lowlands and sparsely vegetated hills, as well as mountains covered with coniferous forests. | | Potential to occur on site within roosting periods. | Low | Low |
| *Monarcha melanopsis* | Black-faced Monarch | 609 | The Black-faced Monarch mainly occurs in rainforest ecosystems, including semi-deciduous vine thickets, complex notophyll vine forests, tropical (mesophyll) rainforest, subtropical (notophyll) rainforest, mesophyll (broadleaf) thicket/shrubland, warm temperate rainforest, dry (monsoon) rainforest and occasionally cool temperate rainforest. | | No suitable habitat to support this species occurs on-site. | Unlikely | Unlikely |
| *Motacilla flava* | Yellow Wagtail | 644 | This species occupies a range of damp or wet habitats with low vegetation, from damp meadows, marshes, waterside pastures, sewage farms and bogs to damp steppe and grassy tundra. | | No suitable habitat to support this species occurs on-site. | Unlikely | Unlikely |
| *Myiagra cyanoleuca* | Satin Flycatcher | 612 | Satin Flycatchers inhabit heavily vegetated gullies in eucalypt dominated forests and taller woodlands, and on migration occur in coastal forests, woodlands, mangroves and drier woodlands and open forests. | | No suitable habitat to support this species occurs on-site. | Unlikely | Unlikely |

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| *Rhipidura rufifrons* | Rufous Fantail | 592 | The Rufous fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by Eucalypts such as *Eucalyptus microcorys*, *Eucalyptus pilularis*, *Eucalyptus resiniferia* and a number of other Eucalyptus species. | | No suitable habitat to support this species occurs on-site. | Unlikely | Unlikely |
| *Symposiachrus trivirgatus* | Spectacled Monarch | 83946 | The Spectacled Monarchs natural habitats are subtropical or tropical moist lowland forests, subtropical or tropical mangrove forests, and subtropical or tropical moist montane forests. Its preference is for thick understorey areas. | | No suitable habitat to support this species occurs on-site. | Unlikely | Unlikely |
| **Migratory wetland species** | | | | | | | |
| *Actitis hypoleucos* | Common Sandpiper | 59309 | The Common Sandpiper utilises a wide range of coastal wetlands and some inland wetlands, including estuaries and deltas of streams, banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and clay pans, and occasionally piers and jetties. They are mostly found in shallow water, around muddy margins or rocky shores and sometimes in muddy areas littered with rocks or snags. The species commonly utilises mangroves for foraging and roosting but is rarely seen on mudflats. | | No suitable foraging or breeding habitat occurs on-site. | Unlikely | Unlikely |
| *Calidris acuminata* | Sharp-tailed Sandpiper | 874 | In Australia, the Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, | | No suitable foraging or breeding habitat occurs on-site. | Unlikely | Unlikely |

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| | | | grass, saltmarsh, and beach cast algae / seaweed or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline salt lakes inland. They also occur in salt works and sewage farms. They use flooded paddocks, sedgelands and other ephemeral wetlands, but leave when they dry. They use intertidal mudflats in sheltered bays, inlets, estuaries or seashores, and also swamps and creeks lined with mangroves. | | | | |
| *Calidris ferruginea* | Curlew Sandpiper | 856 | In Australia, the Curlew Sandpiper occurs around the coasts and are also erratically widespread inland. The species prefers intertidal mudflats in sheltered coastal areas such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. | | No suitable foraging or breeding habitat occurs on-site. | Unlikely | Unlikely |
| *Calidris melanotos* | Pectoral Sandpiper | 858 | The Pectoral Sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. Occasionally found further inland. | | Given the lack of sightings within the local area and unsuitable habitat on-site, it's considered unlikely that this species would occur on-site. | Unlikely | Unlikely |

| *Scientific name* | Common name | EPBC code | Habitat and Distribution | Microhabitat keywords | Likelihood of Occurrence Analysis | Desktop Likelihood of Occurrence (on-site) | Field Survey Confirmed Likelihood of Occurrence (on-site) |
|---|---|---|---|---|---|---|---|
| *Charadrius leschenaultia* | Greater Sand Plover | 877 | In Australia, the Greater Sand Plover is almost entirely coastal, occurring in littoral and estuarine habitats. They generally occur on sheltered beaches, large intertidal flats, sandbanks, saltmarshes, estuaries, coral reefs, rocky islands, tidal lagoons and coastal dunes. | | No suitable foraging or breeding habitat occurs on-site. | Unlikely | Unlikely |
| *Gallinago hardwickii* | Latham's Snipe | 863 | Latham's Snipe occurs in permanent and ephemeral wetlands. They usually inhabit open, freshwater wetlands with low, dense vegetation. | | The majority of the site is dominated by cleared paddock and disturbed vegetation. Several flow paths and two wetland areas exist throughout the site. However, the vegetation surrounding the drainage areas are highly disturbed and does not form the tall dense native vegetation communities this species prefers.<br><br>A record of this species within 5 km west of the site was recorded in 2020. It is possible this species may occur as a vagrant individuals during migratory patterns. | Low | Low |
| *Numenius madagascariensis* | Eastern Curlew | 847 | The Eastern Curlew predominantly occurs in sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The species also occurs among saltmarsh, on | | No suitable foraging or breeding habitat occurs on-site. | Unlikely | Unlikely |

| *Scientific name* | Common name | EPBC code | Habitat and Distribution | Microhabitat keywords | Likelihood of Occurrence Analysis | Desktop Likelihood of Occurrence (on-site) | Field Survey Confirmed Likelihood of Occurrence (on-site) |
|---|---|---|---|---|---|---|---|
| | | | mudflats fringed by mangroves, coastal saltworks and sewage farms. | | | | |
| *Tringa nebularia* | Common Greenshank | 832 | The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. The species is known to forage at the edges of wetlands in soft mud or mudflats. | | Given the lack of sightings within the local area and unsuitable habitat on-site, it's considered unlikely that this species would occur on-site. | Unlikely | Unlikely |

# Appendix E

## Site BioCondition Transect Data and SAT Survey Results

## Habitat Quality Assessment Unit Score Sheet

**Part A - Administrative**

| Transect ID | T1 | Job Number / Property | 11560 - Wyatt Road |
|---|---|---|---|

**Part B - Site Data**

| Recorders | MD & LB | Date | 9/05/2023 |
|---|---|---|---|

| Assessment Unit: | Assessment Unit Area (ha) | RE | Bioregion Number |
|---|---|---|---|
| na | | 12.9-10.3 | 12 |

| Site description and Location (including details of discrete polygons within the assessment unit) |
|---|
| Mapped Koala Habitat Area (core), non-remnant patch representative of RE12.9-10.3. Dominated by *Eucalyptus moluccana* with scattered *Corymbia citriodora* within the patch. No shrub layer and native ground cover limited, scattered weeds throughout ground layer. |

**Part C - Native Species Richness: (*list species below)**

| Tree species richness: | | | | |
|---|---|---|---|---|
| Total number of species | 3 | | | EDL / Dom / R |
| Scientific Name | *Eucalyptus molaccana* | Common Name | Gum-topped Box | EDL / Dom |
| Scientific Name | *Corymbia citriodora* | Common Name | Spotted Gum | EDL |
| Scientific Name | *Angophora leiocarpa* | Common Name | Smooth-barked Apple | EDL |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |

| Shrub species richness: | | | |
|---|---|---|---|
| Total number of species | 0 | | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |

| Grass species richness: | | | |
|---|---|---|---|
| Total number of species | 1 | | |
| Scientific Name | *Cynodon dactylon* | Common Name | Common Couch |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |

| Forbs and others (non grass ground) species richness: | | | |
|---|---|---|---|
| Total number of species | 2 | | |
| Scientific Name | *Eremophila debilis* | Common Name | Winter Apple |
| Scientific Name | *Einadia hasta* | Common Name | Fish Weed |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |

**Part D - Non-Native Plant Cover: (*list species below)**

| Total percentage cover within plot | 30.00% | | |
|---|---|---|---|
| Scientific Name | *Sporobolus pyramidalis* | Common Name | Giant Rat's Tail Grass |

| Scientific Name | *Conyza sumatrensis* | Common Name | Tall Fleabane |
|---|---|---|---|
| Scientific Name | *Verbena bonariensis* | Common Name | Purple-top Verbena |
| Scientific Name | *Senecio madajascariensis* | Common Name | Fireweed |
| Scientific Name | *Solanum chrysotrichum* | Common Name | Giant Devil's Fig |
| Scientific Name | *Solanum mauritianum* | Common Name | Wild Tobacco |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |

**Part E - Coarse Woody Debris: (*list lengths of individual logs in meters)**

| Total Length of Course Woody Debris (Meters per hectare) | 222.00 | | |
|---|---|---|---|
| 1 | 3.00 | 26 | |
| 2 | 2.00 | 27 | |
| 3 | 0.50 | 28 | |
| 4 | 0.50 | 29 | |
| 5 | 1.50 | 30 | |
| 6 | 1.70 | 31 | |
| 7 | 2.50 | 32 | |
| 8 | 0.50 | 33 | |
| 9 | 8.00 | 34 | |
| 10 | 1.50 | 35 | |
| 11 | 0.50 | 36 | |
| 12 | | 37 | |
| 13 | | 38 | |
| 14 | | 39 | |
| 15 | | 40 | |
| 16 | | 41 | |
| 17 | | 42 | |
| 18 | | 43 | |
| 19 | | 44 | |
| 20 | | 45 | |
| 21 | | 46 | |
| 22 | | 47 | |
| 23 | | 48 | |
| 24 | | 49 | |
| 25 | | 50 | |

**Part F - Native perennial grass cover, organic litter: (*provide percentage cover within each quadrat, and provide average cover)**

| Ground Cover | Quadrat 1 | Quadrat 2 | Quadrat 3 | Quadrat 4 | Quadrat 5 | Average |
|---|---|---|---|---|---|---|
| Native perennial grass cover | 50% | 80% | 100% | 60% | 90% | 76% |
| Native other grass | | | | | | |
| Native forbs and other species | | | | 15% | | 15% |
| Native shrubs | | | | | | |
| Non-native grass | | | | | | |
| Non native forbs and shrubs | 20% | | | 15% | 10% | 15% |
| Litter | 30% | 20% | 0% | 10% | 0% | 12% |
| Rock | | | | | | |
| Bare Ground | | | | | | |
| Cryptogram | | | | | | |
| Total | 100% | 100% | 100% | 100% | 100% | 100% |

**Part G- Number of large trees , tree canopy height, recruitment of woody perennial species:**

| Eucalypt Large tree DBH benchmark used : | 450 | Number of large eucalypt trees: | 24 - *Eucalyptus molaccana* - 870, 540, 640, 750, 460, 1100, 710, 670, 790, 510, 520, 450, 650, 480, 660, 1090, 450, 630, 600, 540, 540, 590, 750, 540 |
|---|---|---|---|
| Non- Eucalypt Large tree DBH benchmark used: | N/A | Number of large non eucalypt trees: | 0 |
| Total number of large trees recorded: | 24 | | |
| Total Number Large Trees per ha: | 48 | | |

| Median Tree Canopy Height Measurements | Canopy: | 18 | Sub-canopy: | 14 | Emergent: | 22.00 |
|---|---|---|---|---|---|---|

| Percentage of ecologically dominant layer species regenerating: | 0% |
|---|---|

**Part H - Tree canopy cover, Shrub canopy cover**

| Tree canopy cover % | Canopy: | 47.0% | Sub-canopy: | 10.80% | Emergent: | |
|---|---|---|---|---|---|---|
| Shrub canopy cover % | 0.00% | | | | | |

| Layer | Start | End | Interval | Layer | Start | End | Interval |
|---|---|---|---|---|---|---|---|
| T1 | 0.0 | 3.2 | 3.2 | T2 | 1.2 | 8.3 | 7.1 |
| T1 | 8.3 | 11.0 | 2.7 | T2 | 12.9 | 16.6 | 3.7 |
| T1 | 16.6 | 26.0 | 9.4 | T2 | | | 0.0 |
| T1 | 40.2 | 57.5 | 17.3 | T2 | | | 0.0 |
| T1 | 85.6 | 100.0 | 14.4 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |

| Layer | Start | End | Interval | Layer | Start | End | Interval |
|---|---|---|---|---|---|---|---|
| **Shrub** | | | 0.0 | **Shrub** | | | 0.0 |
| **Shrub** | | | 0.0 | **Shrub** | | | 0.0 |
| **Shrub** | | | 0.0 | **Shrub** | | | 0.0 |
| **Shrub** | | | 0.0 | **Shrub** | | | 0.0 |

Note: Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present *If trees are in the same layer and continuous along the transect you can group them

**Part I: GHFF Stem Count**

| Species Name | Stem Count |
|---|---|
| *Eucalyptus molaccana* | 17 |
| *Corymbia citriodora* | 1 |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

**Part J: SAT Survey Results**

| SAT Survey ID | NA | | | |
|---|---|---|---|---|
| **Tree Number** | **Scientific Name** | **Common Name** | **DBH** | **Scat (Y/N)** |
| 1 | *Eucalyptus moluccana* | Gum-topped Box | 610 | N |
| 2 | *Eucalyptus moluccana* | Gum-topped Box | 520 | N |
| 3 | *Eucalyptus moluccana* | Gum-topped Box | 650 | N |
| 4 | *Eucalyptus moluccana* | Gum-topped Box | 230 | N |
| 5 | *Eucalyptus moluccana* | Gum-topped Box | 470 | N |
| 6 | *Eucalyptus moluccana* | Gum-topped Box | 500 | N |
| 7 | *Eucalyptus moluccana* | Gum-topped Box | 780 | N |
| 8 | *Eucalyptus moluccana* | Gum-topped Box | 600 | N |
| 9 | *Eucalyptus moluccana* | Gum-topped Box | 290 | N |
| 10 | *Eucalyptus moluccana* | Gum-topped Box | 430 | N |
| 11 | *Eucalyptus moluccana* | Gum-topped Box | 220 | N |
| 12 | *Eucalyptus moluccana* | Gum-topped Box | 300 | N |
| 13 | *Eucalyptus moluccana* | Gum-topped Box | 400 | N |
| 14 | *Eucalyptus moluccana* | Gum-topped Box | 390 | N |
| 15 | *Eucalyptus moluccana* | Gum-topped Box | 680 | N |
| 16 | *Eucalyptus moluccana* | Gum-topped Box | 310 | N |
| 17 | *Eucalyptus moluccana* | Gum-topped Box | 480 | N |
| 18 | *Eucalyptus moluccana* | Gum-topped Box | 560 | N |
| 19 | *Corymbia citriodora* | Spotted Gum | 260 | N |
| 20 | *Eucalyptus moluccana* | Gum-topped Box | 430 | N |
| 21 | *Eucalyptus moluccana* | Gum-topped Box | 510 | N |
| 22 | *Eucalyptus moluccana* | Gum-topped Box | 470 | N |
| 23 | *Eucalyptus moluccana* | Gum-topped Box | 410 | N |
| 24 | *Eucalyptus moluccana* | Gum-topped Box | 320 | N |
| 25 | *Eucalyptus moluccana* | Gum-topped Box | 770 | N |
| 26 | *Eucalyptus moluccana* | Gum-topped Box | 530 | N |
| 27 | *Corymbia citriodora* | Spotted Gum | 510 | N |
| 28 | *Corymbia citriodora* | Spotted Gum | 550 | N |
| 29 | *Eucalyptus moluccana* | Gum-topped Box | 750 | N |
| 30 | *Eucalyptus moluccana* | Gum-topped Box | 1100 | N |
| **Total** | | | | 0/30 |

**Attach Landscape Photos Here**



**South**



East



West



## Habitat Quality Assessment Unit Score Sheet

**Part A - Administrative**

| Transect ID | T2 | Job Number / Property | 11560 - Wyatt Road |
|---|---|---|---|

**Part B - Site Data**

| Recorders | MD & AR | Date | 10/05/2023 |
|---|---|---|---|

| Assessment Unit: | Assessment Unit Area (ha) | RE | Bioregion Number |
|---|---|---|---|
| na | | 12.3.3 / 12.3.7 | 12 |

| Site description and Location (including details of discrete polygons within the assessment unit) |
|---|
| Mapped Koala Habitat Area (core). Patch of vegetation dominated by *Eucalyptus tereticornis*. No native shrub layer, ground layer dominated by exotic grass species including Giant Rat's Tail and Rhodes Grass. |

**Part C - Native Species Richness: (*list species below)**

| Tree species richness: | | | | |
|---|---|---|---|---|
| Total number of species | 4 | | | EDL / Dom / R |
| Scientific Name | *Eucalyptus tereticornis* | Common Name | Forest Red Gum | EDL / Dom / R |
| Scientific Name | *Corymbia citriodora* | Common Name | Spotted Gum | EDL / R |
| Scientific Name | *Corymbia intermedia* | Common Name | Pink Bloodwood | EDL |
| Scientific Name | *Eucalyptus crebra* | Common Name | Narrow-leaved Ironbark | EDL |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |

| Shrub species richness: | | | |
|---|---|---|---|
| Total number of species | 3 | | |
| Scientific Name | *Acacia leiocalyx* | Common Name | Early Black Wattle |
| Scientific Name | *Eucalyptus tereticornis* | Common Name | Forest Red Gum |
| Scientific Name | *Corymbia citriodora* | Common Name | Spotted Gum |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |

| Grass species richness: | | | |
|---|---|---|---|
| Total number of species | 5 | | |
| Scientific Name | *Heteropogon contortus* | Common Name | Black Speargrass |
| Scientific Name | *Eragrostis brownii* | Common Name | Brown's Lovegrass |
| Scientific Name | *Capillipedium parviflorum* | Common Name | Scented-top Grass |
| Scientific Name | *Aristida calycina* | Common Name | Dark Wiregrass |
| Scientific Name | *Cynodon dactylon* | Common Name | Common Couch |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |

| Forbs and others (non grass ground) species richness: | | | |
|---|---|---|---|
| Total number of species | 3 | | |
| Scientific Name | *Chrysocephalum apiculatum* | Common Name | Yellow Buttons |
| Scientific Name | *Lobelia purpurascens* | Common Name | White Root |
| Scientific Name | *Dichondra repens* | Common Name | Kidney Weed |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |

**Part D - Non-Native Plant Cover: (*list species below)**

| Total percentage cover within plot | 70.00% | | |
|---|---|---|---|
| Scientific Name | *Sporobolus pyramidalis* | Common Name | Giant Rat's Tail Grass |

| Scientific Name | *Chloris gayana* | Common Name | Rhodes Grass |
|---|---|---|---|
| Scientific Name | *Cyperus polystachyos* | Common Name | Bunchy Sedge |
| Scientific Name | *Gomphocarpus physocarpus* | Common Name | Balloon Cotton Bush |
| Scientific Name | *Lanatana camara* | Common Name | Lanatana |
| Scientific Name | *Senecio madajascariensis* | Common Name | Fireweed |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |

**Part E - Coarse Woody Debris: (*list lengths of individual logs in meters)**

| Total Length of Course Woody Debris (Meters per hectare) | 35.00 | | |
|---|---|---|---|
| 1 | 1.50 | 26 | |
| 2 | 2.00 | 27 | |
| 3 | | 28 | |
| 4 | | 29 | |
| 5 | | 30 | |
| 6 | | 31 | |
| 7 | | 32 | |
| 8 | | 33 | |
| 9 | | 34 | |
| 10 | | 35 | |
| 11 | | 36 | |
| 12 | | 37 | |
| 13 | | 38 | |
| 14 | | 39 | |
| 15 | | 40 | |
| 16 | | 41 | |
| 17 | | 42 | |
| 18 | | 43 | |
| 19 | | 44 | |
| 20 | | 45 | |
| 21 | | 46 | |
| 22 | | 47 | |
| 23 | | 48 | |
| 24 | | 49 | |
| 25 | | 50 | |

**Part F - Native perennial grass cover, organic litter: (*provide percentage cover within each quadrat, and provide average cover)**

| Ground Cover | Quadrat 1 | Quadrat 2 | Quadrat 3 | Quadrat 4 | Quadrat 5 | Average |
|---|---|---|---|---|---|---|
| Native perennial grass cover | 80% | 20% | 0% | 50% | 0% | 30% |
| Native other grass | | | | | | |
| Native forbs and other species | | | | | | |
| Native shrubs | | | | | | |
| Non-native grass | | | | | | |
| Non native forbs and shrubs | | | | | | |
| Litter | 20% | 80% | 100% | 50% | 100% | 70% |
| Rock | | | | | | |
| Bare Ground | | | | | | |
| Cryptogram | | | | | | |
| Total | 100% | 100% | 100% | 100% | 100% | 100% |

**Part G- Number of large trees , tree canopy height, recruitment of woody perennial species:**

| Eucalypt Large tree DBH benchmark used : | 540 | Number of large eucalypt trees: | 1 - *Eucalyptus tereticornis* - 820 |
|---|---|---|---|
| Non- Eucalypt Large tree DBH benchmark used: | 360 | Number of large non eucalypt trees: | 0 |
| Total number of large trees recorded: | 1 | | |
| Total Number Large Trees per ha: | 2 | | |

| Median Tree Canopy Height Measurements | Canopy: | 16 | Sub-canopy: | 14 | Emergent: | 18.00 |
|---|---|---|---|---|---|---|

| Percentage of ecologically dominant layer species regenerating: | 50% |
|---|---|

**Part H - Tree canopy cover, Shrub canopy cover**

| Tree canopy cover % | Canopy: | 40.3% | Sub-canopy: | 31.10% | Emergent: | |
|---|---|---|---|---|---|---|
| Shrub canopy cover % | 0.00% | | | | | |

| Layer | Start | End | Interval | Layer | Start | End | Interval |
|---|---|---|---|---|---|---|---|
| T1 | 0.0 | 8.2 | 8.2 | T2 | 0.0 | 11.6 | 11.6 |
| T1 | 29.7 | 39.2 | 9.5 | T2 | 29.7 | 34.0 | 4.3 |
| T1 | 47.4 | 57.5 | 10.1 | T2 | 61.0 | 70.7 | 9.7 |
| T1 | 63.5 | 72.5 | 9.0 | T2 | 94.5 | 100.0 | 5.5 |
| T1 | 78.6 | 82.1 | 3.5 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| T1 | | | 0.0 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |

| Layer | Start | End | Interval | Layer | Start | End | Interval |
|---|---|---|---|---|---|---|---|
| Shrub | | | 0.0 | Shrub | | | 0.0 |
| Shrub | | | 0.0 | Shrub | | | 0.0 |
| Shrub | | | 0.0 | Shrub | | | 0.0 |
| Shrub | | | 0.0 | Shrub | | | 0.0 |

Note: Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present *If trees are in the same layer and continuous along the transect you can group them

**Part I: GHFF Stem Count**

| Species Name | Stem Count |
|---|---|
| *Eucalyptus tereticornis* | 13 |
| *Corymbia intermedia* | 1 |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

**Part J: SAT Survey Results**

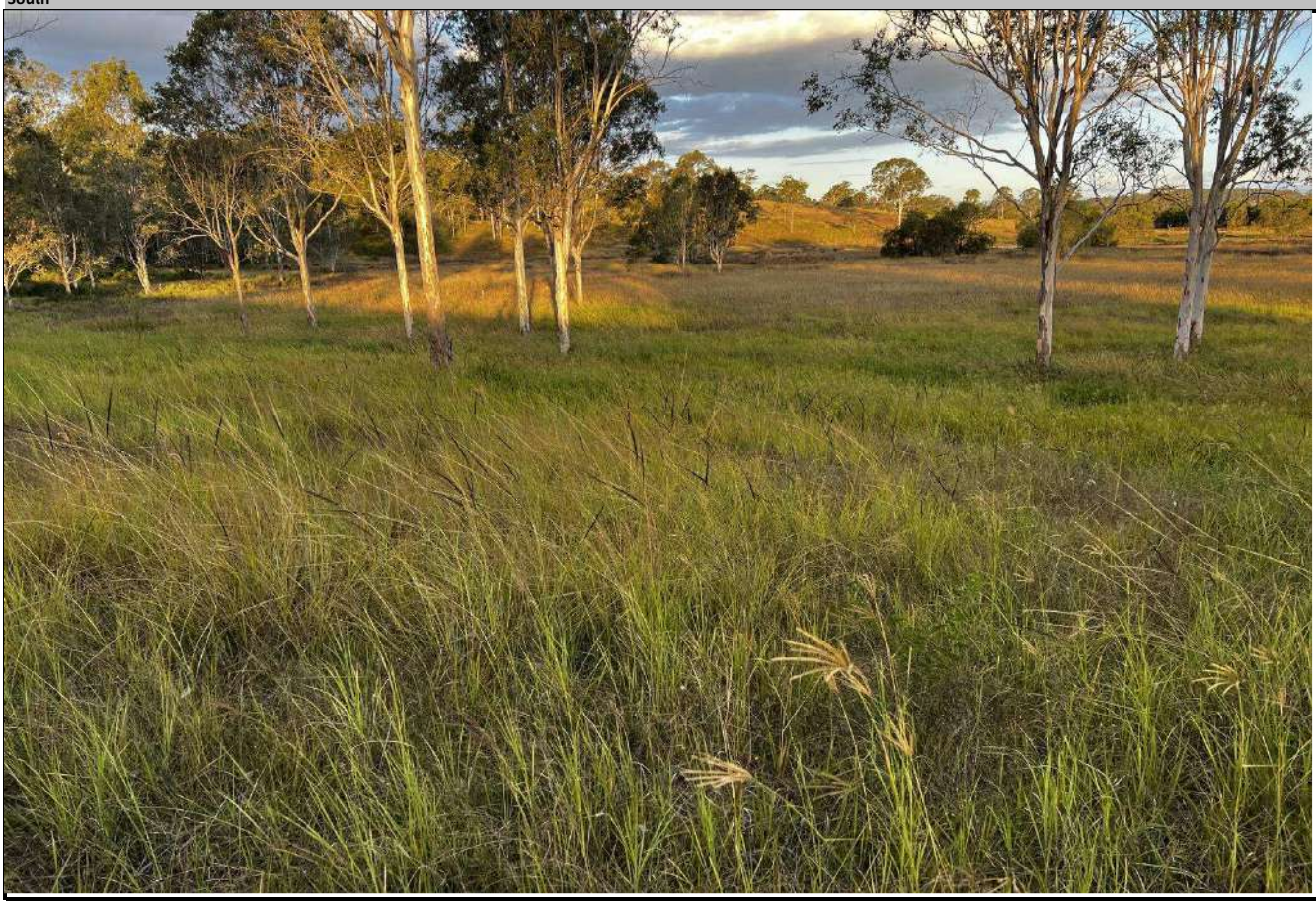
| SAT Survey ID | NA | | | |
|---|---|---|---|---|
| Tree Number | Scientific Name | Common Name | DBH | Scat (Y/N) |
| 1 | *Eucalyptus tereticornis* | Forest Red Gum | 820 | N |
| 2 | *Eucalyptus tereticornis* | Forest Red Gum | 250 | N |
| 3 | *Eucalyptus tereticornis* | Forest Red Gum | 250 | N |
| 4 | *Corymbia intermedia* | Pink Bloodwood | 360 | N |
| 5 | *Eucalyptus tereticornis* | Forest Red Gum | 240 | N |
| 6 | *Corymbia intermedia* | Pink Bloodwood | 320 | N |
| 7 | *Eucalyptus tereticornis* | Forest Red Gum | 290 | N |
| 8 | *Eucalyptus tereticornis* | Forest Red Gum | 280 | N |
| 9 | *Eucalyptus crebra* | Narrow-leaved Ironbark | 150 | N |
| 10 | *Eucalyptus crebra* | Narrow-leaved Ironbark | 180 | N |
| 11 | *Corymbia intermedia* | Pink Bloodwood | 120 | N |
| 12 | *Corymbia citriodora* | Spotted Gum | 200 | N |
| 13 | *Eucalyptus tereticornis* | Forest Red Gum | 330 | N |
| 14 | *Eucalyptus crebra* | Narrow-leaved Ironbark | 310 | N |
| 15 | *Eucalyptus crebra* | Narrow-leaved Ironbark | 280 | N |
| 16 | *Eucalyptus tereticornis* | Forest Red Gum | 350 | N |
| 17 | *Eucalyptus tereticornis* | Forest Red Gum | 270 | N |
| 18 | *Eucalyptus tereticornis* | Forest Red Gum | 380 | N |
| 19 | *Eucalyptus tereticornis* | Forest Red Gum | 330 | N |
| 20 | *Eucalyptus tereticornis* | Forest Red Gum | 230 | N |
| 21 | *Eucalyptus tereticornis* | Forest Red Gum | 300 | N |
| 22 | *Eucalyptus tereticornis* | Forest Red Gum | 280 | N |
| 23 | *Eucalyptus tereticornis* | Forest Red Gum | 300 | N |
| 24 | *Eucalyptus tereticornis* | Forest Red Gum | 220 | N |
| 25 | *Eucalyptus tereticornis* | Forest Red Gum | 300 | N |
| 26 | *Eucalyptus tereticornis* | Forest Red Gum | 290 | N |
| 27 | *Eucalyptus tereticornis* | Forest Red Gum | 470 | N |
| 28 | *Eucalyptus tereticornis* | Forest Red Gum | 390 | N |
| 29 | *Eucalyptus tereticornis* | Forest Red Gum | 410 | N |
| 30 | *Eucalyptus tereticornis* | Forest Red Gum | 420 | N |
| Total | | | | 0/30 |

**Attach Landscape Photos Here**

**North**



**South**



East



West



## Habitat Quality Assessment Unit Score Sheet

**Part A - Administrative**

| Transect ID | T3 | Job Number / Property | 11560 - Wyatt Road |
|---|---|---|---|

**Part B - Site Data**

| Recorders | MD, AR & HM | Date | 23/05/2023 |
|---|---|---|---|

| Assessment Unit: | Assessment Unit Area (ha) | RE | Bioregion Number |
|---|---|---|---|
| na | | 12.9-10.2 / 12.9-10.7 | 12 |

| Site description and Location (including details of discrete polygons within the assessment unit) |
|---|
| Mostly cleared open paddock with scattered large *Eucalyptus tereticornis.* Patch of *E. tereticornis* and *C. citriodora* at western boundary. |

**Part C - Native Species Richness: (*list species below)**

| Tree species richness: | | | | |
|---|---|---|---|---|
| Total number of species | 2 | | | EDL / Dom / R |
| Scientific Name | *Eucalyptus tereticornis* | Common Name | Forest Red Gum | EDL / Dom / R |
| Scientific Name | *Corymbia citriodora* | Common Name | Spotted Gum | EDL / R |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |

| Shrub species richness: | | | |
|---|---|---|---|
| Total number of species | 4 | | |
| Scientific Name | *Alphitonia excelsa* | Common Name | Soap Tree |
| Scientific Name | *Eucalyptus tereticornis* | Common Name | Forest Red Gum |
| Scientific Name | *Corymbia citriodora* | Common Name | Spotted Gum |
| Scientific Name | *Acacia leiocalyx* | Common Name | Early Black Wattle |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |

| Grass species richness: | | | |
|---|---|---|---|
| Total number of species | 3 | | |
| Scientific Name | *Cynodon dactylon* | Common Name | Common Couch |
| Scientific Name | *Heteropogon contortus* | Common Name | Black Speargrass |
| Scientific Name | *Eragrostis brownii* | Common Name | Brown's Lovegrass |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |

| Forbs and others (non grass ground) species richness: | | | |
|---|---|---|---|
| Total number of species | 3 | | |
| Scientific Name | *Chrysocephalum apiculatum* | Common Name | Yellow Buttons |
| Scientific Name | *Lobelia purpurascens* | Common Name | White Root |
| Scientific Name | *Velleia spathulata* | Common Name | Wild Pansies |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |

**Part D - Non-Native Plant Cover: (*list species below)**

| Total percentage cover within plot | 50.00% |
|---|---|

| Scientific Name | *Sporobolus pyramidalis* | Common Name | Giant Rat's Tail Grass |
|---|---|---|---|
| Scientific Name | *Chloris gayana* | Common Name | Rhodes Grass |
| Scientific Name | *Senecio madajascariensis* | Common Name | Fireweed |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |

**Part E - Coarse Woody Debris: (*list lengths of individual logs in meters)**

| Total Length of Course Woody Debris (Meters per hectare) | 10.00 | | |
|---|---|---|---|
| 1 | 0.50 | 26 | |
| 2 | 0.50 | 27 | |
| 3 | | 28 | |
| 4 | | 29 | |
| 5 | | 30 | |
| 6 | | 31 | |
| 7 | | 32 | |
| 8 | | 33 | |
| 9 | | 34 | |
| 10 | | 35 | |
| 11 | | 36 | |
| 12 | | 37 | |
| 13 | | 38 | |
| 14 | | 39 | |
| 15 | | 40 | |
| 16 | | 41 | |
| 17 | | 42 | |
| 18 | | 43 | |
| 19 | | 44 | |
| 20 | | 45 | |
| 21 | | 46 | |
| 22 | | 47 | |
| 23 | | 48 | |
| 24 | | 49 | |
| 25 | | 50 | |

**Part F - Native perennial grass cover, organic litter: (*provide percentage cover within each quadrat, and provide average cover)**

| Ground Cover | Quadrat 1 | Quadrat 2 | Quadrat 3 | Quadrat 4 | Quadrat 5 | Average |
|---|---|---|---|---|---|---|
| Native perennial grass cover | 20% | 0% | 20% | 90% | 0% | 26% |
| Native other grass | | | | | 25% | 25% |
| Native forbs and other species | 5% | | | | | 5% |
| Native shrubs | | | | | | |
| Non-native grass | 70% | 100% | 75% | 0% | 60% | 61% |
| Non native forbs and shrubs | | | | | 5% | 5% |
| Litter | 5% | 0% | 5% | 10% | 5% | 5% |
| Rock | | | | | | |
| Bare Ground | | | | | 5% | 5% |
| Cryptogram | | | | | | |
| Total | 100% | 100% | 100% | 100% | 100% | 100% |

**Part G- Number of large trees , tree canopy height, recruitment of woody perennial species:**

| Eucalypt Large tree DBH benchmark used : | 380 | Number of large eucalypt trees: | 2 - *Eucalyptus tereticornis* - 1190, 870 |
|---|---|---|---|
| Non- Eucalypt Large tree DBH benchmark used: | N/A | Number of large non eucalypt trees: | 0 |
| Total number of large trees recorded: | 2 | | |
| Total Number Large Trees per ha: | 4 | | |

| Median Tree Canopy Height Measurements | Canopy: | 16 | Sub-canopy: | N/A | Emergent: | N/A |
|---|---|---|---|---|---|---|

| Percentage of ecologically dominant layer species regenerating: | 100% |
|---|---|

**Part H - Tree canopy cover, Shrub canopy cover**

| Tree canopy cover % | Canopy: | 24.1% | Sub-canopy: | 0.00% | Emergent: | |
|---|---|---|---|---|---|---|
| Shrub canopy cover % | 0.40% | | | | | |

| Layer | Start | End | Interval | Layer | Start | End | Interval |
|---|---|---|---|---|---|---|---|
| T1 | 0.0 | 9.8 | 9.8 | T2 | | | 0.0 |
| T1 | 28.0 | 42.3 | 14.3 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **T1** | | | 0.0 | **T2** | | | 0.0 |
| **T1** | | | 0.0 | **T2** | | | 0.0 |
| **T1** | | | 0.0 | **T2** | | | 0.0 |
| **T1** | | | 0.0 | **T2** | | | 0.0 |
| **T1** | | | 0.0 | **T2** | | | 0.0 |
| **T1** | | | 0.0 | **T2** | | | 0.0 |
| **T1** | | | 0.0 | **T2** | | | 0.0 |
| **T1** | | | 0.0 | **T2** | | | 0.0 |

| Layer | Start | End | Interval | Layer | Start | End | Interval |
|---|---|---|---|---|---|---|---|
| **Shrub** | 83.1 | 83.5 | 0.4 | **Shrub** | | | 0.0 |
| **Shrub** | | | 0.0 | **Shrub** | | | 0.0 |
| **Shrub** | | | 0.0 | **Shrub** | | | 0.0 |
| **Shrub** | | | 0.0 | **Shrub** | | | 0.0 |

Note: Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present *If trees are in the same layer and continuous along the transect you can group them

**Part I: GHFF Stem Count**

| Species Name | Stem Count |
|---|---|
| *Eucalyptus tereticornis* | 4 |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

**Part J: SAT Survey Results**

| SAT Survey ID | NA | | | |
|---|---|---|---|---|
| **Tree Number** | **Scientific Name** | **Common Name** | **DBH** | **Scat (Y/N)** |
| 1 | *Eucalyptus tereticornis* | Forest Red Gum | 380 | N |
| 2 | *Eucalyptus tereticornis* | Forest Red Gum | 320 | N |
| 3 | *Eucalyptus tereticornis* | Forest Red Gum | 410 | N |
| 4 | *Eucalyptus tereticornis* | Forest Red Gum | 400 | N |
| 5 | *Eucalyptus tereticornis* | Forest Red Gum | 890 | N |
| 6 | *Eucalyptus tereticornis* | Forest Red Gum | 780 | N |
| 7 | *Eucalyptus tereticornis* | Forest Red Gum | 650 | N |
| 8 | *Eucalyptus tereticornis* | Forest Red Gum | 970 | N |
| 9 | *Eucalyptus tereticornis* | Forest Red Gum | 880 | N |
| 10 | *Eucalyptus tereticornis* | Forest Red Gum | 370 | N |
| 11 | *Eucalyptus tereticornis* | Forest Red Gum | 450 | N |
| 12 | *Eucalyptus tereticornis* | Forest Red Gum | 340 | N |
| 13 | *Eucalyptus tereticornis* | Forest Red Gum | 270 | N |
| 14 | *Eucalyptus tereticornis* | Forest Red Gum | 370 | N |
| 15 | *Eucalyptus tereticornis* | Forest Red Gum | 250 | N |
| 16 | *Eucalyptus tereticornis* | Forest Red Gum | 250 | N |
| 17 | *Eucalyptus tereticornis* | Forest Red Gum | 340 | N |
| 18 | *Eucalyptus tereticornis* | Forest Red Gum | 290 | N |
| 19 | *Eucalyptus tereticornis* | Forest Red Gum | 320 | N |
| 20 | *Eucalyptus tereticornis* | Forest Red Gum | 270 | N |
| 21 | *Eucalyptus tereticornis* | Forest Red Gum | 300 | N |
| 22 | *Eucalyptus tereticornis* | Forest Red Gum | 300 | N |
| 23 | *Eucalyptus tereticornis* | Forest Red Gum | 240 | N |
| 24 | *Eucalyptus tereticornis* | Forest Red Gum | 320 | N |
| 25 | *Eucalyptus tereticornis* | Forest Red Gum | 220 | N |
| 26 | *Eucalyptus tereticornis* | Forest Red Gum | 210 | N |
| 27 | *Eucalyptus tereticornis* | Forest Red Gum | 240 | N |
| 28 | *Eucalyptus tereticornis* | Forest Red Gum | 290 | N |
| 29 | *Eucalyptus tereticornis* | Forest Red Gum | 310 | N |
| 30 | *Eucalyptus tereticornis* | Forest Red Gum | 270 | N |
| **Total** | | | | 0/30 |

**Attach Landscape Photos Here**

**North**



**South**



East



West



## Habitat Quality Assessment Unit Score Sheet

**Part A - Administrative**

| Transect ID | T4 | Job Number / Property | 11560 - Wyatt Road |
|---|---|---|---|

**Part B - Site Data**

| Recorders | HM, AR, KM | Date | 17/07/2023 |
|---|---|---|---|

| Assessment Unit: | Assessment Unit Area (ha) | RE | Bioregion Number |
|---|---|---|---|
| na | | 12.9-10.2 | 12 |

| Site description and Location (including details of discrete polygons within the assessment unit) |
|---|
| Mapped 12.9-10.2 RE regorwth open woodland dominated by *Eucalyptus crebra* , *Corymbia tesselaris* , *Corymbia citriodora* with *Lantana camara* dominating the ground/ shrub layer. |

**Part C - Native Species Richness: (*list species below)**

| Tree species richness: | | | | |
|---|---|---|---|---|
| Total number of species | 7 | | | EDL / Dom / R |
| Scientific Name | *Corymbia tesselaris* | Common Name | Moreton Bay Ash | EDL / Dom / R |
| Scientific Name | *Corymbia citriodora* | Common Name | Spotted Gum | EDL / Dom |
| Scientific Name | *Eucalyptus crebra* | Common Name | Narrow-leaved Ironbark | EDL / Dom / R |
| Scientific Name | *Eucalyptus tereticornis* | Common Name | Forest Red Gum | R |
| Scientific Name | *Ficus rubignosa* | Common Name | Rusty Fig | |
| Scientific Name | *Corymbia intermedia* | Common Name | Pink Bloodwood | EDL / Dom / R |
| Scientific Name | *Eucalyptus melanophlioa* | Common Name | Silver-leaved Ironbark | |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |

| Shrub species richness: | | | |
|---|---|---|---|
| Total number of species | 1 | | |
| Scientific Name | *Acacia disparrima* | Common Name | Hickory Wattle |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |

| Grass species richness: | | | |
|---|---|---|---|
| Total number of species | 5 | | |
| Scientific Name | *Cynodon dactylon* | Common Name | Common Couch |
| Scientific Name | *Aristida ramosa* | Common Name | Purple Wiregrass |
| Scientific Name | *Eragrostis brownii* | Common Name | Brown's Lovegrass |
| Scientific Name | *Panicum decompositum* | Common Name | Native Millet |
| Scientific Name | *Imperata cylindrica* | Common Name | Blady Grass |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |

| Forbs and others (non grass ground) species richness: | | | |
|---|---|---|---|
| Total number of species | 7 | | |
| Scientific Name | *Centella asiatica* | Common Name | Pennywort |
| Scientific Name | *Lobelia purpurascens* | Common Name | White Root |
| Scientific Name | *Phyllanthus microcladus* | Common Name | Small-leaved Phyllanthus |
| Scientific Name | *Dichondra repens* | Common Name | Kidney Weed |
| Scientific Name | *Desmodium varians* | Common Name | Native Desmodium |
| Scientific Name | *Juncus acutus* | Common Name | Spiny Rush |
| Scientific Name | *Cheilanthes distans* | Common Name | Bristle Cloak Fern |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |

**Part D - Non-Native Plant Cover: (*list species below)**

| Total percentage cover within plot | 80.00% | | |
|---|---|---|---|
| Scientific Name | *Sporobolus pyramidalis* | Common Name | Giant Rat's Tail Grass |

| Scientific Name | *Cardiospermum graniflorum* | Common Name | Balloon Vine |
|---|---|---|---|
| Scientific Name | *Senecio madajascariensis* | Common Name | Fireweed |
| Scientific Name | *Lantana camara* | Common Name | Lantana |
| Scientific Name | *Gamochaeta pensylvanica* | Common Name | Pennsylvania cudweed |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |

**Part E - Coarse Woody Debris: (*list lengths of individual logs in meters)**

| Total Length of Course Woody Debris (Meters per hectare) | | | |
|---|---|---|---|
| 1 | | 26 | |
| 2 | | 27 | |
| 3 | | 28 | |
| 4 | | 29 | |
| 5 | | 30 | |
| 6 | | 31 | |
| 7 | | 32 | |
| 8 | | 33 | |
| 9 | | 34 | |
| 10 | | 35 | |
| 11 | | 36 | |
| 12 | | 37 | |
| 13 | | 38 | |
| 14 | | 39 | |
| 15 | | 40 | |
| 16 | | 41 | |
| 17 | | 42 | |
| 18 | | 43 | |
| 19 | | 44 | |
| 20 | | 45 | |
| 21 | | 46 | |
| 22 | | 47 | |
| 23 | | 48 | |
| 24 | | 49 | |
| 25 | | 50 | |

**Part F - Native perennial grass cover, organic litter: (*provide percentage cover within each quadrat, and provide average cover)**

| Ground Cover | Quadrat 1 | Quadrat 2 | Quadrat 3 | Quadrat 4 | Quadrat 5 | Average |
|---|---|---|---|---|---|---|
| Native perennial grass cover | 5% | 40% | 75% | 50% | 90% | 52% |
| Native other grass | | | | | | |
| Native forbs and other species | 0% | 5% | 0% | 0% | 0% | 1% |
| Native shrubs | | | | | | |
| Non-native grass | 0% | 0% | 0% | 45% | 0% | 9% |
| Non native forbs and shrubs | 90% | 35% | 0% | 0% | 0% | 25% |
| Litter | 5% | 10% | 20% | 5% | 10% | 10% |
| Rock | | | | | | |
| Bare Ground | 0% | 10% | 5% | 0% | 0% | 3% |
| Cryptogram | | | | | | |
| Total | 100% | 100% | 100% | 100% | 100% | 100% |

**Part G- Number of large trees , tree canopy height, recruitment of woody perennial species:**

| Eucalypt Large tree DBH benchmark used : | 380 | Number of large eucalypt trees: | 0 |
|---|---|---|---|
| Non- Eucalypt Large tree DBH benchmark used: | N/A | Number of large non eucalypt trees: | 0 |
| Total number of large trees recorded: | 0 | | |
| Total Number Large Trees per ha: | 0 | | |

| Median Tree Canopy Height Measurements | Canopy: | 12 | Sub-canopy: | 7 | Emergent: | N/A |
|---|---|---|---|---|---|---|

| Percentage of ecologically dominant layer species regenerating: | 100% |
|---|---|

**Part H - Tree canopy cover, Shrub canopy cover**

| Tree canopy cover % | Canopy: | 26.4% | Sub-canopy: | 0.00% | Emergent: | |
|---|---|---|---|---|---|---|
| Shrub canopy cover % | 7.30% | | | | | |

| Layer | Start | End | Interval | Layer | Start | End | Interval |
|---|---|---|---|---|---|---|---|
| T1 | 5.5 | 10.4 | 4.9 | T2 | | | 0.0 |
| T1 | 12.9 | 17.9 | 5.0 | T2 | | | 0.0 |
| T1 | 36.8 | 42.6 | 5.8 | T2 | | | 0.0 |
| T1 | 57.3 | 58.5 | 1.2 | T2 | | | 0.0 |
| T1 | 64.8 | 66.2 | 1.4 | T2 | | | 0.0 |
| T1 | 84.4 | 89.5 | 5.1 | T2 | | | 0.0 |
| T1 | 97.0 | 100.0 | 3.0 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **T1** | | | 0.0 | **T2** | | | 0.0 |
| **T1** | | | 0.0 | **T2** | | | 0.0 |
| **T1** | | | 0.0 | **T2** | | | 0.0 |
| **T1** | | | 0.0 | **T2** | | | 0.0 |
| **T1** | | | 0.0 | **T2** | | | 0.0 |
| **T1** | | | 0.0 | **T2** | | | 0.0 |
| **T1** | | | 0.0 | **T2** | | | 0.0 |

| Layer | Start | End | Interval | Layer | Start | End | Interval |
|---|---|---|---|---|---|---|---|
| **Shrub** | 42.6 | 47.5 | 4.9 | **Shrub** | | | 0.0 |
| **Shrub** | 96.2 | 98.6 | 2.4 | **Shrub** | | | 0.0 |
| **Shrub** | | | 0.0 | **Shrub** | | | 0.0 |
| **Shrub** | | | 0.0 | **Shrub** | | | 0.0 |

Note: Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present *If trees are in the same layer and continuous along the transect you can group them

**Part I: GHFF Stem Count**

| Species Name | Stem Count |
|---|---|
| *Eucalyptus tereticornis* | 7 |
| *Corymbia intermedia* | 7 |
| *Corymbia citriodora* | 1 |
| *Eucalyptus crebra* | 7 |
| *Eucalyptus melanophlioa* | 4 |
| *Acacia disparrima* | 1 |
| *Corymbia tesselaris* | 1 |
| | |
| | |
| | |
| | |
| | |
| | |

**Part J: SAT Survey Results**

| SAT Survey ID | NA | | | |
|---|---|---|---|---|
| **Tree Number** | **Scientific Name** | **Common Name** | **DBH** | **Scat (Y/N)** |
| 1 | *Corymbia citriodora* | Spotted Gum | 200 | N |
| 2 | *Corymbia citriodora* | Spotted Gum | 200 | N |
| 3 | *Eucalyptus melanophlioa* | Silver-leaved Ironbark | 110 | N |
| 4 | *Eucalyptus melanophlioa* | Silver-leaved Ironbark | 240 | N |
| 5 | *Eucalyptus crebra* | Narrow-leaved Ironbark | 140 | N |
| 6 | *Acacia disparrima* | Hickory Wattle | 120 | N |
| 7 | *Eucalyptus melanophlioa* | Silver-leaved Ironbark | 200 | N |
| 8 | *Eucalyptus crebra* | Narrow-leaved Ironbark | 150 | N |
| 9 | *Eucalyptus melanophlioa* | Silver-leaved Ironbark | 300 | N |
| 10 | *Corymbia citriodora* | Spotted Gum | 220 | N |
| 11 | *Eucalyptus crebra* | Narrow-leaved Ironbark | 130 | N |
| 12 | *Eucalyptus crebra* | Narrow-leaved Ironbark | 120 | N |
| 13 | *Corymbia tesselaris* | Moreton Bay Ash | 150 | N |
| 14 | *Eucalyptus crebra* | Narrow-leaved Ironbark | 180 | N |
| 15 | *Corymbia citriodora* | Spotted Gum | 170 | N |
| 16 | *Eucalyptus crebra* | Narrow-leaved Ironbark | 150 | N |
| 17 | *Acacia disparrima* | Hickory Wattle | 180 | N |
| 18 | *Eucalyptus melanophlioa* | Silver-leaved Ironbark | 200 | N |
| 19 | *Corymbia tesselaris* | Moreton Bay Ash | 140 | N |
| 20 | *Eucalyptus melanophlioa* | Silver-leaved Ironbark | 160 | N |
| 21 | *Eucalyptus melanophlioa* | Silver-leaved Ironbark | 210 | N |
| 22 | *Eucalyptus tereticornis* | Forest Red Gum | 180 | N |
| 23 | *Eucalyptus melanophlioa* | Silver-leaved Ironbark | 200 | N |
| 24 | *Eucalyptus melanophlioa* | Silver-leaved Ironbark | 200 | N |
| 25 | *Eucalyptus melanophlioa* | Silver-leaved Ironbark | 160 | N |
| 26 | *Eucalyptus melanophlioa* | Silver-leaved Ironbark | 130 | N |
| 27 | *Corymbia tesselaris* | Moreton Bay Ash | 110 | N |
| 28 | *Eucalyptus moluccana* | Gum-topped Box | 140 | N |
| 29 | *Corymbia tesselaris* | Moreton Bay Ash | 110 | N |
| 30 | *Acacia disparrima* | Hickory Wattle | 110 | N |
| **Total** | | | | 0/30 |

**Attach Landscape Photos Here**

**North**



**South**



East



West



## Habitat Quality Assessment Unit Score Sheet

**Part A - Administrative**

| Transect ID | T5 | Job Number / Property | 11560 - Wyatt Road |
|---|---|---|---|

**Part B - Site Data**

| Recorders | HM, AR, KM | Date | 17/07/2023 |
|---|---|---|---|

| Assessment Unit: | Assessment Unit Area (ha) | RE | Bioregion Number |
|---|---|---|---|
| na | | 12.3.3 | 12 |

| Site description and Location (including details of discrete polygons within the assessment unit) |
|---|
| Degraded open woodland. Heavily influenced by common introduced paddock species. Sporadic occurrences of canopy species *Eucalyptus tereticornis* and *Eucalyptus crebra.* Bordered by degraded wetland and creek line. |

**Part C - Native Species Richness: (*list species below)**

| Tree species richness: | | | | |
|---|---|---|---|---|
| Total number of species | 3 | | | EDL / Dom / R |
| Scientific Name | *Eucalyptus crebra* | Common Name | Narrow-leaved Ironbark | EDL / Dom |
| Scientific Name | *Eucalyptus tereticornis* | Common Name | Forest Red Gum | EDL / Dom |
| Scientific Name | *Melaleuca viminalis* | Common Name | Weeping Bottlebrush | |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |
| Scientific Name | | Common Name | | |

| Shrub species richness: | | | |
|---|---|---|---|
| Total number of species | 0 | | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |

| Grass species richness: | | | |
|---|---|---|---|
| Total number of species | 1 | | |
| Scientific Name | *Cynodon dactylon* | Common Name | Common Couch |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |

| Forbs and others (non grass ground) species richness: | | | |
|---|---|---|---|
| Total number of species | 2 | | |
| Scientific Name | *Juncus acutus* | Common Name | Spiny Rush |
| Scientific Name | *Oxalis perennans* | Common Name | Yellow Wood Sorrel |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |

**Part D - Non-Native Plant Cover: (*list species below)**

| Total percentage cover within plot | 90.00% | | |
|---|---|---|---|
| Scientific Name | *Sporobolus pyramidalis* | Common Name | Giant Rat's Tail Grass |

| Scientific Name | *Cardiospermum graniflorum* | Common Name | Balloon Vine |
|---|---|---|---|
| Scientific Name | *Senecio madajascariensis* | Common Name | Fireweed |
| Scientific Name | *Marrubium vulgare* | Common Name | White Horehound |
| Scientific Name | *Gamochaeta pensylvanica* | Common Name | Pennsylvania cudweed |
| Scientific Name | *Chloris gayana* | Common Name | Rhodes Grass |
| Scientific Name | *Malva sylvestris* | Common Name | Mallow |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |
| Scientific Name | | Common Name | |

**Part E - Coarse Woody Debris: (*list lengths of individual logs in meters)**

| Total Length of Course Woody Debris (Meters per hectare) | | | |
|---|---|---|---|
| 1 | | 26 | |
| 2 | | 27 | |
| 3 | | 28 | |
| 4 | | 29 | |
| 5 | | 30 | |
| 6 | | 31 | |
| 7 | | 32 | |
| 8 | | 33 | |
| 9 | | 34 | |
| 10 | | 35 | |
| 11 | | 36 | |
| 12 | | 37 | |
| 13 | | 38 | |
| 14 | | 39 | |
| 15 | | 40 | |
| 16 | | 41 | |
| 17 | | 42 | |
| 18 | | 43 | |
| 19 | | 44 | |
| 20 | | 45 | |
| 21 | | 46 | |
| 22 | | 47 | |
| 23 | | 48 | |
| 24 | | 49 | |
| 25 | | 50 | |

**Part F - Native perennial grass cover, organic litter: (*provide percentage cover within each quadrat, and provide average cover)**

| Ground Cover | Quadrat 1 | Quadrat 2 | Quadrat 3 | Quadrat 4 | Quadrat 5 | Average |
|---|---|---|---|---|---|---|
| Native perennial grass cover | 90% | 0% | 80% | 20% | 100% | 58% |
| Native other grass | | | | | | |
| Native forbs and other species | 0% | 0% | 10% | 40% | 0% | 10% |
| Native shrubs | | | | | | |
| Non-native grass | 0% | 100% | 0% | 60% | 0% | 32% |
| Non native forbs and shrubs | 5% | 0% | 10% | 0% | 0% | 3% |
| Litter | 5% | 0% | 0% | 0% | 0% | 1% |
| Rock | | | | | | |
| Bare Ground | 0% | 0% | 0% | 0% | 0% | |
| Cryptogram | | | | | | |
| Total | 100% | 100% | 100% | 120% | 100% | 100% |

**Part G- Number of large trees , tree canopy height, recruitment of woody perennial species:**

| Eucalypt Large tree DBH benchmark used : | 380 | Number of large eucalypt trees: | *Eucalyptus tereticornis* (1150, 885); *Eucalyptus crebra* (590) |
|---|---|---|---|
| Non- Eucalypt Large tree DBH benchmark used: | N/A | Number of large non eucalypt trees: | 0 |
| Total number of large trees recorded: | 3 | | |
| Total Number Large Trees per ha: | 6 | | |

| Median Tree Canopy Height Measurements | Canopy: | 18 | Sub-canopy: | 5 | Emergent: | N/A |
|---|---|---|---|---|---|---|

| Percentage of ecologically dominant layer species regenerating: | 50% |
|---|---|

**Part H - Tree canopy cover, Shrub canopy cover**

| Tree canopy cover % | Canopy: | 2.5% | Sub-canopy: | 0.00% | Emergent: | |
|---|---|---|---|---|---|---|
| Shrub canopy cover % | 0.00% | | | | | |

| Layer | Start | End | Interval | Layer | Start | End | Interval |
|---|---|---|---|---|---|---|---|
| T1 | 14.7 | 17.2 | 2.5 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| T1 | | | 0.0 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |
| T1 | | | 0.0 | T2 | | | 0.0 |

| Layer | Start | End | Interval | Layer | Start | End | Interval |
|---|---|---|---|---|---|---|---|
| Shrub | | | 0.0 | Shrub | | | 0.0 |
| Shrub | | | 0.0 | Shrub | | | 0.0 |
| Shrub | | | 0.0 | Shrub | | | 0.0 |
| Shrub | | | 0.0 | Shrub | | | 0.0 |

Note: Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present *If trees are in the same layer and continuous along the transect you can group them

**Part I: GHFF Stem Count**

| Species Name | Stem Count |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

**Part J: SAT Survey Results**

| SAT Survey ID | NA | | | |
|---|---|---|---|---|
| Tree Number | Scientific Name | Common Name | DBH | Scat (Y/N) |
| 1 | *Eucalyptus crebra* | Narrow-leaved Ironbark | 410 | N |
| 2 | *Eucalyptus crebra* | Narrow-leaved Ironbark | 350 | N |
| 3 | *Eucalyptus crebra* | Narrow-leaved Ironbark | 320 | N |
| 4 | *Eucalyptus crebra* | Narrow-leaved Ironbark | 400 | N |
| 5 | *Eucalyptus crebra* | Narrow-leaved Ironbark | 380 | N |
| 6 | *Eucalyptus tereticornis* | Forest Red Gum | 960 | N |
| 7 | *Eucalyptus crebra* | Narrow-leaved Ironbark | 420 | N |
| 8 | *Eucalyptus crebra* | Narrow-leaved Ironbark | 410 | N |
| 9 | *Eucalyptus crebra* | Narrow-leaved Ironbark | 410 | N |
| 10 | *Eucalyptus crebra* | Narrow-leaved Ironbark | 330 | N |
| 11 | *Eucalyptus tereticornis* | Forest Red Gum | 1200 | N |
| 12 | *Eucalyptus crebra* | Narrow-leaved Ironbark | 340 | N |
| 13 | *Eucalyptus tereticornis* | Forest Red Gum | 440 | N |
| 14 | *Eucalyptus tereticornis* | Forest Red Gum | 640 | N |
| 15 | *Eucalyptus tereticornis* | Forest Red Gum | 1400 | N |
| 16 | *Eucalyptus tereticornis* | Forest Red Gum | 890 | N |
| 17 | *Eucalyptus tereticornis* | Forest Red Gum | 1000 | N |
| 18 | *Lophostemon suaveolens* | Swamp Box | 310 | N |
| 19 | *Eucalyptus tereticornis* | Forest Red Gum | 480 | N |
| 20 | *Eucalyptus tereticornis* | Forest Red Gum | 300 | N |
| 21 | *Eucalyptus tereticornis* | Forest Red Gum | 700 | Y |
| 22 | *Melaleuca viminalis* | Weeping Bottlebrush | 180 | N |
| 23 | *Melaleuca viminalis* | Weeping Bottlebrush | 300 | N |
| 24 | *Eucalyptus crebra* | Narrow-leaved Ironbark | 890 | N |
| 25 | *Eucalyptus crebra* | Narrow-leaved Ironbark | 530 | N |
| 26 | *Eucalyptus tereticornis* | Forest Red Gum | 600 | N |
| 27 | *Eucalyptus tereticornis* | Forest Red Gum | 1110 | N |
| 28 | *Eucalyptus tereticornis* | Forest Red Gum | 350 | N |
| 29 | *Eucalyptus tereticornis* | Forest Red Gum | 850 | N |
| 30 | *Eucalyptus crebra* | Narrow-leaved Ironbark | 450 | N |
| Total | | | | 1 in 30 |

**Attach Landscape Photos Here**

**North**



**South**



East



West



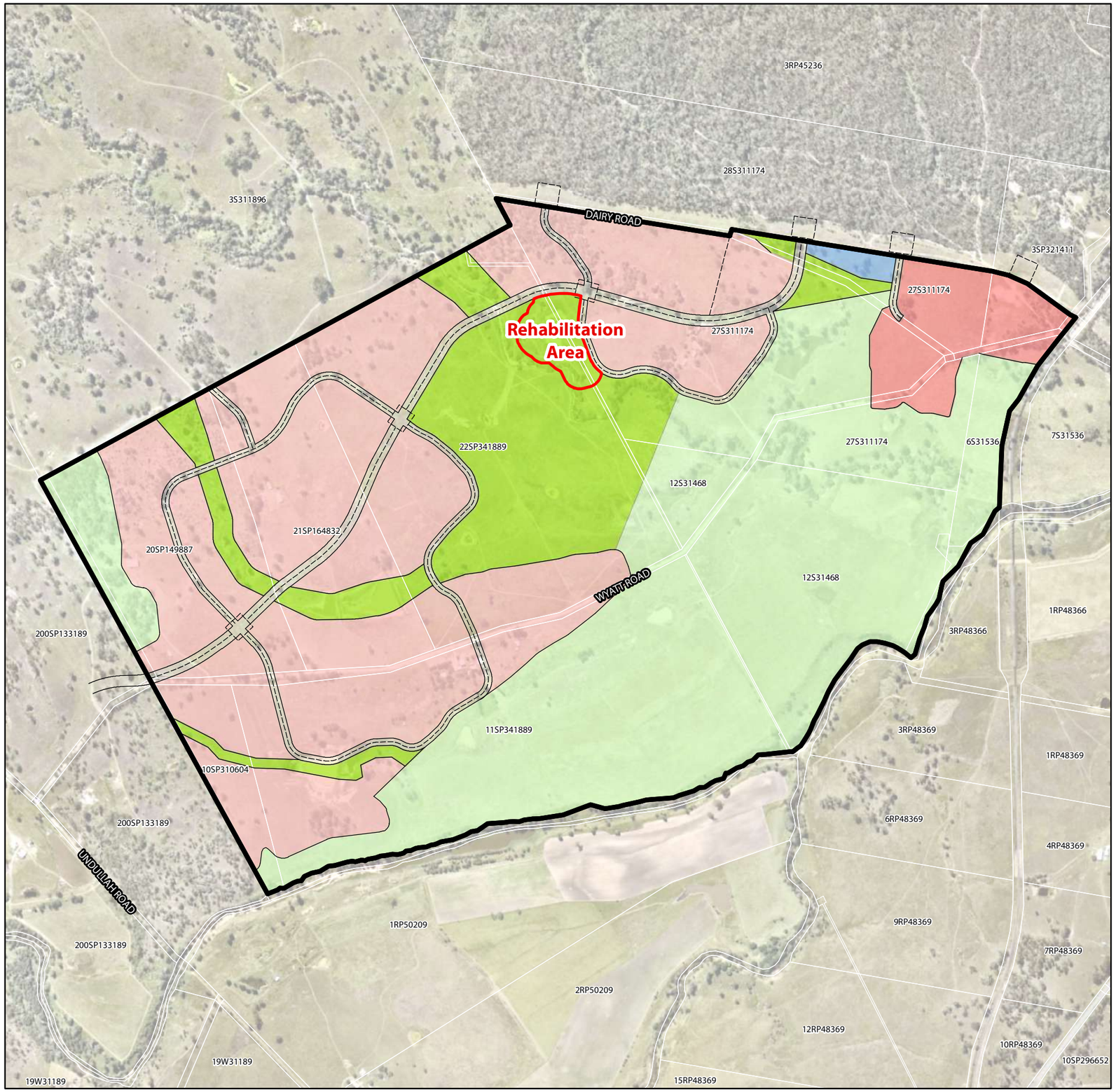
# Appendix F

## Northern Wetland Rehabilitation Plan

# Wyatt Road, Kagaru

# Wetland Rehabilitation Plan

| Plan Ref (Date): **11560 R WRP A (19 March 2024)** | | | | |
|---|---|---|---|---|
| **Sheet No.** | **Title** | **Description** | **Issue** | **Date** |
| 1 | 11560 E 01 WRP A | Cover sheet | A | 19/03/2024 |
| 2 | 11560 E 02 WRP A | Rehabilitation Notes - Introduction | A | 14/03/2024 |
| 3 | 11560 E 03 WRP A | Management Zones | A | 14/03/2024 |
| 4 | 11560 E 04 WRP A | Detail Sheets | A | 14/03/2024 |
| 5 | 11560 E 05 WRP A | Rehabilitation Notes – Site works / Weeds | A | 14/03/2024 |
| 6 | 11560 E 06 WRP A | Rehabilitation Notes – Planting Notes | A | 14/03/2024 |
| 7 | 11560 E 07 WRP A | Planting Species Schedule | A | 14/03/2024 |
| 8 | 11560 E 08 WRP A | Rehabilitation Notes – Fauna / Maintenance | A | 14/03/2024 |
| 9-11 | 11560 E A01-A03 RP A | Appendix A - Weed treatment & Removal | A | 14/03/2024 |





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Client:

WelCo Group Pty Ltd

Disclaimer:


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PRIOR TO ANY DEMOLITION, EXCAVATION OR CONSTRUCTION ON SITE, THE RELEVANT AUTHORITY SHOULD BE CONTACTED FOR FURTHER UNDER-GROUND SERVICES AND DETAILD LOCATIONS OF ALL SERVICES.


References:

Layout drawing (SHG 2024)

Amendments:

| Issue | Date | Description | Checked |
|---|---|---|---|
| A | 19/03/2024 | Client Draft | MD |

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Project:

Wyatt Road, Kagaru

environmental management

Plan of:

Wetland Rehabilitation Plan

| | | | |
|---|---|---|---|
| Date: | 19/03/2024 | Checked: | MD |
| Client Ref: | 11560 | Drawn: | LS |
| Drawing No.: | 11560 E 01 WRP A | | |

Wyatt Road, Kagaru

# Wetland Rehabilitation Plan - *Notes*

## Background

This Wetland Rehabilitation Plan (WRP) has been prepared by **Saunders Havill Group (SHG)** for **WelCo Group Pty Ltd**. The primary objectives of this WRP is to re-create a resilient, fully-functioning vegetation community that is consistent in composition and structure to the mapped pre-clearing regional ecosystems, that can support itself in perpetuity and to minimise edge effects from the proposed road development on existing wetland areas

The development site area covers approximately 405.73 ha and is located at Wyatt Road, Kagura. The land has been extensively cleared for cattle grazing and contains only scattered trees and patches of regrowth vegetation. The land use is in keeping with the broader rural landscape of the region. Based on aerial photography, significant portions of the site were cleared of vegetation prior to 1944, particularly in the southern portion of the site with land used for cropping through 1970 to 2002.

The rehabilitation site is located surrounding wetland vegetation containing Of Concern RE 12.3.8 described as "Swamps with Cyperus spp., Schoenoplectus spp. and Eleocharis spp". This wetland is also mapped within State Planning Policy 2017 (SPP) biodiversity mapping as 'high ecological significance wetlands'.

Ground surveys confirm the northern mapped wetland contains elements of the mapped regional ecosystem and contains semi-permanent water indicative of a wetland. Assessment of the wetland area against the AquaBAAM criteria resulted in the wetland considered the wetland to have moderate value to the overall protection of wetlands in the catchment rather than provide attributes of a wetland of High Ecological significance.



The rehabilitation site wetland is proposed to be retained, however the new alignment of Wyatt Road will be re-positioned adjacent to this wetland. As a result , rehabilitation and appropriate batters will be instated to support and improve the ecological function of the northern wetland with the re-alignment of Wyatt Road.



## Introduction

A substantial amount of rehabilitation research has been conducted and compiled as part of the "South East Queensland Ecological Restoration Framework (SEQERF)" and subsequently endorsed by the majority of South East Queensland councils. Given this, information provided within this WRP will largely utilize information derived from this framework.

Rehabilitation or "Ecological Restoration" can be described as "the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed" (source: Society for Ecological Restoration International).

The ability of an ecosystem to recover naturally depends on the existing natural regeneration capacity of the ecosystem i.e. resilience potential, and the level and type of disturbance, degradation or damage that has occurred. Generally, the ability of an ecosystem to naturally recover declines with increased disturbance, degradation or damage.

Determination of the resilience potential and level of degradation will assist practitioners to determine the level of effort required to restore the ecosystem. The following four ecological restoration approaches are listed under the SEQERF guidelines and are described in further detail on *Sheet 03*.

- Natural Regeneration
- Assisted Natural Regeneration
- Reconstruction
- Fabrication

In practice, sites with higher resilience potential should adopt the Natural Regeneration and Assisted Natural Regeneration approaches as these are generally the most cost-effective and encourage recruitment of locally occurring species that are adapted to local conditions. Adversely, highly degraded sites with poor resilience and an exhausted soil seed bank will likely require Reconstruction or Fabrication approaches i.e. planting to restore the ecosystem.

A key aspect of ecological restoration is that structure and function are returned to site, improving site stability, and improved habitat for fauna and flora. Structure includes vegetation height and density, canopy cover and appropriate species, as well as habitat features such as fallen logs and site rock. Function refers to the natural and self-sustaining processes occurring within the site including regeneration capacity, succession and cycling of nutrients. Activities required to achieve these objectives may include controlling environmental weeds, re-establishment of wildlife corridors and or stabilisation of creek banks.

As restoration work progresses on a site, ongoing changes to the structure and diversity of the vegetation will become apparent. These changes tend to occur in a cyclical manner, with the initial disturbance to the vegetation (either natural or man-made) being the trigger for changes. It is important to recognize that the vegetation will have to pass through a variety of stages of succession first, often over a period of years.

While disturbance as part of restoration works often has a negative connotation, it can also be useful for site restoration. Regeneration of native plant species is stimulated by mimicking natural disturbances. The techniques used will depend on the individual species and vegetation community, as they have evolved to respond to disturbances in different ways. Some examples of these techniques are:

- Control of competing vegetation, especially environmental weeds;
- Controlled burns or burn piles in vegetation communities adapted to fire;
- Soil disturbances such as ripping or raking; and or
- Alterations to hydrology in wetlands to reinstate natural movement.

The SEQERF also highlights that consistent follow up is critical for success of ecological restoration. This ensures that beneficial, permanent changes can occur within the vegetation community benefiting both fauna and flora. In order to be able to confirm these changes are occurring, ongoing site monitoring may also be required.

Ecological restoration is a complicated and evolving field. It requires careful consideration for all ecosystem aspects to try and minimise any unexpected interactions, although is generally accepted that not all can be fully known about each complex ecosystem. Given this, it is necessary to remain flexible throughout this process to adapt to site and natural changes.

## Rehabilitation - Approaches

| Ecological Restoration Approaches | |
|---|---|
| **Natural Regeneration** | |
| Applies: | To relatively large, intact and weed-free areas of native vegetation.<br>Where native plants are healthy and capable of regenerating without human intervention.<br>When native plant seed is stored in the soil or will be able to reach the site from nearby natural areas, by birds or other animals, wind or water.<br>Where the plant community has a high potential for recovery after any short-live disturbance such as a fire or cyclonic winds.<br>When preventative action is all that is required to avert on-going disturbances e.g. erection of fencing to prevent intrusion by cattle. |
| Role of planting: | Planting in such areas can work against the aims of restoration by interfering with natural regeneration. |
| Goal vegetation community: | The re-establishing plant community will be similar in structure, composition and diversity to the original vegetation. |
| **Assisted Natural Regeneration** | |
| Applies: | To natural areas where the native plant community is largely healthy and functioning.<br>When native plant seed is still stored in the soil or will be able to reach the site from nearby natural areas, by birds or other animals, wind or water.<br>Where the natural regeneration processes (seedling germination, root suckering, etc.) are being inhibited by external factors, such as weed invasion, soil compaction, cattle grazing, mechanical slashing, etc.<br>When limited human intervention, such as weed control, minor amelioration of soil conditions, erection of fencing, cessation of slashing, etc. will be enough to trigger the recovery processes through natural regeneration.<br>When the main management issue is weed infestation and/or current land use practices. |
| Role of planting: | Planting in such areas can work against the aims of restoration by interfering with natural regeneration except where species cannot return to site without direct intervention. |
| Goal vegetation community: | The re-establishing plant community will be substantially similar in structure, composition and diversity to the original vegetation. |
| **Reconstruction** | |
| Applies: | Where the site is highly degraded or altered.<br>When the degree of disturbance has been so great and long-standing that the pre-existing native plant community cannot recover by natural means.<br>To sites such as areas of fill, sites affected by stormwater flow, areas that have been drastically cleared, even though there may be a few remaining native trees or shrubs.<br>When a greater degree of human intervention is required, such as weed control, cessation of grazing and/or slashing, amelioration of soil conditions such as importation of soils, drainage works or re-shaping of the landscape. |
| Role of planting: | Importation of native species to the area is required, either through planting or direct seeding (in some situations). natural regeneration and recruitment is insufficient to initially re-establish the original vegetation. Depending on the prevailing circumstances, the planting of a broad diversity of species from the target ecosystem may be unnecessary and the use of pioneers may be sufficient to re-establish ecological processes. |
| Goal vegetation community: | The re-establishing planted community should be similar to the original vegetation in structure, composition and diversity. |
| **Fabrication (Type Conversion)** | |
| Applies: | Where site conditions have been irreversibly changed.<br>When it is not possible to restore the original native plant community.<br>Where a better-adapted local plant community can be planted that will function within the changed conditions.<br>In situations such as the construction of a wetland plant community to mitigate increased urban storm-water run-off. |
| Role of planting: | Revegetation (planting) is the major component in a fabrication program. |
| Goal vegetation community: | The re-establishing planted community should be similar to a naturally occurring plant community of the same type (e.g. a constructed freshwater wetland should resemble a natural system in terms of structure, composition and diversity). |

*Note: Table adapted from Gold Coast City Council's 'Guideline for the preparation of a Rehabilitation Plan'*

## Rehabilitation - Methodology

Detailed assessment of site conditions prior to commencement of documentation is essential. As part of most rehabilitation scopes, it is worth considering an appropriate methodology for both compiling documentation and site works. This can be broken down into the following items:

- Site assessment
- Rehabilitation Design Documentation (this plan)
- Site Works
- Maintenance and monitoring

### Methodology – Site Assessment

Detailed assessment of site conditions prior to commencement of documentation is essential in the establishment of a site-specific ecological restoration methodology. In accordance with the SEQERF. The following checklist will form part of the site assessment process:

- Describe the history and background of the site
- Describe the soil, drainage, topography and aspect
- Describe the native vegetation on the site and along site boundaries
- Describe the weeds on site
- Describe the vegetation dispersal and structure
- Describe the fauna use onsite
- Describe estimated native regeneration response.

The responses to the above checklist will provide the basis of the proposed restoration approach from Natural Regeneration to Fabrication for each treatment area within this Rehabilitation Plan.

Consideration should be made in the importance of integrating site-specific measures for fauna habitat and movement. With many fauna species having specific habitat requirements, foraging patterns and movement patterns. During the site assessment process, the following provisions should be taken into consideration:

- Fauna movement opportunities via easements, tracts, utility corridors and or infrastructure pathways;
- Diversity and type of fauna and distribution on site;
- Habitat opportunities e.g. Dense foliage, roosting areas, log hollows and potential nesting boxes;
- Fauna disturbance and vicinity of works to significant nesting areas and or fauna movement;
- Distribution of significant specialized food resources e.g. Koala trees; and
- Stage weed removal and or altering of weed control technique if the weeds are currently forming a significant fauna habitat.

For the sake of keeping this plan concise, site analysis results are compiled under a separate template, and may or may not be included in this set, however the analysis outcomes derive the Rehabilitation design methodology.

### Methodology – Rehabilitation Design

This documentation has been compiled through processes outlined in the SEQERF, site analysis and previous rehabilitation project experiences. The rehabilitation design—comprising distinct management zones—provides assessment managers, clients and contractors a clear methodology to assist the recovery of an ecosystem(s) that has been degraded, damaged or destroyed.

Rehabilitation zones were identified through detailed site analysis and are described on *Sheet 03*.

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References:
South East Queensland Ecological Restoration Framework (2012)
Guideline for the preparation of a Rehabilitation Plan (GCC)

Amendments:

| Issue | Date | Description | Checked |
|---|---|---|---|
| A | 14/03/2024 | Client Draft | MD |

Project: Wyatt Road, Kagaru

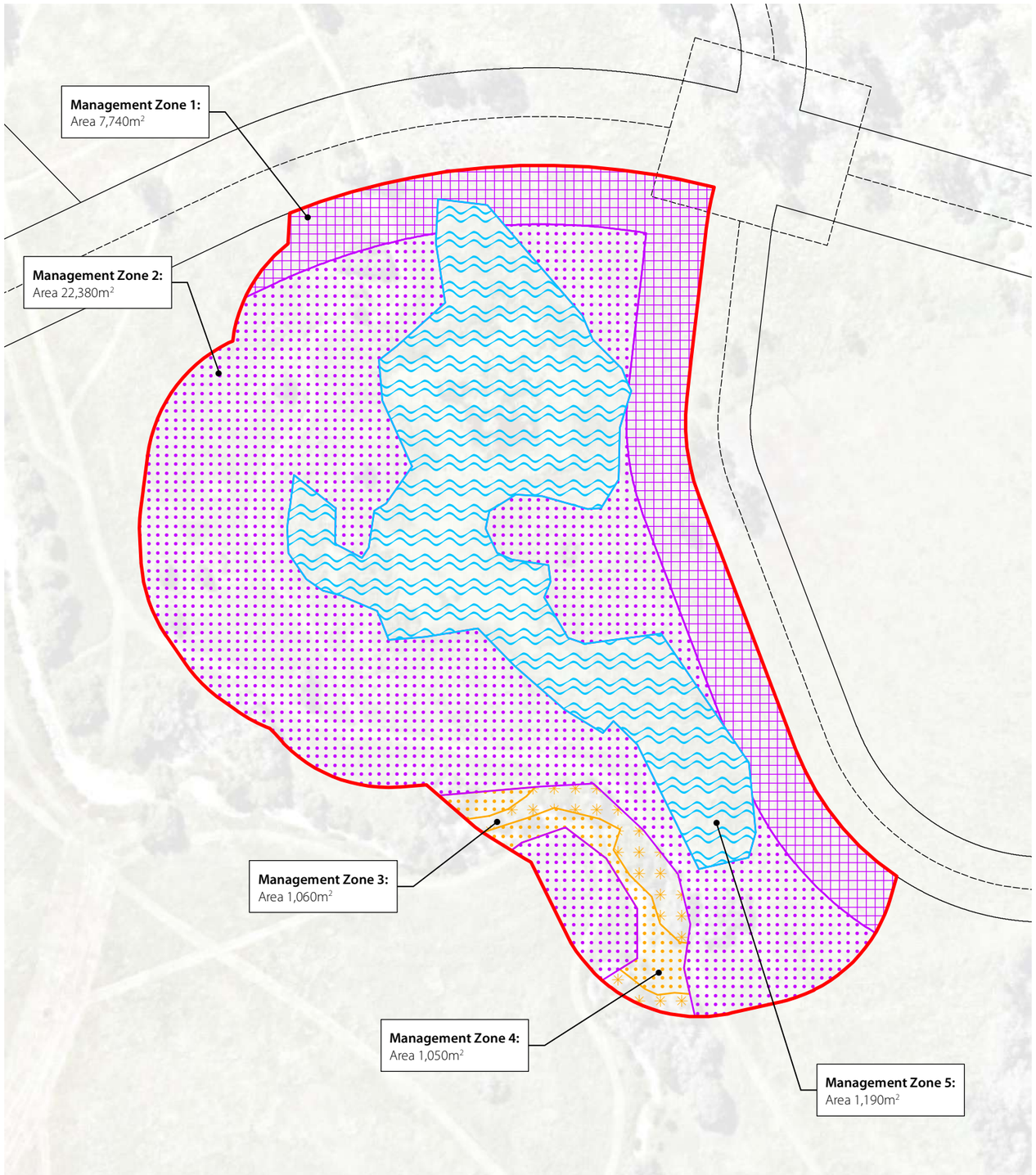
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| Client Ref: | 11560 | Drawn: | LS |
| Drawing No.: | 11560 E 02 WRP A | | |

Wyatt Road, Kagaru

# Wetland Rehabilitation Plan - *Management Zones*




## Management Zones Legend

**Management Zone 1 – RE 12.3.3 Interface Intensive Planting Area**

Primary weed management in accordance with SEQERF and LCC Biosecurity Plan to encourage natural regeneration, minimise damage to existing native vegetation, stabilise soil and minimise impacts to aquatic / semi-aquatic fauna. Earthworks areas to be finalised by the civil contractor appropriately prior to rehabilitation works, including, but not limited to: cultivation and scarification to media, installation of final media profile to approved levels / depths, and conducting all tests (flow, conductivity etc.) as required by assessment manager.Any additional bare, eroded or erosion-prone areas to be appropriately cultivated, topsoiled and blanket mulched with 100mm thick aged forest mulch). Blanket mulch within areas prone to inundation to be secured with a natural fibre netting or substituted with a natural fibre matting in heavily eroded/inundated areas. Existing pasture grass to be retained in planting areas and managed throughout maintenance period. Mulch rings (above inundation level) and jute mat squares (below inundation level) to be used as required at planting locations. Additional protective measures i.e. tree guards and coir logs to be used as required. All measures to be installed in accordance with manufacturer's recommendations. Entire zone to be planted with a mixture of trees, shrubs and groundcovers at rates of 1:7², 1:5m² and 3:1m² respectively. Species to be in accordance with RE 12.3.3 *Refer to Rehabilitation Notes for additional details, plant species and densities.*

**Management Zone 2 – RE 12.3.3 Reconstruction**

Primary weed management in accordance with SEQERF and LCC Biosecurity Plan to encourage natural regeneration, minimise damage to existing native vegetation, stabilise soil and minimise impacts to aquatic / semi-aquatic fauna. Any additional bare, eroded or erosion-prone areas to be appropriately cultivated, topsoiled and blanket mulched with 100mm thick aged forest mulch). Blanket mulch within areas prone to inundation to be secured with a natural fibre netting or substituted with a natural fibre matting in heavily eroded/inundated areas. All rehabilitation works within waterway bed and banks to adhere to Part 3.3 - Waterway and Wetland Enhancement Works of the Logan Planning Scheme 2015. Protection devices such as tree guards, jute mat squares, stakes and coir logs to be used at discretion of qualified rehabilitation supervisor. Mulch rings (above inundation level) and jute mat squares (below inundation level) to be used as required at planting locations. Additional protective measures i.e. tree guards and coir logs to be used as required. All measures to be installed in accordance with manufacturer's recommendations. Entire zone to be planted with a mixture of trees, shrubs and groundcovers at rates of 1:10m², 1:5m² and 1:1m² respectively. Planting on creek bank to comply with 'Categories of channel vegetation' figure on Sheet 06. Species to be in accordance with RE 12.3.3. *Refer to Rehabilitation Notes for additional details, plant species and densities.*

**Management Zone 3 – RE 12.3.7 Assisted Natural Regeneration**

Existing native trees, shrubs and groundcovers to be protected and retained. Primary weed management in accordance with SEQERF and LCC Biosecurity Plan to encourage natural regeneration, minimise damage to existing native vegetation, stabilise soil and minimise impacts to aquatic / semi-aquatic fauna. Any bare, eroded or erosion-prone areas to be appropriately cultivated, topsoiled and blanket mulched with 100mm thick aged forest mulch. Blanket mulch within areas prone to inundation or washout to be secured with a natural fibre netting or substituted with a natural fibre matting in heavily eroded/inundated areas. Infill planting of bare areas beneath existing native canopy trees with a mixture of shrubs and groundcovers throughout, and trees installed at locations >3m from existing tree trunks. Tubestock trees, shrubs and groundcovers to be installed at rates of 1:10m², 1:5m² and 1:1m² respectively. Planting on creek bank to comply with 'Categories of channel vegetation' figure on Sheet 06. Species to be in accordance with RE 12.3.7. *Refer to Rehabilitation Notes for additional details, plant species and densities.*

**Management Zone 4 – RE 12.3.7 Reconstruction**

Primary weed management in accordance with SEQERF and LCC Biosecurity Plan to encourage natural regeneration, minimise damage to existing native vegetation, stabilise soil and minimise impacts to aquatic / semi-aquatic fauna. Any additional bare, eroded or erosion-prone areas to be appropriately cultivated, topsoiled and blanket mulched with 100mm thick aged forest mulch). Blanket mulch within areas prone to inundation to be secured with a natural fibre netting or substituted with a natural fibre matting in heavily eroded/inundated areas. All rehabilitation works within waterway bed and banks to adhere to Part 3.3 - Waterway and Wetland Enhancement Works of the Logan Planning Scheme 2015. Protection devices such as tree guards, jute mat squares, stakes and coir logs to be used at discretion of qualified rehabilitation supervisor. Mulch rings (above inundation level) and jute mat squares (below inundation level) to be used as required at planting locations. Additional protective measures i.e. tree guards and coir logs to be used as required. All measures to be installed in accordance with manufacturer's recommendations. Entire zone to be planted with a mixture of trees, shrubs and groundcovers at rates of 1:10m², 1:5m² and 1:1m² respectively. Planting on creek bank to comply with 'Categories of channel vegetation' figure on Sheet 06. Species to be in accordance with RE 12.3.7. *Refer to Rehabilitation Notes for additional details, plant species and densities.*

**Management Zone 5 – RE 12.3.8 Wetland Reconstruction**

Primary weed management in accordance with SEQERF and LCC Biosecurity Plan to encourage natural regeneration, minimise damage to existing native vegetation, stabilise soil and minimise impacts to aquatic / semi-aquatic fauna. Native plant protection and weed management in accordance with Management Zone 1a. Exotic pasture areas to be treated with frog-friendly herbicide during dry periods and outside of significant frog breeding and development periods. Any bare, eroded or erosion-prone areas to be covered with 75mm thick blanket mulch and secured with natural fibre mesh. Planting on creek bank to comply with 'Categories of channel vegetation' figure on Sheet 06. All rehabilitation works within waterway bed and banks to adhere to Part 3.3 - Waterway and Wetland Enhancement Works of the Logan Planning Scheme 2015. Protection devices such as tree guards, jute mat squares, stakes and coir logs to be used at discretion of qualified rehabilitation supervisor. Mulch rings (above inundation level) and jute mat squares (below inundation level) to be used as required at planting locations. Additional protective measures i.e. tree guards and coir logs to be used as required. All measures to be installed in accordance with manufacturer's recommendations. Entire zone to be planted with a mixture of trees and groundcovers at rates of 1:100² and 1:1m² respectively. Species to be in accordance with RE 12.3.8. *Refer to Rehabilitation Notes for additional details, plant species and densities.*


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References:

Layout drawing (SHG 2024)

Amendments:

| Issue | Date | Description | Checked |
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| A | 14/03/2024 | Client Draft | MD |

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Project: Wyatt Road, Kagaru

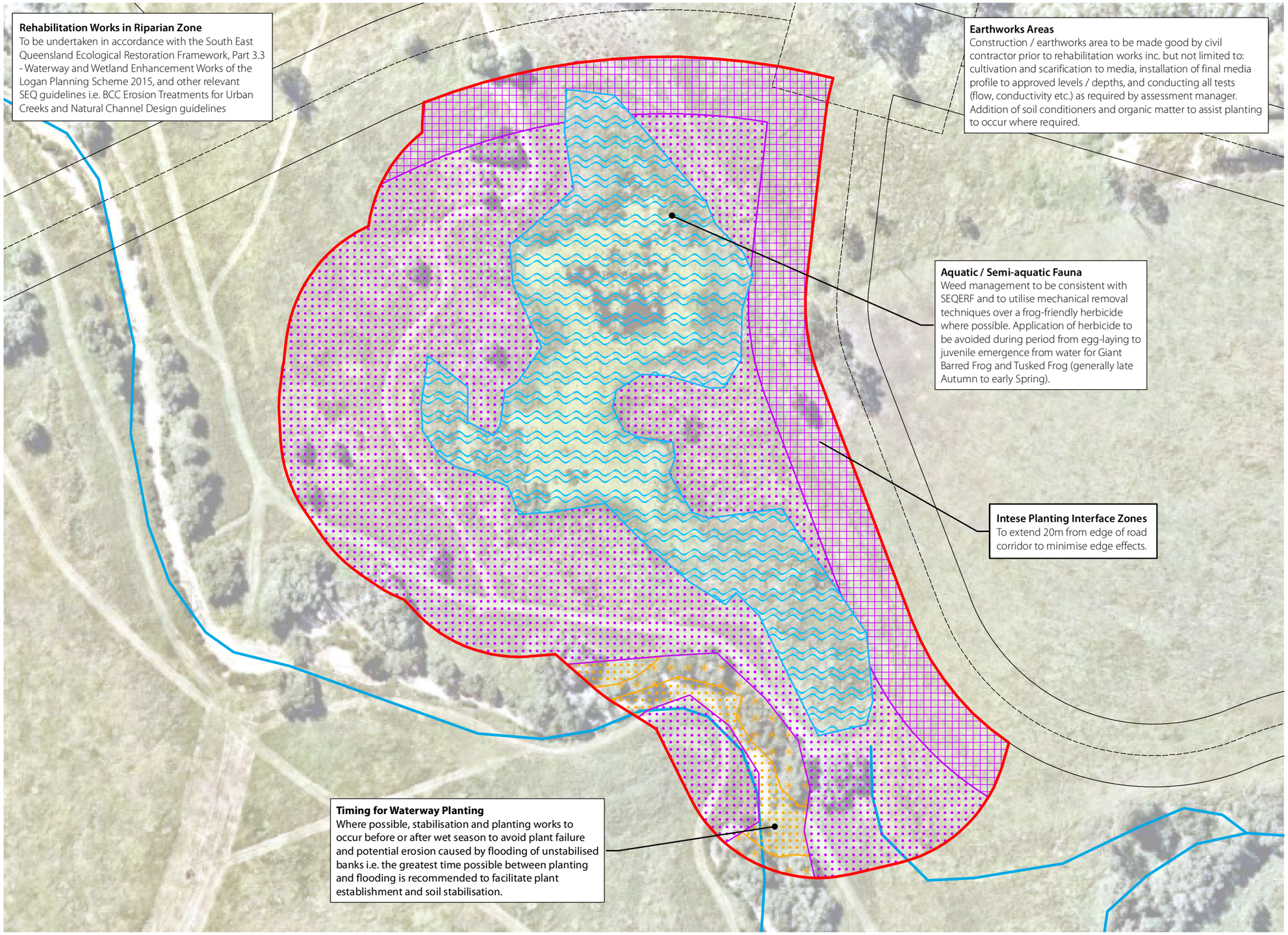
environmental management

Plan of: Wetland Rehabilitation Plan

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Wyatt Road, Kagaru

# Wetland Rehabilitation Plan - *Detail Sheet*




**Legend**

- Wetland Rehabilitation Area
- **Management Zone 1** - RE 12.3.3 Interface Intensive Planting Area
- **Management Zone 2** - RE 12.3.3 Reconstruction
- **Management Zone 3** - RE 12.3.7 Assissted Natural Regeneration
- **Management Zone 4** - RE 12.3.7 Reconstruction
- **Management Zone 5** – RE 12.3.8 Wetland Reconstruction
- Watercourse / Drainage Feature
- Collector Road Allignment
- Proposed Road Parcel

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| A | 14/03/2024 | Client Draft | MD |

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Project:

Wyatt Road, Kagaru

environmental management

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Wetland Rehabilitation Plan

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# Wetland Rehabilitation Plan - *Notes*

## Methodology – Site Works

Following resolution of the site analysis and management areas as part of rehabilitation design, prioritising site works should be considered. Prior to site works commencing, the site should be secured from degrading impacts such as grazing by stock, unauthorised access and rubbish. Some factors that may require immediate attention include:

- The presence of highly invasive weed species which may disperse further prior to substantial site works commencing
- The presence of weed species which may have a long term impact on ecological communities such as exotic and weed varieties of vines
- Flammable materials (including weed thickets, grasses and vines)
- Damaging and easy access by 4WD, motorbikes and pedestrians into core retained vegetation and ecological restoration areas. This may require installation of temporary fencing if deemed appropriate

Site works can be typically broken down into the following categories:

- Primary Works
- Follow-up Works
- Maintenance Works

***Primary Works***

Primary works or initial works within the site or a section of the site will commonly involve a sequence of activities such as the control of all groundcover weeds, woody weeds in the understorey and exotic vines prior to the control of weed trees. Primary work has the effect of creating a large degree of disturbance which will stimulate the germination of native and exotic species. Therefore, continuing works should be scheduled shortly after the initial visit to allow for timely control of the newly regenerating weeds.

Highly invasive weeds, such as the Restricted Invasive Plants listed under the Biosecurity Act 2014, should be treated as a priority during primary works to alleviate competition on native flora species and inhibit spread into newly disturbed areas. For example, canopy smothering vines such as Cat's Claw Creeper can have a detrimental impact on native canopy trees and should be prioritised over less invasive herbs such as Blue Billy Goat Weed. Some weeds will also need to be treated in stages i.e. where the weed provides protection and habitat for native fauna or where it is providing bank stabilisation. For example, where Lantana is providing the only habitat for small birds, it should be removed in phases as native shrub habitat establishes.

Techniques used during primary work commonly involve spot spray, cut-scrape paint, cut-paint, scrape-paint, roll-hang and over spraying (source: SEQERF). Refer to Weed Management notes for additional details.

Following completion of weed management, rehabilitation (such as assisted natural regeneration, construction and fabrication planting) can occur in areas unaffected by weed management activities or areas that primary weed management activities have concluded. Refer to Rehabilitation Works notes for additional details. At the end of primary work, the zone will have been comprehensively and systematically worked, ready for follow-up works.

***Follow-up Works***

At intervals, which will vary according to the type of weed impacting the site and growing conditions, follow-up work will be necessary. This generally involves the spot-spraying of newly germinating weeds and resprouting sections of woody weeds and vines. It is at this stage that observational visits should be made to the site to determine what progress the vegetation is making, and decide when to implement further follow-up work. A site that receives badly-timed, too frequent or too little follow-up will rapidly experience setbacks, as weed propagules will quickly become established in the newly disturbed areas. Germinating native seedlings may be swamped by weeds or damaged by inexperienced operators thereby exhausting the seed bank. Unless adequate follow-up can be ensured when planning restoration works, there is little point in commencing primary work, as time and resources are consumed with no substantial gain achieved (source: SEQERF).

***Maintenance Works***

By the maintenance stage, the vegetation community is at a point where native plant species are germinating and establishing, and canopy formation is occurring. Weed density is starting to decrease as the native plants which have been encouraged during the previous restoration works are able to out-compete the weeds. One of the fundamental principles of ecological restoration is that it attempts to create or re-establish an ecosystem that is self-sustaining. Therefore, it is the underlying goal that maintenance will eventually be decreased to a minimum. While this is not always possible, due to factors such as the continual reintroduction of weed propagules to the site from nearby residential areas; unfavourable seasons or weather event; persistent weed species; or global influences such as the enhanced greenhouse effect, it should always be strived for (source: SEQERF).

Maintenance works may include minor ongoing weed management and infill planting depending on site conditions.

## Methodology – Weed Notes

Weed management typically comprises a major part of rehabilitation site works. Weed management provides the basis of aiding natural regeneration and assisted natural regeneration. It also forms part of the preliminary work required for reconstruction and fabrication scopes.

Weed Management is to be undertaken in accordance with the SEQERF Primary, Follow-up and Maintenance works notes above. Weed management shall encompass all species declared at the commonwealth, state and local level, and any weeds that appear to be invasive at the site.

A total of twenty-three (23) introduced / weed species were identified across the entire development area during vegetation assessments and may be present within the rehabilitation area. Five (5) of these are classified as Restricted Invasive Plants under the Biosecurity Act 2014 and are listed in *Appendix A*.

Critical skills for Weed Management include:

- Knowledge of relevant legislation
- Plant Identification skills
- Knowledge of different weed management techniques

***Knowledge of Relevant Legislation***

It is expected contractors have a depth of knowledge of relevant legislation to complete site rehabilitation works. This includes invasive plant classifications and control obligations under the Queensland *Biosecurity Act 2014* and local Biosecurity Plans (Refer to adjacent schedules for classification of weeds under the Act).

Bush regenerators must also comply with the requirements of the Workplace Health and Safety Act 2011 or, when working on Commonwealth lands, the Commonwealth's Occupational Health and Safety (Commonwealth Employment) Act 1991.

Contractors should also obtain all relevant permits required under State and Commonwealth legislation (e.g.Nature Conservation Act 1992, Fisheries Act 1994, Vegetation Management Act 1999, Biosecurity Act 2014). Contractors must also be aware of and adhere to cultural heritage protection obligations under the Aboriginal Cultural Heritage Act 2003 and where chemicals are in use, the Agricultural Chemicals Distribution Control Act 1966.

In addition to the above, contractors should also be familiar with local government body requirements (e.g. Local Codes, Policies and Guidelines).

| RESTRICTED MATTERS (*BIOSECURITY ACT 2014*) | |
|---|---|
| **Category** | **Description** |
| **1** | must be reported to an inspector within 24 hours if it is present in, or on, something in your possession or under your control or at a place where you are the occupier, unless an appropriately authorised officer has already been advised or you possess a permit for the restricted matter. Includes red imported fire ants, electric ants, Asian honey bees, and certain animal diseases, aquatic diseases and pathogens. |
| **2** | must be reported to an inspector within 24 hours if it is present in, or on, something in your possession or under your control or at a place where you are the occupier, unless an appropriately authorised officer has already been advised or you possess a permit for the restricted matter. includes certain noxious fish, weeds and pest animals |
| **3** | You must not distribute this restricted matter. It must not be given as a gift, sold, traded or released into the environment unless the distribution or disposal is authorised in a regulation or under a permit. Deliberate human distribution or disposal contrary to the legislation is a key source of spread into other areas. includes weeds, pest animals and noxious fish |
| **4** | You must not move this restricted matter to ensure that it does not spread into other areas of the state. includes specific weeds, pest animals and noxious fish |
| **5** | You must not possess or keep this restricted matter under your control. These pests have a high risk of negatively impacting on the environment. You may only keep this restricted matter under a permit of the *Biosecurity Act 2014* or another Act. includes weeds, pest animals and noxious fish |
| **6** | You must not feed this category of restricted matter. Feeding this restricted matter may cause their numbers to increase and negatively impact the economy or the environment. Feeding for the purpose of preparing for or undertaking a control program is exempted. Includes invasive animals such as feral deer, foxes, rabbits and wild dogs and noxious fish such as carp, gambusia and tilapia. |
| **7** | If you have these noxious fish in your possession you must kill the restricted matter and dispose of the carcass by burying the whole carcass in the ground above the high tide water mark or placing it in a waste disposal receptacle. Includes noxious fish such as carp, weatherloach, climbing perch and gambusia |

***Plant Identification Skills***

Both native and weed species should be identified prior to primary weed removal works and ongoing throughout the follow-up and maintenance periods. This is to maximise natural regeneration and reducing likelihood of accidental weed spraying to native vegetation. Regenerating species to be treated and maintained in a similar manner to newly planted revegetation tubestock. If contractor is unsure of species, advice should be sought by botanist, specialist contractor or confirmed with Queensland Herbarium. Refer to indicative Weed Treatment schedules derived from Queensland Herbarium for an indication of weed species and treatments.

***Knowledge of Different Weed Management Techniques***

A range of weed management techniques are available to combat varying weed species and scenarios. Refer to adjacent schedules and Appendix A for an indication of weed management techniques.

| WEED MANAGEMENT TECHNIQUES | |
|---|---|
| **METHOD** | **DESCRIPTION** |
| **Herbicide** | **The herbicide weed control techniques described below provide a range of proven methods that can be used on a restoration site.** |
| **Cut - Scrape-Paint** | Cut the stem of the plant close to the ground (approximately 1-2cm) ensuring that soil does not come in contact with the cut surface. The cut can be made at a slight angle in order to increase the surface area that is exposed to the chemical. Apply herbicide immediately to the cut stump using poison pot and brush or dripper bottle. Using a knife, scrape the sides of the stump thoroughly to expose the green tissue. Apply herbicide to the scraped stump. The chemical must be applied within 10 seconds of the cut or scrape being made in order for it to be fully effective. |
| **Cut - Paint** | Cut the stem of the plant close to ground level. Apply herbicide to the cut stump using poison pot and brush or dripper bottle. This method is best suited to easy-to-treat weeds such as small-leaved privet (Ligustrum sinense), provided that the diameter of the stem at ground level is less than approximately three centimetres. If a glyphosate-/ metsulfuron methyl herbicide mix is being used in the poison pot, a greater range of weeds can be controlled using this method e.g. Easter cassia. |
| **Scrape - Paint** | Scrape as much of the stem as possible (one side of the stem) using a knife and apply herbicide to the scrape. Leave a small section of the vine unscraped, and then twist the vine so that the next scrape is made on the opposite side of the stem to the preceding scrape. Continue along the length of the vine, scraping and painting as much of the stem as possible, with scraping to be concentrated along the thicker stems close to the root of the plant. This is the best method to use for madeira vine, as it allows the chemical to translocate to the underground storage organs and aerial tubers which may be hanging in large clusters above head height. This avoids the potential problem of tubers from cut stems left hanging in the trees from dropping to the ground and sprouting. When scraping madeira vine stems a deep scrape is advisable – scrape right through to the fibrous, stringy section of the stem, taking care not to sever the vine. This method is also suitable for treatment of ochna. |
| **Over-spraying** | Over-spraying involves the use of knapsacks or power sprayers to treat large expanses of weed such as lantana thickets. The foliage must be covered with herbicide but not to the point of running off the plant. The dead plants remain in place and can be cut down at a later stage. Prior to over-spraying, any weeds that are growing closely around established native plants must be hand removed or treated by cut-scrape-paint. |
| **Spot-spraying** | A knapsack filled with an appropriate herbicide mix is used by the operator to selectively control environmental weeds. A keen eye and an ability to distinguish between the native and weed species likely to be present, especially at seedling stage, is essential. Marker dye is added to the chemical mix to allow the operator to see what has already been sprayed, thus covering the ground weeds comprehensively and thoroughly Glyphosate and metsulfuron methyl are the main herbicides used for spot-spraying in ecological restoration, together with the addition of a penetrant and/or surfactant and marker dye. |
| **Splatter Gun** | This small gas-powered injector kit is fitted into a knapsack for easy carrying and delivers large droplets in a stream over the weed. The gun is used to deliver a concentrated herbicide (glyphosate or metsulfuron methyl) across large dense expanses of weed. The method is used for species such as lantana (ratio of 1:9 of glyphosate:water). Splatter gun involves spraying strips at one to two metre intervals over the thicket. The herbicide is then translocated throughout the entire plant. The method does not require the whole plant to be covered as in over-spray. |
| **oll-hang** | Vines such as mile-a-minute (Ipomoea cairica) which produce long stolons extending many metres along the surface of the ground, are suited to the roll-hang method. Locate the base of the plant and carefully pull up the runners and roll them up. The resulting roll of vine is then hung in the fork of a tree to dry out as if it is left on the ground it is likely to re-shoot. Where runners are climbing up into a tree they are cut off at head height prior to the runner being rolled up – there is no need to pull cut vines down from trees as this action is likely to damage the tree. The base of the vine is treated using the cutscrape-paint method. |
| **Gouge-paint** | This method applies to plant species that have a fleshy underground storage organ, such as the large tuber that is often found at the base of madeira vine. It is also particularly appropriate for the treatment of climbing asparagus (Protasparagus plumosus). If using this technique on climbing asparagus, first cut the stems that are growing into the canopy at head height and also at the base. The fleshy rhizome can then be gouged, or alternatively in the case of climbing asparagus, it may be struck several times firmly with the head of a pair of loppers, allowing the brown outer covering of the crown to peel away exposing the white fleshy inner section of the rhizome for application of herbicide. Gouge out sections of the fleshy base with a knife and apply herbicide using a paint pot and brush or dripper bottle within 10 seconds. |
| **Basal Barking** | This method involves mixing an oil-soluble herbicide in diesel/kerosene and painting or spraying the full circumference of the trunk or stem of the plant from ground level to a height of approximately 45cm. Basal bark application is suitable for thin-barked woody weeds including saplings, regrowth and multi-stemmed shrubs. The method will usually result in the mortality of difficult-to-control woody weeds at any time of the year, provided the bark is not wet or too thick to enable the herbicide to penetrate. The method should not be used in wet weather, adjacent to waterways or in areas where native trees and shrubs are located. The use should be restricted to situations where a weed is particularly difficult to control e.g. cherry guava and where other methods have been unsuccessful. |
| **Stem Injection** | Large woody weeds such as camphor laurel, coral trees (Erythrina spp, Privet Ligustrum spp) and umbrella trees are generally treated by stem-injection. Holes are drilled at regular intervals around the base of the tree and exposed roots using a drill. A tree injection syringe attached to a small capacity knapsack is used to fill the holes with the herbicide. Stem-injection of trees can also be undertaken using a hatchet to create cuts in a 'brickwork pattern' in trunks of trees for the application of herbicide (known as tree frilling). Frilling is more labour intensive than drilling. The greatest benefit of steminjection is that the trees can be left standing in situ as they die, provided there is no risk to humans or infrastructure from falling limbs. This creates convenient roosts for birds and other animals, and prevents the formation of large amounts of debris on the ground and damage to understorey plants which would result if the trees were to be cut down using a chainsaw. |
| **Wick Wiping** | Wick wipers can be manually used with a sponge or wick applicator, attached to a container filled with herbicide or as an attachment towed by a tractor. The manual method can be used to selectively apply herbicide to the leaves of weeds growing in sensitive situations. The hand held container can leak and generally spot spraying would be recommended. The use of a tractor drawn wick wiper is used to control taller growing species such as introduced grasses and to encourage the growth of lower growing species. This method could be used in preparation for planting. |
| **Mechanical** | **Mechanical weed control involves the use of powered and non-powered equipment such as brushcutters, chainsaws, slashers, shovels, pruners, saws, etc. These methods are best used in situations where there is a large, uninterrupted stand of weeds.** |
| **Dig and Bag** | Dig and remove tuberous/ rhizomatous root systems. Remove roots or whole plant in hard/ compacted soils. Place in suitable container and remove from site, dispose of by deep burial, burn or burial at a land fill, must not place declared weed species in recycling (mulch). |
| **Hand-Pull** | Remove totally from ground by hand (human). Perform when soil is moist. Applicable to small infestations or areas of environmental sensitivity (including sensitive watercrouses, when frogs are breeding, or presence of threatened species). |
| **General Mechanical** | May involve use of machinery (e.g. brushcutter, chainsaw, slasher, dozer, excavator). Suitable for lage infestations and weed trees. Initially cost-effective, but requires immediate revegetation of site or matting/ mulch application and extensive maintenance periods. Generates excessive soil and vegetation disturbance. |

*Note: Table adapted from a table in SEQERF*

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References:
South East Queensland Ecological Restoration Framework (2012)

Amendments:

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| A | 14/03/2024 | Client Draft | MD |

Project: Wyatt Road, Kagaru

environmental management

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Wyatt Road, Kagaru

# Wetland Rehabilitation Plan - *Planting Notes*

## Methodology – Planting

Primary weed management works, areas requiring infill planting (assisted natural regeneration), and larger scale planting (reconstruction and fabrication) can be undertaken. Prior to installation, the following items should be considered:

- Species selection
- Sourcing plant material
- Timing of planting
- Site preparation
- Planting density
- Planting installation

***Species Selection***

Species selection is critical in achieving the desired ecological restoration outcomes for rehabilitation sites. Planting is typically derived from:

- Local Regional Ecosystem (RE) descriptions.
- Observed site native vegetation.
- Bioretention guideline requirements.
- Climatic and weather conditions observed on site (frost, salt-spray, etc.
- 'Pioneer' species are useful in site stabilisation and encouraging native regeneration.
- Utilising flowering and fruiting species are useful to attract wildlife and result in introduction of seeds.
- Diverse vegetation layers (trees, shrubs, groundcovers)
- Species availability from seed propagation and or local nurseries

Refer to plant schedule for species and planting densities.

***Sourcing Plant Material***

There are a number of options for sourcing plant material for revegetation purposes. Propagation from site seed is a good outcome however is often limited by required timing of works. Sourcing planting from local nurseries is the commonly chosen option and has the following benefits:

- Awareness of genetic considerations when collecting seed.
- Experience with breaking dormancy mechanisms in hard to germinate seeds.
- Highly successful propagation techniques.
- Ability to provide high quality stock to order
- Draw on industry resources.

***Timing of Planting***

The timing of planting should ideally be aligned with the wet season in SEQ (summer and autumn). This minimises the need for intensive watering to establishment planting. Planting between February to May is the most beneficial as it also seeks to avoid intense heat periods of summer. Furthermore, planting at flood-prone and frost-prone locations should aim for plant establishment prior to the onsite of flooding / frost events. Despite this, it is understood planting may occur at various times within rehabilitation areas due to development timing needs.

***Site Preparation***

Site or planting preparation includes:

- Fencing to exclude grazing animals and people (if required)
- Pre-spraying of exotic grasses and other weeds to planting areas
- Consideration of source of water for new planting (access tracks, temporary irrigation)
- Arranging delivery of mulch, jute netting and treeguards (if required)
- Treatment of heavily compacted soils by ripping and or application of gypsum
- Soil amelioration as required

***Planting Density***

Plant density is calculated on a zone by zone basis. This allows planting to cater for various requirements including standard revegetation, infill only requirements such as canopy trees at low densities, as well as dense bioretention plantings as per Bioretention Technical Guidelines.

Refer to plant schedule for species and planting densities.

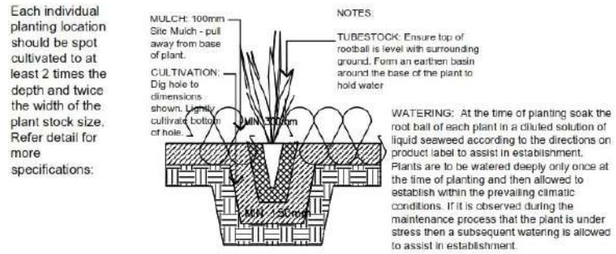
***Planting Installation***

The following outlines the preferred installation methodology for revegetation works within the rehabilitation areas. It has been designed to maximise plant establishment success rates and minimize plant mortality. Revegetation works shall be either undertaken or directly supervised by an experienced and qualified contractor. All works shall be in accordance with the provisions of this ORMP, and local government policies and Australian Standards.

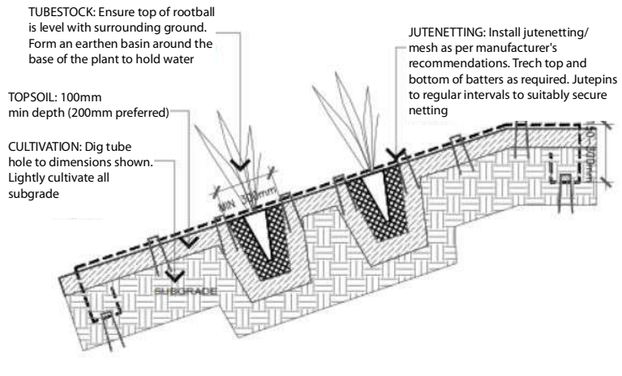
Plant installation methods shall include:

- Plants are to be vigorous, well established, hardened off, consistent with species or variety, free from disease and insect pests, with large root systems and no evidence of having been restricted or damaged. The landscape coordinator has the right to inspect and reject stock prior to planting
- Plants are to be planted immediately after delivery to the planting site.
- Planting is to be undertaken in accordance with the planting module contained within this drawing sheet.
- Excavate planting medium to a depth suitable for the installation of tube or pot specimens. In areas where planting substrate is deemed to be very poor (compacted, nutrient deficient, hydrophobic etc.) and above areas of potential frequent inundation and waterflow, topsoil may be used.
- Pre-water plant hole, if soil is dry, to decrease root stress upon planting and assess the infiltration of water through the soil.
- Incorporate into the planting substrate the appropriate quantity of prepared water crystals or other
- Suitable hydrating product such as Hortex 'Rainsaver' or 'Moisturaid'.
- Place plant into hole and backfill ensuring that the plant is upright and the stem is not covered in any less than 10mm or any more than 20mm of planting medium.
- Plants are to be watered thoroughly immediately after planting (ensure deep irrigation) and thereafter as required during the construction phase of the development depending on climatic conditions. Creation of a concave hollow around the base of each plant will aid water infiltration to the plant roots.
- A complete, slow release fertiliser is recommended, and is to be administered appropriately during
- planting. Topdressing with slow release fertiliser is preferred to avoid toxic levels of fertiliser
- accumulating in the plant hole around the plant roots.
- To ensure successful establishment, all planting surfaces must be covered in:
    - a 100mm layer of high-quality weed-free composted chip mulch (site mulch)- Note: to avoid possible stem rot in some 'drier' species ensure mulch is 'dished' and not covering plant stem by more than 20mm. Where available, mulch material to be sourced from cleared vegetation material if adequately seasoned, or
    - Suitable individual anchored natural fibre weed mat (jute or coir mat)
- A long-term slow-release fertiliser, such as Nutricote or similar product should be used for all plantings after initial plant establishment.
- A minimum 90% survival rate should be achieved.

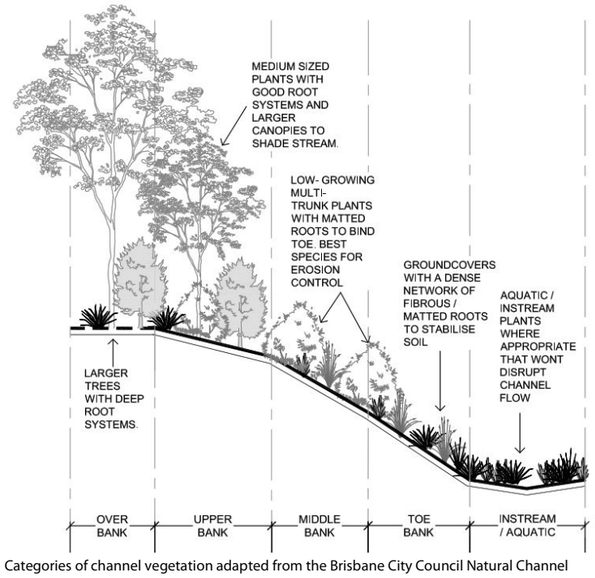
Typical planting details as below for standard medium mulch installation and jutenetting. Refer to manufacturer's recommendations for detailed jute netting installation including pinning, etc.




Where evidence of plant damage is occurring, tree guards grow tubes to be installed as required.

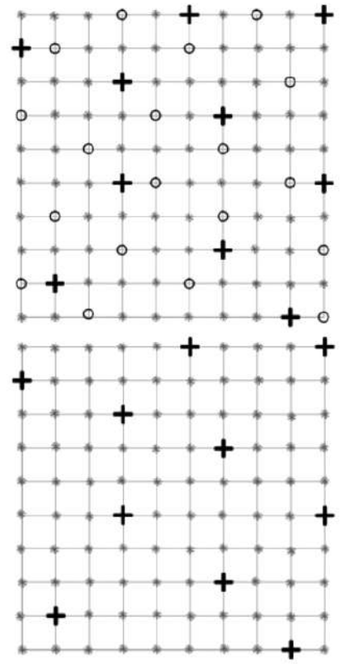



Jute netting mesh to be installed as per manufacturer's recommendations. Indicative detail shown only.




Categories of channel vegetation adapted from the Brisbane City Council Natural Channel Design Guidelines.

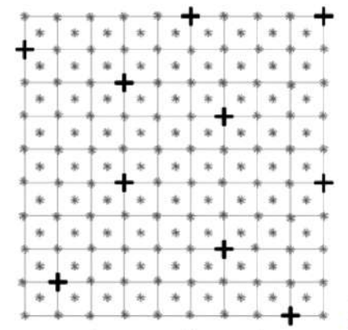
Revegetation planting locations shall be generally set out in accordance with a typical random grid pattern as shown below. Various typical densities shown. Refer to plant schedule for species and planting densities.



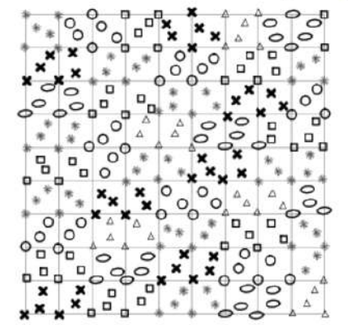

Typical 3 Tiered Revegetation Grid




Typical 2 Tiered Revegetation Grid




Typical 2 Tiered (Dense Groundcovers) Revegetation Grid




Typical Stormwater/ Biobasin Revegetation Grid

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References:
South East Queensland Ecological Restoration Framework (2012)
Guideline for the preparation of a Rehabilitation Plan (GCC)

Amendments:

| Issue | Date | Description | Checked |
|---|---|---|---|
| A | 14/03/2024 | Client Draft | MD |

Project: Wyatt Road, Kagaru

environmental management

Plan of: Wetland Rehabilitation Plan

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|---|---|---|---|
| Date: | 14/03/2024 | Checked: | MD |
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| Drawing No.: | 11560 E 06 WRP A | | |

Wyatt Road, Kagaru

# Wetland Rehabilitation Plan - *Planting Species Schedule*

**FINAL SPECIES PALETTE TO COMPRISE MAXIMUM DIVERSITY OF SPECIES FROM SCHEDULES. TO BE APPROVED BY ENVIRONMENTAL COORDINATOR AND COUNCIL PRIOR TO INSTALLATION.**

## Management Zone 1 – RE 12.3.3 Interface Intensive Planting Area

**Notes:**
1) Setback trees 3 metres minimum from all property boundaries, sewer and service alignments
2) Distribute plants in groups on site in random arrangement - to be confirmed with super intendant on site
3) Plant species according to tolerances and site conditions
4) Plant quantities to be confirmed by rehabilitation supervisor according to site conditions and nursery availability. Unsuitable or unavailable species to be substituted with other species from this schedule.
5) Species consistent with RE technical description.

| SCIENTIFIC NAME | COMMON NAME | PLANT FORM | POT SIZE | PLANTING DENSITY |
|---|---|---|---|---|
| **TREES** | | | | **1 PER 7 m²** |
| *Melaleuca viminalis* | Weeping Bottlebrush | T1 | Tube | - |
| *Eucalyptus tereticornis* | Forest Red Gum | T1 | Tube | - |
| *Eucalyptus crebra* | Narrow-leaved Ironbark | T1 | Tube | - |
| *Eucalyptus moluccana* | Grey Box | T1 | Tube | - |
| *Corymbia clarksoniana* | Grey Bloodwood | T1 | Tube | - |
| *Lophostemon suaveolens* | Swamp Box | T2 | Tube | - |
| *Melaleuca nervosa subsp. nervosa* | Fibrebark | T2 | Tube | - |
| **SHRUBS** | | | | **1 PER 5m²** |
| *Corymbia tessellaris* | Moreton Bay Ash | S | Tube | - |
| *Acacia disparrima subsp. disparrima* | Salwood | S | Tube | - |
| *Angophora subvelutina* | Broad-leaved Apple | S | Tube | - |
| *Jacksonia scoparia* | Dogwood | S | Tube | - |
| *Acacia leiocalyx* | Black Wattle | S | Tube | - |
| **GROUND COVERS** | | | | **3 PER 1 m²** |
| *Schoenoplectus subulatas* | Mangrove Club Rush | G | Tube | - |
| *Eremochloa bimaculata* | Poverty Grass | G | Tube | - |
| *Imperata cylindrica* | Cogongrass | G | Tube | |

## Management Zone 2 – RE 12.3.3 Reconstruction

**Notes:**
1) Setback trees 3 metres minimum from all property boundaries, sewer and service alignments
2) Distribute plants in groups on site in random arrangement - to be confirmed with super intendant on site
3) Plant species according to tolerances and site conditions
4) Plant quantities to be confirmed by rehabilitation supervisor according to site conditions and nursery availability. Unsuitable or unavailable species to be substituted with other species from this schedule.
5) Species consistent with RE technical description.

| SCIENTIFIC NAME | COMMON NAME | PLANT FORM | POT SIZE | PLANTING DENSITY |
|---|---|---|---|---|
| **TREES** | | | | **1 PER 10 m²** |
| *Melaleuca viminalis* | Weeping Bottlebrush | T1 | Tube | - |
| *Eucalyptus tereticornis* | Forest Red Gum | T1 | Tube | - |
| *Eucalyptus crebra* | Narrow-leaved Ironbark | T1 | Tube | - |
| *Eucalyptus moluccana* | Grey Box | T1 | Tube | - |
| *Corymbia clarksoniana* | Grey Bloodwood | T1 | Tube | - |
| *Lophostemon suaveolens* | Swamp Box | T2 | Tube | - |
| *Melaleuca nervosa subsp. nervosa* | Fibrebark | T2 | Tube | - |
| **SHRUBS** | | | | **1 PER 5m²** |
| *Corymbia tessellaris* | Moreton Bay Ash | S | Tube | - |
| *Acacia disparrima subsp. disparrima* | Salwood | S | Tube | - |
| *Angophora subvelutina* | Broad-leaved Apple | S | Tube | - |
| *Jacksonia scoparia* | Dogwood | S | Tube | - |
| *Acacia leiocalyx* | Black Wattle | S | Tube | - |
| **GROUND COVERS** | | | | **1 PER 1 m²** |
| *Schoenoplectus subulatas* | Mangrove Club Rush | G | Tube | - |
| *Eremochloa bimaculata* | Poverty Grass | G | Tube | - |
| *Imperata cylindrica* | Cogongrass | G | Tube | |

## Management Zone 3 – RE 12.3.7 Assisted Natural Regeneration & Management Zone 4 – RE 12.3.7 Reconstruction

**Notes:**
1) Setback trees 3 metres minimum from all property boundaries, sewer and service alignments
2) Distribute plants in groups on site in random arrangement - to be confirmed with super intendant on site
3) Plant species according to tolerances and site conditions
4) Plant quantities to be confirmed by rehabilitation supervisor according to site conditions and nursery availability. Unsuitable or unavailable species to be substituted with other species from this schedule.
5) Species consistent with RE technical description.

| SCIENTIFIC NAME | COMMON NAME | PLANT FORM | POT SIZE | PLANTING DENSITY |
|---|---|---|---|---|
| **TREES** | | | | **1 PER 10m²** |
| *Eucalyptus tereticornis* | Forest Red Gum | T1 | Tube | - |
| *Casuarina cunninghamiana subsp. cunninghamiana* | River Oak | T1 | Tube | - |
| *Lophostemon suaveolens* | Swamp Box | T1 | Tube | - |
| *Corymbia intermedia* | Pink Bloodwood | T2 | Tube | - |
| *Corymbia tessellaris* | Moreton Bay Ash | T2 | Tube | - |
| *Melaleuca bracteata* | Black Tea-tree | T2 | Tube | - |
| **SHRUBS** | | | | **1 PER 5m²** |
| *Acacia disparrima subsp. disparrima* | Southern Salwood | S | Tube | - |
| *Maclura cochinchinensis* | Cockspur Thorn | S | Tube | - |
| *Acacia leiocalyx* | Early-flowering Black Wattle | S | Tube | - |
| *Melaleuca bracteata* | Black Tea-tree | S | Tube | - |
| *Syzygium australe* | Brush Cherry | S | Tube | - |
| **GROUND COVERS** | | | | **1 PER 1 m²** |
| *Lomandra hystrix* | Green Mat-rush | G | Tube | - |
| *Bothriochloa decipiens var. decipiens* | Pitted Bluegrass | G | | - |
| *Oplismenus aemulus* | Creeping Beard Grass | G | Tube | - |
| *Themeda triandr* | Kangaroo Grass | G | Tube | - |

## Management Zone 5 – RE 12.3.8 Wetland Reconstruction

**Notes:**
1) Distribute plants in groups on site in random arrangement - to be confirmed with super intendant on site
2) Plant species according to tolerances and site conditions
3) Plant quantities to be confirmed by rehabilitation supervisor according to site conditions and nursery availability. Unsuitable or unavailable species to be substituted with other species from this schedule.
4) Species consistent with RE details and adapted information from Redland City Council Regional Ecosystem Species Database.

| SCIENTIFIC NAME | COMMON NAME | PLANT FORM | POT SIZE | PLANTING DENSITY |
|---|---|---|---|---|
| **TREES** | | | | **1 PER 100m²** |
| *Melaleuca quinquenervia* | Broad-Leaved Paperbark | T1 | Tube | - |
| **GROUND COVERS** | | | | **1 PER 1 m²** |
| *Cladium procerum* | Leafy Twigrush | G | Tube | - |
| *Cyperus gracilis* | Slender Sedge | G | Tube | - |
| *Cyperus polystachyos* | Bunchy Sedge | G | Tube | - |
| *Eleocharis equisetina* | Spike Rush | G | Tube | - |
| *Eleocharis sphacelata* | Tall Spike Rush | G | Tube | - |
| *Philydrum lanuginosum* | Woolly Frogmouth | G | Tube | - |
| *Schoenoplectus validus* | River Club-Rush | G | Tube | - |
| *Typha domingensis* | Bulrush | G | Tube | - |
| *Nymphoides indica* | Water Snowflake | G | Tube | - |
| *Persicaria attenuata* | Smartweed | G | Tube | - |
| *Persicaria decipiens* | Slender Knotweed | G | Tube | - |
| *Persicaria strigosa* | Prickly Smartweed | G | Tube | - |

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References:
Ryan, T.S. (ed.) (2012) Technical Descriptions of Regional Ecosystems of Southeast Queensland, (Queensland Herbarium, Department of Science, Information Technology, Innovation and the Arts: Brisbane)

Amendments:

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| A | 14/03/2024 | Client Draft | MD |

Project: Wyatt Road, Kagaru

environmental management

Plan of: Wetland Rehabilitation Plan

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|---|---|---|---|
| Date: | 14/03/2024 | Checked: | MD |
| Client Ref: | 11560 | Drawn: | LS |
| Drawing No.: | 11560 E 07 WRP A | | |

Wyatt Road, Kagaru

# Wetland Rehabilitation Plan - *Notes*

## Methodology – Fauna Notes

Consideration for fauna habitat values should be given during rehabilitation site works and should seek to enhance and restore the existing native vegetation areas and promote safe fauna movement throughout the site and into larger greenspace corridors where possible. It is assumed properties adjacent to the rehabilitation scope of works will undertake individual site analysis, fauna investigations, and implement future measures as required.

. The following treatments are intended to enhance fauna habitat values at the rehabilitation area and movement across the site:

- Protection of existing native vegetation and where possible, staged removal of weeds that provide fauna habitat to correspond with growth of native supplementary habitat.
- (If applicable) reuse of fallen hollow logs and site rock from the development area and installation of fauna habitat piles to create fauna safe havens and protection for small fauna.
- Increased plant cover, protection and food resources via assisted natural regeneration and planting of native species

Consideration for bushfire requirements should be reviewed to confirm no conflict in both the fauna and rehabilitation approaches.





## Methodology – Maintenance & Monitoring

***Maintenance***

Maintenance, as with all ecological restoration work, is fundamental in ensuring project success. Maintenance of the planting includes tasks such as:

- Herbicide spraying to control competing weeds.
- Watering while plants are establishing. This is often highly variable and depends on the suite of species planted, weather conditions and time of year when planted. A watering schedule may consist of watering every day for week 1, twice per week for weeks 2-6 and then weekly from weeks 6-12.
- Repair of tree guards if they become damaged.
- Replenishment of mulch.
- Maintaining fauna-friendly and pet exclusion fencing where applicable; and
- Additional planting if required.

Additional planting may be required to replace plants that do not survive (e.g.to meet survival rate requirements, or to fill gaps), but it may also be necessary to introduce new species at different stages of vegetation succession. An adaptive management approach should be utilised, if one plant species repeatedly dies on a site, consider supplementing with a species that is performing well.

Maintenance is required following installation of the plants, although if maintenance is regular and thorough during the first year, maintenance requirements are likely to taper off significantly in the following years. The desired end-product is a fully-functioning system that can support itself in perpetuity, with minimal maintenance and input required.

A minimum two (2) year maintenance period is recommended for this project.

***Benchmark criteria / performance indicators***

The utilisation of benchmark criteria helps to determine rehabilitation success during the maintenance period and assists in prompting when additional maintenance activities are required. Typically accepted benchmarks or performance indicators for dedicated or open space rehabilitation works include:

- Compliance 'On Maintenance' requirements:
  - All required planting completed.
  - 98% plant survival.
  - 100% kill rate of declared environmental weeds.
  - 98% kill rate of other weeds
  - Control measures implemented at all eroded / erosion-prone areas
- Ongoing 'Off Maintenance' requirements:
  - 95% plant survival.
  - Tree guards, stakes and general rubbish removed.
  - No remaining eroded or degraded areas.
  - 100% kill rate of declared environmental weeds.
  - 98% kill rate of other weeds
  - Control measures implemented at all eroded / erosion-prone areas

***Monitoring***

Informal monitoring of rehabilitation works is one method of determining ecological restoration success in conjunction with the adjacent benchmarks. Informal monitoring may occur through ongoing site inspections, completion of record sheets and note taking. Notes to be distributed to the rehabilitation team and rectification works completed against notes.

Photo point monitoring is an effective form of informal monitoring that may be used to support note taking, and may be requested during the approval process by the assessment manager. A permanent or semi-permanent photo point can be set up using a star picket marked with fluorescent yellow safety cap or painted timber stakes, so that a photograph may be taken of the site at regular (quarterly) intervals as it is being restored. A time series of photographs from a degraded state prior to the commencement of restoration, through the transition stages and into the maintenance stage will assist in assessing the success of the ecological restoration process. Collected site data and photos should be compiled in a 'master' monitoring report for proper record keeping.

Monitoring of the weed management and revegetation works allows practitioners to:

- Monitor the rate of assisted regeneration and revegetation of desirable native species promoted in areas where weeds have been removed i.e. number and species of native seedlings established that were not planted on site
- Ensure level of protection for existing identified native vegetation inclusive of that which has naturally regenerated.
- Review the rate of spread or contraction of weed infestation within the weed removal and control program i.e. has weed growth been inhibited by current control program or has it spread to newly disturbed areas?
- Identification of new weed threats or other factors that may be affecting areas designated for rehabilitation i.e. have additional scour locations been identified?
- Review of the benchmark criteria / pre-established performance indicators for measuring the success of the weed removal and control program i.e. has the rate of weed removal on ground reached the benchmark criteria for On or Off Maintenance?

Monitoring timeframes may involve a series of key milestones:

- Prestart Inspection - On site meeting prior to the initial commencement of work. Typically involves Consultant, Contractor and Assessment Manager to work through rehabilitation areas and clarify any adjustments to scope against approved works.
- Compliance Inspections - At the completion of the Primary Site Works, a compliance inspection meeting will be held with the Consultant, Contractor and Assessment Manager to inspect the works on-site in relation to the approved plans and previously agreed benchmarks performance indicators. Should the rehabilitation be a dedicated asset (open space) to the assessment manager, this inspection is commonly referred to as 'on maintenance'. For dedicated assets, a secondary compliance inspection will be required (off maintenance).
- Ongoing Monitoring Inspections- Informal monitoring to occur on a regular basis as highlighted above. These inspections will generally occur throughout the process, specifically before, during and after relevant compliance inspections.

Monitoring during the minimum two (2) year maintenance period will be the responsibility of the proponent and will be undertaken on a bi-annual basis.

***Progress Reporting***

Following implementation of this plan, it is important that the techniques/methods and outcomes from maintenance and monitoring visits are documented and issued to Logan City Council for review and Council records.

Progress reporting will be undertaken by the proponent on a bi-annual basis throughout the minimum two (2) year maintenance period.

***Adaptive management***

Adaptive management is an on-going, systematic approach for improving rehabilitation outcomes by learning from existing management techniques. It is a cyclic process that involves:

1. identification of unsuccessful treatments and new threats during monitoring events
2. investigation of new and alternative treatments
3. implementation of alternative management strategies based on best available knowledge
4. review of new / alternative management strategies during monitoring

Adopting an adaptive approach to rehabilitation works is recommended to achieve benchmark criteria and maximise environmental outcomes for the site.

## Rehabilitation Team Responsibilities

It is critical for all parties to understand their responsibilities as part of the rehabilitation 'team'.

| PARTY | DESCRIPTION |
|---|---|
| **Proponent** | Ensure all consultants, contractors, sub-contractors or others utilizing the area are aware of the Rehabilitation Plan.<br>Appoint appropriate consultants and contractors to undertake works as prescribed on the drawings and conditioned by the Assessment Manager.<br>Provide security via an uncompleted works bond and maintenance bond for the cost of works if required.<br>Cover costs of all resources to ensure works are completed as per approved plans. |
| **Consultants** | Brief proponent on their requirements in implementing and maintaining works as per the Rehabilitation Plan.<br>Attend pre-start and compliance (on and off maintenance) inspections.<br>Undertake monitoring and reporting to the Assessment Manager as per this plan.<br>Be available to respond to technical queries to the approved documentation when on-site conditions require changes.<br>Liaise with the Assessment Manager throughout all stages of approval, initial works and maintenance of works. |
| **Assessment Manager** | Provide technical expertise via commentary on the approval of documentation.<br>Attend pre-start and compliance (on and off maintenance) inspections.<br>Reduce and release securities held against works at the completion of successful milestone inspections.<br>Be available to respond to technical queries to the approved documentation when on-site conditions require changes.<br>Accept and review maintenance reports as dictated (if required in this plan. |
| **Contractor** | Ensuring implementation of works and compliance with this Rehabilitation Plan.<br>Attend pre-start and compliance (on and off maintenance) inspections.<br>Has a minimum Certificate III in Conservation and Land Management, or a Certificate III in Horticulture, or a Certificate III in Rehabilitation Construction, or equivalent experience in rehabilitation.<br>Hold relevant licenses in applicable weed management/ revegetation/ fauna management, any required insurances for scope of works and an understanding of required Laws, Act, Policies and Guidelines.<br>Recommend changes to the documentation when specific experience or on-site conditions require so. |

| COLOUR KEY TO WORK ITEMS |
|---|
| Weed Management |
| Soil Preparation and Mulching |
| Planting Works |
| Watering, Monitoring and Reporting |

**INDICATIVE MAINTENANCE SCHEDULE OF WORK ITEMS AND SEQUENCING (NOTE: SCHEDULE IS SUBJECT TO CHANGE BASED ON ON-GROUND REQUIREMENTS AND MUST MEET THE REQUIREMENTS ON THE REHABILITATION CONDITION OF THE DEVELOPMENT APPROVAL )**

| TIMING | SPRING | | | | SUMMER | | | AUTUMN | | | WINTER | | | SPRING | | | SUMMER | | | AUTUMN | | | WINTER | | | SPRING | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PRIMARY WORKS | | | | FOLLOW-UP WORKS | | | FOLLOW-UP / MAINTENANCE WORKS | | | MAINTENANCE WORKS | | | MAINTENANCE WORKS | | | MAINTENANCE WORKS | | | MAINTENANCE WORKS | | | MAINTENANCE WORKS | | | MAINTENANCE WORKS | | | |
| | Month 1 | Month 2 | Month 3 | | Month 1 | Month 2 | Month 3 | Month 1 | Month 2 | Month 3 | Month 1 | Month 2 | Month 3 | Month 1 | Month 2 | Month 3 | Month 1 | Month 2 | Month 3 | Month 1 | Month 2 | Month 3 | Month 1 | Month 2 | Month 3 | Month 1 | Month 2 | Month 3 | |
| WEEK 1 | Pre-start meeting Council, Contractor and Superintendent | Establish photo points if required. Weed management - "knockdown spray" | Mulch spreading and Jute-mat installation | MILESTONE: COMPLIANCE / "ON MAINTENANCE" | Watering and Monitoring and reporting (throughout establishment). Photo monitoring as required | Watering and Monitoring and reporting (throughout establishment). Photo monitoring as required | Watering and Monitoring and reporting (throughout establishment). Photo monitoring as required | Watering to replacement plants only. | Watering to replacement plants only. | Monitoring and reporting. Photo monitoring as required | watering to replacement plants only. | | Monitoring and reporting. Photo monitoring as required. | Watering to replacement plants only | | Monitoring and reporting. Photo monitoring as required. | Watering to replacement plants only | | Monitoring and reporting. Photo monitoring as required. | Watering to replacement plants only | | Monitoring and reporting. Photo monitoring as required. | Watering to replacement plants only | | Monitoring and reporting. Photo monitoring as required. | Mulch - top up depths to 100mm and replace / repair Jutematting as required | Watering to replacement plants only | Monitoring and reporting. Photo monitoring as required. | MILESTONE: COMPLIANCE / "OFF MAINTENANCE" |
| WEEK 2 | Initial weed management works - wood weed removal /"knockdown" spray | Soil Preparation and cultivation | Natural regeneration plants staking for identification | | Weed management - "knockdown spray" in mulched areas | Weed management - "knockdown spray" re-apply woody weeds | Weed management - "knockdown spray" in mulched areas | Weed management - rotation "knockdown spray" in mulched areas | Weed management - rotation "knockdown spray" in mulched areas | Weed management - rotation "knockdown spray" in mulched areas | Weed management - rotation "knockdown spray" in mulched areas | | Weed management - rotation "knockdown spray" in mulched areas | Weed management - rotation "knockdown spray" in mulched areas | | Weed management - rotation "knockdown spray" in mulched areas | Weed management - rotation "knockdown spray" in mulched areas | | Weed management - rotation "knockdown spray" in mulched areas | Weed management - rotation "knockdown spray" in mulched areas | | Weed management - rotation "knockdown spray" in mulched areas | Weed management - rotation "knockdown spray" in mulched areas | | Weed management - rotation "knockdown spray" in mulched areas | Natural regeneration plants - weed management | Weed management - "knockdown spray" re-apply woody weeds | Weed management - "knockdown spray" in mulched areas | |
| WEEK 3 | Weed management works - removal by hand | Soil Preparation and modification | Planting and Watering | | Natural regeneration plants - weed management | Replacement of Failed Plants | Replacement of Failed Plants | Natural regeneration plants - weed management | Natural regeneration plants - weed management | Replacement of Failed Plants | Natural regeneration plants - weed management | | Trees formative pruning | | | Replacement of Failed Plants | | | | | | Natural regeneration plants - weed management | | Trees formative pruning | | | | Trees formative pruning | Replacement of Failed Plants | Natural regeneration plants - weed management | |
| WEEK 4 | Weed Management - slashing of maintenance access paths | Mulch - stockpiled on site | Planting and Watering | | Weed Management - slashing of maintenance access paths | Weed Management - slashing of maintenance access paths | Weed Management - slashing of maintenance access paths | Weed Management - slashing of maintenance access paths | Weed Management - slashing of maintenance access paths | Weed Management - slashing of maintenance access paths | Weed Management - slashing of maintenance access paths | | Weed Management - slashing of maintenance access paths | Weed Management - slashing of maintenance access paths | | Weed Management - slashing of maintenance access paths | Weed Management - slashing of maintenance access paths | | Weed Management - slashing of maintenance access paths | Weed Management - slashing of maintenance access paths | | Weed Management - slashing of maintenance access paths | Weed Management - slashing of maintenance access paths | | Weed Management - slashing of maintenance access paths | Replacement of Failed Plants | Weed Management - slashing of maintenance access paths | Weed Management - slashing of maintenance access paths | |

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CONFIRM ALL DIMENSIONS ON SITE PRIOR TO CONSTRUCTION AND DO NOT SCALE FROM THE DRAWINGS. ALL DIMENSIONS ARE IN MILLIMETRES. ANY DISCREPANCIES SHOULD BE CLARIFIED IN WRITING WITH SAUNDERS HAVILL GROUP PRIOR TO THE COMMENCEMENT OF WORK.

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References:

South East Queensland Ecological Restoration Framework (2012)

Guideline for the preparation of a Rehabilitation Plan (GCC)

Keeping Dead Wood and Creating Wildlife Habitat Piles:
Some Guidance for Forest owners
https://www.nrrg.org/habitat-piles/

Amendments:

| Issue | Date | Description | Checked |
|---|---|---|---|
| A | 14/03/2024 | Client Draft | MD |

Project: Wyatt Road, Kagaru

environmental management

Plan of: Wetland Rehabilitation Plan

| | | | |
|---|---|---|---|
| Date: | 14/03/2024 | Checked: | MD |
| Client Ref: | 11560 | Drawn: | LS |
| Drawing No.: | 11560 E 08 WRP A | | |

Wyatt Road, Kagaru

# Wetland Rehabilitation Plan - *Weed Treatment and Removal (1)*

## Queensland Herbarium Invasive Naturalised Plants In South East Queensland

| Rk | Family | Scientific and common names | Sr | R | S | LFS | Non-Chemical Control | Chemical Control |
|---|---|---|---|---|---|---|---|---|
| 1 | Mimosaceae | Acacia boliviana (Bolivian wattle) | 1 | 1 | 4 | T/O | Mechanical or chain removal. | Herbicides must be applied by appropriately qualified / supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority (APVMA) issued off-label permit where applicable. Refer to South East Queensland Ecological Restoration Framework for additional guidance. |
| 2 | Mimosaceae | Acacia farnesiana (mimosa bush) | 6 | 15 | 3 | T/A | Mechanical removal of small plants. | |
| 3 | Mimosaceae | Acacia nilotica subsp. indica (prickly acacia) | 3 | 3 | 4.4 | T/A | Mechanical or chain removal. | |
| 4 | Cactaceae | Acanthocereus tetragonus (sword pear) | 1 | 1 | 3 | S/O | Biological controls available: cactoblastis cactorum successful. Mechanical control difficult. Fire can be used. | |
| 5 | Polygonaceae | Acetosa sagittata (rambling dock) | 4 | 18 | 4 | V/U | Tubers: Dig up, bag and remove. | |
| 6 | Agavaceae | Agave americana (century plant) | 4 | 9 | 4 | S/OA | Dig out by hand or machine | |
| 7 | Agavaceae | Agave sisalana (sisal) | 2 | 4 | 4 | S/OA | Dig out by hand or machine | |
| 8 | Agavaceae | Agave vivipara var. vivipara (sisal) | 2 | 3 | 4 | S/OA | Dig out by hand or machine | |
| 9 | Asteraceae | Ageratina adenophora (crofton weed) | 6 | 38 | 5 | H/O | Hand pull and hang to dry. | |
| 10 | Asteraceae | Ageratina riparia (mistflower) | 5 | 38 | 5 | H/O | Hand pull and hang to dry. | |
| 11 | Asteraceae | Ageratum houstonianum (blue billygoat weed) | 8 | 81 | 4 | H/UO | N/A | |
| 12 | Simaroubaceae | Ailanthus altissima (tree of heaven) | 1 | 3 | 4 | T/O | Seedlings: Hand pull | |
| 13 | Amaranthaceae | Alternanthera philoxeroides (alligator weed) | 1 | 3 | 5 | Ha/U | Physical removal of plant should not be attempted | |
| 14 | Poaceae | Andropogon virginicus (whisky grass) | 6 | 14 | 4 | H/A | Hand pull or dig out small infestations. | |
| 15 | Basellaceae | Anredera cordifolia (madeira vine) | 8 | 16 | 5 | V/O | Small Vines & Tubers: Hand pull. Bag and dispose. | |
| 16 | Asclepiadaceae | Araujia sericifera (mothvine) | 9 | 38 | 4 | V/O | Seedlings & Vines: Hand pull. Bag and remove fruit. | |
| 17 | Aristolochiaceae | Aristolochia elegans (Dutchman's pipe) | 8 | 30 | 4 | V/O | Stems: Hand pull; Fruit: Bag and remove. | |
| 18 | Poaceae | Arundo donax (giant reed) | 1 | 4 | 4 | H/O | Physical removal of small infestations. | |
| 19 | Asclepiadaceae | Asclepias curassavica (red cotton bush) | 9 | 43 | 3 | S/O | Hand pull; Slash | |
| 20 | Asparagaceae | Asparagus aethiopicus cv. Sprengeri (asparagus ground fern) | 5 | 35 | 5 | H/O | Dig out unwanted plants and dispose of at the appropriate council landfill. Remove the entire crown of underground stem of plant to prevent regrowth | |
| 21 | Asparagaceae | Asparagus africanus (ornamental asparagus, asparagus fern) | 7 | 26 | 5 | V/O | Dig out roots and dispose of at local council landfill site. Remove entire crown and underground stem to prevent regrowth | |
| 22 | Asparagaceae | Asparagus plumosus (asparagus fern) | 4 | 8 | 4 | V/O | Rhizomes: crown and hang to dry. | |
| 23 | Poaceae | Axonopus compressus ( broad leaved carpet grass) | 5 | 23 | 4 | H/AO | Cut stems from roos. | |
| 24 | Asteraceae | Baccharis halimifolia (groundsel bush) | 10 | 168 | 5 | S/O | Seedlings: Hand pull | |
| 25 | Asteraceae | Bidens pilosa (cobbler's pegs) | 10 | 110 | 4 | H/U | Hand pull or cultivation. | |
| 26 | Poaceae | Brachiaria decumbens (signal grass) | 4 | 14 | 4 | H/A | Grazing | |
| 27 | Poaceae | Brachiaria mutica (para grass) | 6 | 18 | 4 | Ha/A | Grazing | |
| 28 | Crassulaceae | Bryophyllum daigremontianum x B. delagoense (hybrid mother-of millions) | 6 | 15 | 5 | H/O | Hand pull and dispose | Herbicides must be applied by appropriately qualified / supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority (APVMA) issued off-label permit where applicable. Refer to South East Queensland Ecological Restoration Framework for additional guidance. |
| 29 | Crassulaceae | Bryophyllum delagoense (mother of millions) | 8 | 38 | 5 | H/O | Hand pull and dispose | |
| 30 | Crassulaceae | Bryophyllum pinnatum (resurrection plant) | 6 | 17 | 4 | H/O | Hand pull and dispose | |
| 31 | Buddlejaceae | Buddleja madagascariensis (buddleja) | 5 | 6 | 3 | S,V/O | N/A | |
| 32 | Cabombaceae | Cabomba caroliniana (cabomba, fanwort) | 4 | 12 | 5 | Ha/F | Mechanical removal of small infestations | |
| 33 | Caesalpiniaceae | Caesalpinia decapetala (thorny poinciana) | 4 | 20 | 4 | S,V/O | Seed-heads: Bag and remove. | |
| 34 | Brassicaceae | Cakile edentula (American sea rocket) | 4 | 24 | 4 | H/U | Manually grub and destroy. | |
| 35 | Commelinaceae | Callisia fragrans (purple succulent) | 3 | 9 | 4 | H/O | N/A | |
| 36 | Cannaceae | Canna indica (canna lily) | 3 | 9 | 3 | H/O | Dig out entire plant | |
| 37 | Sapindaceae | Cardiospermum grandiflorum (balloon vine) | 7 | 31 | 4 | V/O | Seedlings & Small Vines: Hand Pull | |
| 38 | Apocynaceae | Cascabela thevetia (syn. Thevetia peruviana) (yellow oleander) | 5 | 9 | 3 | ST/O | Hand pull small infesttions. Slashing can be used but should be followed up by herbicide application. | |
| 39 | Apocynaceae | Catharanthus roseus (pink periwinkle) | 5 | 22 | 4 | S/O | Hand pull | |
| 40 | Ulmaceae | Celtis sinensis (Chinese celtis) | 8 | 19 | 5 | T/O | Remove when small. Hand pull or dig out small seedlings. Combine dozing, burning and controlled grazing for large infestations | |
| 41 | Poaceae | Cenchrus ciliaris (buffel grass) | 4 | 15 | 4 | H/A | Hand or mechanical removal of young plants | |
| 42 | Poaceae | Cenchrus echinatus (Mossman river grass) | 8 | 43 | 3 | H/A | Hand or mechanical removal of young plants | |
| 43 | Solanaceae | Cestrum parqui (green cestrum) | 6 | 36 | 4 | S/O | Seedlings: Hand pull | |
| 44 | Caesalpiniaceae | Chamaecrista rotundifolia (round-leaf cassia) | 6 | 14 | 3 | ST/A | Seedlings: Hand pull | |
| 45 | Poaceae | Chloris gayana (Rhodes grass) | 9 | 55 | 4 | H/A | Hand pulling and removal and digging of larger clumps | |
| 46 | Asteraceae | Chrysanthemoides monilifera subsp. rotundata (bitou bush) | 3 | 23 | 5 | S/OA | N/A | |
| 47 | Lauraceae | Cinnamomum camphora (camphor laurel) | 7 | 25 | 5 | T/O | Seedlings: Hand pull | |
| 48 | Rubiaceae | Coffea arabica (coffee) | 3 | 7 | 3 | ST/A | Saplings: Hand pull | |
| 49 | Arecaceae | Colocasia esculenta (taro) | 3 | 4 | 3 | H/AO | Hand pull. | |
| 50 | Commelinaceae | Commelina benghalensis (hairy wandering jew) | 4 | 7 | 4 | H/O | Collect and Bag | |
| 51 | Asteraceae | Conyza bonariensis (flax-leaf fleabane) | 7 | 38 | 3 | H/U | Hand or mechanical removal of small infestations | |
| 54 | Poaceae | Cortaderia selloana (pampas grass) | 2 | 1 | 4 | H/O | Small Plants: dig out by hand or machine | |
| 55 | Asclepiadaceae | Cryptostegia grandiflora (rubber vine) | 6 | 19 | 4 | V/O | Scattered or medium-density infestations: Where possible, repeated slashing close to ground level is recommended. | |
| 56 | Poaceae | Cynodon dactylon (couch, Bahama grass introduced cultivars) | 10 | 45 | 4 | H/OA | Hand pull small infestations, removing all roots or smother with mulch. | |
| 57 | Cyperaceae | Cyperus brevifolius (Mullumbimby couch) | 8 | 53 | 3 | H/O | Each has to be dug out with a spade and the entire plant turned over, exposing the root system while making sure all aerial parts of the plant are completely covered. | Herbicides must be applied by appropriately qualified / supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority (APVMA) issued off-label permit where applicable. Refer to South East Queensland Ecological Restoration Framework for additional guidance. |
| 58 | Cyperaceae | Cyperus involucratus (African sedge) | 6 | 15 | 4 | Ha/OF | Each has to be dug out with a spade and the entire plant turned over, exposing the root system while making sure all aerial parts of the plant are completely covered. | |
| 59 | Fabaceae | Desmodium intortum (greenleaf desmodium) | 4 | 11 | 3 | H/A | Hand pull or crown and dispose | |
| 60 | Fabaceae | Desmodium uncinatum (silverleaf desmodium) | 5 | 14 | 4 | H/A | Hand pull or crown and dispose | |
| 61 | Poaceae | Digitaria didactyla (Queensland blue couch) | 9 | 70 | 4 | H/A | Hand pull or cultivation | |
| 62 | Poaceae | Digitaria eriantha (pangola grass) | 5 | 20 | 3 | H/A | Hand pull or cultivation | |
| 63 | Verbenaceae | Duranta erecta (duranta) | 6 | 14 | 4 | ST/O | Shrubs: CS&P (1:1.5) | |
| 64 | Poaceae | Echinochloa colona (awnless barnyard grass) | 9 | 44 | 3 | H/A | Hand or mechanical removal of small infestations | |
| 65 | Poaceae | Echinochloa crus-galli (barnyard grass) | 6 | 34 | 4 | H/A | Hand pull or dig out small infestations. | |
| 66 | Hydrocharitacea e | Egeria densa (egeria waterweed) | 2 | 7 | 4 | Ha/F | Hand pulling, cutting and digging with machines effective | |
| 67 | Pontederiaceae | Eichhornia crassipes (water hyacinth) | 4 | 8 | 5 | Ha/OF | Mechanical removal of small infestations | |
| 68 | Poaceae | Eleusine indica (crowsfoot grass) | 8 | 55 | 4 | H/A | Pull and chip. Replant with native couch. | |
| 69 | Poaceae | Eragrostis curvula (African lovegrass) | 7 | 29 | 4 | H/U | Chipped out before they flower. When chipping out the plant ensure that the tussock crowns are removed, as this will prevent regrowth. If in seed, the stems must be cut and bagged first. | |
| 70 | Rosaceae | Eriobotrya japonica (loquat) | 3 | 5 | 3 | T/O | Seedlings: Hand pull | |
| 71 | Fabaceae | Erythrina crista-galli (cockspur coral tree) | 2 | 4 | 4 | T/O | N/A | |
| 72 | Myrtaceae | Eugenia uniflora (Brazilian cherry) | 4 | 19 | 4 | ST/O | N/A | |
| 73 | Euphorbiaceae | Euphorbia cyathophora (painted spuge) | 8 | 20 | 3 | H/O | Hand pull | |
| 74 | Euphorbiaceae | Euphorbia heterophylla (milk weed) | 5 | 12 | 3 | H/O? | Hand pull | |
| 75 | Agavaceae | Furcraea foetida (Cuban hemp) | 3 | 4 | 4.3 | S/OA | Dig out by hand or machine | |
| 76 | Agavaceae | Furcraea selloa (hemp) | 1 | 2 | 4 | S/OA | Dig out by hand or machine | |
| 77 | Caesalpiniaceae | Gleditsia triacanthos (honey locust) | 7 | 12 | 4 | T/O | For the control of dense infestations on grazing land, burning followed by spot spraying is an economical control method. | |
| 78 | Colchicaceae | Gloriosa superba (glory lily) | 3 | 26 | 4 | V/O | N/A | |
| 79 | Asclepiadaceae | Gomphocarpus physocarpus (balloon cotton bush) | 10 | 132 | 4 | S/OU | Slash in winter and burn cuttings. Wanderer Butterfly can also be used as biological control. | |

**= Weed species recorded within development area and may be present on site**

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Project: Wyatt Road, Kagaru

environmental management

Plan of: Wetland Rehabilitation Plan

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|---|---|---|---|
| Date: | 14/03/2024 | Checked: | MD |
| Client Ref: | 11560 | Drawn: | LS |
| Drawing No.: | 11560 E A01 WRP A | | |

Wyatt Road, Kagaru

# Wetland Rehabilitation Plan - *Weed Treatment and Removal (2)*

## Queensland Herbarium Invasive Naturalised Plants In South East Queensland

| Rk | Family | Scientific and common names | Sr | R | S | LFS | Non-Chemical Control | Chemical Control |
|---|---|---|---|---|---|---|---|---|
| 80 | Asteraceae | Gymnocoronis spilanthoides (Senegal tea) | 3 | 4 | 5 | Ha/F | Place plant material in a sealed plastic bag, leave in sunlight to rot then burn or dispose of at a council-approved land fill tip | Herbicides must be applied by appropriately qualified / supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority (APVMA) issued off-label permit where applicable. Refer to South East Queensland Ecological Restoration Framework for additional guidance. |
| 81 | Cactaceae | Harrisia martinii (harrisia cactus) | 2 | 4 | 4 | S/O | The use of the biological mealy-bug agent is recommended | |
| 82 | Zingiberaceae | Hedychium coronarium (wild ginger) | 2 | 2 | 4 | H/O | Small Plants: Hand pull and dispose | |
| 83 | Zingiberaceae | Hedychium gardnerianum (ginger lily) | 1 | 3 | 4 | H/O | Small Plants: Hand pull and dispose | |
| 84 | Malpighiaceae | Hiptage benghalensis (hiptage) | 3 | 5 | 4 | S,V/O | Hand pull small infestations. | |
| 85 | Acanthaceae | Hygrophila costata (Glush weed) | 3 | 7 | 5 | Ha/F | Hand pull smal infestations. Can be controlled by planting competitive native species. | |
| 86 | Poaceae | Hymenachne amplexicaulis cv. Olive (hymenachne) | 1 | 1 | 4 | Ha/A | A combined approach of different control methods including mechanical, chemical and biological with land management practices is most effective | |
| 87 | Acanthaceae | Hypoestes phyllostachya (polka-dot plant | 3 | 5 | 4 | H/O | Hand pull or crown and dispose | |
| 88 | Balsaminaceae | Impatiens walleriana (balsam) | 2 | 6 | 4 | H/O | N/A | |
| 89 | Convolvulaceae | Ipomoea cairica (mile-a-minute) | 7 | 56 | 4 | V/O | Vines & Runners: hand pull, roll up and hand up to dry. | |
| 90 | Convolvulaceae | Ipomoea indica (blue morning glory) | 5 | 24 | 4 | V/O | Vines and Runners: hand pull, roll up and hang to dry. | |
| 91 | Bignoniaceae | Jacaranda mimosifolia (jacaranda) | 4 | 12 | 3 | T/O | Seedlings: Hand pull | |
| 92 | Euphorbiaceae | Jatropha gossypiifolia (cotton-leaf physic nut, bellyache bush) | 1 | 1 | 4 | S/O | Hand pull | |
| 93 | Juncaceae | Juncus articulatus (jointed rush) | 1 | 2 | 4 | Ha/FO | Hand pull. | |
| 94 | Acanthaceae | Justicia betonica (squirreltail) | 2 | 4 | 4 | S/O | Hand pull smal infestations. Can be controlled by planting competitive native species. | |
| 95 | Sapindaceae | Koelreuteria elegans (Chinese rain tree) | 1 | 1 | 3.6 | T/O | Seedlings: Hand pull | |
| 96 | Verbenaceae | Lantana camara var. camara (lantana) | 10 | 455 | 5 | S/O | Seedlings: Hand pull | |
| 97 | Verbenaceae | Lantana montevidensis (creeping lantana) | 8 | 62 | 5 | S/O | Fire and/or mechanical control | |
| 98 | Mimosaceae | Leucaena leucocephala (leucaena) | 6 | 14 | 4 | ST/A | Small plants: Hand pull or mechanical removal | |
| 99 | Oleaceae | Ligustrum lucidum (tree privet) | 5 | 9 | 5 | T/O | Seedlings: Hand pull | |
| 100 | Oleaceae | Ligustrum sinense (Chinese privet) | 4 | 11 | 5 | T/O | Seedlings: Hand pull | |
| 101 | Liliaceae | Lilium formosanum (Taiwan lily) | 5 | 10 | 4 | H/O | Hand pull or crown and dispose | |
| 102 | Caprifoliaceae | Lonicera japonica (Japanese honeysuckle) | 3 | 6 | 4 | V/O | Vines and Runners: hand pull, roll up and hang to dry. | |
| 103 | Solanaceae | Lycium ferocissimum (African boxthorn) | 1 | 5 | 4.4 | S/O | N/A | |
| 104 | Bignoniaceae | Macfadyena unguis-cati (cat's claw creeper) | 5 | 36 | 5 | V/O | Tubers: crown or dig up, bag and remove. | Herbicides must be applied by appropriately qualified / supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority (APVMA) issued off-label permit where applicable. Refer to South East Queensland Ecological Restoration Framework for additional guidance. |
| 105 | Fabaceae | Macroptilium atropurpureum (siratro) | 8 | 39 | 4 | V/A | N/A | |
| 106 | Fabaceae | Macrotyloma axillare (perennial horse gram) | 4 | 12 | 3 | V,H/A | N/A | |
| 107 | Poaceae | Melinis minutiflora (molasses grass) | 5 | 17 | 5 | H/A | Grazing or mowing | |
| 108 | Poaceae | Melinis repens (red Natal grass) | 10 | 134 | 4 | H/A | Grazing or mowing | |
| 109 | Mimosaceae | Mimosa pudica (common sensitive plant) | 4 | 12 | 4 | S/A | N/A | |
| 110 | Moraceae | Morus alba (white mulberry) | 3 | 10 | 3 | T/O | N/A | |
| 111 | Rutaceae | Murraya paniculata cv. Exotica (murraya) | 6 | 26 | 4 | S/O | Seedlings: Hand pull | |
| 112 | Haloragaceae | Myriophyllum aquaticum (parrot's feather) | 3 | 15 | 4 | Ha/F | N/A | |
| 113 | Brassicaceae | Nasturtium officinale (Qld use Rorippa nasturtium-aquaticum) (watercress) | 7 | 19 | 4 | Ha/FU | Manually grub and destroy. | |
| 114 | Fabaceae | Neonotonia wightii (glycine) | 5 | 16 | 5 | H/A | N/A | |
| 115 | Nymphaeaceae | Nymphaea caerulea subsp. zanzibarensis (blue lotus) | 4 | 17 | 4 | Ha/OF | Hand pull small infestations. | |
| 116 | Nymphaeaceae | Nymphaea mexicana (yellow waterlily) | 2 | 4 | 4 | Ha/OF | Hand pull small infestations. | |
| 117 | Ochnaceae | Ochna serrulata (ochna) | 7 | 33 | 5 | S/O | N/A | |
| 118 | Onagraceae | Oenothera drummondii subsp. drummondii (beach evening primrose) | 3 | 17 | 4 | H/O | Hand pull | |
| 119 | Oleaceae | Olea europaea (olive) | 2 | 6 | 4 | T/A | Seedlings: Hand pull | |
| 120 | Cactaceae | Opuntia aurantiaca (tiger pear) | 1 | 2 | 4 | S/O | Biological controls available: cactoblastis cactorum successful. Mechanical control difficult. Fire can be used. | |
| 121 | Cactaceae | Opuntia imbricata (rope pear) | 1 | 1 | 4 | H/O | Biological controls available: cactoblastis cactorum successful. Mechanical control difficult. Fire can be used. | |
| 122 | Cactaceae | Opuntia monacantha (drooping tree pear, syn. O. vulgaris) | 2 | 3 | 4 | S/O | Biological controls available: cactoblastis cactorum successful. Mechanical control difficult. Fire can be used. | |
| 123 | Cactaceae | Opuntia stricta (common prickly pear) | 7 | 67 | 4 | S/O | Biological controls available: cactoblastis cactorum successful. Mechanical control difficult. Fire can be used. | |
| 124 | Cactaceae | Opuntia tomentosa (velvet tree pear) | 8 | 46 | 4 | S/O | Biological controls available: cactoblastis cactorum successful. Mechanical control difficult. Fire can be used. | |
| 125 | Poaceae | Panicum maximum (green panic and guinea grass) | 8 | 78 | 5 | H/A | Hand or mechanical removal of small infestations | |
| 126 | Asteraceae | Parthenium hysterophorus (parthenium weed) | 6 | 14 | 4 | H/U | Hand pulling of small areas is not recommended | Herbicides must be applied by appropriately qualified / supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority (APVMA) issued off-label permit where applicable. Refer to South East Queensland Ecological Restoration Framework for additional guidance. |
| 127 | Poaceae | Paspalum conjugatum (paspalum grass) | 7 | 38 | 4 | H/A | Cut below crown. | |
| 128 | Poaceae | Paspalum dilatatum (paspalum grass) | 10 | 30 | 4 | H/A | Hand pull or dig up | |
| 129 | Poaceae | Paspalum mandiocanum (broad leaf paspalum) | 3 | 6 | 4 | H/A | N/A | |
| 130 | Poaceae | Paspalum notatum (bahia grass) | 4 | 10 | 4 | H/A | Hand pull or dig up | |
| 131 | Passifloraceae | Passiflora edulis (passion fruit) | 6 | 12 | 3 | V/AO | Hand Pull | |
| 132 | Passifloraceae | Passiflora foetida (stinking passion flower) | 7 | 50 | 4 | V/O | Hand Pull | |
| 133 | Passifloraceae | Passiflora suberosa (cork passionflower) | 8 | 166 | 4 | V/O | N/A | |
| 134 | Passifloraceae | Passiflora subpeltata (white passion flower) | 10 | 60 | 4 | V/O | Stems: Hand pull | |
| 135 | Scrophulariaceae | Paulownia tomentosa (paulownia) | 3 | 5 | 4 | T/AO | Seedlings: Hand pull | |
| 136 | Poaceae | Pennisetum alopecuroides (swamp foxtail) | 7 | 29 | 4 | H/O | Hand Pull | |
| 137 | Poaceae | Pennisetum clandestinum (kikuyu grass) | 4 | 12 | 4 | H/A | Hand Pull | |
| 138 | Poaceae | Pennisetum purpureum (elephant grass) | 2 | 9 | 4 | H/O | Grazing or mechanical removal | |
| 139 | Poaceae | Pennisetum setaceum (fountain grass) | 3 | 11 | 3 | H/O | Hand Pull | |
| 140 | Verbenaceae | Phyla canescens (lippia, Condamine couch) | 3 | 4 | 4 | Ha/O | A combined approach of different control methods including chemical and mechanical with land management practices is most effective | |
| 141 | Poaceae | Phyllostachys aurea (fishpole bamboo) | 1 | 2 | 4 | S/O | N/A | |
| 142 | Phytolaccaceae | Phytolacca octandra (inkweed) | 10 | 50 | 3 | H/O | Hand pull or crown | |
| 143 | Pinaceae | Pinus elliottii (slash pine) | 4 | 22 | 4 | T/A | Seedlings: Hand pull; Saplings and Trees: cut close to ground or ring-bark | |
| 144 | Araceae | Pistia stratiotes (water lettuce) | 3 | 8 | 4 | Ha/OF | Mechanical removal of small infestations | |
| 145 | Mimosaceae | Prosopis pallida (algaroba) | 2 | 2 | 4 | ST/O | When using mechanical control methods, it is important to remove the bud zone of the root system (about 30 cm below the ground surface). If this is not removed, re-shooting can occur. | |
| 146 | Rosaceae | Prunus munsoniana (wild goose plum) | 7 | 31 | 4 | ST/A | Seedlings: Hand pull | |
| 147 | Myrtaceae | Psidium guajava and P. guineense (yellow guava and West Indes guava) | 4 | 7 | 4 | ST/AO | N/A | |
| 148 | Fabaceae | Pueraria lobata (kudzu) | 3 | 4 | 4 | V,S/O | Slash; Diminish by shading site | |
| 149 | Bignoniaceae | Pyrostegia venusta (flame vine) | 1 | 1 | 4 | V/O | N/A | |
| 150 | Rosaceae | Rhaphiolepis indica (Indian hawthorn) | 3 | 10 | 4 | ST/O | Seedlings: Hand pull | |

**● = Weed species recorded within development area and may be present on site**

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Client: WelCo Group Pty Ltd

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References: Queensland Herbarium Invasive Naturalised Plants in South East Queensland

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| A | 14/03/2024 | Client Draft | MD |

Project: Wyatt Road, Kagaru

environmental management

Plan of: Wetland Rehabilitation Plan

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| Drawing No.: | 11560 E A02 WRP A | | |

Wyatt Road, Kagaru

# Wetland Rehabilitation Plan - *Weed Treatment and Removal (3)*

## Queensland Herbarium Invasive Naturalised Plants In South East Queensland

| Rk | Family | Scientific and common names | Sr | R | S | LFS | Non-Chemical Control | Chemical Control |
|---|---|---|---|---|---|---|---|---|
| 150 | Rosaceae | Rhaphiolepis indica (Indian hawthorn) | 3 | 10 | 4 | ST/O | Seedlings: Hand pull | Herbicides must be applied by appropriately qualified / supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority (APVMA) issued off-label permit where applicable. Refer to South East Queensland Ecological Restoration Framework for additional guidance |
| 151 | Euphorbiaceae | Ricinus communis (castor oil plant) | 7 | 20 | 4 | S/O | Seedlings: Hand pull | |
| 152 | Phytolaccaceae | Rivina humilis (baby pepper) | 8 | 61 | 4 | H/O | Hand pull and hang to dry. | |
| 153 | Rosaceae | Rubus bellobatus (kittatinny blackberry) | 5 | 22 | 4 | S/O | Slashing hinders growth, giving some control if plants are slashed before they seed | |
| 154 | Rosaceae | Rubus discolor (R. fruticosus complex, a blakberry) | 4 | 10 | 4 | S/OA | Slashing hinders growth, giving some control if plants are slashed before they seed | |
| 155 | Rosaceae | Rubus ellipticus (yellowberry) | 4 | 26 | 4 | S/O | Slashing hinders growth, giving some control if plants are slashed before they seed | |
| 156 | Acanthaceae | Ruellia malacosperma (ruellia) | 5 | 16 | 4 | H/O | N/A | |
| 157 | Ruppiaceae | Ruppia maritima (sea tassel) | 2 | 8 | 4 | Ha/F | Hand pull or dig up | |
| 158 | Alismataceae | Sagittaria graminea var. platyphylla (sagittaria arrowhead) | 3 | 7 | 4 | Ha/FO | Physical removal of small infestations. | |
| 159 | Lamiaceae | Salvia coccinea (red salvia) | 9 | 46 | 4 | H/O | remove small areas by hand or machine | |
| 160 | Salviniaceae | Salvinia molesta (salvinia) | 8 | 57 | 5 | Ha/F | Mechanical removal of small infestations; Salvinia weevil (Biological control) | |
| 161 | Caprifoliaceae | Sambucus canadensis (American elder) | 3 | 7 | 3 | ST/O | Vines and Runners: hand pull, roll up and hang to dry. | |
| 162 | Dracaenaceae | Sansevieria trifasciata (sansevieria) | 2 | 7 | 3 | H/O | Hand pull or dig up | |
| 163 | Anacardiaceae | Schinus terebinthifolius (broad-leaf pepper tree) | 6 | 49 | 5 | T/O | Seedlings: Hand pull | |
| 164 | Asteraceae | Senecio madagascariensis (fire weed) | 6 | 28 | 4 | H/U | Vines: Hand pull and remove; Runners: Roll up and hang to dry. | |
| 165 | Asteraceae | Senecio tamoides (Canary creeper) | 3 | 8 | 4 | V/O | Vines: Hand pull and remove; Runners: Roll up and hang to dry. | |
| 166 | Caesalpiniaceae | Senna pendula var. glabrata (Easter cassia) | 7 | 33 | 4 | ST/O | Seedlings: Hand pull | |
| 167 | Caesalpiniaceae | Senna septemtrionalis (arsenic bush, was S. floribunda) | 6 | 25 | 4 | S/O | Seedlings: Hand pull | |
| 168 | Poaceae | Setaria palmifolia (palm leaf setaria) | 5 | 13 | 3 | H/O | Hand pull or dig up | |
| 169 | Poaceae | Setaria sphacelata (South African pigeon grass) | 9 | 41 | 4 | H/A | Hand pull or dig up | |
| 170 | Malvaceae | Sida rhombifolia (Paddy`s lucerne) | 9 | 69 | 4 | S/U | Hand pull or dig out. | |
| 171 | Asteraceae | Sigesbeckia orientalis (Indian weed) | 10 | 148 | 4 | H/U | Hand pull or cultivation. | |
| 172 | Solanaceae | Solanum erianthum (a tobacco bush) | 7 | 19 | 3 | S/O | Hand pull | |
| 173 | Solanaceae | Solanum hispidum (giant devil's fig) | 5 | 23 | 4 | S/O | Hand pull | |
| 174 | Solanaceae | Solanum mauritianum (wild tobacco tree) | 8 | 30 | 4 | S/O | Seedlings: Hand pull | |
| 175 | Solanaceae | Solanum seaforthianum (Brazilian nightshade) | 8 | 78 | 4 | V/O | Hand pull | |
| 176 | Solanaceae | Solanum torvum (devil's fig) | 6 | 39 | 4 | S/O | Seedlings: Hand pull | |
| 177 | Asteraceae | Solidago canadensis var. scabra (Canadian goldenrod) | 7 | 15 | 4 | H/O | Hand pull and hang to dry. | |
| 178 | Bignoniaceae | Spathodea campanulata (African tulip tree) | 1 | 1 | 3 | T/O | N/A | |
| 179 | Asteraceae | Sphagneticola trilobata (Singapore daisy) | 6 | 34 | 5 | H/O | Hand pull | |
| 180 | Poaceae | Sporobolus africanus (Parramatta grass) | 8 | 48 | 5 | H/U | Hand or mechanical removal of small infestations | |
| 181 | Poaceae | Sporobolus fertilis (giant Parramatta grass) | 9 | 27 | 5 | H/U | Hand or mechanical removal of small infestations | |
| 182 | Poaceae | Sporobolus pyramidalis and S. natalensis (giant rat's tail grasses) | 8 | 72 | 5 | H/U? | Hand or mechanical removal of small infestations | |
| 183 | Poaceae | Stenotaphrum secundatum (buffalo grass) | 3 | 23 | 3 | H/AO | Hand or mechanical removal of small infestations | |
| 184 | Fabaceae | Stylosanthes scabra (shrubby stylo) | 4 | 4 | 4.3 | H/A | N/A | |
| 185 | Arecaceae | Syagrus romanzoffiana (queen palm) | 4 | 10 | 4 | T/O | Seedlings: Hand pull or crown; Trees: cut below growing point | |
| 186 | Asteraceae | Tagetes minuta (stinking roger) | 8 | 32 | 3 | H/U | Hand pull and hang to dry. | |
| 187 | Bignoniaceae | Tecoma capensis (Cape honeysuckle) | 3 | 8 | 4 | ST/O | N/A | |
| 188 | Bignoniaceae | Tecoma stans (yellow bells) | 4 | 16 | 4 | ST/O | N/A | |
| 189 | Poaceae | Themeda quadrivalvis (grader grass) | 8 | 25 | 4 | H/A | Hand pull or dig out small infestations. | |
| 190 | Acanthaceae | Thunbergia alata (black eyed susan) | 5 | 22 | 4 | H/O | N/A | |
| 191 | Acanthaceae | Thunbergia grandiflora (thunbergia, blue thunbergia) | 2 | 3 | 5 | V/O | N/A | |
| 192 | Acanthaceae | Thunbergia laurifolia (laurel clock vine) | 1 | 1 | 4 | V/O | N/A | |
| 193 | Fabaceae | Tipuana tipu (tipuana) | 2 | 5 | 3 | T/O | Seedlings: Hand pull | |
| 194 | Asteraceae | Tithonia diversifolia (Mexican sunflower) | 5 | 11 | 4 | H/O | N/A | |
| 195 | Commelinaceae | Tradescantia fluminensis (Qld use T. albiflora) (wandering jew) | 5 | 9 | 4 | H/O | N/A | |
| 196 | Commelinaceae | Tradescantia zebrina (zebrina) | 3 | 12 | 4 | H/O | N/A | |
| 197 | Tiliaceae | Triumfetta rhomboidea (Chinese burr) | 7 | 44 | 4 | H/U | Hand pull | |
| 198 | Asteraceae | Verbesina encelioides (crownbeard) | 7 | 34 | 4 | H/U | Vines: Hand pull and remove; Runners: Roll up and hang to dry. | |
| 199 | Iridaceae | Watsonia meriana var. bulbillifera (bulbil watsonia) | 2 | 3 | 3 | H/O | Dig up, bag and remove | |
| 200 | Asteraceae | Zinnia peruviana (wild zinnia) | 6 | 33 | 3 | H/O | Seedlings: Hand pull | |

**Explanatory notes.**

Sub-region (Sr): Number of the ten sub-regions of the Southeast Queensland bioregion (Young and Dillewaard 1999) within which species recorded (Queensland Herbarium data).
Rec no. (R): Total number of records for species within study area, Queensland Herbarium CORVEG and HERBRECS data.
Scores (S): Based on panel data of invasiveness, 5 (highest) to 3 (moderate). ? indicate doubtful scores.

Life forms (LFS): T-tree (woody plant >5m), ST-small tree (2-5m), S-shrub (woody <2m), H-herb (grasses & forbes), Ha-aquatic herbs.
Source: A-agriculture, O-ornamental and landscaping, F-fish aquarium, U-unintentional introduction and/or contaminant.

**Abbreviations: Control Methods**

**CS&P** = cut scrape and paint

**S&P** = scrape and paint

**C&P** = cut and paint

**F/I** = frill or inject stem

**Abbreviations: Herbicides**

**G** = Glyphosate, eg. Roundup Biactive, Weedmaster Duo

**MM** = Metsulfuron methyl, eg, Brushoff

**F** = Fluroxypyr, eg. Starane

**Abbreviations: Herbicide Dilution Rates for High Concentration Applications**

**GU** = Glyphosate undiluted

**G1** = 1 part water to 1 part glyhphosate

**G1.5** = 1.5 parts water to 1 part glyphosate

**G4** = 4 parts water to 1 part glyphosate

**Abbreviations: Herbicide Spray Concentrations**

**G100** = 100mL glyphosate per 10L of water + surfuctant, eg 20mL LI 700 per 10L
**G200** = 200mL glyphosate per 10L of water + surfuctant, eg 50mL LI 700 per 10L

**G100 + MM** = 100mL glyphosate + 1.5g metsulfuron methyl per 10L of water + wetting agent, eg. 2mL Agral per 10L water
**G200 + MM** = 200mL glyphosate + 1.5g metsulfuron methyl per 10L of water + wetting agent, eg. 2mL Agral per 10L water

**MM** = 1.5g metsulfuron methyl per 10L water + wetting agent, eg. 2mL Agral per 10L water

**F100** = 100mL fluroxypyr per 10L water

**F150** = 150mL fluroxypyr per 10L water

**Other Abbreviations**

# = Locally non-indigenous native species


*Ref. 1.* Big Scrub Rainforest Landcare Group (2008), 'Common Weeds of Subtropical Rainforests of Eastern Australia: A practical manual on their identification and control'

*Ref. 2.* Department of Primary Industries and Fisheries (QLD), 'Weeds and pest animals and ants'.

*Ref. 3.* Holland et al. (1996), 'Suburban Weeds', DPI QLD.

*Ref 4.* Port Stephens Council (NSW), 'Weed Busters'.
*Ref 5.* Department of Primary Industries (NSW), 'Noxious and Environmental Weed Handbook, 3rd Edition'.

*Ref 6.* Department of Environment and Conservation, 'Florabase', (DEC- WA)

*Ref 7.* Vitelli, J.S. and Madigan, B.A. and Van Haaren, P.E. and Setter, S. and Logan, P. (2009) Control of the invasive liana, Hiptage benghalensis. Weed Biology and Management, 9 (1). pp. 54-62.


**= Weed species recorded within development area and may be present on site**


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