APPENDIX B

Environmental Study

Caboolture West Environmental Study

Findings and Recommendations

Revision 4
August 2013

For Moreton Bay Regional Council

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1 INTRODUCTION

1.1 Project Background

Moreton Bay Regional Council ("Council") is working towards the preparation of a broad land use plan and infrastructure strategy for the Caboolture West area ("Study Area"). The broad land use plan and infrastructure strategy will in turn inform the new MBRC Planning Scheme.

Covering approximately 6,413 hectares of land, the area is recognised as an Identified Growth Area for long-term residential and employment growth in the Moreton Bay region. On 17 February 2012, the State Government declared the Study Area as a Master Planned Area under the provisions of the *Sustainable Planning Act 2009*. Master planned areas are typically greenfield sites which are to transition from rural, non-urban land to urban land. In some cases, the area may require additional detailed planning in order to facilitate future development (DSDIP, 2012).

The following considerations listed in the declaration apply to this Environmental Study:

- Planning for and management of protected areas and wildlife and its habitat (including koalas) as provided for under the *Nature Conservation Act 1992;*
- Planning for and the management of water quality and the protection of water environmental values as provided for under State Planning Policy 4/10 Healthy Waters;
- Planning for and management of vegetation under the Vegetation Management Act 1999; and
- The structure plan is to ensure that koala populations are maintained and enhanced within the declared master planned area and in the wider landscape, as required by State Planning Policy 2/10 Koala Conservation in South East Queensland.

Some of the key outcomes Council is seeking to achieve in the process of planning for the future development of this area include:

- delivery of sustainable solutions;
- resolution of conflicts about land use, infrastructure and the environment through the strategy rather than during the development assessment process;
- use of place types in the concept design process as the basis for determining the structure of the area;
- a land use and infrastructure plan that provides clear guidance and certainty to the preparation of local and neighbourhood plan stages and subsequent development applications;
- application of best practice urban green infrastructure, and water sensitive urban design; and

- implementation measures that provide for efficient, affordable and cost effective provision of infrastructure.

SMEC has been specifically engaged to assist with the preparation of the broad land use plan and infrastructure strategy, by undertaking an environmental study for the Caboolture West area. This includes:

1. An on-ground koala population assessment, including the location of breeding female colonies.

2. A flora and fauna habitat assessment with attention to threatened species and Council's Priority Species of The Moreton Bay Region.

3. Based on findings of 1) and 2), ground-truthing and verification of the State Government's and Council's current environmental values mapping.

4. Identification and nomination of key and additional corridor/linkages, further to current environmental values mapping with attention to appropriately securing and developing koala and other wildlife movement corridors, in particular to increase the viability of koala populations in the Caboolture West area.

5. Ground-truthing and determination of land that is potentially suitable for receiving offsets that will contribute to the viability of koala and/or other priority species populations. Identified areas could be suitable for either revegetation or protection of existing values based on environmental values.

6. Recommendations to Council to determine the constraint level of the ground-truthed and verified environmental values, and any additional identified corridor/linkages.

This Findings and Recommendations Report will:

- Review relevant environmental legislation that might impact on the project;
- Identify and assess the environmental values within the Study Area;
- Verify existing ecological data;
- Identify and nominate corridors and linkages; and
- Provide environmental recommendations for the future planning of the Caboolture West Area.

1.2 Description Of The Study Area

The master planned area declaration covers approximately 6,413 hectares of land immediately north-west of Caboolture and Morayfield, and currently contains 1085 parcels of land. The area is bound to the north by the D'Aguilar Highway and Caboolture River Road to the south (**Figure 1**). Caboolture West is recognised as an Identified Growth Area, which may accommodate significant growth in the Moreton Bay region in the long-term. This area will incorporate a range of activities through residential and employment growth in the Moreton Bay Region.

The land use in the area is currently a mixture of agriculture, rural residential/lifestyle acreages and small pockets of residential development centred around the village of Wamuran. Historically the area been used for broader scale agriculture (grazing, Dairy farming) and forestry. In more recent times intensive cropping (pineapples) and horticultural activities have become more widespread.

1.3 Abbreviations and Common Terms

- DBH – Diameter at Breast Height
- DEHP – Department of Environment and Heritage Protection (Qld)
- EEC – Endangered Ecological Community
- EPBC Act – *Environmental Protection and Biodiversity Conservation Act 1999*
- Koala SPP 2/10 - Koala State Planning Policy 2/10
- MBRC – Moreton Bay Regional Council
- MNES – Matters of National Environmental Significance under the *EPBC Act*
- NC Act - *Nature Conservation Act 1992*
- RE – Regional Ecosystem as defined under the *Vegetation Management Act 1999*
- SEQ – South East Queensland
- SEWPaC – Department of Sustainability, Environment, Water, Population and Communities (Cmlth)

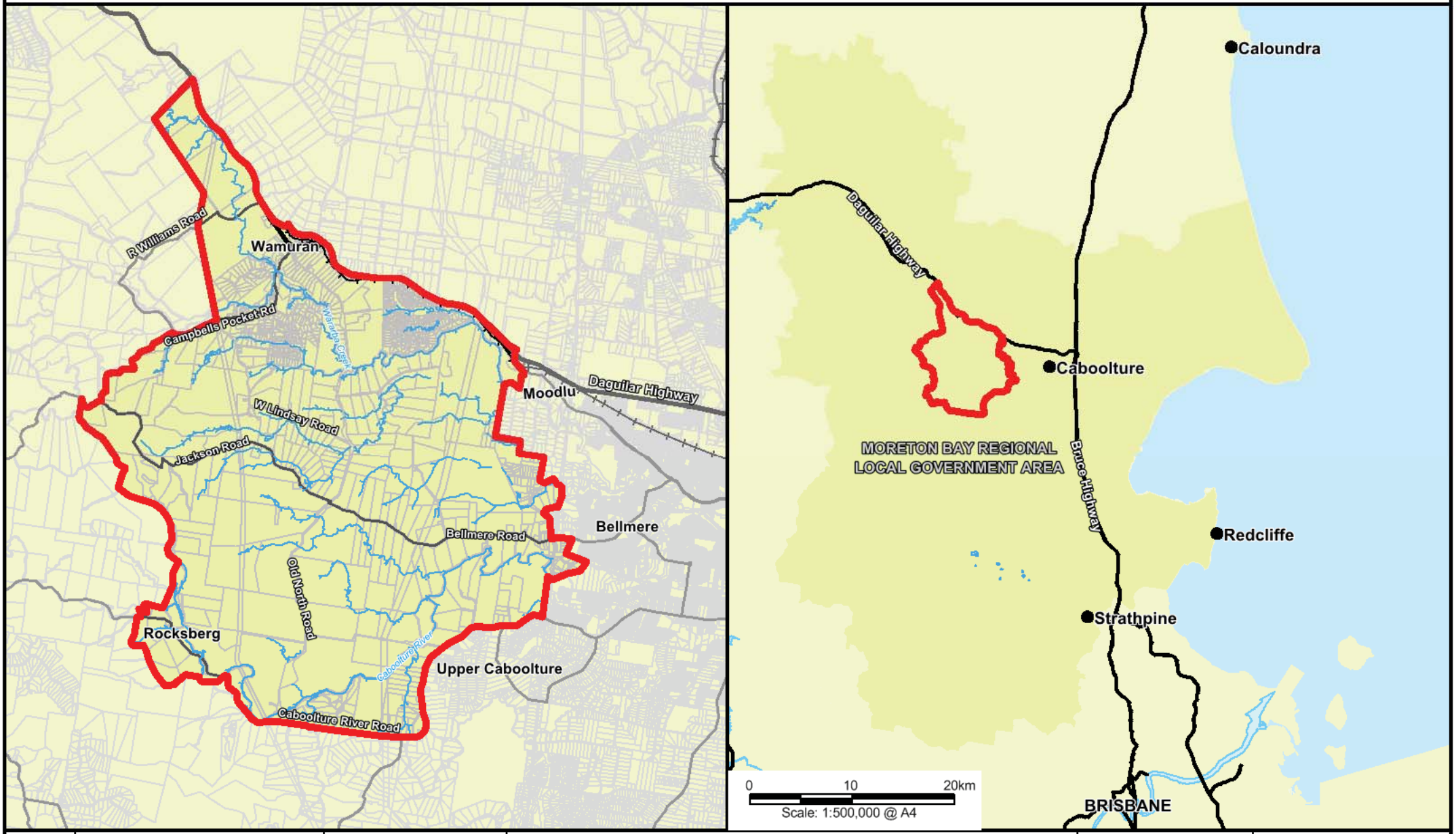
1.4 Context of this Study

This study represents one component of a range of natural resources, land use and infrastructure delivery related information which has been gathered by council, specialist consultants and State Government agencies.

The information and recommendations provided by this study will be used to inform the wider planning study. Whilst this environmental study represents a significant component of that planning study, the ultimate result of the planning study will take consideration of a wide range of sometimes conflicting findings from the full range of information available.

As such the findings of this study should be viewed as representing another layer of information used to help shape the ultimate planning study and not as a series of inflexible constraints.

Figure 1: Caboolture West Study Area Locality Map



N

SCALE 0 1.5 3km
Scale: 1:100,000 @ A4

COORDINATE SYSTEM
GDA 1994 MGA Zone 56

FIGURE 1 - Locality
REVISION 0
STATUS FINAL
CREATED BY AM11482
DATE 22/08/2013
ISSUED FOR INFORMATION

SOURCE The State of Queensland (Department of Environment and Resource Management), Copyright 2012)
PATH G:\Common Resources\Design Resources\Design aids\GIS DATA\West Caboolture\West Caboolture.wor

PROJECT NO. 30031051
PROJECT TITLE Caboolture West Environmental Study

CLIENT Moreton Bay Regional Council

CONSULTANT SMEC Australia

2 ENVIRONMENTAL PLANNING AND POLICY CONTEXT

2.1 Federal

Environmental Protection and Biodiversity Conservation Act (EPBC) 1999

The EPBC Act provides for environmental regulation of development at a Commonwealth level. Any proposed action that has, will have or is likely to have a significant impact on a Matter of National Environmental Significance, or another matter specified under the Act, may be considered a "controlled action" and must be the subject of a referral to the Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) for their approval.

Matters of National Environmental Significance to which the EPBC Act applies include:

- world heritage sites
- national heritage places
- wetlands of international importance (often called 'Ramsar' wetlands after the international treaty under which such wetlands are listed)
- nationally threatened species and ecological communities
- migratory species
- Commonwealth marine areas
- the Great Barrier Reef Marine Park
- nuclear actions.

On 2nd May 2012, Koala populations in Queensland were listed as Vulnerable under the *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act). Referral to the Commonwealth Government is required if an action is likely to have a significant impact on an important koala population.

2.2 State

2.2.1 Koala

South East Queensland Koala Conservation State Planning Regulatory Provisions (SPRP)

The *South East Queensland Koala Conservation State Planning Regulatory Provisions 2010* (SPRP) in association with the *Koala State Planning Policy 2/10* (SPP 2/10) are planning tools used to regulate assessable development under the *Sustainable Planning Act 2009* (SPA), and target areas where koalas are known to be under the most significant risks.

The SPRP prohibits the clearing of bushland in koala priority areas in and outside of the urban footprint (as defined in the SEQ Regional Plan) with a view to bolster habitat for at risk populations.

SPRP Koala Habitat Values maps depict areas with koala habitat occurring within assessable development areas, as defined under the SPRP. These maps also show land potentially suitable for offsets, that is, land which has a high to medium potential for rehabilitation.

The SPRP mapping triggers the requirement for all development activities to minimise impact upon koalas. Depending upon the development type and the mapped koala habitat type, such requirements may include:

- Avoiding, minimising or offsetting the clearing of non-juvenile koala habitat trees;
- Site design that provides safe koala movement opportunities appropriate to the development type and habitat connectivity values of the site;
- Construction phases that do not increase the risk of death or injury to koalas;
- Clearing of native vegetation, undertaken as sequential clearing; and
- Clearing of koala habitat trees, undertaken in the presence of a koala spotter.

Note: No areas of the Caboolture West Planning area are covered under the SPRP.

State Planning Policy 2/10 Koala Conservation in South East Queensland

The Koala SPP 2/10 complements the Koala SPRP by informing future Government planning, such as planning scheme amendments, and land-use planning decisions through structure plans, local area plans, master plans, community infrastructure designations, and biodiversity development offset areas.

The SPP 2/10 applies to the seven eastern local government areas of South-east Queensland: Sunshine Coast Regional Council, Moreton Bay Regional Council, Brisbane City Council, Redland City Council, Ipswich City Council, Logan City Council and Gold Coast City Council, which collectively form the South-east Queensland Koala Protection Area (SEQKPA).

The intent of the Koala SPP 2/10 is to ensure that koala habitat conservation is taken into account in planning process, contributing to a net increase in koala habitat and assisting the long term retention of viable koala populations in SEQ. Planning decisions made in the SEQKPA must include strategies and measures to respond to potential conflicts between achieving koala conservation objectives and development.

Section 3.3 of the SPP states: “A local planning instrument, structure plan or an amendment to a planning scheme made under the SPA must include planning strategies and measures aimed at minimising the impacts of new development on koalas and koala habitat.”

The Koala SPP 2/10 will soon be superseded by the State Planning Policy, which is currently under review in draft form (August, 2013). This policy is detailed below.

Draft State Planning Policy (Draft SPP)

The Koala SPP 2/10 is one of thirteen State Planning Policies developed under the *Integrated Planning Act 1997 and* current under the *Sustainable Planning Act 2009.* The Draft State Planning Policy (draft SPP, April 2013), a single state planning policy to replace the multiple policies in existence, is currently being developed.

The draft SPP identifies the state's interests in planning and development and how these are to be dealt with in planning instruments, council development assessment processes and in designating land for community infrastructure.

In making or amending a local planning instrument, local governments will be required to have regard to 6 listed principles in their decision making to inform the preparation of the local planning instrument:

1. Support the efficient approval of appropriate development;
2. Facilitate effective delivery of sustainable planning outcomes;
3. **Protect and enhance Queensland's natural and built environments and places;**
4. Maximise transparency and accountability of planning instruments and decisions;
5. Enable positive responses to change, challenges and opportunities; and
6. Consider infrastructure needs required to support development.

With regards to Environment and Heritage, a local planning instrument is to reflect the SPP for this state interest by:

1. reflecting an appropriate consideration of:
    a. matters of national environmental significance;
    b. matters of state environmental significance;
    c. strategic offset areas;
2. facilitating the protection of matters of national and state environmental significance by:
    a. protecting species and species habitat, ecosystems and ecosystem services and other natural values, to the greatest extent practicable;
    b. maintaining or enhancing ecological connectivity;
    c. avoiding establishing urban areas or other development (unless there is no feasible alternative location) that may:
        i. significantly and adversely affect matters of national or state environmental significance, or
        ii. prevent strategic offset areas from being secured, and
    d. including planning measures that require development to avoid significant and adverse environmental impacts, or where this cannot be reasonably achieved, impacts are minimised and residual impacts offset.

Offsets for Net Gain of Koala Habitat in South East Queensland Policy

Where necessary, the draft SPP is supported by guidance material to assist in the implementation of the state's interests, including the Offsets for Net Gain of Koala Habitat in South East Queensland Policy. This policy is to be applied when determining Koala habitat offsets for a local planning instrument within the South East Queensland Koala Protection Area (KPA) to achieve a net increase in bushland Koala habitat within the planning area. The Caboolture West Study Area is within the KPA.

The policy requires an offset to contribute the equivalent of five new koala habitat trees for every non-juvenile koala habitat tree removed (i.e. 5:1 offset ratio). The koala offset site must be in an area identified as high value or medium value suitable for rehabilitation habitat. Where an area of high value or medium value suitable for rehabilitation habitat is not available within the area required by provisions below, koala offset sites should be located within low value suitable for rehabilitation habitat, or where appropriate, within bushland habitat to enhance the quality of bushland within the local government area.

The Queensland Government is currently preparing mapping of strategic offset areas as part of its current revision of the Queensland Government Environmental Offsets Policy. The new policy will replace issue specific biodiversity offset policies that are presently applied (including koalas in SEQ).

2.2.2 *Vegetation Management Act (VMA) 1999*

The *Vegetation Management Act 1999* (VMA) is the state-wide law regulating the clearing of native vegetation in Queensland. It is administered by the Department of Environment and Heritage Protection (DEHP), and applies on all land tenures – private (freehold) land as well as leasehold and unallocated State land.

The VMA regulates the clearing of vegetation in a way that conserves remnant vegetation mapped as containing an Endangered, Of Concern or Least Concern regional ecosystem (RE) and High Value Regrowth[1] vegetation. Clearing permits are required under this legislation to remove any remnant vegetation mapped in the study area.

RE mapping is also used to determine where essential habitat is likely to occur based on vegetation that is consistent with habitat for endangered, vulnerable and rare fauna. Essential habitat mapping for the koala identifies additional values, and may represent more 'critical' koala habitat areas.

2.2.3 *Nature Conservation Act (NC Act) 1994*

The objective of the *Nature Conservation Act 1992* ("*NC Act*") and associated *Nature Conservation (Wildlife) Regulation 1994* is to conserve nature. Nature under the Act refers to ecosystems including their constituent parts and processes.

The *Nature Conservation (Wildlife) Regulation 2006* identifies native wildlife as extinct in the wild, endangered, vulnerable, near threatened and least concern and states the declared management intent for each of the classes of wildlife. All of these categories are considered "protected" under the legislation and clearing of "protected" species is regulated by the Act.

All Australian native plants in Queensland are protected under the *NC Act* and associated subordinate legislation, the *Nature Conservation (Protected Plants) Conservation Plan 2000.* This Plan forms a key part of the framework through which DEHP regulates the

[1] At the time of writing amendments to the VMA (Vegetation Management Framework Amendment Bill, 2013) have been approved and will result in the removal of high value regrowth vegetation regulations from freehold and indigenous land. Regrowth vegetation regulations will remain in place for leasehold land used for agriculture and grazing and for watercourses in in priority reef catchments.

taking and use of protected plants, including the clearing of protected plants for development purposes.

2.2.4 *South East Queensland Regional Plan 2009-2031*

The study area is located outside the Urban Footprint under the South East Qld Regional Plan 2009-2031. The SE Qld Regional Plan contains broad policy guidelines in regard to Biodiversity and Koala Conservation. It also draws on the mapping of the "Areas of Ecological Significance" mapping discussed below.

Areas of Ecological Significance

DEHP provides areas of ecological significance mapping, based on areas of state biodiversity significance and spatial data associated with relevant legislation. This mapping is used to support land-use planning and development assessment purposes and feeds into local planning instruments and other documents.

2.3 Local

Caboolture Planning Scheme

The Caboolture Planning Scheme (2005) is applicable to the study area. The planning scheme includes numerous environmental and ecological themes, presented as a series of codes and overlay maps. These cover areas such as Nature Conservation, Koala Conservation and Catchment Protection.

Environmental Corridors

Environmental corridors have been broadly mapped within the investigation area as part of ongoing planning studies, but additional work being undertaken via this study and other internal MBRC studies to find critical movement linkages (existing and to build). Preliminary waterway and ecological corridors mapping have been undertaken to facilitate the early stages of the Caboolture West planning study and these have been integrated into the analysis of this investigation.

Priority Species

MBRC has identified a number of priority fauna and flora which are either present or likely to occur in the MBRC local government area. Species identified include those listed under the NC and EPBC Acts and other, non-threatened species recognised by MBRC as having local and/or regional significance. These latter species are often recognised as a key indicator in the management of particular ecosystems.

3 STUDY METHODOLOGY

3.1 Desktop Analysis

Prior to the commencement of field investigations, the following documents, maps and databases were reviewed to assess the existing recognised ecological values of the study area:

- Caboolture Shire Plan 2005;
- Regional Ecosystem and High Value Regrowth mapping for the area;
- DEHP Wildlife Online database to determine the records of threatened species under the *NC Act 1992*, a 10km search area based on the centre of the Study Area was used;
- SEWPaC Protected Matters Search Tool to determine species listed as Matters of National Environmental Significance (MNES) under the *EPBC Act 1999* that are predicted to occur in the study area, a 10km search area based on the centre of the Study Area was used;
- DEHP South East Queensland Koala Conservation State Planning Policy (SPP) 2/10: Koala Conservation in South East Queensland koala habitat values maps;
- DEHP Areas of Ecological Significance Mapping; and
- Various MBRC spatial data including mapping of:
    - Caboolture Shire Plan Overlays;
    - Koala sightings;
    - Landforms; and
    - Lowland Rainforest.

3.2 Field Survey

Field surveys were conducted by SMEC between March and May 2013 to verify the results of the desktop assessment and existing mapping. Detailed surveys for species such as Koala were conducted during this period.

3.2.1 Koala Activity Assessment

A survey of Koala presence and activity, utilising the Spot Assessment Technique (Phillips and Callaghan 2011) was conducted within the Study Area. This study assessed existing Koala habitat mapping under the Koala SPP (2/10) as well as the intent of the Interim Referral Advice for the Koala under the EPBC Act.

The Koala Spot Assessment Technique (SAT) is a point-based tree sampling method that uses the presence/absence of Koala faecal pellets around the base of trees to derive a measure of Koala activity. A 500m x 500m regularised grid was overlaid on the West Caboolture Study Area. Access permitting, a Koala SAT was undertaken at each grid intersection falling within Koala Bushland Habitat (as shown in **Appendix A**), as mapped

by DEHP under the State Planning Policy (SPP) 2/10. In order to establish a meaningful confidence interval for the level of Koala activity at each SAT site, thirty (30) trees were sampled. The following methodology from Phillips and Callaghan (2011) was adopted:

1. Locate and mark with flagging tape one tree (the focal tree) that meets one or more of the following selection criteria:
    a. A tree of any species[2], beneath which, one or more Koala faecal pellets has been observed;
    b. A tree in which a Koala has been observed; and/or
    c. Any other tree known to be potentially important for the Koala (e.g. recognized koala food trees).
2. Identify and uniquely mark the 29 nearest koala habitat trees to this tree;
3. Undertake a search for Koala faecal pellets beneath each of the 30 marked trees, based on a cursory inspection of the undisturbed ground surface within a distance of 100 centimetres around the base of each tree, followed (if no faecal pellets are initially detected) by a more thorough inspection involving disturbance of the leaf litter and ground cover within the prescribed search area.

Each selected tree was identified to species level and its diameter at breast height (DBH) and height (m) estimated. Consistent with SPP 2/10, only trees greater than 10cm DBH or 4m in height were selected. The location of each focal tree was recorded with a GPS.

A maximum of two person-minutes per tree was dedicated to the faecal pellet search. The search concluded either once a faecal pellet had been found or when the two person-minutes had expired. A brief search was also made of each tree to determine the presence or absence of Koalas.

3.2.2 Threatened and Priority Species Habitat Assessment

At each Koala SAT site a habitat assessment was undertaken, enabling variation in habitat quality to be systematically described across the Study Area. Habitat assessments were also conducted in non-Koala habitat (e.g. rainforest) areas to fully document the range of habitats available. Whilst some of these additional assessments were conducted on private property, others were generally conducted at accessible sites, such as bridges and roadsides.

The habitat assessments were undertaken by randomly locating a 25 x 25m quadrat at each site. Within this quadrat the floristic and structural characteristics of the site (e.g. dominant species, number, height and cover of each strata) were described. The particular aim was to describe the types and abundances of resources known to be important to priority species. This included habitat features such as fruit and nectar-producing trees, mistletoes, tree hollows and nests, termitaria, fallen logs, decorticating bark, leaf litter development and surface water features. The disturbance history and age structure of each site were also recorded. These data was recorded systematically on a standard pro forma. (**Appendix B – Habitat Assessment field data sheet**). The duration

[2] Not just Koala food/habitat trees were observed, as per the Koala SPOT Assessment Technique (Phillips & Callaghan 2011)

of each habitat assessment varied depending on the complexity of the site, but was generally between 15 and 30 minutes per site.

The habitat requirements of priority species were determined from published accounts (e.g. field guides and scientific publications), essential habitat mapping, wildlife online database results and expert opinion based on extensive field experience. The habitat requirements of each priority species was then assessed against the availability of broad habitat types (determined from RE mapping and ground-truthing), habitat structure (e.g. density of understorey) and the key habitat features described above. Based on this assessment, species were assigned to one of five classes to indicate their probability of occurrence within the Study Area:

- Nil. It was possible to rule out species for which no habitat was clearly present (e.g. species dependent on coastal wallum (e.g. acid frogs), intertidal habitat (e.g. *Lilaeopsis brisbanica*), species requiring high elevation moist forest (e.g. Pouched Frog *Assa darlingtoni*, Fleay's Barred Frog *Mixophyes fleayi*), marine habitat (e.g. Albatross species)).

- Low. Some species had only a limited amount of suitable habitat available and were clearly restricted by the presence or absence of key habitat features. These species may be present in small parts of the Study Area and, therefore, cannot be definitively ruled out (e.g. the Elf Skink *Eroticoscincus graciloides* is limited by broad habitat type (moist forests) and the habitat features deep leaf litter and fallen logs; Sooty Owl *Tyto tenebricosa* is likely to be limited by the availability of large, deep gullies).

- Moderate. Species for which the broad habitat type was available, but were likely to be limited by the presence of a particular habitat features (e.g. hollow-bearing trees). These species are likely to be patchily distributed in the Study Area (e.g. Squirrel Glider *Petaurus norfolcensis*).

- High. Species for which both the broad habitat type and key habitat features were present were assigned a high probability of occurring in the Study Area (e.g. the Grey-headed Flying-fox *Pteropus poliocephalus* is a highly mobile nectarivore and there are a number of good nectar-producing trees in the Study Area, such as Forest Red Gum *Eucalyptus tereticornis* and Northern Grey Ironbark *E. siderophloia*).

- Occasional. Some species would definitely use the Study Area as suitable habitat is present, but on a seasonal or intermittent basis depending on resource availability (e.g. Little Red Flying-fox *Pteropus scapuatus*) or flooding (e.g. Black-necked Stork *Ephippiorhynchus asiaticus*).

3.2.3 Verification of Regional Ecosystem Mapping

At each Koala SAT site where the vegetation was mapped as remnant, verification of the Regional Ecosystem (RE) mapping (including mapped boundaries) was conducted. Thus, the tree species present, the landform and underlying geology were used to accept or reject the existing mapping. In the latter case, the appropriate RE was determined from the field data. RE assessments were also conducted in non-Koala habitat (e.g. rainforest) areas to fully document the mapped vegetation in the Study Area. These additional assessments were generally conducted at accessible sites, such as bridges and roadsides.

3.3 Data Analysis

3.3.1 Koala SPP 2/10 Verification

The Koala activity level at each SPOT assessment site was expressed as a percentage of the 30 trees where at least one Koala faecal pellet was detected. This enables Koala activity levels to be classified as low, medium or high based on activity thresholds given by Phillips and Callaghan (2011) in reference to an east coast high density population. A high density population was considered appropriate as the south-east Queensland region is generally regarded as supporting significant Koala populations (e,g. Dique *et al.* 2004). Areas of habitat that evidence medium to high activity infer sedentary ranging patterns, whereas low activity areas often indicate more transitory habitat utilisation (see discussion in Section 6.1.3). Therefore, areas of medium to high activity are considered likely to indicate core breeding areas where male/female home-ranges overlap and low activity habitat is assumed to indicate movement areas or little used parts of the home-range (Phillips and Callaghan 2011).

The Koala State Planning Provisions (2/10) Koala Habitat Mapping was then verified, using the data collected at each Koala SAT site and aerial imagery analysis. The mapped categories of low, medium and high value bushland were tested against the Koala activity levels established in the field survey to determine whether there was correspondence between the two approaches. The field work revealed that some areas mapped as Koala bushland habitat did not currently support Koala habitat (see Section 4.1) and could probably be more correctly identified as Koala rehabilitation areas. Subsequently aerial imagery interpretation was used to determine the extent of such non-bushland areas and to locate any additional mapped bushland areas where Koala habitat does not presently occur.

3.3.2 Habitat for Priority Species

The results of each habitat assessment were extrapolated to areas of similar mapped vegetation in the vicinity of the assessment site. This information was then used, in conjunction with RE mapping and essential habitat maps to produce potential habitat maps of priority species likely to occur in the Study Area.

The characteristics used to create potential habitat maps for each priority species included:

- Regional Ecosystem and Essential Habitat mapping
- Landform (i.e. floodplain, rises, low hills, north and south facing hills and mountains)
- Waterway stream order
- Dams
- Vegetative cover

Buffers were applied to some of these datasets dependent on the likely habitat for each species. For example, the scale used in the RE mapping (1:100,000) is not detailed enough to capture narrow strips of rainforest growing along steep gullies in Eucalypt forest. Such areas are, therefore, mapped as blended REs with a proportion assigned to

each type. Accordingly, in the case of species that occur along streams in closed forest a 30 m buffer was applied to creek lines within mixed REs (e.g. 12.11.3/12.11.10) to capture the likely extent of the rainforest. However, buffers were not applied to reduce edge effects of surrounding land uses on the habitat because the detailed response to edges of many species is poorly known. The data prioritisation spreadsheet for each priority species is included in **Appendix C**.

3.3.3 Vegetation Mapping Verification

The results of the Regional Ecosystem verification surveys were inputted into GIS to spatially show mapping errors. This data was then extrapolated to areas of similar mapped vegetation using high resolution aerial imagery to assess. The same process was undertaken for High Value Regrowth.

Council's existing Lowland Rainforest mapping was verified based on Regional Ecosystem groundtruthing conducted by SMEC (2013) throughout the Study Area. The criteria was based on SEWPaC's Threatened Species Scientific Committee Listing Advice for Lowland Rainforest of Subtropical Australia (SEWPaC, 2010), including verified:

- RE 12.3.1 (Endangered Gallery rainforest on alluvial plains)
- RE 12.3.7 (Least concern Forest Red Gum, bottlebrush, She-oak fringing riverine forest), dependent on the presence of Weeping Lilli Pilli
- RE12.11.10 (Least Concern Dry Rainforest)
- RE12.11.3/12.11.10 (in gullies and south facing hills)

3.3.4 Identification of Corridors and Linkages

Two constraints were analysed in order to identify likely corridors and linkages:

1. Physical constraints, including:
    - All land above 60m AHD
    - Q100 flood extent
2. Ecological constraints, including:
    - Potential habitat for priority species likely to occur in the Study Area (as detailed in Section 3.3.2)
    - Waterway setbacks for waterway health, including the following buffers from the edge of the geomorphic stream channels:
        - Caboolture River – 100m
        - Caboolture River tributaries – 50m
        - Wararba Creek and tributaries – 50m
        - South Wararba Creek and tributaries – 50m.
3. Strategic Environmental Constraints:
        - Areas identified as requiring protection in order to the reduce edge-effects on important and isolated patches of habitat

The two constraints were then strategically consolidated to form a Draft Corridor. Priority was given to linking larger and more proximate habitat areas, with smaller and/or more distant habitat areas given secondary or lower importance. However, corridors to small habitat patches were considered if they fit strategically with linkages to larger habitat patches. Priority was also given to achieving a satisfactory level of north-south linkage between the predominantly east-west orientated corridors formed by some of the larger watercourses in the Study Area. The following characteristics were used for each value corridor ranking:

- Primary Corridors:
    - Represent corridors of State significance;
    - Rivers and major habitat patches;
    - Minimum 200m width; and
    - Includes east-west and north-south orientated corridors.
- Secondary Corridors:
    - Caboolture River tributaries, Wararba Creek and South Wararba Creek and tributaries and associated habitat patches;
    - Minimum 100m width; and
    - Mostly east-west orientated.
- Tertiary corridors
    - Minor drainage lines and watercourses;
    - Other constraints, such as priority species habitat not connected to primary or secondary corridors; and
    - Minimum 20m width.
- Linkages:
    - Strategic connections between habitat patches;
    - Provides north-south linkage between Primary and Secondary corridors, and linkages across main thoroughfares, such as Old North Rd and Bellmere Rd; and
    - Although these linkages are important, locations are indicative, and are to be investigated further in the detailed planning phase of the Project.

3.3.5 Ground-truthing the Suitability of Land used for Offsetting

Habitat offsets can be used to mitigate the potential loss of habitat associated with proposed development in the Study Area. They can be used to protect existing habitat areas and to achieve a net gain of vegetation with positive offset ratios for established vegetation. Thus, offsets can be used to increase patch size, provide more regular patch boundaries (decreasing edge to core ratios) and provide strategic linkages between habitat patches.

Potential offset areas were mapped and ground-truthed to ensure that they are capable providing habitat suitable for the target species. This involves consideration of factors

such as floristic composition and habitat structure of existing vegetation. In areas targeted for vegetation re-establishment, the topography, soils, aspect and drainage were given consideration. Attention was also be given to corridor width and patch size for edge sensitive species.

The offset maps were dissected into the following categories:

1. Areas suitable for receiving Koala offsets under the Offsets for Net Gain of Koala Habitat in South East Queensland Policy (DERM, 2010), in order of priority:
    - High value suitable for rehabilitation areas under the Koala SPP2/10
    - Medium value suitable for rehabilitation areas under the Koala SPP2/10
    - Low value suitable for rehabilitation areas under the Koala SPP2/10
    - Bushland habitat mapped under the Koala SPP2/10 that was identified as requiring some rehabilitation in order to meet the habitat requirements for the Koala (further ranked into High, Medium and Low value)
2. Areas suitable for receiving Regional Ecosystem offsets. This consisted of areas identified as requiring rehabilitation (i.e. cleared or degraded areas) during field work and analysis of aerial imagery, and High Value Regrowth mapping under the *VMA 1999*.

The areas suitable for receiving offsets were then categorised into Regional Ecosystem offset potential using the Biodiversity status of pre-clearing and 2009 remnant Regional Ecosystems data (DSITIA, 2012). The area available for receiving Koala offsets and Regional Ecosystem offsets was then calculated for each Regional Ecosystem Identification number in the Study Area.

3.3.6 Constraint Levels of Verified Environmental Values

During the process of consolidating the ecological and physical constraints into the corridor, a number of areas of ecological significance were discarded from the corridor map, simply because they weren't proximate to the corridor. These areas were then assessed based on their level of ecological significance. All land within the corridor was classified as "high environmental value". The areas of ecological significance that did not form the corridor were classified as "environmental offset potential". All other areas not covered by the corridor or the remaining areas of ecological significance were classified as "other land use".

4 SURVEY RESULTS

4.1 Koala Habitat

The State Planning Policy (SPP) 2/10 Koala Habitat Values mapping shows that Koala Bushland Habitat is widespread in the Study Area, particularly in the northern two-thirds (**Appendix A**). Few areas are mapped as high value bushland habitat, with the majority of habitat mapped as medium value. Areas of low value bushland are confined to the more elevated far west of the Study Area.

Overall, the mapping shows Koala habitat to be highly fragmented within the Study Area. However, larger, more continuous patches are evident in the north and west. While the southern part of the Study Area contains little mapped Koala bushland habitat, the Caboolture River supports some habitat along its high bank (where Forest Red Gum is present). Caboolture River is likely to be an important movement corridor for the Koala, connecting the Study Area to habitat to the south where a higher density Koala population is known to be present (GHD, 2008).

84 Koala Spot Surveys were completed throughout the Study Area. Koala pellets were detected at 23 (27%) of sites. A maximum of 6 trees (20%) were found to have been utilised at any given site. Only 6 sites had three or more trees (within the 30 surveyed per KSAT site) with evidence of Koalas. Refer to **Figure 2** for survey results.

Although all sites identified for survey were mapped as Koala Bushland Habitat, 17 sites were found not to support Koala habitat because they were either pine plantations, largely cleared areas dominated by *Acacia* spp. regrowth, farm dams or orchards. Accordingly, there was not a focal tree to begin the survey (Phillips and Callaghan 2011) or lack of 30 trees that met the diameter and height requirements defined by SPP 2/10 (100mm DBH and/or 4m tall) to conduct the survey. Although we recognise that Koalas seek shelter in non-food trees, this typically occurs where they are associated with food trees (e.g. Moreton Bay Rail). Koalas are unlikely to occupy large tracts of vegetation that lack food trees (e.g. Lindenmayer *et al.*1999) and such areas are assumed to be non-habitat (e.g. Seabrook *et al.* 2003). Koala Spot Survey Results are detailed in **Appendix A.** In addition to areas directly surveyed, the interpretation of high resolution aerial imagery over the Study Area found another 24 sites mapped as Bushland Habitat under the Koala SPP (2/10) that do not support Koala habitat (**Figures 3 and 4).**

According to the criteria of Phillips and Callaghan (2011), all sites are considered to show low Koala activity levels with reference to an east coast high density population (the threshold for medium use is 22%). The Koala activity levels did not reflect the mapped Koala habitat value, with a range of activity levels in both medium and high value bushland habitat. Few sites were located in low value habitat, but these areas did seem to be associated with lower activity levels (**Figure 5**).

Figure 2 - Koala Spot Survey Results - Number of Trees with Koala Scats

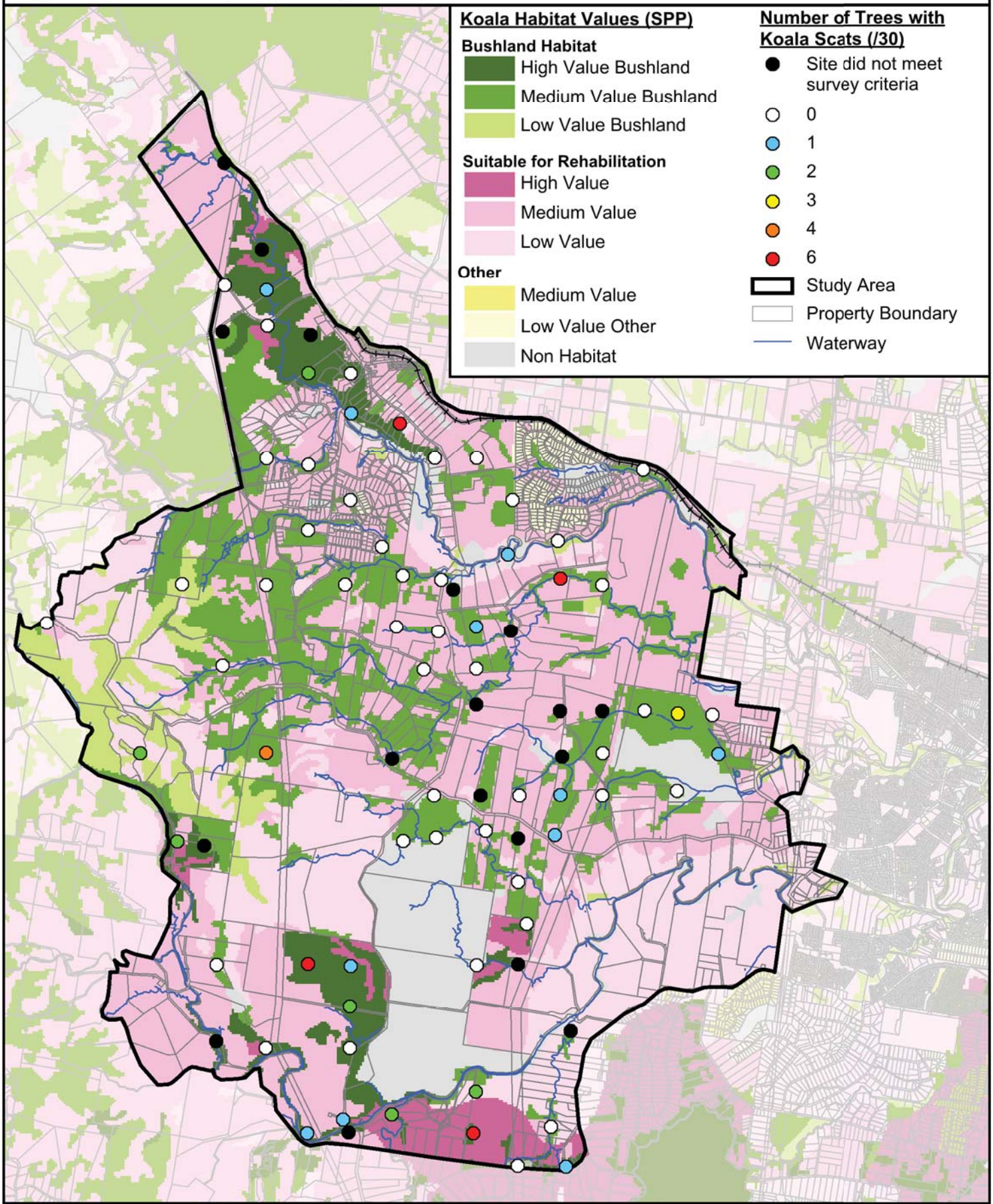


FIGURE Koala Survey Results	PROJECT NO. 30031051	SCALE 0 1 2km Scale: 1: 60,000 @ A4	N	CONSULTANT SMEC Australia
CREATED BY AM11482	PROJECT TITLE Caboolture West Environmental Study			
REVISION 2				
STATUS FINAL	COORDINATE SYSTEM GDA 1994 MGA Zone 56			CLIENT Moreton Bay Regional Council
DATE 12/08/2013	SOURCE The State of Queensland (DEHP), Copyright 2012			
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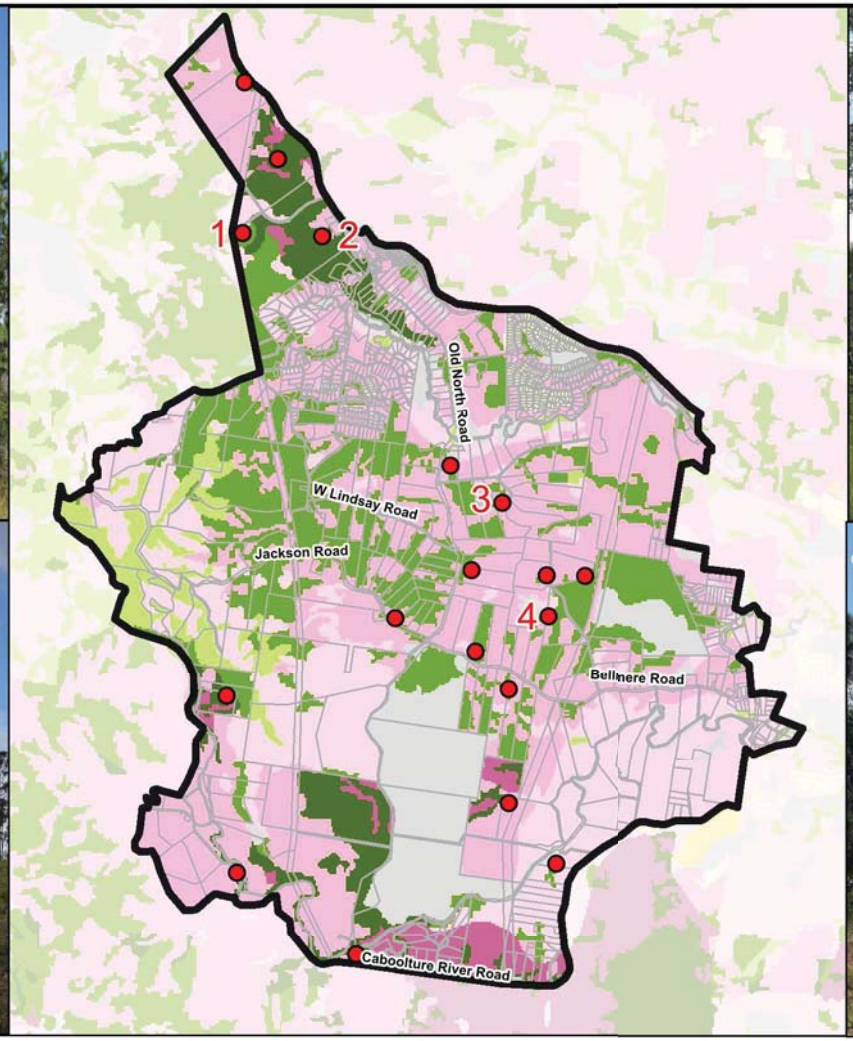
Figure 3: Koala Bushland Habitat (SPP 2/10) Mapping Error Examples



LEGEND

Bushland Habitat
- High Value Bushland
- Medium Value Bushland
- Low Value Bushland

Suitable for Rehabilitation
- High Value
- Medium Value
- Low Value

Other
- Medium Value Other
- Low Value Other
- Non Habitat

- Study Area
- Property Boundary
- Unsuitable Habitat for Koalas

N

SCALE 0 1.5 3km
Scale: 1:100,000 @ A4

COORDINATE SYSTEM
GDA 1994 MGA Zone 56

FIGURE 3 - Mapping Errors
REVISION 2
STATUS FINAL
CREATED BY AM11482
DATE 12/08/2013
ISSUED FOR INFORMATION

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PROJECT NO. 30031051
PROJECT TITLE Caboolture West Environmental Study

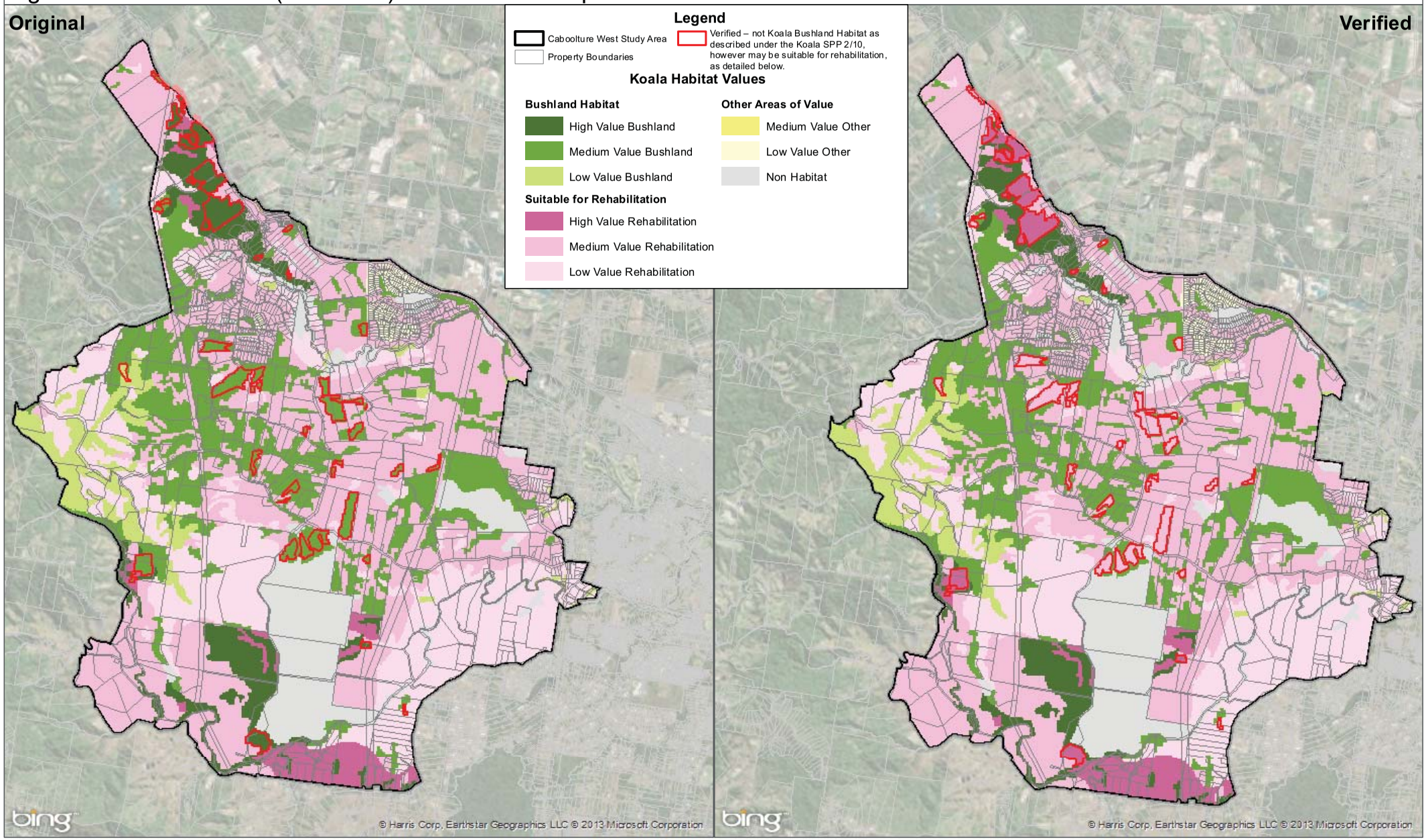
Moreton Bay Regional Council

CLIENT Moreton Bay Regional Council

SMEC

CONSULTANT SMEC Australia

Figure 4 - Koala Habitat (SPP 2/10) Verification Comparison



COORDINATE SYSTEM GDA 1994 MGA Zone 56	0 750 1,500 2,250 3,000 Metres	**DRAWING NO.** 1	**REVISION** A **STATUS**
PAGE SIZE A3 **SCALE** 1:60,000		**CREATED BY** EH11799	**DATE** 22/08/2013 Time: 2:29:22 PM
PROJECT NO. 30031051 **PROJECT TITLE** Caboolture West Environmental Study		**SOURCE** Bing Maps, Koala Planning Areas (DERM)	**CLIENT**

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CONSULTANT SMEC Australia

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Figure 5 - Koala Activity

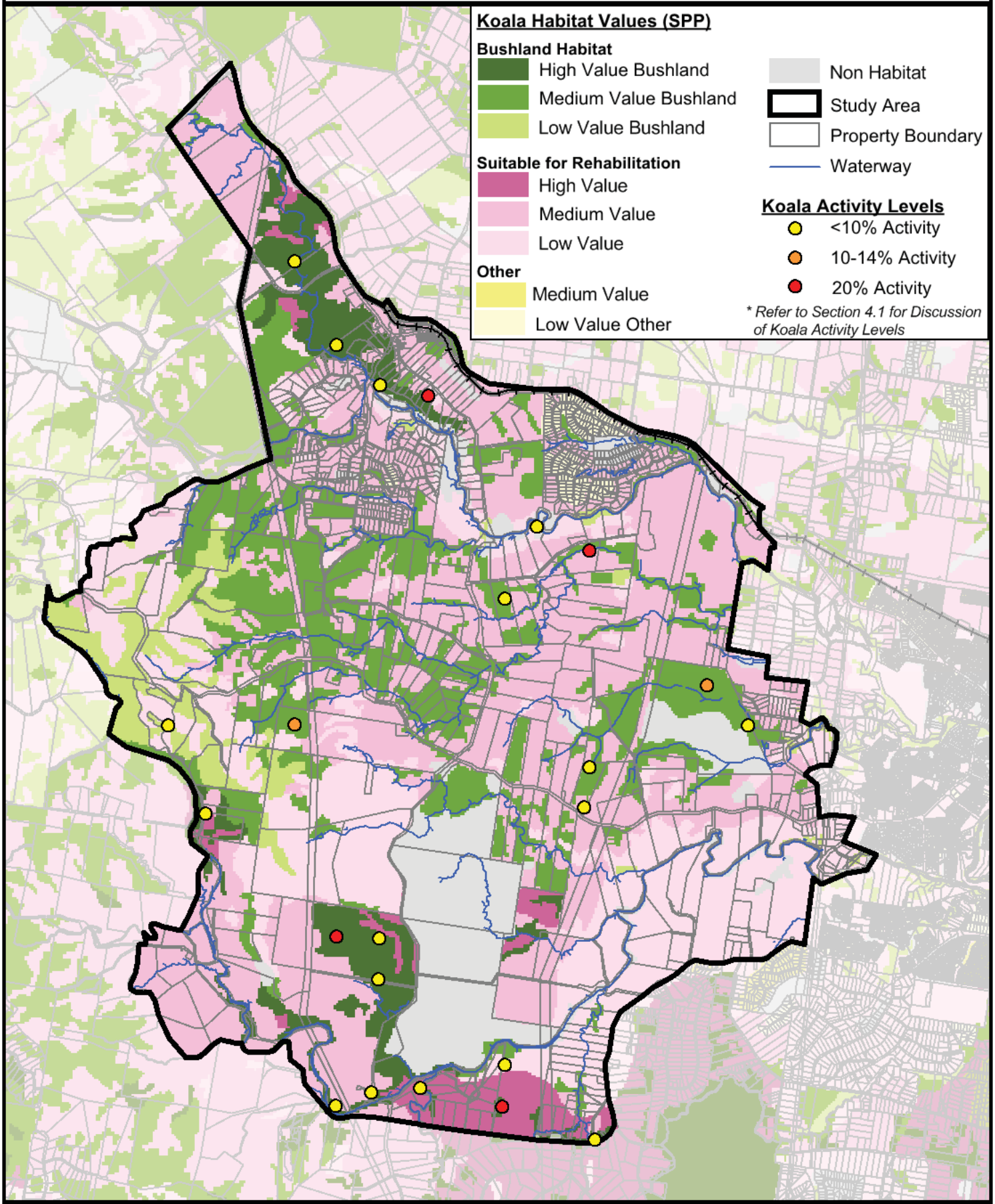

FIGURE Koala Activity	PROJECT NO. 30031051	SCALE 0 1 2km Scale: 1: 60,000 @ A4	N	CONSULTANT SMEC Australia
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DATE 14/08/2013	SOURCE The State of Queensland (DEHP), Copyright 2012			
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The activity levels derived at each Koala SAT survey site suggest:

1. There are a few low density clusters of the Koalas in the Study Area, indicated by the higher activity levels approaching 20% (**Figure 5**). Koala pellets were generally intact and showed little decay, indicating fairly recent use of these areas. However, no pellets were sufficiently fresh to suggest use at the time of the field surveys and no Koalas were observed. However, these survey sites are likely to fall within a socially stable aggregation of breeding Koalas where individual home-ranges are large, and
2. Transitory individuals are moving across the landscape in areas of lower activity. Koala pellets were often many months old, which is consistent with the presence of transitory individuals. Koalas generally disperse between June and December (Dique *et al.* 2003a), therefore, the field surveys were conducted well outside the peak dispersal period. Due to the decay of Koala pellets over time, and the observation that many pellets in low activity areas were decayed, it is likely that the presence and activity of dispersing Koala in the Study Area was under-estimated.

Overall, the Koala population in the Study Area appears to be dispersed and characterised by a low density of individuals. The combination of limited habitat and low density suggests that the overall population size is likely to be small. However, with the available data it is not possible to estimate an accurate population number.

4.2 Other Priority Species (Habitat Assessment)

121 priority species have been recorded within, or in close proximity to the Study Area, including 46 flora and 75 fauna species.

88 habitat assessments were conducted within the Study Area, at Koala SAT sites and in non-Koala habitat (e.g. rainforest) areas (Refer to **Appendix D** map for locations). These surveys aimed to describe the types and abundances of resources known to be important to priority species. This includes habitat features such as nectar-producing trees, mistletoes, tree hollows, fallen logs and leaf litter development. The results of the surveys are detailed in **Appendix D**.

The habitat assessment data was used to assess the potential for priority species to occur in the Study Area. Table 1 summarizes the likelihood of occurrence of these priority species within the Study Area based on the availability of known habitat characteristics. The detailed table is provided in **Appendix E**, which also describes their key habitat requirements, including broad habitat type and essential micro-habitat features as appropriate. Essential habitat for threatened species is shown collectively in **Figure 6**.

Table 1: Summary of potential occurrence of priority species in the Study Area

Taxa	High	Moderate	Low	Occasional	Nil	Total
Flora	2	8	19	N/A	17	46
Fauna	10	11	26	6	22	75
Total	12	19	45	6	39	121

Figure 6 - Vegetation Management Act Essential Habitat

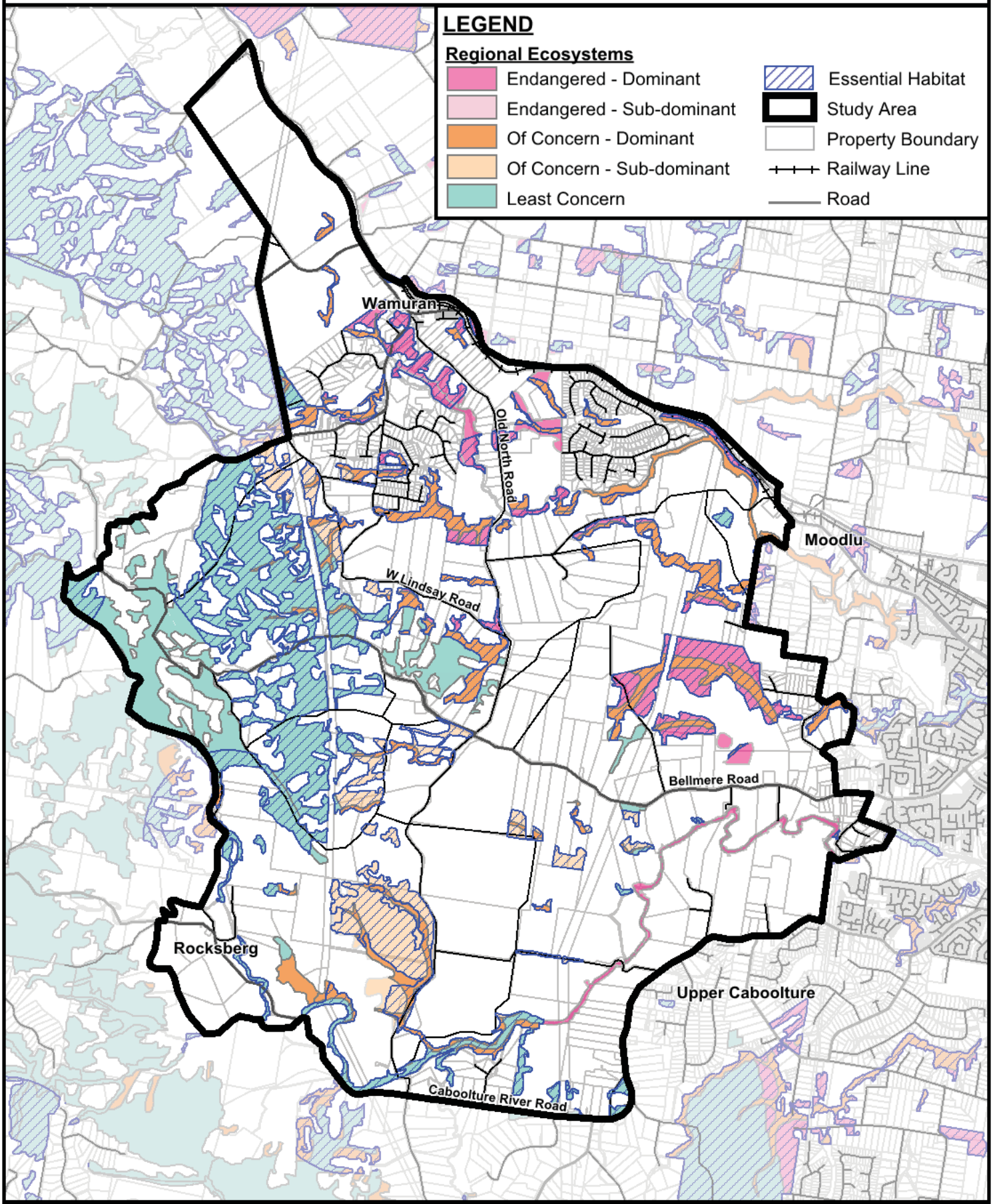


FIGURE Essential Habitat	**PROJECT NO.** 30031051	**SCALE** 0 1 2km Scale: 1: 60,000 @ A4	N	**CONSULTANT** SMEC Australia
CREATED BY AM11482	**PROJECT TITLE** Caboolture West Environmental Study			
REVISION 1				
STATUS FINAL	**COORDINATE SYSTEM** GDA 1994 MGA Zone 56			**CLIENT** Moreton Bay Regional Council
DATE 03/07/2013	**SOURCE** The State of Queensland (DEHP), Copyright 2012			
ISSUED FOR INFORMATION	**PATH** G:\Common Resources\Design Resources\Design aids\GIS DATA\West Caboolture\West Caboolture.wor			

31 priority species (10 flora, 21 fauna) are considered to have a moderate to high probability of occurring in the Study Area. An additional 6 fauna are also highly likely to utilise the Study Area, however due to their seasonally nomadic behaviour (e.g. Little Red Flying-fox, Regent Honeyeater) only occasional use is expected. Collectively, these species are considered likely to occur in the Study Area.

Threatened flora species most likely to occur in the Study Area are those associated with moist forests, particularly rainforest margins and along streams. *Croton mamillatus*, which is Endangered under the NC Act and prefers the edges dry rainforest, was recorded in the hilly west of the Study Area (**Appendix F**).

Priority fauna species highly likely to occur in the Study Area include species associated with:

- Rivers and creeks, e.g. Giant Barred Frog (**Plate 1**), Tusked Frog and Platypus;
- Farm dams, e.g. Australian Painted Snipe and potentially Tusked Frog; and
- Flooded pasture, e.g. Green-thighed Frog and Tusked Frog (particularly when near forest), Black-necked Stork and Brolga.

Moreover, mobile nectarivores, including honeyeaters, Swift Parrot, flying-foxes and gliding possums (where tree hollows are available), and species with large territories (e.g. Grey Goshawk, Square-Tailed Kite and Powerful Owl) are likely to be moderately to highly tolerant of the current extent of habitat fragmentation in the Study Area and so could be expected to occur on an occasional basis. A Grey-headed Flying-fox camp was observed on Wararba Creek just outside the Study Area.

The remaining 90 priority species would either not occur in the Study Area (because the area clearly does not provide any suitable habitat), or would have a low probability of occurring (very unlikely but difficult to definitively exclude). For these species, limiting factors include:

- Lack of coastal and high elevation habitat (e.g. Pouched Frog):
- Small patch size (particularly mammals, reptiles and more sedentary birds);
- Fragmentation, affecting species with low to moderate mobility;
- Immaturity of vegetation in the Study Area (**Plate 2**):
  - Lack of hollow-bearing trees (particularly limiting the distribution of arboreal mammals); and
  - Lack of fallen logs (e.g. habitat for Elf Skink).
- Lack of understorey complexity (i.e. lack of shelter and habitat structure); and
- Paucity of accumulated leaf litter (e.g. Elf Skink).

These factors may also constrain the distribution of “likely” species within the Study Area.

Potential habitat for each priority species in the Study Area, categorised by the survey results, interpretation of Regional Ecosystem and Essential Habitat mapping, landform, waterways, dams and vegetative cover, can be found in the maps in **Appendix F**.

Plate 1: *Pool/riffle sequences in Caboolture River traversing Old North Road, indicating potential Giant Barred Frog habitat*

Plate 2: *Example of immaturity of vegetation in the Study Area*

4.3 Mapping Verification

4.3.1 Regional Ecosystem Mapping

The RE mapping revealed that 14 different REs occur in the Study Area (**Figure 7**). Three of these are described as Endangered (12.3.1, 12.5.3, 12.5.6) and four as Of Concern (12.3.2, 12.3.11, 12.11.14, 12.11.15). REs are mostly found as linear strips along waterways (e.g. Endangered 12.3.1) or in the steep, elevated western part of the Study Area (e.g. Least Concern 12.11.18).

Ground-truthing revealed that the remnant vegetation mapping was generally accurate (**Appendix G**). In particular, the floristic composition of mapped REs was consistent with on-ground observations. 13 anomalies in RE mapping have been identified within the Study Area (**Figure 8**). An additional 10 sites mapped as remnant vegetation have since been cleared.

One anomaly that has been identified several times near boundaries of mapped geological units throughout the Study Area, is due to assigning an inappropriate land zone. This suggests an inaccuracy in the geological base maps used in the RE mapping. These areas of Blackbutt-dominated forest in the Wamuran area, are mapped as RE 12.5.6 (indicating land zone 5: old loamy and sandy plains); but in fact appear to be RE 12.11.3b (land zone 11: hills and lowlands of metamorphic rocks). The areas in question are both hilly and moderately steep and metamorphic rocks are visible on the surface. Similar metamorphic rocks are apparent on the surface further west in the Study Area where land zone 11 is correctly identified in the RE mapping. RE 12.5.6 is Endangered, whereas 12.11.3b is of Least Concern. However, this area retains other important ecological values rendering it a significant constraint to urban development in land use planning.

4.3.2 Lowland Rainforest

Field assessment results indicate that Lowland Rainforest, which is listed as an EEC under the EPBC Act, is not as extensive as mapped in the western portion of the Study Area (**Figure 9**). This error has arisen due to the RE mapping of a broad area of RE12.11.3/12.11.10 (95/5). This means that 95% of the remnant is RE 12.11.3 (Least Concern Grey Gum/Grey Ironbark forest) and 5% is RE 12.11.10 (Least Concern Dry Rainforest). RE 12.11.3 occurs on the slopes and ridges and does indeed comprise of about 95% of the area (**Plate 3**). RE 12.11.10 comprises approximately 5% of the area, confined to the lower slopes and gullies. However, the amalgamating of these REs into a single polygon has led to some inaccuracy in the Lowland Rainforest mapping. While 12.11.10 is Least Concern vegetation, it nonetheless conforms to the EEC definition of Lowland Rainforest. However, it only occupies 5% of the area mapped as Lowland Rainforest.

Further, some areas mapped as Lowland Rainforest within the south-western portion of the study area are mapped as of concern and least concern High Value Regrowth. Groundtruthing of much of this area has indicated large areas dominated by *Acacia* regrowth and lantana overgrowth.

Plate 3: *Example of an area mapped as Lowland Rainforest that is clearly RE 12.11.3 (Least Concern Grey Gum/Grey Ironbark forest) on a slope*

4.3.3 High Value Regrowth

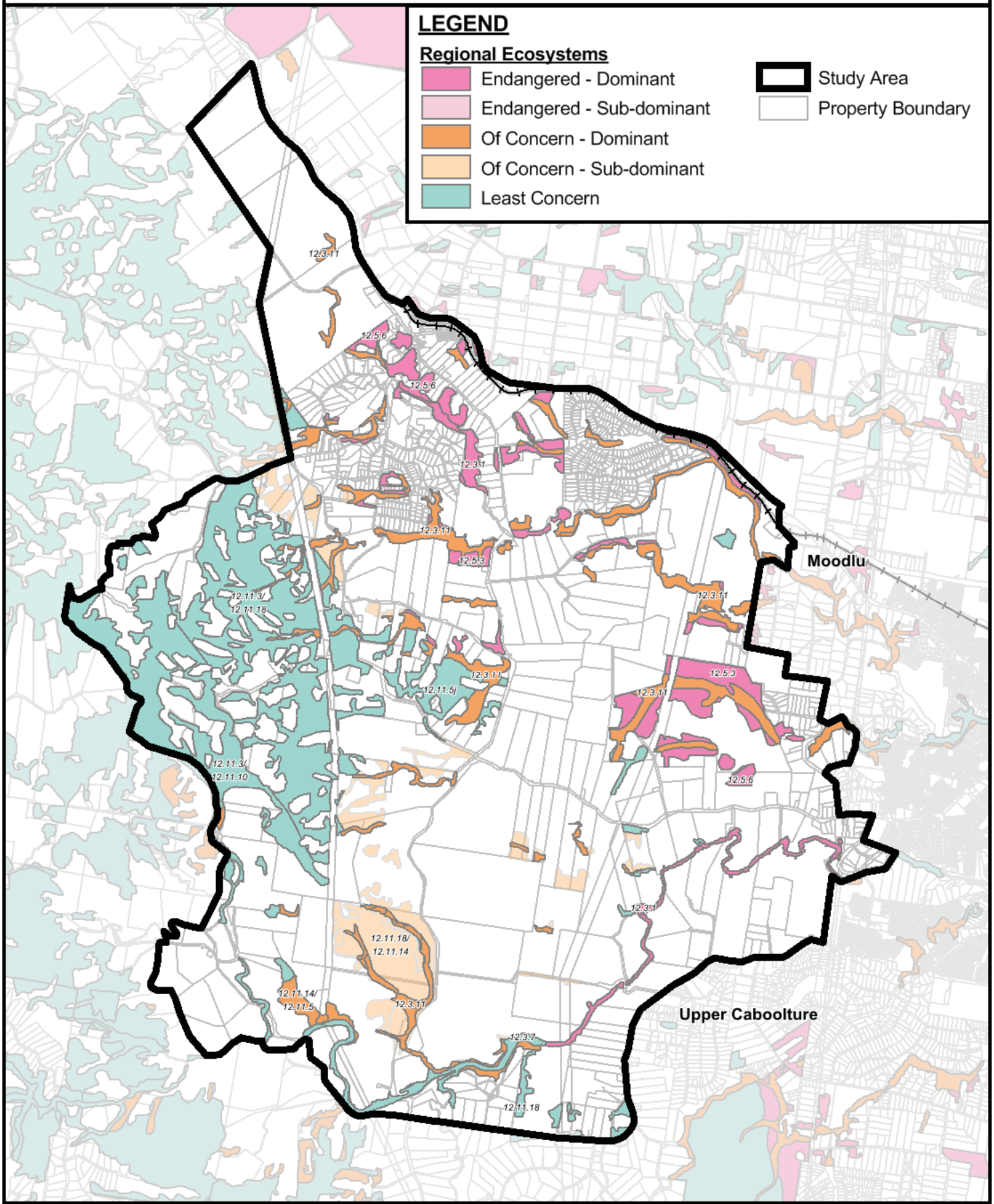
Areas of Endangered and Of Concern regrowth vegetation are mapped in the lower elevation eastern two-thirds of the Study Area (**Figure 10**). Ground-truthing revealed that the regrowth vegetation mapping was generally accurate. Many of these regrowth areas have been identified as areas that would benefit from rehabilitation and revegetation works.

4.3.4 Areas of Ecological Significance

Areas of Ecological Significance (AES) essentially distill a range of ecological values, including those considered in this report, into a single map layer. This map reveals that much of the Study Area is subject to ecological constraints. However, a broad area not covered by the mapping can be discerned running north/south through the centre of the Study Area and extending eastwards in the central part of the Study Area (**Figure 11**). The elevated western portion of the Study Area and the Caboolture River, located along the southern extent of the local plan area, forms part of a broadly mapped Strategic Rehabilitation area (**Figure 11**).

AES mapping was verified based on the verification of all other local and state values mapping. Anomalies in AES mapping are highlighted in **Figure 11**.

Figure 7 - Regional Ecosystem Mapping



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DATE 03/07/2013	SOURCE The State of Queensland (DEHP), Copyright 2012			
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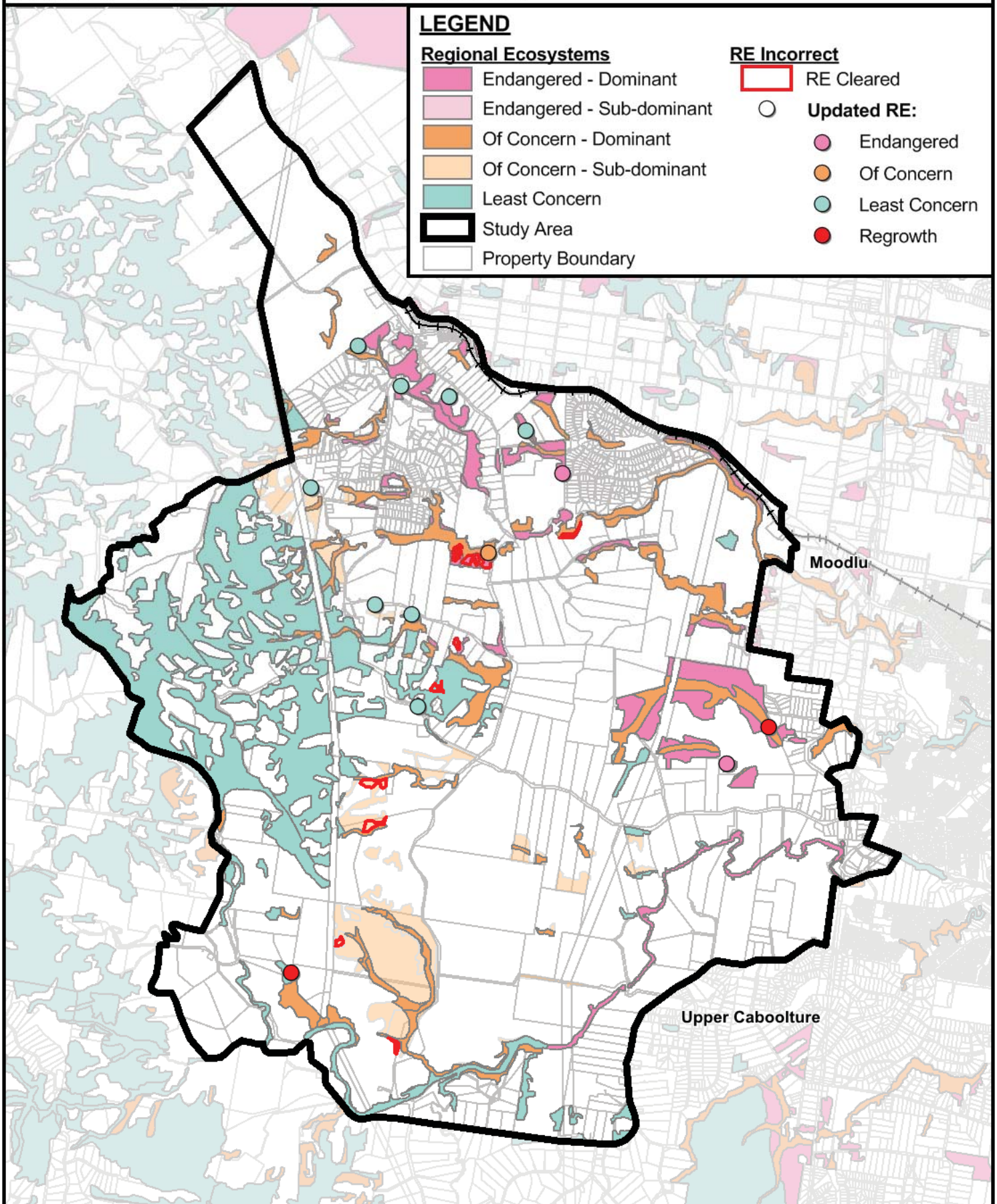
Figure 8 - Regional Ecosystem Verification



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DATE 03/07/2013	SOURCE The State of Queensland (DEHP), Copyright 2012			
ISSUED FOR INFORMATION	PATH G:\Common Resources\Design Resources\Design aids\GIS DATA\West Caboolture\West Caboolture.wor			

Figure 9 - Lowland Rainforest Verification

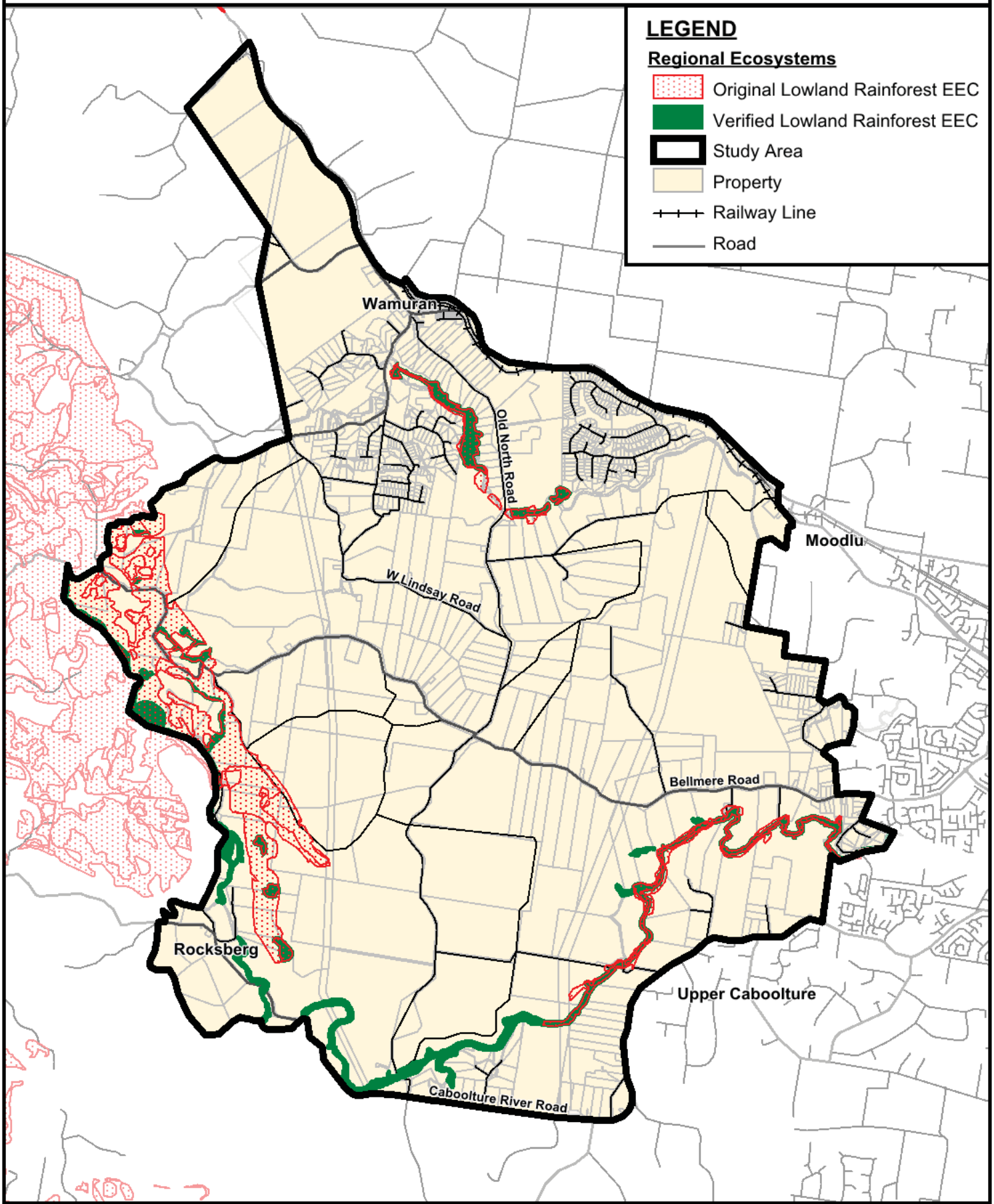

FIGURE Lowland Rainforest	PROJECT NO. 30031051	SCALE 0 1 2km Scale: 1: 60,000 @ A4	N	CONSULTANT SMEC Australia
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DATE 20/06/2013	SOURCE The State of Queensland (DEHP), Copyright 2012			
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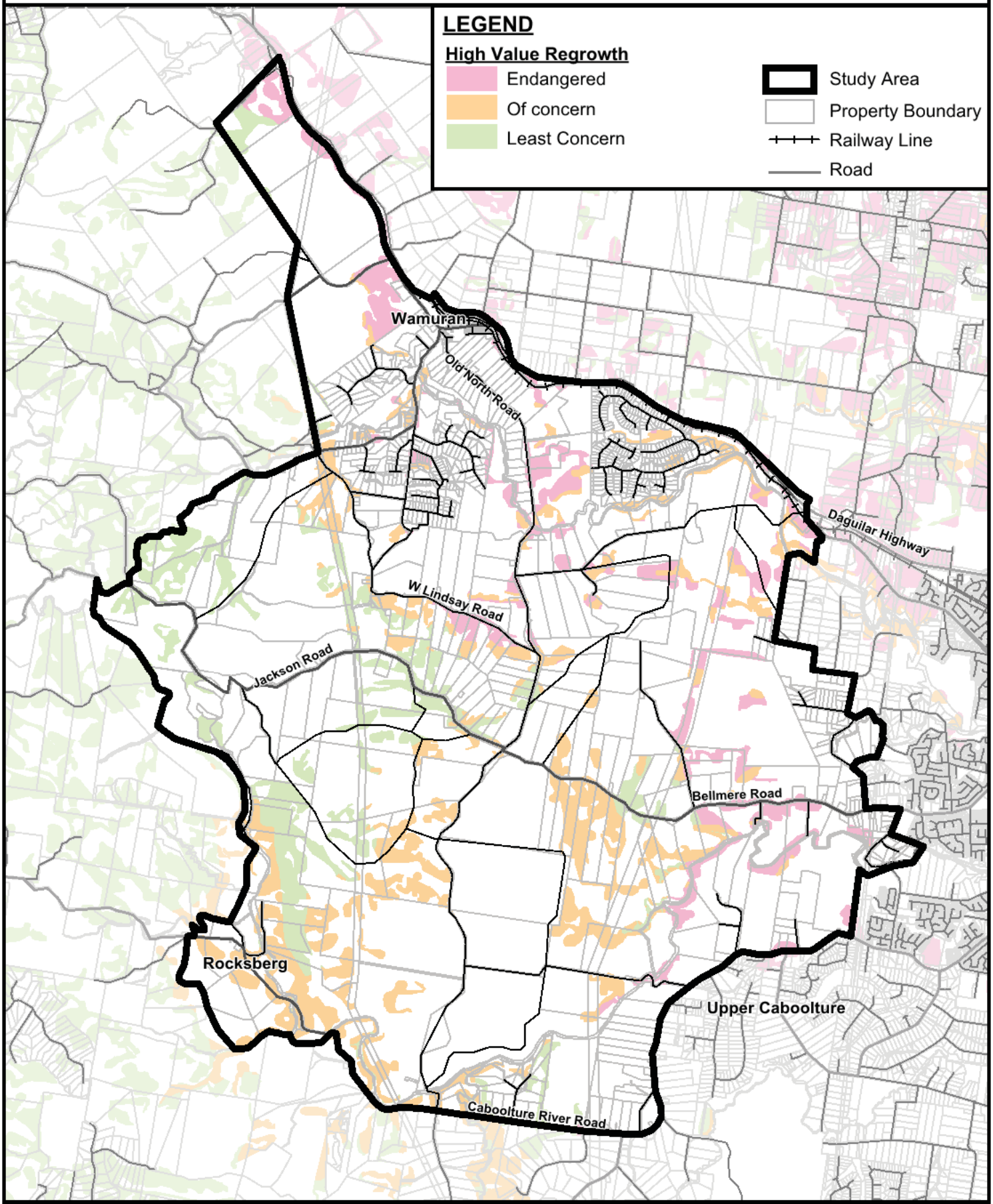
Figure 10: High Value Regrowth



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DATE 03/07/2013	SOURCE The State of Queensland (DEHP), Copyright 2012			
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Figure 11 - Verification of Areas of Ecological Significance

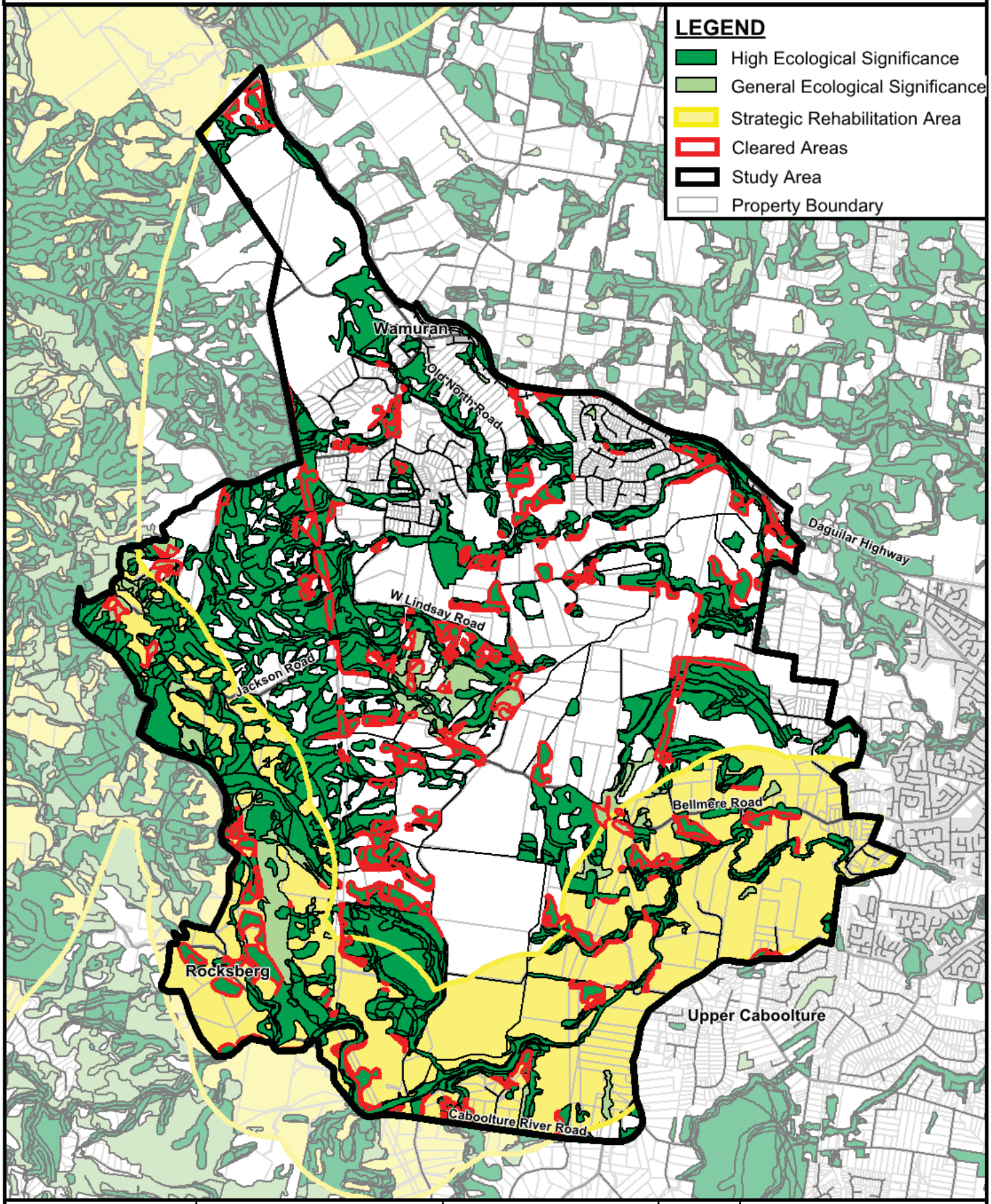

FIGURE AES	PROJECT NO. 30031051	SCALE 0 1 2km, Scale: 1: 60,000 @ A4	N	CONSULTANT SMEC Australia
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DATE 03/07/2013	SOURCE The State of Queensland (DEHP), Copyright 2012			
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5 MAPPING OF ENVIRONMENTAL VALUES AND CORRIDORS

5.1 Corridors

5.1.1 Priority Species Mapping

Potential habitat for priority species likely to occur in the Study Area was assessed in GIS to determine the most appropriate locations for corridors and linkages. A combined map of all potential habitat for priority species likely to occur in the Study Area is provided in **Figure 12.** This includes potential habitat for the following flora species:

- Cudgerie (*Hernandia bivalvis*) – Near threatened (NC Act);
- Giant Ironwood (Choricarpia subargentea) – Near threatened (NC Act);
- Brush Sophora (*Sophora fraseri*) – Vulnerable (NC Act);
- Dunns White Gum (*Eucalyptus dunnii*) – Vulnerable (NC Act);
- Hairy Hazelwood (*Symplocos harroldii*) – Near threatened (NC Act);
- Fine-leaved Tuckeroo (*Lepiderema pulchella*) – Vulnerable (NC Act);
- Red Lily Pilly (*Syzygium hodgkinsoniae*) – Vulnerable (NC Act);
- Three-leaved Bosistoa (*Bosistoa transversa*) – Vulnerable (EPBC Act); and
- Bahrs Scrub Croton (*Croton mammillatus*) – Endangered (NC Act).

And the following fauna species:

- Tusked Frog (*Adelotus brevis*) – Vulnerable (NC Act)
- Giant Barred Frog (*Mixophyes iteratus*) – Endangered (NC Act, EPBC Act)
- Sapphire Rockmaster (*Diphlebia coerulescens*) – locally significant
- Plumed Frogmouth (*Podargus ocellatus plumiferus*) – Vulnerable (NC Act)
- Platypus (*Ornithorhynchus anatinus*) – Special Least Concern (NC Act)
- Australian River Mussel (*Cucumerunio novaehollandiae*) - Locally Significant
- Koala (*Phascolartos cinereus*) – Vulnerable (NC Act, EPBC Act)
- Glossy Black Cockatoo (*Calyptorhynchus lathami*) – Vulnerable (NC Act)
- Black-chinned Honeyeater (*Melithreptus gularis*) – Near threatened (NC Act)
- Black-necked Stork (*Ephippiorhynchus asiaticus*) – Near threatened (NC Act)
- Green-thighed Frog (*Litoria brevipalmata*) – Near threatened (NC Act)
- Australian Painted Snipe (*Rostratula australis*) – Vulnerable (NC Act, EPBC Act)
- Brolga (*Grus rubicunda*) – locally significant
- Lewins Rail (*Lewinia pectoralis*) – Near threatened (NC Act).

Other species likely to occur in the Study Area, such as the Grey Goshawk and Square-tailed Kite were not included in the combined Priority Species Habitat Mapping, because of their large home ranges. Due to their high mobility, the landscape would appear patchy rather than fragmented to these species. While corridors may provide additional foraging habitat for these species, they are not necessary to facilitate movement. Similarly, the

Echidna was not included as its broad habitat requirements suggest that it could use most of the landscape, including cleared areas. For these reasons, the aforementioned species are not particularly informative with respect to the development of a corridor strategy.

5.1.2 Waterway Health Corridors

Figure 13 displays the corridors for waterway health, including the following buffers from the edge of the geomorphic stream channels:

- Caboolture River – 100m
- Caboolture River tributaries – 50m
- Wararba Creek and tributaries – 50m
- South Wararba Creek and tributaries – 50m.

5.1.3 Other Physical Constraints

Figure 14 shows the physical constraints in the Study Area, including:

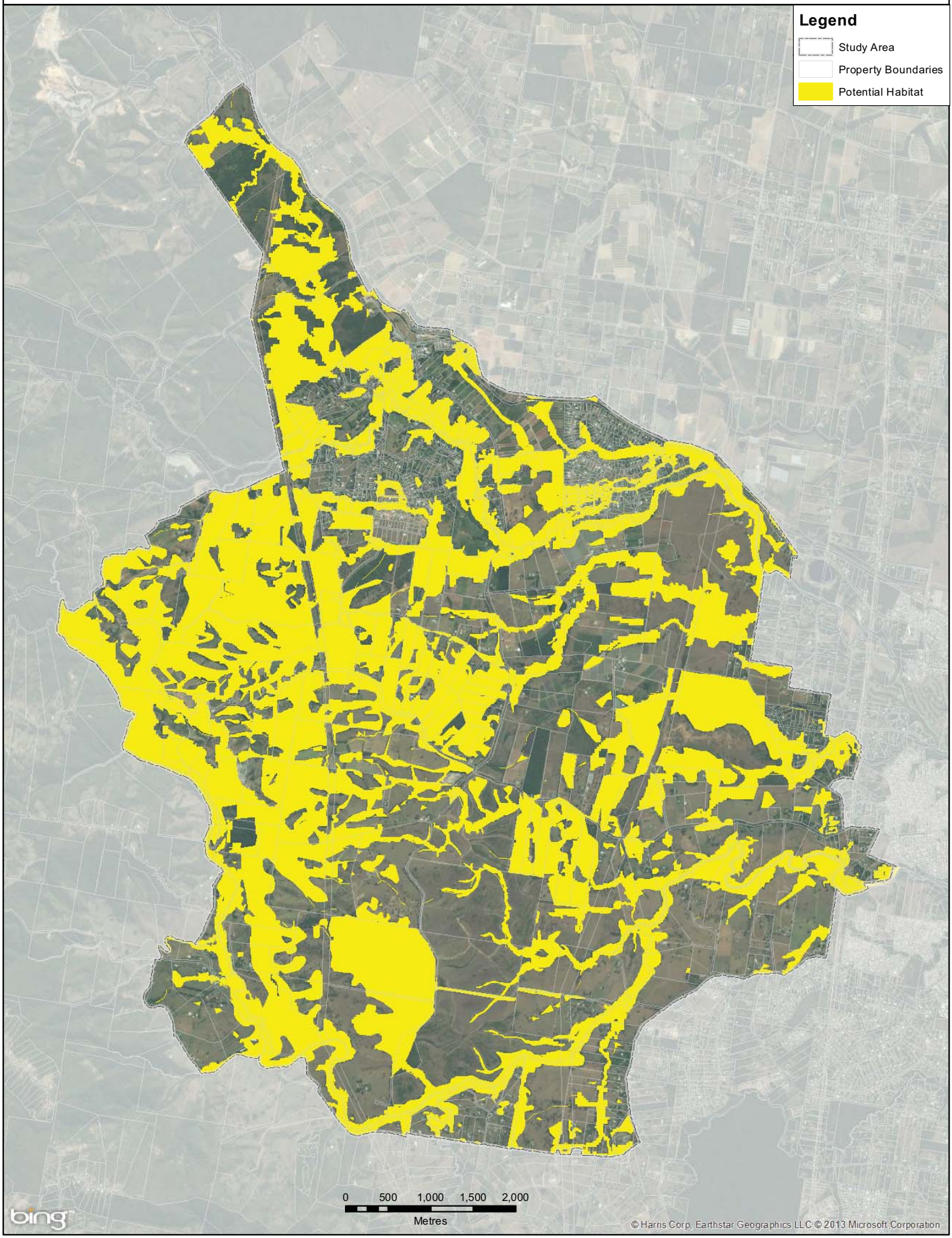
- All land above 60m AHD
- Q100 flood extent.

5.1.4 Edge Effects

Corridors are typically linear strips of habitat primarily intended to provide connectivity between habitat patches. Because corridors are relatively long and narrow, their function can be substantially affected by edge effects. Edge effects are a well-known ecological phenomenon and can arise for a variety of reasons, which can be roughly divided into abiotic and biotic effects such as altered micro-climate, altered light levels, weed invasion, inter-specific competition and increased rates of predation (Hilty *et al.* 2006). Abiotic effects (e.g. altered micro-climate and light levels) generally extend up to 50 m into an area of habitat (Murcia 1995). Biotic effects (e.g. weed invasion, inter-specific competition, predation) can penetrate 200 m or more into habitat (e.g. Goldingay and Whelan 1997; Piper and Catterall 2003; Clarke and Oldland 2007), but the influence is not always that extreme (e.g. Goosem 2000). The influence of edge effects decreases with increasing distance from the edge. For example, Recher *et al.* (1987) found that a 250 m wide corridor was sufficient to contian a full complement of forest birds. The intensity of edge effects also tends to decrease over time, suggesting that edge sealing can somewhat ameliorate edge effects (Murcia 1995).

For this reason, a “Strategic Environmental Constraint” was added to the corridor mapping. In some cases this is in the form of a buffer and in others areas where, for example, Endangered Regional Ecosytems surround a piece of cleared land the cleared land has been incorporated into the corridor system to provide a buffer and minimse edge effects.

Figure 12 - Combined Priority Species Habitat



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COORDINATE SYSTEM GDA 1994 MGA Zone 56	SOURCE Bing Maps, MBRC		CLIENT Moreton Bay Regional Council
PAGE SIZE A3 SCALE 1:40,000			CONSULTANT SMEC Australia

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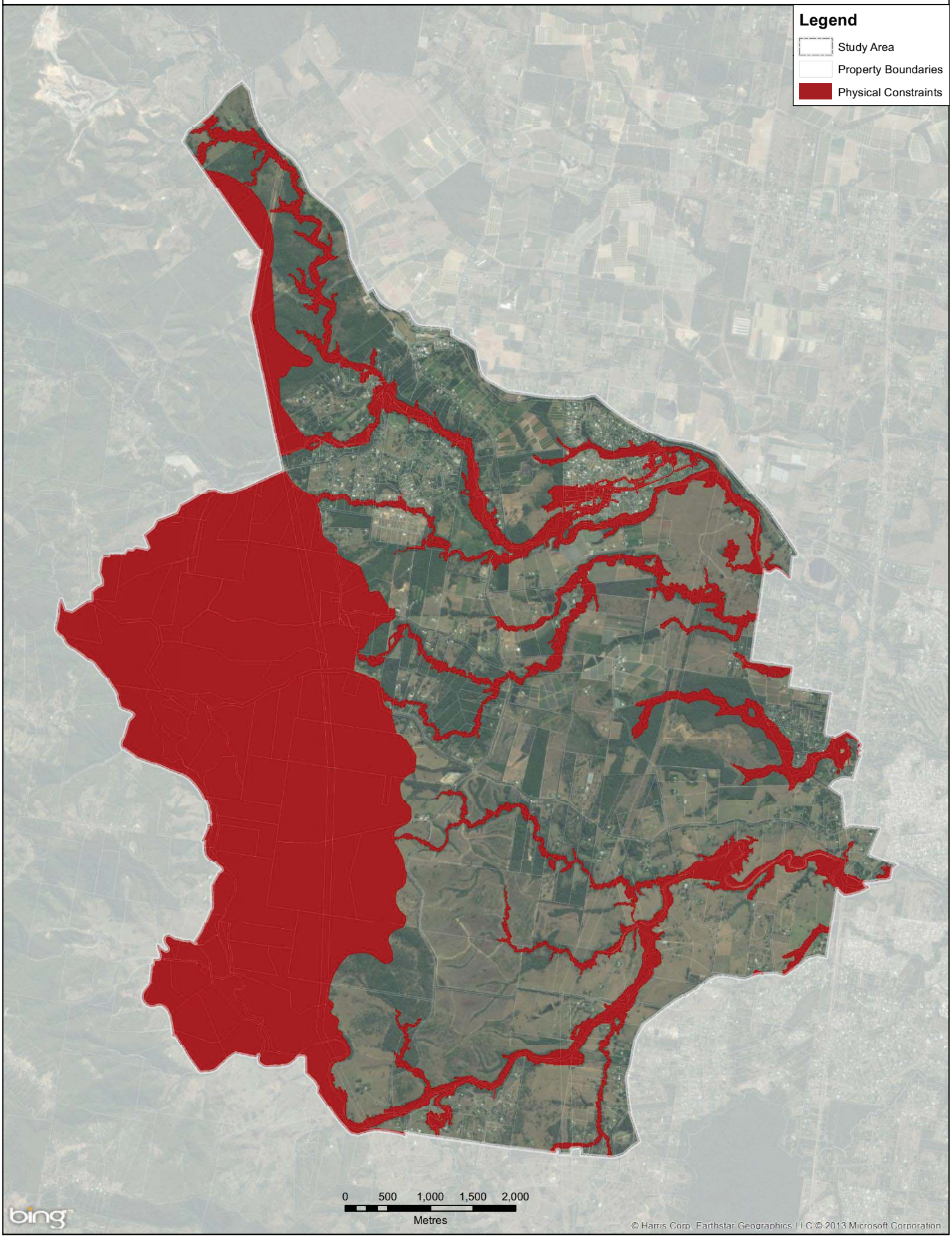
Figure 13 - Waterway Health Corridors

PROJECT NO. 30031051	**DRAWING NO.** 1	**REVISION** C	**STATUS**	N	**CLIENT** Moreton Bay Regional Council
PROJECT TITLE Caboolture West Environmental Study	**CREATED BY** EH11799	**DATE** 15/08/2013 Time: 7:36:58 AM			**CONSULTANT** SMEC Australia
COORDINATE SYSTEM GDA 1994 MGA Zone 56					
PAGE SIZE A3 **SCALE** 1:40,000	**SOURCE** Bing Maps, MBRC				

Path: R:\PROJECTS\30031051_MBRC_Caboolture\Products\MXD\30031051_Fig13_Waterway_Health_Corridors_A3_P_RevA.mxd

Figure 14 - Physical Constraints



PROJECT NO. 30031051	**DRAWING NO.** 1	**REVISION** B	**STATUS**	N	**CLIENT** Moreton Bay Regional Council
PROJECT TITLE Caboolture West Environmental Study	**CREATED BY** EH11799	**DATE** 15/08/2013 Time: 8:03:34 AM			**CONSULTANT** SMEC Australia
COORDINATE SYSTEM GDA 1994 MGA Zone 56	**SOURCE** Bing Maps, MBRC				
PAGE SIZE A3 **SCALE** 1:40,000					

Path: R:\PROJECTS\30031051_MBRC_Caboolture\Products\MXD\30031051_Fig14_Physical_Constraints_A3_P_RevB.mxd

5.1.5 Consolidation of Ecological and Physical Constraints

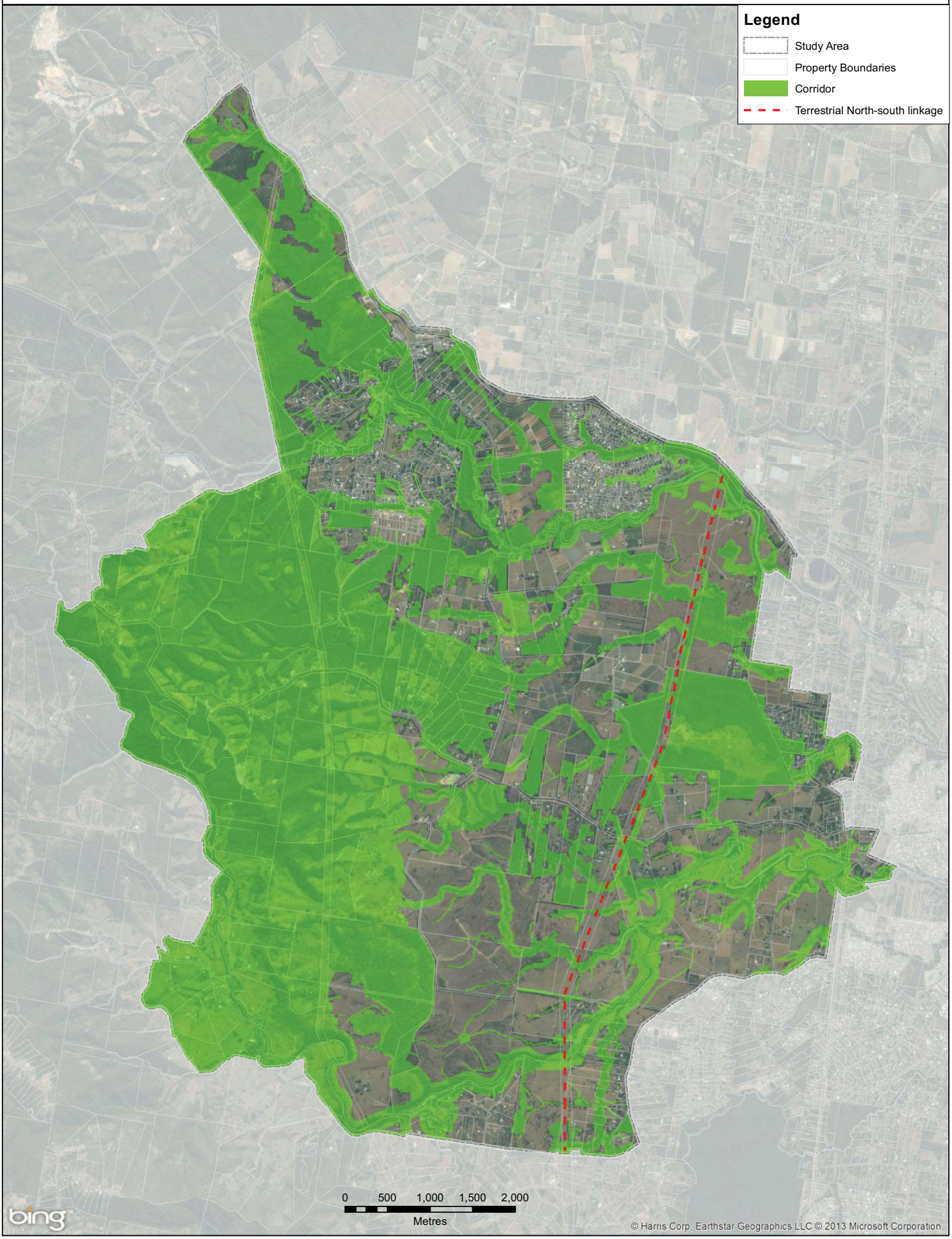
The strategic consolidation of the priority species habitat mapping, the waterway health corridors and the physical constraints is provided in an Overall Corridor Map (**Figure 15**). Priority was given to linking larger and more proximate habitat areas, with smaller and/or more distant habitat areas given secondary or lower importance. Priority was also given to assigning of north-south linkages between the predominantly east-west corridors. The following characteristics were used for each value corridor ranking:

- Primary Corridors:
    - Represent corridors of State significance;
    - Rivers and major habitat patches;
    - Minimum 200m width; and
    - Includes east-west and north-south orientated corridors.
- Secondary Corridors:
    - Caboolture River tributaries, Wararba Creek and South Wararba Creek and tributaries and associated habitat patches;
    - Minimum 100m width; and
    - Mostly east-west orientated.
- Tertiary corridors
    - Minor drainage lines and watercourses;
    - Other constraints, such as priority species habitat not connected to primary or secondary corridors; and
    - Minimum 20m width.
- Linkages:
    - Strategic connections between habitat patches;
    - Provides north-south linkage between Primary and Secondary corridors, and linkages across main thoroughfares, such as Old North Rd and Bellmere Rd; and
    - Although these linkages are important, locations are indicative, and are to be investigated further in the detailed planning phase of the Project.

Refer to **Figure 16** for prioritised corridors.

The corridor strategy utilised existing vegetation and gave consideration to the establishment of new vegetation (via rehabilitation) where required. The establishment of new habitat within corridors can potentially be used to offset the impact of loss of vegetation in other parts of the Study Area. This will enable consolidated development layouts and maximise the values of retained and established habitat areas by increasing habitat area (assuming positive offset ratios) and the strategic linking of habitat.

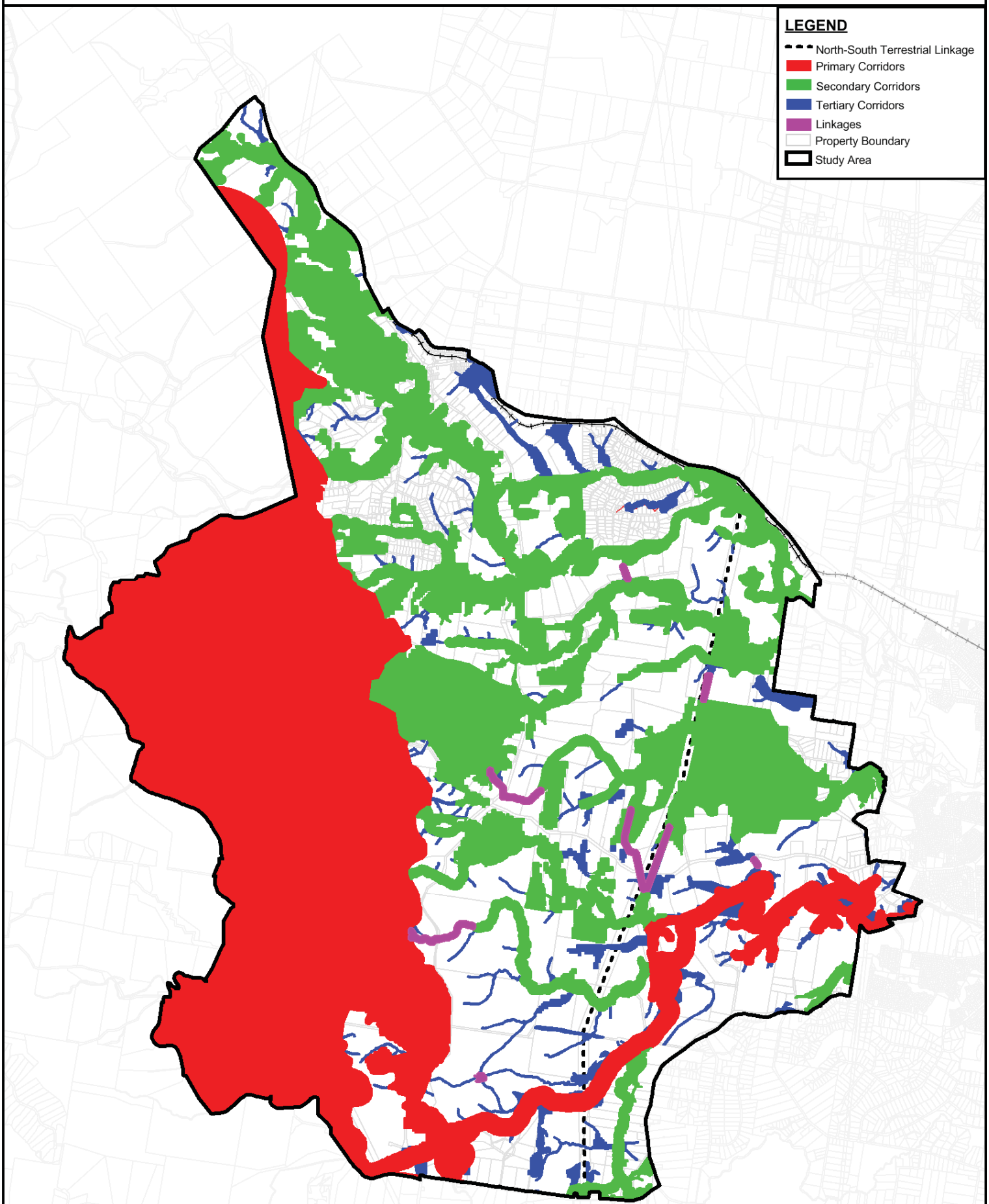
Figure 15 - Corridor Map



PROJECT NO. 30031051	**DRAWING NO.** 1	**REVISION** C	**STATUS**	N	**CLIENT**	
PROJECT TITLE Caboolture West Environmental Study	**CREATED BY** KM11809	**DATE** 16/08/2013 Time: 3:56:22 PM			Moreton Bay Regional Council	SMEC
COORDINATE SYSTEM GDA 1994 MGA Zone 56	**SOURCE** Bing Maps, MBRC					**CONSULTANT** SMEC Australia
PAGE SIZE A3 **SCALE** 1:40,000						

Path: R:\PROJECTS\30031051_MBRC_Caboolture\Products\MXD\30031051_Fig15_Corridors_A3_P_Rev_F.mxd

Figure 16 - Corridor Categorisations



N

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Scale: 1: 40,000 @ A3

COORDINATE SYSTEM
GDA 1994 MGA Zone 56

FIGURE 16 REVISION 0 STATUS FINAL
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5.2 Rehabilitation and Offset Receiving Potential

Desktop GIS analysis indicates 2070.8 ha of land in the Study Area may be suitable for Koala offset (**Figure 17**), including:

- 68.8 ha of high value suitable for rehabilitation areas under the Koala SPP2/10 **(Figure 17a)**
- 1001.6 ha of medium value suitable for rehabilitation areas under the Koala SPP2/10 **(Figure 17b)**
- 820.3 ha of low value suitable for rehabilitation areas under the Koala SPP2/10 **(Figure 17c)**
- 180 ha of Koala Bushland habitat mapped under the Koala SPP2/10 that was identified as requiring some rehabilitation in order to meet the habitat requirements for the Koala:
    - High Value Bushland: 82.6 ha
    - Medium Value Bushland: 96.9 ha
    - Low Value Bushland: 0.6 ha (**Figure 17d)**

Further, 1119 ha of land in the Study Area may be suitable for Regional Ecosystem offsets (**Figure 18**).

Overall, the combined area of land potentially suitable for offsets is 2480.7 ha (**Figure 19**), of which 709.1 ha may be suitable for both Koala and other Regional Ecosystem offsetting. This is particularly important in areas of rainforest communities such as RE12.11.10, which is mapped as low value suitable for rehabilitation for the Koala, but has a much higher value as a rehabilitation area for rainforest-dependent priority species.

Figure 19 also shows Public Land within the Study Area (92 ha). There is currently limited availability of Public land in the Study Area and it may not always occur in strategic locations (e.g. intended corridors). Therefore, private land will remain important for receiving offsets.

Figure 19 also shows areas identified as higher priority for rehabilitation. These areas include:

- Areas mapped as Koala Bushland Habitat under the Koala SPP (2/10) that were identified not to contain suitable Koala habitat, but are suitable for rehabilitation;
- Areas mapped as remnant vegetation under the *VM Act 1999* that were either cleared, or did not reach remnant vegetation status;
- Areas mapped as High Value Regrowth under the *VM Act 1999* that were cleared.

5.3 Constraint Levels of Verified Environmental Values

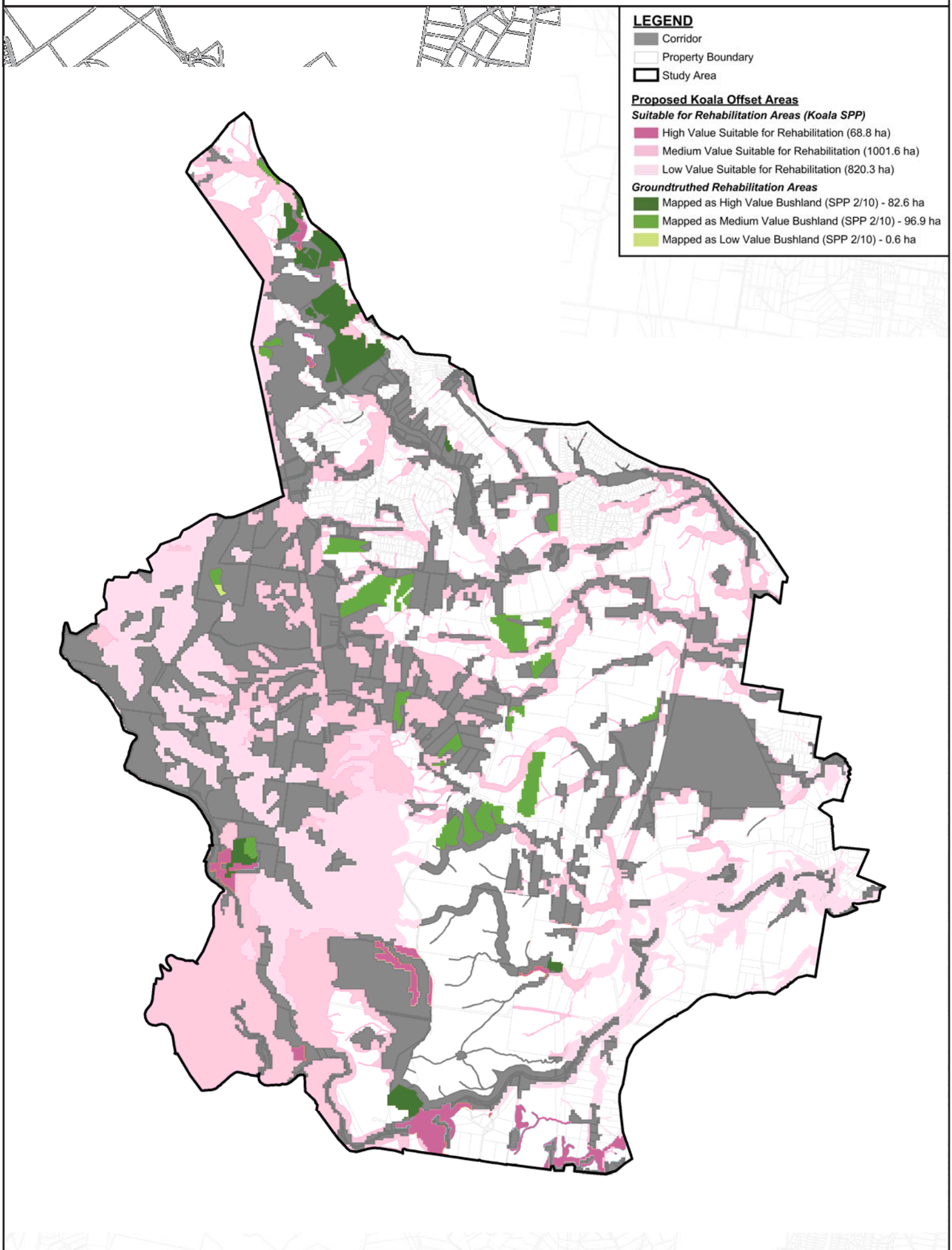
Based on the methodology outlined in Section 3.3.6, **Figure 20** maps areas subject to three levels of constraint:

1) High Environmental Value;

2) Environmental Offset Potential; and

3) Other Land Use.

Figure 17 - Land Suitable for Koala Offset



N

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Scale: 1: 40,000 @ A3

COORDINATE SYSTEM
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FIGURE 17 REVISION 0 STATUS FINAL

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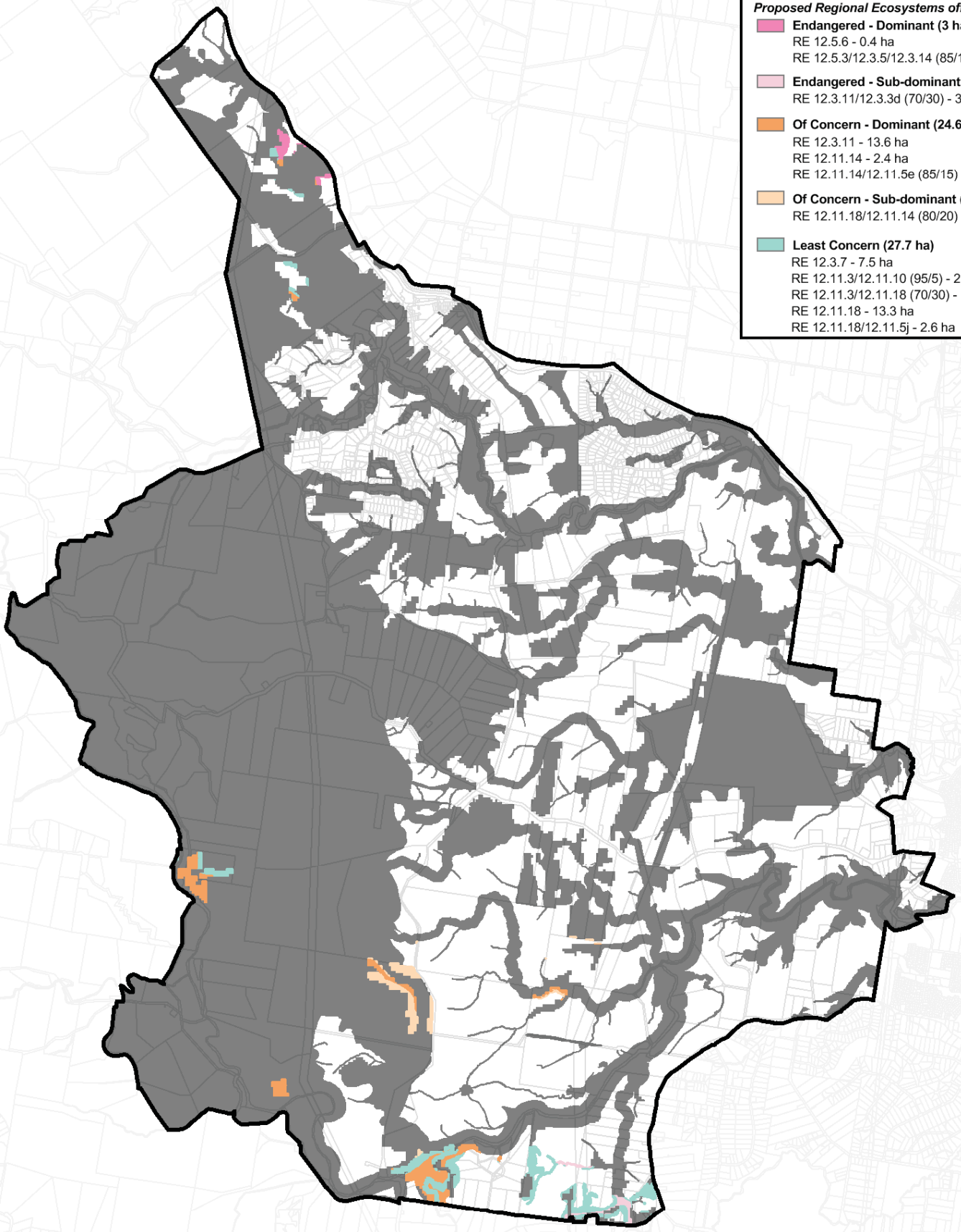
CONSULTANT SMEC Australia

Figure 17a - Land Suitable for Koala Offset: High Value Rehabilitation Areas



LEGEND

- Corridor
- Property Boundary
- Study Area

Proposed High Value Koala Offset Areas

Proposed Regional Ecosystems offsets

- **Endangered - Dominant (3 ha)**
  RE 12.5.6 - 0.4 ha
  RE 12.5.3/12.3.5/12.3.14 (85/10/5) - 2.6 ha
- **Endangered - Sub-dominant (3.8 ha)**
  RE 12.3.11/12.3.3d (70/30) - 3.8 ha
- **Of Concern - Dominant (24.6 ha)**
  RE 12.3.11 - 13.6 ha
  RE 12.11.14 - 2.4 ha
  RE 12.11.14/12.11.5e (85/15) - 8.6 ha
- **Of Concern - Sub-dominant (9.6 ha)**
  RE 12.11.18/12.11.14 (80/20) - 9.6 ha
- **Least Concern (27.7 ha)**
  RE 12.3.7 - 7.5 ha
  RE 12.11.3/12.11.10 (95/5) - 2.5 ha
  RE 12.11.3/12.11.18 (70/30) - 1.8 ha
  RE 12.11.18 - 13.3 ha
  RE 12.11.18/12.11.5j - 2.6 ha

N

SCALE 0 0.5 1km
Scale: 1: 40,000 @ A3

COORDINATE SYSTEM GDA 1994 MGA Zone 56

FIGURE 17A REVISION 1 STATUS FINAL

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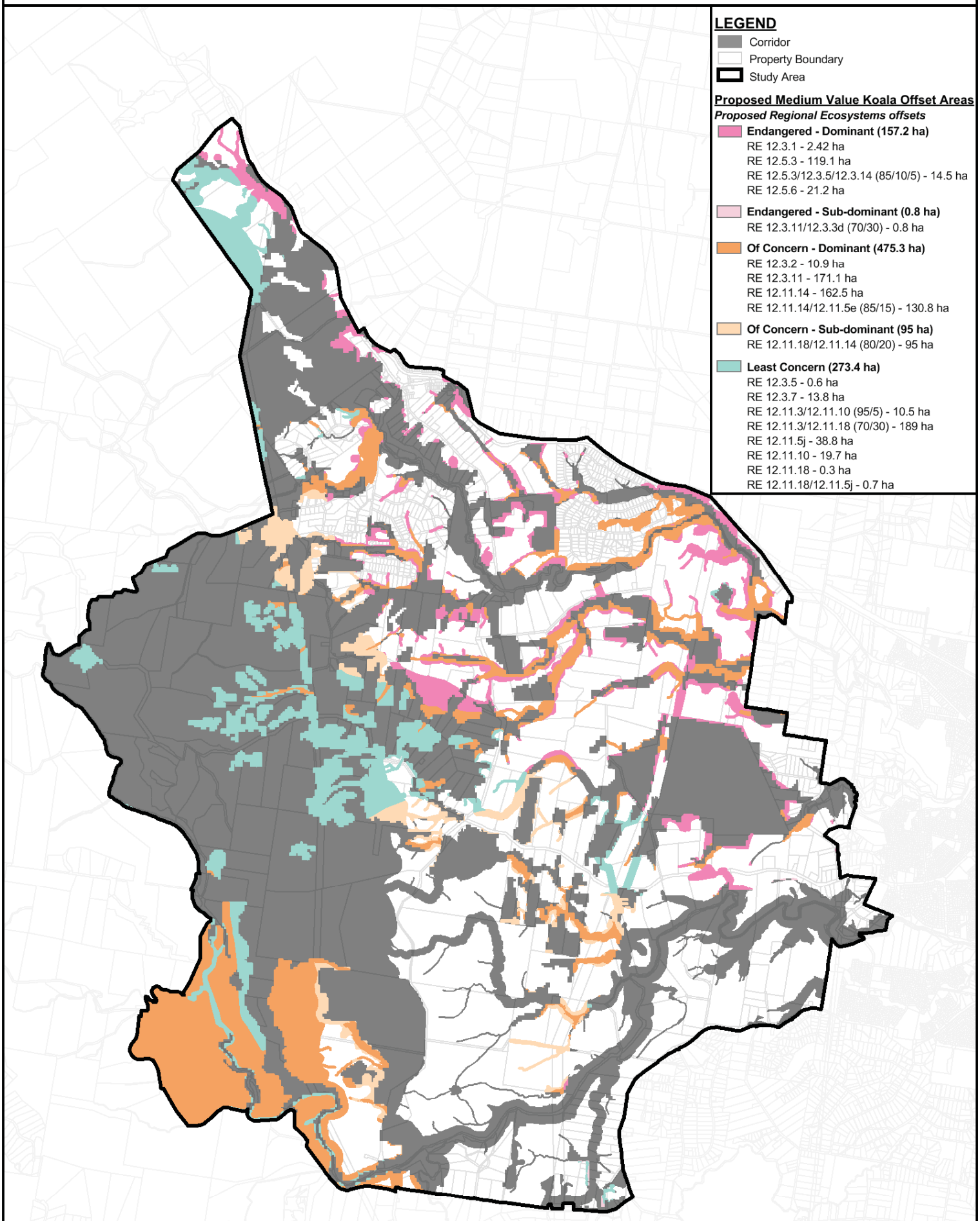
Figure 17b - Land Suitable for Koala Offset: Medium Value Rehabilitation Areas



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Scale: 1: 40,000 @ A3

COORDINATE SYSTEM GDA 1994 MGA Zone 56

FIGURE 17B REVISION 0 STATUS FINAL

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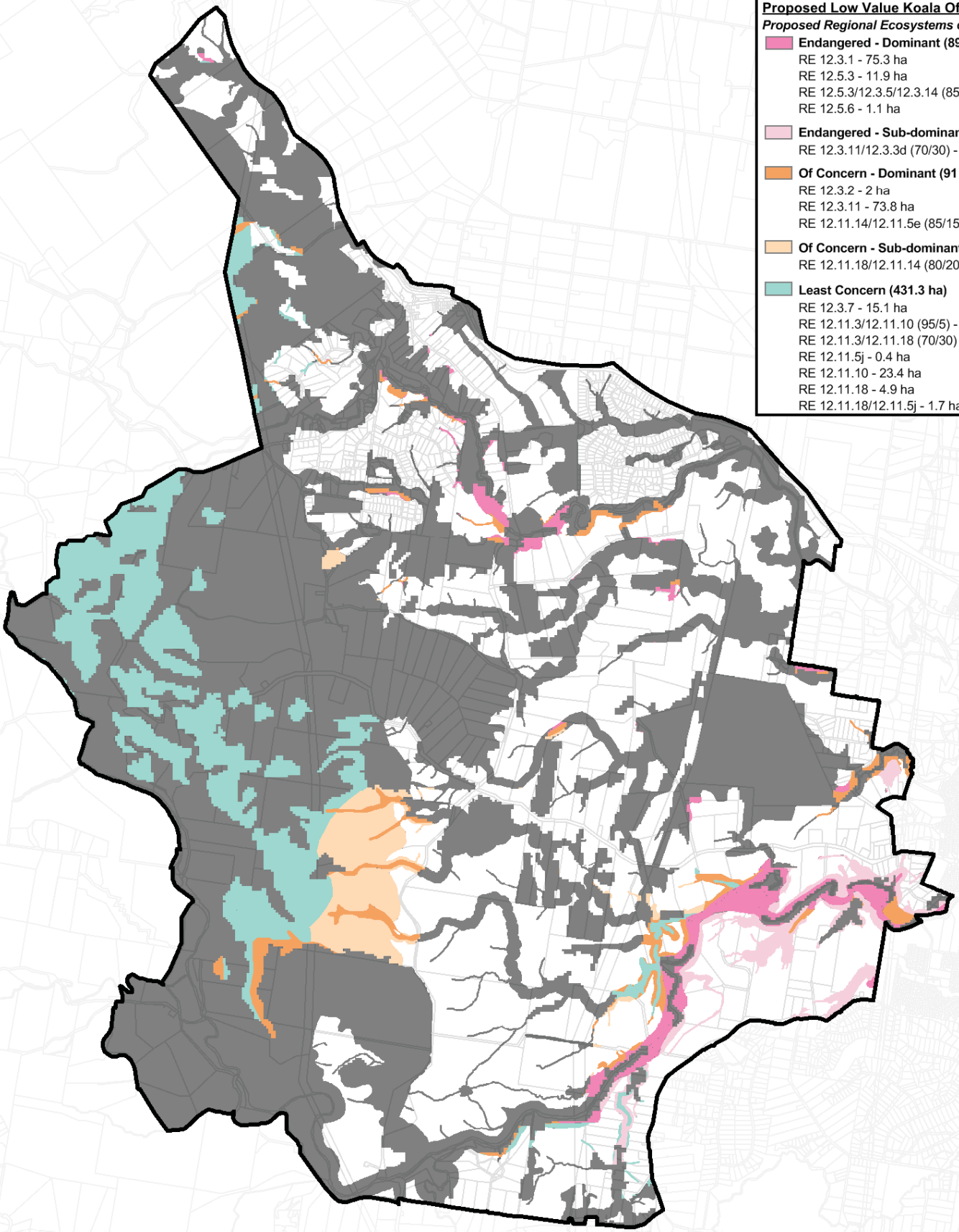
Figure 17c - Land Suitable for Koala Offset: Low Value Rehabilitation Areas



LEGEND

- Corridor
- Property Boundary
- Study Area

Proposed Low Value Koala Offset Areas

Proposed Regional Ecosystems offsets

Endangered - Dominant (89 ha)
- RE 12.3.1 - 75.3 ha
- RE 12.5.3 - 11.9 ha
- RE 12.5.3/12.3.5/12.3.14 (85/10/5) - 0.7 ha
- RE 12.5.6 - 1.1 ha

Endangered - Sub-dominant (83.9 ha)
- RE 12.3.11/12.3.3d (70/30) - 83.9 ha

Of Concern - Dominant (91 ha)
- RE 12.3.2 - 2 ha
- RE 12.3.11 - 73.8 ha
- RE 12.11.14/12.11.5e (85/15) - 15.2 ha

Of Concern - Sub-dominant (124.9 ha)
- RE 12.11.18/12.11.14 (80/20) - 124.9 ha

Least Concern (431.3 ha)
- RE 12.3.7 - 15.1 ha
- RE 12.11.3/12.11.10 (95/5) - 146.3 ha
- RE 12.11.3/12.11.18 (70/30) - 239.5 ha
- RE 12.11.5j - 0.4 ha
- RE 12.11.10 - 23.4 ha
- RE 12.11.18 - 4.9 ha
- RE 12.11.18/12.11.5j - 1.7 ha

N

SCALE 0 0.5 1km
Scale: 1: 40,000 @ A3

COORDINATE SYSTEM GDA 1994 MGA Zone 56

FIGURE 17C REVISION 1 STATUS FINAL

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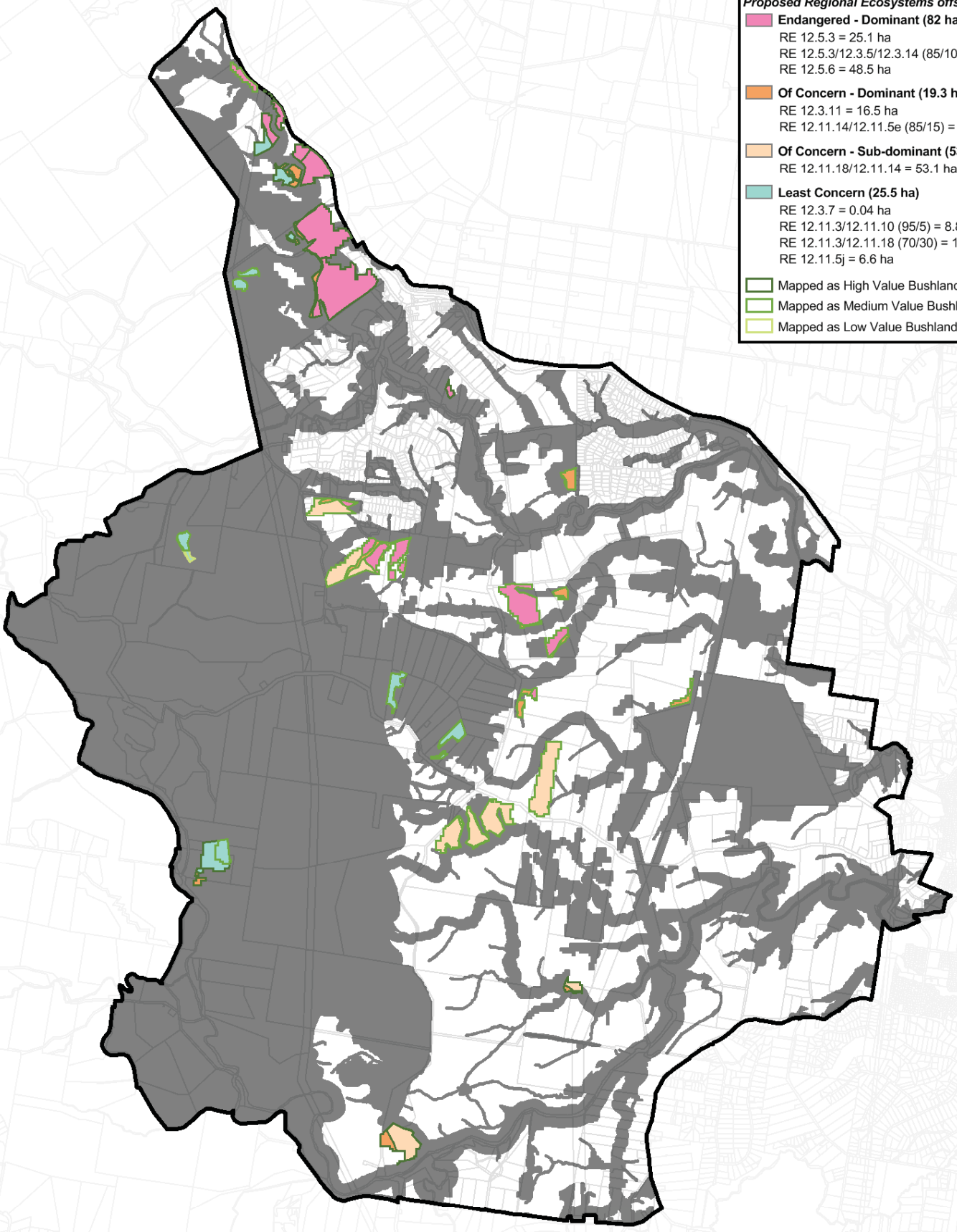
Figure 17d - Land Suitable for Koala Offset: Land mapped as Bushland Habitat (SPP2/10) that requires Rehabilitation



LEGEND

- Corridor
- Property Boundary
- Study Area

Proposed Koala Offset Areas

Proposed Regional Ecosystems offsets

- **Endangered - Dominant (82 ha)**
  - RE 12.5.3 = 25.1 ha
  - RE 12.5.3/12.3.5/12.3.14 (85/10/5) = 8.4 ha
  - RE 12.5.6 = 48.5 ha
- **Of Concern - Dominant (19.3 ha)**
  - RE 12.3.11 = 16.5 ha
  - RE 12.11.14/12.11.5e (85/15) = 2.8 ha
- **Of Concern - Sub-dominant (53.1 ha)**
  - RE 12.11.18/12.11.14 = 53.1 ha
- **Least Concern (25.5 ha)**
  - RE 12.3.7 = 0.04 ha
  - RE 12.11.3/12.11.10 (95/5) = 8.8 ha
  - RE 12.11.3/12.11.18 (70/30) = 10.1 ha
  - RE 12.11.5j = 6.6 ha

- Mapped as High Value Bushland (SPP 2/10)
- Mapped as Medium Value Bushland (SPP 2/10)
- Mapped as Low Value Bushland (SPP 2/10)

N

SCALE 0 0.5 1km
Scale: 1: 40,000 @ A3

COORDINATE SYSTEM GDA 1994 MGA Zone 56

FIGURE 17d REVISION 0 STATUS FINAL

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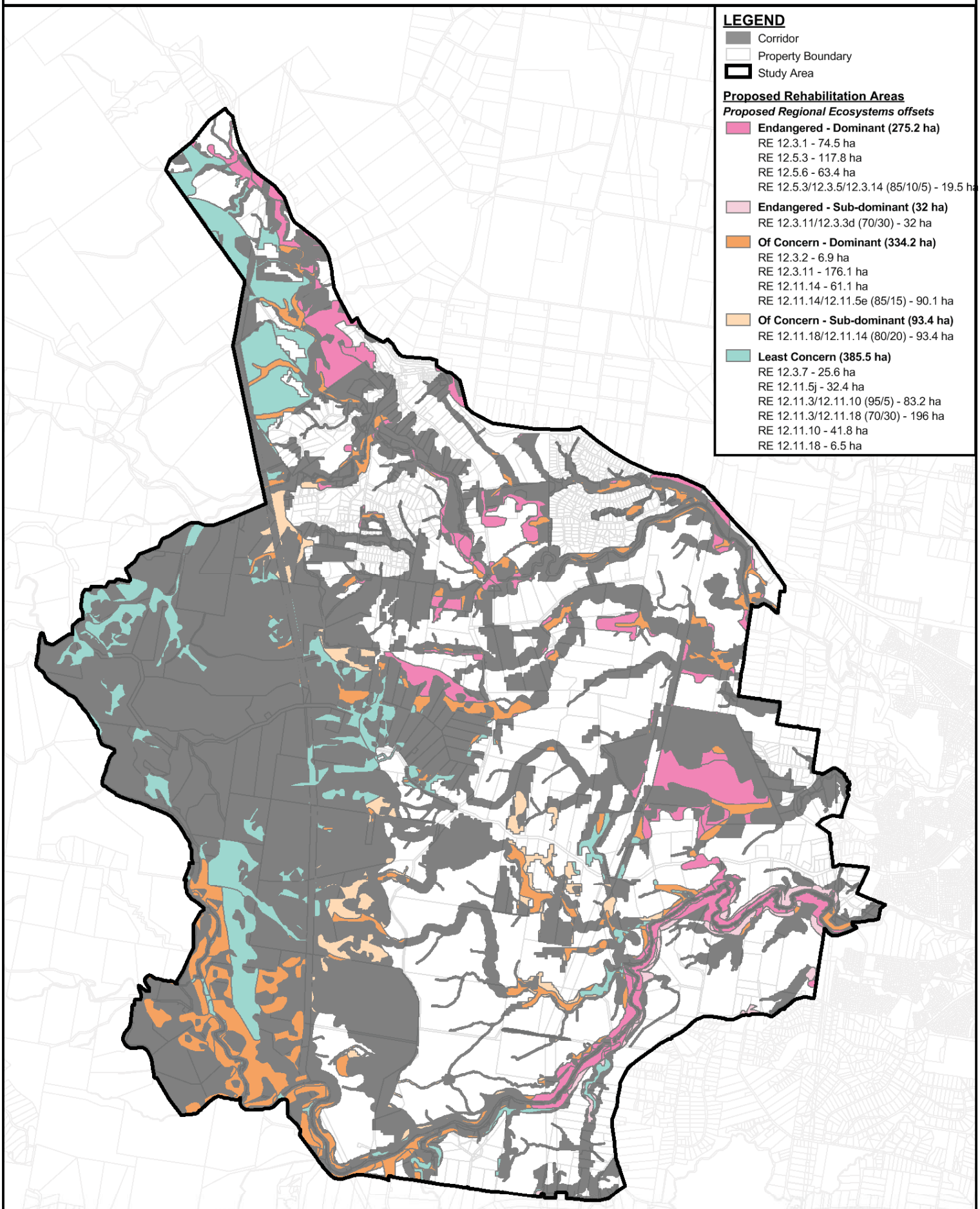
Figure 18 - Land Suitable for Regional Ecosystem Offsets



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Scale: 1: 40,000 @ A3

COORDINATE SYSTEM GDA 1994 MGA Zone 56

FIGURE Land Suitable for RE Offsets
REVISION 1
STATUS FINAL
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PROJECT NO. 30031051
PROJECT TITLE Caboolture West Environmental Study

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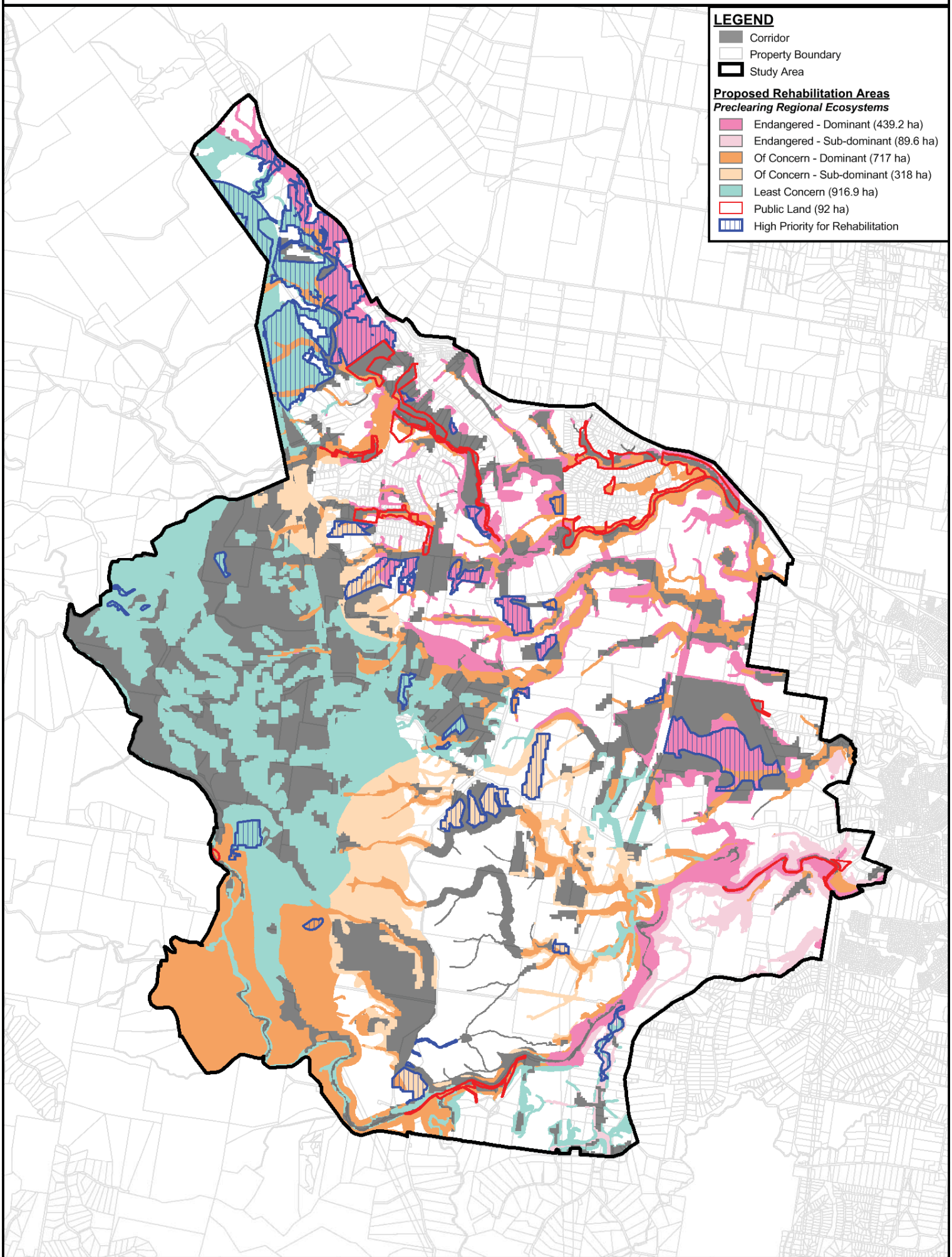
CONSULTANT SMEC Australia

Figure 19 - Land Suitable for Offsets



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COORDINATE SYSTEM
GDA 1994 MGA Zone 56

FIGURE Land Suitable for Offsets REVISION 1 STATUS FINAL
CREATED BY AM11482 DATE 21/08/2013 ISSUED FOR INFORMATION

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PROJECT NO. 30031051 PROJECT TITLE Caboolture West Environmental Study

Moreton Bay Regional Council
CLIENT Moreton Bay Regional Council

SMEC
CONSULTANT SMEC Australia

Figure 20 - Environmental Values

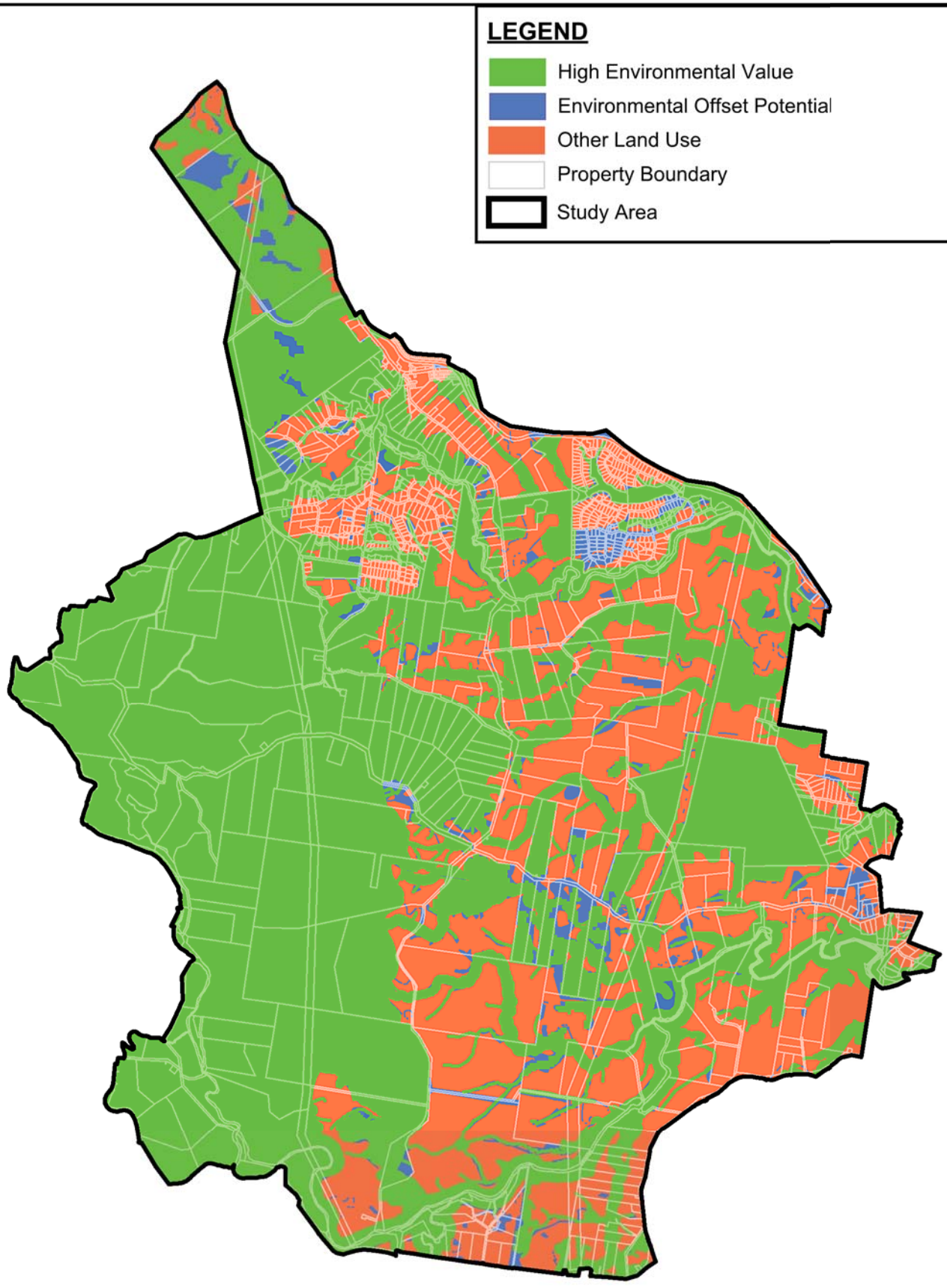

FIGURE Environmental Values	PROJECT NO. 30031051	SCALE 0 1 2km Scale: 1: 60,000 @ A4	N	CONSULTANT SMEC Australia
CREATED BY AM11482	PROJECT TITLE Caboolture West Environmental Study			
REVISION 2				
STATUS DRAFT	COORDINATE SYSTEM GDA 1994 MGA Zone 56			CLIENT Moreton Bay Regional Council
DATE 28/08/2013	SOURCE The State of Queensland (DEHP), Copyright 2012			
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6 DISCUSSION

6.1 Koala

6.1.1 Koala Habitat Mapping

A number of errors with the existing Koala habitat mapping were observed in the field and where principally due to incorrect mapping of unsuitable or lower quality habitat, such as plantations, exotic pines and Acacia regrowth (see Seabrook *et al.* 2003). These areas were in some cases, such as plantations where rehabilitation is unlikely, removed from a modified Koala habitat map. Despite this, potential Koala habitat is geographically widespread in the Study Area. Overall, however, Koala habitat is fragmented, and the overall amount limited particularly in the eastern half of the Study Area.

While Koala habitat was patchy in the eastern half of the Study Area, it tended to be associated with medium to high habitat quality according to the State mapping criteria. In contrast, habitat was more continuous in the western part of the Study Area, but was associated with low quality habitat. The SPP mapping is based on landscape features, such as land zone and elevation. However, the presence of a Koala record can increase habitat quality by one category (e.g. from low to medium given the same landscape characteristics). Therefore, low habitat quality in the western half of the Study Area is partly an artefact of the difficultly of obtaining Koala records in steep, hilly country. However, while there was Koala activity in the west of the Study Area, it was generally low level activity.

6.1.2 Assumptions and Limitations of SPOT Assessment

Koala home-ranges can range from several hectares to tens of hectares in coastal environments (White 1999; Ellis *et al*. 2009), but can be even larger (~100 ha) in inland areas (Ellis *et al.* 2002). Reported male home-ranges are sometimes larger than females (Mitchell 1990; White 1999) but this is not always the case (Ellis *et al.* 2009). Similarly, while Koala home-ranges may overlap (particularly males overlapping with one or more females: Mitchell 1990), overlap independent of sex has also been reported (Ellis *et al.* 2009). Although home-ranges overlap, there appears to be little sharing of food trees (Matthews *et al.* 2007; Ellis *et al.* 2009). Despite this, areas of home-range overlap appear to be important to the social behaviour of the Koala and it is this spatial structuring that provides the rationale behind the SPOT assessment technique (Phillips and Callaghan 2011).

The use of indirect cues, primarily pellet-based searching, has been widely used in published studies on the Koala (Woosnam-Merchez 2012). Interpretation of the SPOT assessment technique is based on the proportion of 30 trees in a plot with at least one Koala pellet within 1 m of its base. An advantage of this approach is that Koalas do not need to be within the sampling area at the time of survey, but simply during some prior period during which pellet were deposited. It is thought that Koala pellets may persist for up to a year in dry conditions (Callaghan *et al.* 2011). While this is a relatively efficient use of time and resources, it is important to understand the limitations of the approach.

The SPOT assessment technique assumes that areas of higher Koala activity are associated with a greater proportion of trees with deposited pellets (Phillips and Callaghan

2011). There is evidence to suggest that there is a relationship between the probability of finding Koala pellets and their population density, but this relationship needs to be calibrated by site-specific details (Ellis *et al.* 2013). This is because there are a number of factors that can influence the chance of finding a pellet beneath a tree.

Firstly, the rate of pellet production is unlikely to be uniform. Factors influencing pellet production may include geographic location, season, tree species browsed and time of day (Ellis *et al.* 1998, 2013). The present study was conducted over a very restricted geographic area and over a short period of time, making these factors unlikely to cause substantive error when comparing relative Koala activity across the study sites. However, they do confound any attempt to calibrate the results with population densities determined in other locations at other times. Koalas appear to deposit most pellets in the initial stages of the activity period, which in Queensland occurs during the first half of the night (Ellis *et al.* 1998). Therefore, not all trees used by a Koala may have pellets deposited beneath them. In south-east Queensland, this was estimated to be 23% of trees (Ellis *et al.* 2013). In contrast, when Ellis *et al.* (1998) placed plastic sheeting beneath occupied trees, only 4% of trees failed to produce pellets. This suggests that detectability may be a more important constraint than pellet production (Ellis *et al.* 2013).

Secondly, the decay of pellets is important as a pellet that has decayed is not available to be detected. The rate of pellet decay varies depending on factors such as rainfall, flooding, moisture content of the substrate, landscape position and invertebrate activity (Cristescu *et al.* 2012). Thus, there will be spatial and temporal variation in the rate of pellet decay. The months preceding the field survey were characterised by above average rainfall, with 986 mm recorded from January to April 2013 (mean for this period 694 mm) (BOM 2013). This is likely to affect comparisons with Koala activity in other localities, particularly when data was obtained during drier years. However, it is not likely to affect relative comparisons within the study area because all field work was conducted over a fairly short period. Indeed, sampling at nearby Morayfield was also conducted following this above average rainfall and moderate to high Koala activity levels were obtained. While the Morayfield sites were generally more open as many occurred in a rural residential context, this suggests that rainfall *per se* does not adequately explain the low activity levels in the present study. While some variation between sites may be expected due to the remaining factors, and there is likely to be some correlation between them, this still does not explain why no sites with medium to high activity levels were found at least at sites less conducive to pellet decay.

Thirdly, there is likely to be variation in pellet detectability due to understorey structure and litter fall, which will obscure pellets, assuming them to be present (i.e. false absence) (Cristescu *et al.* 2012). Scats are more difficult to detect beneath trees where the understorey is dense. However, the SPOT assessment technique does not rely on finding all deposited pellets, only one per tree. Provided pellets are on the surface of the leaf litter Cristescu *et al.* (2012) indicates that a two minute search should be sufficient to find at least one pellet irrespective of understorey density. While some sites in the study area had a dense understorey, most did not. Therefore, understorey density does not explain why no sites of medium to high activity were identified. Similarly, given that all sites were sampled over a fairly short period of time, it is unlikely that litter fall has produced pronounced differences in pellet detection between sites. Moreover, most sites were characterised by a litter layer with a depth of no more than 3 cm and there had been no recent bark shed. These observations suggest that it is unlikely that pellets would have

generally been obscured under litter. When SPOT assessments were conducted at sites along the Moreton Bay Rail corridor there had been recent bark shed by Scribbly Gum, resulting in deep piles of bark around the bases of these trees (D. Sharpe personal observations). However, this did not prevent Koala pellets being readily found leading to medium to high activity scores at many sites (SMEC 2012). Despite this, it is likely that trees with only one or a few pellets underneath will occasionally yield a zero result due to litter fall. Due to the rainfall that preceded the study area, which would have resulted in a constantly wet substrate, this is fairly likely and suggests that the interpretation of Koala activity levels should be conducted in this light. In other words, the threshold for delineating levels of Koala activity should be slightly relaxed.

Despite the limitations discussed above, it is important to remember that the SPOT assessment technique requires only one pellet to be located per tree (not all pellets) and it does not seek to provide density estimates, but rather to identify areas of relative Koala activity. Koala activity is then divided into three broad categories, high, medium and low, which are interpreted in the context to an underlying population density at a regional scale (Phillips and Callaghan 2011). Given that south-eastern Queensland in general (e.g. Dique *et al.* 2004) and the Moreton Bay region in particular are known to be important to the Koala (see Dique *et al.* 2003b; Dique and Taske 2008; SMEC 2012), an east coast high density population was used as the reference. The SPOT technique has particular value in planning studies that require some form of prioritisation of Koala habitat importance rather than density estimates (Callaghan *et al.* 2011).

An alternative approach would have been to use direct observation of Koalas to locate core habitat. This would potentially also have enabled the estimation of population density. However, there are limitations to direct observation. Despite its moderate size, the Koala is a difficult animal to locate as it camouflages well, often occurs at low density and individuals may be outside the sampling area at the time of survey. Consequently, few data may be obtained (Woosnam-Merchez 2012). While it is possible to overcome these limitations with increased sampling intensity, such effort will typically be beyond the scope of planning studies and development assessments due to time, labour and financial constraints. Given the Koala activity levels determined by the SPOT assessment technique suggest that a low density population occurs in the study area, it is unlikely that direct observation techniques would have enabled reliable estimates of population density or enabled the identification of core habitat without intensive searching by i) conducting surveys at many sites and ii) conducting repeated surveys at each site. The required level of survey effort would have greatly exceeded the resourcing of this planning study.

While conducting the fieldwork for this study, the trees in each plot were routinely scanned for the presence of the Koala. Although this represents opportunistic observation rather than a formal survey, it is worth noting that no Koalas were observed at any of the 80 survey sites, all of which produced evidence of no or low Koala activity. In contrast, Koalas were opportunistically observed at 4 of the 24 sites used along the Moreton Bay Rail corridor (SMEC, 2012) and at 2 of 18 survey sites at Morayfield (SMEC, unpublished data). Both these locations were frequently associated with medium to high Koala activity, as determined by the SPOT assessments. Thus, the ability of the SPOT assessment technique to provide a reliable guide to relative Koala activity levels in the study area appears to be justified. These observations also suggest that the low activity levels are a reasonable reflection of Koala distribution and abundance in the study area.

6.1.3 Status and Conservation of the Local Koala Population

In interpreting of the SPOT assessment technique it is assumed that medium and high Koala activity levels are generally indicative of sedentary individuals in stable home-ranges and suggest an area of major activity likely to be associated with the presence of breeding females. In contrast, low activity levels indicate more transitory habitat use (Phillips and Callaghan 2011). However, Phillips and Callaghan (2011) cautioned about the interpretation of low activity levels as it may also indicate a low density population due to, for example, the palatability of foliage on soils of different quality. In any case, low activity levels should not necessary detract from the importance of habitat because historic factors (e.g. logging, fire, previous clearing) may influence contemporary population dynamics and the recovery potential may be high if suitable tree species are present and populations are known to occur nearby.

Although only low Koala activity (Phillips and Callaghan 2011) was detected in the study area, there were many sites that only had one or two trees with deposited pellets and a few sites that had more. The four best sites each had six trees with scats (20%), which is approaching the 22% threshold for medium level activity. Rainfall that preceded the study may have caused accelerated pellet decay, suggesting activity level thresholds for determining the presence of sedentary individuals should probably be relaxed.

The habitat in the study area is also highly fragmented. It is possible that small patch size and the spatial arrangement of habitat patches may be limiting population density (Bowers and Matters 1997; McAlpine *et al.* 2006, but see Dique *et al.* 2004). Moreover, many of the habitat patches had been previously cleared, as indicated by the lack of large trees and trees with hollows (**Appendix D**). Thus, historic and contemporary patterns of habitat availability may be influencing contemporary Koala population dynamics, causing current density to be low even though Koalas are resident within the study area. The impact of historic clearing may have been compounded by hunting and the impact these factors may have had on the incidence of disease, particularly Chlamydia (Seabrook *et al.* 2003). With increasing urbanisation, vehicle strike and dog attack may be additional factors affecting the local Koala population.

There may also be a relationship between site quality and Koala abundance in the study area. Site quality is known to influence leaf palatability (Moore and Foley 2000; Moore *et al.* 2005). The Moreton Bay Rail corridor (SMEC 2012) and Morayfield (SMEC unpublished data) were associated with medium to high Koala activity levels. The Moreton Bay Rail corridor is characterised by land zones 3 and 5 and Morayfield is predominately land zone 5. In contrast, most Koala habitat in the Study Area is associated with land zone 11. While land zone 3 is present, most of the suitable Koala habitat has been cleared. Thus, the predominance of Koala habitat on land zone 11 may be limiting Koala density in the study area (e.g. Phillips and Callaghan 2000).

Although Koala activity is low, we suggest that Koalas are resident in parts of the study area. Therefore, in conjunction with the preceding discussion, we propose that areas of habitat associated with activity levels of greater than 10% are indicative of sedentary Koalas with large home-ranges. Population density in these areas will be correspondingly low. While it is not possible to suggest precise values for home-range area from our data, it is likely that home-range areas are at the upper end of published estimates (i.e. tens of hectares). Therefore, individual Koala home-ranges would extend well beyond the survey

plots. The highest percentage of trees used by the Koala at a single survey site was 20%, which Ellis *et al.* (2013) found to approximate a population density of 0.15 ha^{-1}. While there are many caveats associated with any extrapolation of density data from other regions (see discussion above), this may provide a ballpark estimate of Koala population density in the study area and is at the lower end of Koala density estimates (e.g. Dique *et al.* 2004). In addition to uncertainty about density, it is difficult to produce an estimate of the size of the local Koala population without further resolving the amount of habitat that is occupied. However, the combination of low density, limited available habitat and the under-utilisation of existing habitat all suggest that the local Koala population will be relatively small. Despite this, the Study Area would contribute to the viability of the regional Koala population (e.g. Dique *et al.* 2004).

Most survey plots that detected the Koala produced activity levels likely to be associated with transitory individuals. Male Koalas have a higher probability of dispersing between social aggregations (Dique *et al.* 2003a), making sub-adult males the most vulnerable to mortality, particularly due to vehicle strike (Lunney *et al.* 1999). However, both sub-adult and adult females are also known to move between habitat patches (Dique *et al.* 2003a). Therefore, movement corridors are important to maintain connectivity within the local population and allow the recolonisation of empty habitat patches. Creek lines are likely to be important movement corridors and are also capable of providing living habitat if sufficiently wide corridors are retained. While the major creek lines often support rainforest vegetation (e.g. RE 12.3.1), eucalypt communities (particularly RE 12.3.11) generally commence from the high bank. Forest Red Gum is an indicator species of RE 12.3.11 and has been identified as an important Koala food tree in many studies (e.g. White 1990; Tucker *et al.* 2007; Callaghan *et al.* 2011). Vegetated buffers along creek lines that capture RE 12.3.11 will be required to provide functional movement habitat for the Koala throughout the study area. Despite finding that Koalas were patchily distributed in the Study Area, the fieldwork revealed that preferred Koala food trees are widespread in the Study Area (e.g. Forest Red Gum, Tallowwood, Scribbly Gum, Small-fruited Grey Gum) (see Callaghan *et al.* 2011), both in areas of remnant vegetation and in areas of regrowth. Moreover, Koalas are known to occur both within the Study Area and in higher density areas to the south. These factors suggest that the potential for population recovery is good, but will require amelioration of current threats. If that can be achieved, a slow outward expansion from a number of small core areas to eventually form a more continuous population in the long-term is possible. Key mitigation actions will need to include wild dog control, reducing the occurrence of vehicle strike through appropriate urban planning, consolidating habitat patches, increasing the availability of habitat and the enhancement of habitat connectivity both within the Study Area and with areas of known habitat elsewhere in the region by establishing a corridor network.

Enhancing habitat connectivity via a corridor network is perhaps the most important action to enhance the viability of the Koala in the Study Area. The effect of the corridor network would be threefold. Firstly, due to habitat fragmentation the parts of the Study Area where aggregations of Koalas were identified are spatially discrete, suggesting that the Koala population is fragmented. Thus, the Koala population would exist as a meta-population, which is a series of local population connected by dispersal. Dispersal is an important mechanism that maintains population viability in a meta-population (Hanski and Gilpin 1991). A principle function of corridors is to facilitate dispersal and can be used to achieve connectivity within the Study Area and to link the Study Area with other areas of Koala habitat in the region. Secondly, Koalas are capable of using linear corridors as living

habitat. Koalas require access to a certain number of feed trees to persist and the area required to achieve this varies with habitat quality, the characteristics of individual trees, disturbance regimes and land use (Dique *et al.* 2004). While area is, therefore, an important consideration, the shape of the home-range is of secondary importance. Therefore, corridors have the potential to increase the total size of the Koala meta-population, possibly transforming it into one large, continuous population. Population size is the single most important determinant of population viability (Reed *et al.* 2003; Reed 2005). Thirdly, corridors potentially reduce mortality rates. In the case of the Koala, corridors with continuous tree cover enable escape for predators and reduce levels of energetic stress. The viability of populations of long-lived, slowly reproducing species, such as the Koala, are very sensitive to the mortality rate of juvenile, sub-adult and particularly adult individuals (Oli 2004; Goldingay and Sharpe 2004).

To be effective, corridors should have characteristics attractive to the target species (Hilty *et al.* 2006). In the case of the Koala, the presence of quality food trees is going to be an important factor (e.g. Phillips *et al.* 2000). As discussed above, Forest Red Gum would be captured in corridors along major drainage lines. Other likely food species were sufficiently widespread that they would be captured in corridors in other landscape positions. While Koalas will use narrow corridors and corridors consisting of scattered trees, neither situation is ideal because they expose them to a higher level of predator and may restrict social interactions. Dogs, which are known Koala predators, can generally penetrate up to 200 m into undisturbed habitat (Goldingay and Whelan 1997). However, they will gradually decline with increasing distance from a habitat edge (Catling and Burt 1995). This suggests that corridors suitable for the Koala should probably have a total width of 200 – 400 m. Corridors of this width would also be capable of supporting overlapping home-ranges, enabling fairly natural patterns of spatial organisation and social behaviour to become established.

The corridor strategy proposed in this report uses a series of priorities corridors to provide connectivity through the Study Area. The primary corridors would achieve minimum widths of 200 m and secondary corridors 100 m. These corridors would be primarily along the major drainage lines and waterways in the Study Area. Tertiary corridors and linkages would be 20 – 50 m and their locations will be finalised at the detailed design phase.

6.2 Other Priority Species

Of the 121 priority species identified during the desktop review, 31 were regarded as having a moderate to high chance of occurring in the Study Area, at least occasionally in the case of some highly mobile fauna (e.g. Flying-foxes, Black-necked Stork). Some of these species may occur broadly throughout the Study Area, but many other species depend on particular microhabitats that would limit their habitat use. It was beyond the scope of this study to survey and map in detail the distribution of microhabitat features, such as hollow-bearing trees and fallen logs), however, some general comments can be made.

Species such as raptors (Grey Goshawk, Square-tailed Kite) and owls (Powerful Owl) are highly mobile and have very large territories. It is unlikely that the Study Area appears fragmented to such species. There will be some variation in habitat use depending on

prey density, but they are likely to use most of the Study Area, at least occasionally. Thus, it is unlikely that current levels of fragmentation are impacting on these species. Rather, they would be limited by habitat availability. Therefore, any mitigation strategy that involves a net increase in habitat area, whether by consolidating habitat patches or enhancing corridor linkages, would benefit these species. Breeding opportunities for the Powerful Owl would be limited by the availability of trees with large hollows. This suggests that any breeding would be most likely to occur in the western part of the Study Area.

Stream-dwelling fauna (e.g. Giant Barred Frog, Tusked Frog, Platypus Sapphire Rockmaster, Australian River Mussel) also have the potential to be widespread in the Study Area. The streams are generally in good condition, water quality appears good and riparian vegetation is fairly continuous. Habitat appeared to be particularly good for the Giant Barred Frog, with pool/riffle sequences evident along most of the major drainage lines (e.g. Caboolture River, Wararba Creek). This species is listed as Endangered under both State and Commonwealth legislation, making it perhaps the most significant species of conservation concern in the Study Area. The Plumed Frogmouth is also strongly associated with streams, but it most likely to be confined to the steep gullies in the western part of the Study Area.

A number of highly mobile nectarivores are likely to use the Study Area to obtain nectar. The Grey-headed Flying-fox and the Black Flying-fox are fairly sedentary in south-east Queensland. These species also eat fruit. They are likely to be present in the Study Area most of the time, though their numbers will fluctuate greatly in response to food availability. Other species, such as the Little Red Flying-fox, Regent Honeyeater and Swift Parrot are more nomadic and would only be present during years of heavy flowering of Eucalypt species. The Swift Parrot only breeds in Tasmania and is a winter visitor to the mainland. The nearest known breeding site of the Regent Honeyeater is near Ipswich in south-east Queensland.

Feathertail Gliders and Squirrel Gliders also consume a lot of nectar, however, their diets also include honeydew and arthropods (insects and spiders). Tree hollows are required for daytime shelter and breeding. These species are sedentary and therefore require all necessary resource to occur within the home-range area. While the bushland within the Study Area was floristically suitable to meet the foraging requirements of these species, hollow-bearing trees were very patchy. This would severely constrain the distribution of these species, particularly in the eastern half of the Study Area. These species are also sensitive to habitat fragmentation, with gaps greater than 20 – 50m unlikely to be crossed. This may prevent some areas of otherwise suitable habitat from being occupied.

Similarly, the Brush-tailed Phascogale, which feeds mainly on arthropods, requires tree hollows. It has quite a large home-range. The paucity of tree hollows in the eastern part of the Study Area in conjunction with relatively small patch size suggests that this species is likely to be absent from this area. It is likely to be present in the hilly western part of the Study Area where larger tracts of habitat are available and tree hollows are more common.

The Black-necked Stork and Brolga are wetland birds that are likely to occur on the Caboolture River floodplain occasionally. The Brolga feeds mainly on tubers and could potentially turn up at any time. However, the Black-necked Stork feeds on frogs, fish, eels

and invertebrates. It is most likely to occur in the Study Area following heavy rains that result in temporary flooding; not just river flooding, but also the filling of depressions on the floodplain as eels can move overland during rain events. It may also use farm dams occasionally. Similarly, the Green-thighed Frog breeds in temporarily flooded areas. While it would also use the floodplain, it may also occur in other parts of the Study Area where large temporary pools become available.

The Australian Painted Snipe uses freshwater wetlands and dams. There are no natural wetlands in the Study Area likely to be suitable for this species; however, it may feed in farm dams with vegetative cover and muddy edges. Lewins Rail occupies swamps and swamp forest with a dense cover of sedges and/or ferns. Some small areas of Paperbark Forest with a dense ferny understory were found in the Study Area. It is not clear whether these patches were of sufficient area to support this species. Lewin's Rail also occurs in tall rank grassland, however, the current grazing pressure in the Study Area appears to be limiting the development of suitable grassland.

Most of the priority flora species that are likely to occur in the Study Area are associated with streams and/or rainforest, particularly drier rainforest. Most streamside vegetation in the eastern half of the Study Area showed evidence of previous disturbance, which suggests a lower probability of many priority species occurring there. Therefore, most priority flora would be found in the western part of the Study Area where the vegetation is less disturbed. Indeed, the only threatened flora record obtained during the fieldwork was Bahr's scrub croton in the hilly western area. However, threatened flora surveys were not a specific aim of the fieldwork and it remains likely that other priority flora will be present.

The scope of this study was not sufficiently broad to provide detailed mapping of priority species distributions. Rather, the priority species mapping should be viewed as the likely broad limits to a species distribution within the Study Area, but the actual distribution of many species will be further limited by the availability of specific microhabitat features, such as fallen logs and hollow-bearing trees. However, the maps enable a precautionary approach to be adopted in land use decisions and should be used to guide the implementation of specific clearing protocols. Furthermore, the distribution maps provide good starting points for further field surveys for particular priority species should the need arise.

6.3 Vegetation

The vegetation of the study area is reflective of the areas long history of clearing and disturbance for agriculture, forestry and more recently rural residential development. Extensive areas of regrowth vegetation are present throughout the study area. This has implications for fauna habitat values and, correspondingly, for the need to manage regrowth areas strategically within a planning framework which allows the maintenance of existing ecological values while providing opportunities to offset impacts from future development.

The Vegetation Management Framework Amendment Bill was passed on 21 May 2013 and will come into effect towards the end of this year. This Bill includes the removal of all High Value Regrowth vegetation regulations from freehold and Indigenous land. With this in mind, we did not attempt to verify the existing High Value Regrowth layer during

fieldwork. As such, High Value Regrowth vegetation will not operate as a constraint in the future.

Despite the change in legal status, the value of High Value Regrowth vegetation remains an important issue. High Value Regrowth Mapping includes all areas of non-remnant woody vegetation to be used for vegetation management purposes (i.e. all woody vegetation that fails to meet the structural and / or floristic characteristics of remnant vegetation). As such, it may include regrowth, heavily thinned or logged and significantly disturbed vegetation. While this mapping is ambiguous, it can be useful for identifying land suitable for rehabilitation and the receipt of offsets. Regrowth vegetation has benefits over cleared land for this purpose as stands of regrowth are likely to require gap planting rather than broadscale planting and there will be a reduction in the time required for structural habitat features, such as hollow-bearing trees, to develop.

6.4 Corridors and Connectivity

The study area has a range of natural features which provide excellent potential for wildlife corridor development and expansion. Large, generally east - west orientated watercourses in the area provide an already development constrained linkage which can be built on and developed and which link to the extensive area of topographically constrained and heavily vegetated land in the west of the study area. This area has already been identified as forming part of a regional wildlife corridor and this use is supported by the findings of this study However, it should be noted that these largely riparian corridors currently do not contain habitat suitable for the full suite of priority species identified as being likely to occur in the study area. Careful planning will be required to develop the proposed corridors to maximise their utility across a wide range of species.

The ultimate aim of the corridor/linkage strategy is to improve the viability of the local Koala population and populations of other threatened and priority species identified during the flora and fauna habitat assessment. Population viability is strongly influenced by population size and migration rates (which allow recolonisation of empty habitat patches, for example, after fire and provide genetic exchange). Therefore, the objectives of the corridor/linkage strategy were to maximise the overall population size by consolidating habitat into large patches and strategically linking habitat to allow the exchange of individuals (e.g. during dispersal).

If appropriate rehabilitation is undertaken, these areas are capable of providing suitable habitat for priority species and will provide key linkages in the proposed corridor network as the habitat values in these areas develops.

7 CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

Koalas were found to be widespread in the Caboolture West Study Area. The Study Area appears to contain a comparatively small, but widely distributed Koala population. This population appears to include both resident Koala and transitory individuals. Higher levels of koala activity were found at selected sites, indicating the presence of a socially stable aggregation of breeding Koalas where individual home-ranges are large. The Study Area would contribute to the viability of the regional Koala population.

Potential low to moderate quality habitat for the Koala is widespread in the Study Area. The area also has significant areas of potential habitat for a range of priority fauna and flora species many of which are threatened species. The area has excellent potential for the development of a wildlife corridor network based around existing physical features (e.g. floodplains, creeklines, topography), which are constrained from a development perspective (primary and secondary corridors). However, a number of narrower minor linkages will need to be included at the detailed design phase to complement the primary and secondary corridors.

As noted in the previous section the proposed corridor network aligns well with proposed regional level wildlife corridor planning. Notably, with regard to the hilly western portion of the study area and the Caboolture River corridor.

Most priority species identified, either live along creeklines or are highly mobile fauna that would not perceive the existing landscape as being fragmented (e.g. raptors, flying-foxes). Overall, priority species that currently remain in the Study Area would be relatively tolerant of fragmentation and edge effects. Thus, they are likely to benefit from the enhanced corridor network proposed. Primary and secondary corridors of 100 – 400 m are likely to cater for priority species with a moderate to high probability of occurring in the Study Area. Many of these species would be capable of utilising the corridor network as living or occasional foraging habitat.

Although activity levels were low, it is still considered that the Study Area supports an important Koala population. Rainfall prior to the field survey is likely to have resulted in accelerated rates of pellet decay, potentially causing activity levels to be slightly under-estimated. This factor should be taken into consideration in future planning for this species. It is also possible that the Koala population within the study area is still recovering from major historic disturbance. Much of the habitat in the Study Area was relatively immature, consistent with previous clearing. Investigation of historical aerial photography of the study area shows the extensive levels of clearing which have occurred. Known Koala food trees (e.g. Forest Red Gum, Tallowwood, Scribbly Gum, Small-fruited Grey Gum) remain widespread in the Study Area both in areas of remnant vegetation and in areas of regrowth.

Koalas are capable of establishing stable home ranges in linear corridors. While Koalas will use narrow corridors and corridors consisting of scattered trees, neither situation is ideal because they expose them to a higher level of predator and may restrict social interactions. Dogs can generally penetrate up to 200 m into undisturbed habitat (Goldingay and Whelan 1997), gradually declining with increased distance from a habitat

edge (Catling and Burt 1995). This suggests that corridors suitable for the Koala should have a total width of 200 – 400 m.

Wider corridors have a greater chance of accommodating a number of home ranges and therefore allowing home range overlap. This enables areas of home range overlap facilitating social behaviour of Koalas, including breeding activity. The proposed corridor strategy provides an interconnected network of habitat with widths ranging from 100 – 400 m, which are sufficient widths to accommodate Koala social behaviour. Minor linkages are also likely to be used during dispersal and in the course of movements through subdivided home-ranges spread over two or more habitat patches or in primary/secondary corridors.

Moreover, the Caboolture River is a significant movement area for the Koala and an important gateway to known Koala populations south of the Study Area (e.g. Sheepstation Creek). Thus, the potential for the recovery of the local Koala population is good. This recovery would be supported by the management of other known threats to the Koala (e.g. dog attack, vehicle strike). The establishment of a corridor network will in time enable a continuous and functioning Koala population to become established within the Study Area.

Ground-truthing revealed that the regrowth vegetation mapping was generally accurate. There are large areas of regrowth vegetation in the Study Area much of which is captured within the proposed corridor network. These areas provide an opportunity to develop an offsetting network which would provide a means of reducing development conflict whilst improving the ecological sustainability of the wider area. This will support ecological sustainability the Koala population and other priority species.

The ultimate aim of the corridor/linkage strategy is to improve the viability of the local Koala population and populations of other threatened and priority species identified during the flora and fauna habitat assessment. This can be assisted by maximising the overall population sizes of priority species by consolidating habitat into large patches and strategically linking habitat to allow the exchange of individuals or propagules (e.g. during dispersal).

In south-east Queensland, management of the Koala at the planning stage is currently directed by State Planning Policy 2/10 Koala Conservation in South East Queensland. As discussed earlier this policy will soon be superseded however the current broad policy aim, of ensuring that Koala habitat conservation is appropriately considered during the planning process so that there is a net increase in the amount of Koala habitat, resulting in an improvement in the viability of Koala populations is a laudable one and has been embraced within the wider planning study. These objectives have been achieved in the present study by i) identifying areas of Koala habitat, ii) offsetting any loss of Koala habitat to achieve a net gain of habitat and iii) strategically linking areas of retained and established habitat to increase population size and connectivity. These measures are essential to improving the viability of Koala populations in the Study Area and in the region generally.

7.2 Recommendations and Planning Considerations

7.2.1 Planning and Detailed Design Phase

The following points represent a range of ecological planning actions which are specific to the Study area and should be considered in the ongoing planning exercise.

- Consolidate habitat patches by increasing area (particularly small patches) and smoothing out edges to create more regular shapes. This will help to promote more efficient use of patches by reducing the likelihood of vacant space (inefficient home-range packing) and allow edge-sensitive animals to occur. The proposed corridor strategy has attempted to do this by amalgamating habitat areas within the corridor network where this was spatially feasible.

- Establish a corridor system that allows the connection of habitat patches in both a north/south and east/west direction. This will facilitate the movements of seasonal and altitudinal migrants. Corridors should be of sufficient width to allow movement by target species. Edge-sensitive species will require wider corridors. Therefore, primary and secondary corridors should be 100 – 400 m wide, including buffers. Corridors should be composed of the vegetation that would occur naturally in each landscape position.

- Koalas are capable of establishing stable home ranges in linear corridors. Wider corridors have a greater chance of accommodating a number of home ranges and therefore allowing home range overlap. This enables areas of home range overlap facilitating social behaviour of Koalas, including breeding activity. The corridor strategy recommends an interconnected network of habitat 100 – 400 m wide, which is sufficient to accommodate Koala social behaviour. Smaller linkages of 40 m (including buffers) are intended to supplement the primary and secondary corridors. The exact locations of these additional linkages are to be determined at the detailed design phase. The establishment of a corridor network will in time enable a continuous and functioning Koala population to become established within the Study Area.

- While the presence of waterways and other natural features determines a significant component of the corridor system, further planning of non-riparian corridors is required in the detailed design and planning phases of the project. Particularly to establish north –south linkages between the larger east –west corridors.

- Strategically locate offsets to:

    i) increase patch area,

    ii) regularise patch shape,

    iii) contribute to the corridor network and

    iv) provide vegetated buffers as appropriate. A detailed and comprehensive offsetting/rehabilitation strategy will be required once more detailed planning is complete.

- Caboolture West Koala populations should be considered and managed as a single metapopulation in conjunction with Morayfield to the south and Beerburrum/Woodford to the north. Therefore, linkages beyond the Study Area need to be identified and retained.

7.2.2 On Ground Works Considerations

At a finer level of detail the following actions should be considered with regard to wildlife management at an individual development level.

- Because corridors may also provide living habitat, they should contain food (e.g. nectar, fruit, insects) and shelter (e.g. hollow-bearing trees, fallen logs) resources to promote survival of less mobile species during dispersal. These resources may require deliberate introduction if not already present.
- Retain dead trees wherever practical, as these are an important part of the hollow resource and can undergo rapid hollow development.
- Install nest boxes to compensate for the paucity of hollow-bearing trees. Encourage landowners to install nest boxes on their land. Council could assist by providing nest box designs on their website.
- Encourage landowners to report the locations of raptor stick nests.
- During clearing, salvage trees and move these to areas of retained or established vegetation to provide habitat as “fallen logs”.
- Underpass structures will need to be installed where roads intersect with areas of habitat and corridors. The underpasses will need to be designed to meet the needs of target species. Dry passage will be required where an underpass also provides a drainage function. Along creeks, the abutments of bridges can be set back from the bank to provide dry passage.
- Trees should be allowed to grow as close to road edges as practical to allow gliders to cross roads. In the case of four-lane roads, a central median will be required and planted with trees or a gliding pole installed. The resulting gaps should be <20m.
- Koala exclusion fencing is likely to be required along higher speed arterial roads. Vehicle speeds may need to be along residential roads. Traffic calming devices will be required to limit vehicle speeds.
- Where houses abut Koala habitat, dogs will be need to be kept in Koala proof yards (e.g. colourbond fencing) or enclosures. Trees and shrubs must be kept at least 2m from the outside of the fence to prevent Koala access. An escape pole should be installed on the inside of and next to the fence to allow Koala’s to escape should they become trapped.
- Where houses abut Koala habitat, swimming pools should be surrounded by Koala proof fencing (e.g. colourbond). Trees and shrubs must be kept at least 2m from the outside of the fence to prevent Koala access. An escape pole should be

installed on the inside of and next to the fence to allow Koala's to escape should they become trapped.

- Develop clearing protocols aimed at ensuring animal welfare during clearing operations.
- Conduct surveys for the Giant Barred Frog in the area of any bridge construction or other works in a waterway considered to provide suitable habitat.

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APPENDIX A – KOALA SPOT SURVEY RESULTS

Appendix A - Koala Habitat (SPP 2/10) and Spot Survey Locations

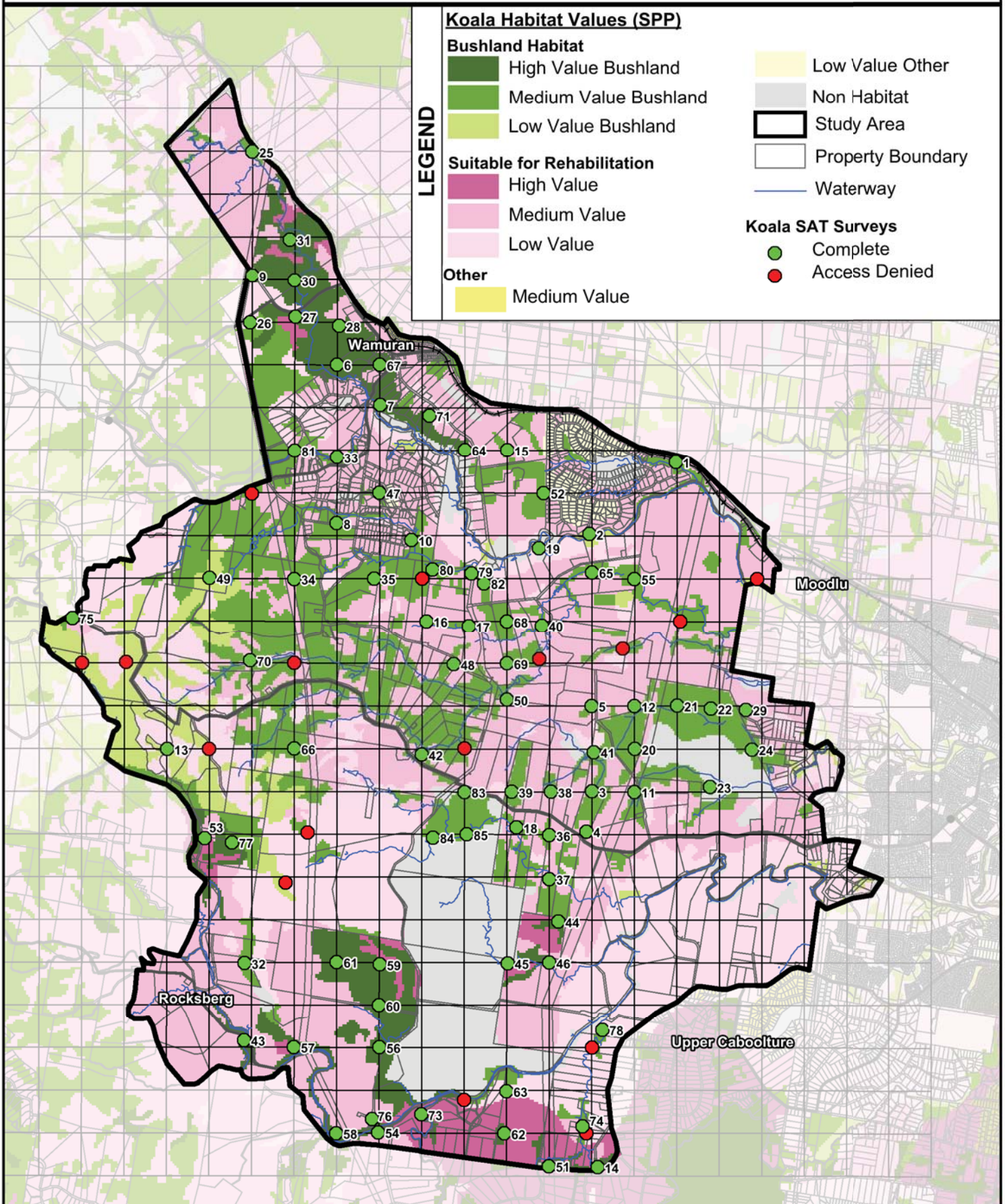

FIGURE Koala SAT	PROJECT NO. 30031051	SCALE 0 1 2km, Scale: 1: 60,000 @ A4	N	CONSULTANT SMEC Australia
CREATED BY AM11482	PROJECT TITLE Caboolture West Environmental Study			
REVISION 2				
STATUS FINAL	COORDINATE SYSTEM GDA 1994 MGA Zone 56			CLIENT Moreton Bay Regional Council
DATE 12/08/2013	SOURCE The State of Queensland (DEHP), Copyright 2012			
ISSUED FOR INFORMATION	PATH G:\Common Resources\Design Resources\Design aids\GIS DATA\West Caboolture\West Caboolture.wor			

#	Lot	Plan	Coordinates	Date	Koala Habitat Value (SPP 2/10)		Angophora leiocarpa	Angophora woodsiana	Callistemon salignus	Corymbia citriodora	Corymbia intermedia	Corymbia tessellaris	Corymbia trachyphloia	Lophostemon confertus	Lophostemon suaveolens	Eucalyptus acmenoides	Eucalyptus carnea	Eucalyptus crebra	Eucalyptus fibrosa	Eucalyptus grandis	Eucalyptus melanophloia	Eucalyptus microcorys	Eucalyptus moluccana	Eucalyptus pilularis	Eucalyptus propinqua	Eucalyptus racemosa	Eucalyptus resinifera	Eucalyptus siderophloia	Eucalyptus tereticornis	Melaleuca quinquenervia	Melaleuca salignus	Total
1	200	RP902525	489482; 7007862	26-Mar	Low	*# Trees surveyed*			1		4					2						15			1			6	1			**30**
2	200	RP902525	488468; 7007022	26-Mar	Low	*# Trees surveyed*			1		2			11						1								9	6			**30**
3	4	RP137998	4885033; 7004008	26-Mar	Medium	*# Trees surveyed*	4				7			2	4		1								1			9	2			**30**
						# Trees with scats	1																									**1**
4	4	RP137998	488437; 7003534	26-Mar	Medium	*# Trees surveyed*									6		3					11				7		1	2			**30**
						# Trees with scats																							1			**1**
5	1	RP187715	488497; 7005001	26-Mar	Medium	Not surveyed due to lack of adequate habitat. *Acacia concurrens* 3 year old regrowth <10cm DBH, surrounding dams mapped as Koala habitat.																										
6	10	RP214503	485497; 7009004	26-Mar	High	*# Trees surveyed*					5			1	4									13		1		4	2			**30**
						# Trees with scats									1									1								**2**
7	95	SP115603	486007; 7008532	26-Mar	High	*# Trees surveyed*					4			5		2									13			6				**30**
						# Trees with scats																			1							**1**
8	24	SP100203	485495; 7007146	26-Mar	Medium	*# Trees surveyed*			1		5			5	4											1		7	7			**30**
9	39	C311435	484499; 7010048	26-Mar	High	*# Trees surveyed*								5			6					3	1					15				**30**
10	903	SP217987	486373; 7006949	26-Mar	Medium	*# Trees surveyed*			1		9			5		2	0									4		6	3			**30**
11	2	RP149408	489000; 7004002	27-Mar	Medium	*# Trees surveyed*					8			8	6														3	5		**30**
12	10	RP43369	489000; 7004999	27-Mar	Medium	Area marked for Ksat is a Dam. Nearby Melaleuca forest is located on adjacent property and not accessible.																										
13	18	RP902092	483501; 7004499	27-Mar	Low	*# Trees surveyed*					1			5			2								19			3				**30**
						# Trees with scats																			2							**2**
14	30	CP898982	488573; 6999605	27-Mar	High	*# Trees surveyed*	1				3			1	9		1											7	8			**30**
						# Trees with scats																						1				**1**
15	1	SP113086	487500; 7008002	27-Mar	Medium	*# Trees surveyed*		6			19													5								**30**
16	1	RP101687	486550; 7000600	27-Mar	Medium	*# Trees surveyed*	1				6			5			7						1		3			6	1			**30**
17	1	RP101687	487048; 7005944	27-Mar	Medium	*# Trees surveyed*	1				6			5	9		0								2			1	6			**30**
18	2	RP135402	487611; 7003582	27-Mar	Medium	*# Trees surveyed*	2				1			4			13					1			6			3				**30**

#	Lot	Plan	Coordinates	Date	Koala Habitat Value (SPP 2/10)		Angophora leiocarpa	Angophora woodsiana	Callistemon salignus	Corymbia citriodora	Corymbia intermedia	Corymbia tessellaris	Corymbia trachyphloia	Lophostemon confertus	Lophostemon suaveolens	Eucalyptus acmenoides	Eucalyptus carnea	Eucalyptus crebra	Eucalyptus fibrosa	Eucalyptus grandis	Eucalyptus melanophloia	Eucalyptus microcorys	Eucalyptus moluccana	Eucalyptus pilularis	Eucalyptus propinqua	Eucalyptus racemosa	Eucalyptus resinifera	Eucalyptus siderophloia	Eucalyptus tereticornis	Melaleuca quinquenervia	Melaleuca salignus	Total
19	6	RP35975	487874; 7006857	27-Mar	None	*# Trees surveyed*					7			7						11		4				1						**30**
						# Trees with scats														1												**1**
20	2	RP185220	489,004, 7004505	8-Apr	Medium	*# Trees surveyed*					12			8												8		2				**30**
21	2	RP185220	489504, 7005005	8-Apr	Medium	*# Trees surveyed*					9				3											15			1	2		**30**
22	2	RP185220	489899, 7004971	8-Apr	Medium	*# Trees surveyed*	1				3		1	2	4											6	2	5	2	4		**30**
						# Trees with scats																					2		1			**3**
23	2	RP185220	489888, 7004061	8-Apr	Medium	*# Trees surveyed*					12		4	5												2		7				**30**
24	2	RP185220	490383, 7004498	8-Apr	Medium	*# Trees surveyed*	2				3		8		7												2	4	3	1		**30**
						# Trees with scats							1																			**1**
25	2	CG2096	484494; 7011495	8-Apr	Medium	Acacia regrowth <10cm DBH, not enough Koala Habitat to conduct KSAT.																										
26	6	CG6213	484473; 7009497	8-Apr	Medium & High	Pine plantation with regrowth. No focal tree. Not adequate to conduct KSAT																										
27	6	CG6213	485009; 7009565	8-Apr	Medium & High	*# Trees surveyed*					1				3	21												3	2			**30**
28	6	CG6213	485522; 7009457	9-Apr	Medium & High	Acacia regrowth <10cm DBH, not adequate to conduct KSAT.																										
29	19	RP228479	490310; 7004957	9-Apr	Medium	*# Trees surveyed*					17															12		1				**30**
30	4	CG3363	484998; 7009993	9-Apr	High	*# Trees surveyed*					16						1					6				3		2	2			**30**
						# Trees with scats																1										**1**
31	4	CG3363	484993; 7010502	9-Apr	High	Lantana & Acacia regrowth <10cm DBH, not enough Koala Habitat to conduct KSAT.																										
32	89	CG4644	484416; 7001992	17-Apr	Medium	*# Trees surveyed*					5			20														5				**30**
33	8	RP859637	485498; 7007919	17-Apr	Medium	*# Trees surveyed*					14			10											1	2		3				**30**
34	1	SP218056	484996;7006496	18-Apr	Medium	*# Trees surveyed*								7			1		3				5		8			6				**30**
35	5	RP200935	485937; 7006502	18-Apr	Medium	*# Trees surveyed*								3	13		4								4				5	1		**30**
36	2	RP134785	487999; 7003491	18-Apr	Medium	Acacia regrowth, very sparse, immature Eucalypt sp. <10cm DBH. Inadequate for Survey																										
37	2	RP134785	487999; 7002978	18-Apr	Medium	*# Trees surveyed*	2				7				7		6								3			5				**30**

#	Lot	Plan	Coordinates	Date	Koala Habitat Value (SPP 2/10)		Angophora leiocarpa	Angophora woodsiana	Callistemon salignus	Corymbia citriodora	Corymbia intermedia	Corymbia tessellaris	Corymbia trachyphloia	Lophostemon confertus	Lophostemon suaveolens	Eucalyptus acmenoides	Eucalyptus carnea	Eucalyptus crebra	Eucalyptus fibrosa	Eucalyptus grandis	Eucalyptus melanophloia	Eucalyptus microcorys	Eucalyptus moluccana	Eucalyptus pilularis	Eucalyptus propinqua	Eucalyptus racemosa	Eucalyptus resinifera	Eucalyptus siderophloia	Eucalyptus tereticornis	Melaleuca quinquenervia	Melaleuca salignus	Total
38	1	RP108978	488016; 7004003	18-Apr	Medium	*# Trees surveyed*					5						5									6		5	9			**30**
39	2	RP187716	487554; 7004003	18-Apr	Medium	Acacia regrowth (<10cm DBH) in semi-cleared pine forest. No Eucalypt sp.																										
40	5	RP222902	487908; 7005951	18-Apr	Medium	Acacia regrowth <10cm DBH, inadequate for survey.																										
41	2	RP150179	488521; 7004465	18-Apr	Medium	Acacia regrowth with recent clearing. Not mature enough for survey.																										
42	17	RP122628	486499; 7004437	18-Apr	Medium	Area marked for Ksat was a Dam, not enough habitat trees for survey.																										
43	2	CG3645	484411; 7001085	18-Apr	High	Acacia regrowth (DBH <10cm), not enough Koala Habitat to conduct KSAT.																										
44	100	C311086	488104; 7002480	18-Apr	High	*# Trees surveyed*	5				7			2	4		1											9		2		**30**
45	100	C311086	487510; 7001991	18-Apr	High	*# Trees surveyed*	4				4			1			11								3	2		5				**30**
46	4	RP886161	487999; 7002000	18-Apr	High	Not enough trees with DBH >10cm for survey.																										
47	2	SP235197	485997; 7007500	19-Apr	Medium	*# Trees surveyed*					12				2													8	3	5		**30**
48	6	RP122628	486875; 7005487	19-Apr	Medium	*# Trees surveyed*					14				7											1		7	1			**30**
49	2	SP161037	483997; 7006506	19-Apr	Low	*# Trees surveyed*					1							6										18	5			**30**
50	7	RP200248	487500; 7005073	23-Apr	Medium	Acacia regrowth <10cm DBH, not adequate to conduct KSAT.																										
51	Road Reserve		487999; 6999617	23-Apr	High	*# Trees surveyed*	11							2									15					2				**30**
52	11	SP235220	487928; 7007500	23-Apr	Medium	*# Trees surveyed*					16			1	1											10		1	1			**30**
53	3	SP178503	483946; 7003452	23-Apr	High	*# Trees surveyed*					14			4											10			2				**30**
						# Trees with scats					2																					**2**
54	18	SP141493	485987; 7000008	23-Apr	High	Acacia regrowth <10cm DBH, not adequate to conduct KSAT.																										
55	13	RP158044	488996; 7006500	23-Apr	Medium	*# Trees surveyed*	5				5			11	1							1			2			5				**30**
56	8	RP220229	486001; 7001003	23-Apr	High	*# Trees surveyed*		1			2							15											12			**30**
57	8	RP220229	484999; 7001003	23-Apr	High	*# Trees surveyed*					2							22											6			**30**
58	8	RP220229	485494; 6999999	23-Apr	High	*# Trees surveyed*				23					3				1									3				**30**
						# Trees with scats																						1				**1**
59	2	RP206112	486008; 7001978	23-Apr	High	*# Trees surveyed*				6	2			5			5						10					2				**30**
						# Trees with scats																	1									**1**
60	2	RP206112	486008; 7001978	2-May	High	*# Trees surveyed*	2			15	2			4			4											3				**30**
						# Trees with scats	1			1																						**2**

#	Lot	Plan	Coordinates	Date	Koala Habitat Value (SPP 2/10)		Angophora leiocarpa	Angophora woodsiana	Callistemon salignus	Corymbia citriodora	Corymbia intermedia	Corymbia tessellaris	Corymbia trachyphloia	Lophostemon confertus	Lophostemon suaveolens	Eucalyptus acmenoides	Eucalyptus carnea	Eucalyptus crebra	Eucalyptus fibrosa	Eucalyptus grandis	Eucalyptus melanophloia	Eucalyptus microcorys	Eucalyptus moluccana	Eucalyptus pilularis	Eucalyptus propinqua	Eucalyptus racemosa	Eucalyptus resinifera	Eucalyptus siderophloia	Eucalyptus tereticornis	Melaleuca quinquenervia	Melaleuca salignus	Total
61	2	RP206112	485997; 7001498	2-May	High	*# Trees surveyed*				5				1			6					1	13					2	2			**30**
						# Trees with scats								1								1	4									**6**
62	42	S31500	487471; 6999998	24-Apr	Medium & High	*# Trees surveyed*	2	1			7												2					12	6			**30**
						# Trees with scats					1												1					1	3			**6**
63	42	S31500	487500; 7000491	24-Apr	Medium & High	*# Trees surveyed*	1			9	5												1					7	7			**30**
						# Trees with scats					2																					**2**
64	11	SP110039	487002; 7008003	24-Apr	Medium	*# Trees surveyed*					3			10								7						6	4			**30**
65	14	SP113085	488499; 7006575	24-Apr	Medium	*# Trees surveyed*					7			9								13						1				**30**
						# Trees with scats					1			3								2										**6**
66	2	SP231512	484999; 7004505	24-Apr	Medium	*# Trees surveyed*								20		3							7									**30**
						# Trees with scats					1												3									**4**
67	3	RP190250	486000; 7009001	24-Apr	High	*# Trees surveyed*		1			13			4	1	4								2		1	1	3				**30**
68	10	RP187714	487500; 7006000	30-Apr	Medium	*# Trees surveyed*					10				1											1		2	5	11		**30**
						# Trees with scats																							1			**1**
69	10	RP187714	487500; 7005500	30-Apr	Medium	*# Trees surveyed*					4					2				6		7		11								**30**
70	3	SP218056	484480, 7005530	30-Apr	High	*# Trees surveyed*	4				4			3		9	3								4			3				**30**
71	9	RP190256	486,585; 7,008,408	30-Apr	High	*# Trees surveyed*																19		8			1	2				**30**
						# Trees with scats																2		2			1	1				**6**
72	231	CG4057	491235; 7002973	1-May	Low	< 30 trees.																										
73	12	RP224249	486499; 7000219	1-May	Medium	*# Trees surveyed*					1	2			1													4	22			**30**
						# Trees with scats																							2			**2**
73.5	12	RP907788	488395; 7000079	8-May	Medium	*# Trees surveyed*	4				6			2	1		1								1			13	2			**30**
75	1	RP188419	482388; 7006037	8-May	Medium	*# Trees surveyed*					4			5	3										2	3			13			**30**
76	Road Reserve		485920; 7000162	8-May	High	*# Trees surveyed*		2			1										4							14	9			**30**
						# Trees with scats																						1				**1**
77	3	SP178503	484266; 7003403	8-May	Medium	Acacia regrowth, not adequate to conduct KSAT.																										

#	Lot	Plan	Coordinates	Date	Koala Habitat Value (SPP 2/10)		Angophora leiocarpa	Angophora woodsiana	Callistemon salignus	Corymbia citriodora	Corymbia intermedia	Corymbia tessellaris	Corymbia trachyphloia	Lophostemon confertus	Lophostemon suaveolens	Eucalyptus acmenoides	Eucalyptus carnea	Eucalyptus crebra	Eucalyptus fibrosa	Eucalyptus grandis	Eucalyptus melanophloia	Eucalyptus microcorys	Eucalyptus moluccana	Eucalyptus pilularis	Eucalyptus propinqua	Eucalyptus racemosa	Eucalyptus resinifera	Eucalyptus siderophloia	Eucalyptus tereticornis	Melaleuca quinquenervia	Melaleuca salignus	Total
78	3	RP13771	488644; 7001154	22-May	Medium	Rainforest species																									
79	3	RP101687	487080; 7006560	22-May	Medium	*# Trees surveyed*					1			10	4													11	3		1	30
80	3	RP101687	486623; 7006608	22-May	Medium	*# Trees surveyed*		1			6			6	1		11								2			3				30
81	10	RP222918	485000; 7007993	22-May	Medium	*# Trees surveyed*					4			20						3					1				2			30
82	22	RP907545	487225, 7006446	8-May	Medium	Orchard - not suitable Koala Habitat																									
83	2	RP197793	487,000, 7,004,000	30-May	Medium	*# Trees surveyed*	7				6			10			3								2			2				30
84	2	RP197793	486,633, 7,003,463	30-May	Medium	*# Trees surveyed*				1	4			2			1	1										16	1	4		30
85	2	RP197793	487,025, 7,003,500	30-May	Medium	*# Trees surveyed*	5				5			2	3							1						14				30

Total # trees surveyed	**1980**
Total # trees with scats	**54**
Overall % Koala Activity	**2.73%**

APPENDIX B – HABITAT ASSESSMENT DATA SHEET

HABITAT ASSESSMENT

Method: At random establish a 25 x 25m quadrat or 100 x 10m transect and record the following information.		
Lot & Plan:	**Date:**	**Time:**
Observers:		
Location (GPS):		
Photos:		
Physical Details: Slope:	Aspect:	

DISTURBANCE HISTORY	**Severity**				**Estimated time since last event**
	Nil	*Light*	*Moderate*	*Severe*	
Fire					
Logging					
Clearing/fragmentation					
Grazing					
Weeds					
Flooding					

VEGETATION STRUCTURE AND FLORISTICS			
Stratum:	***Height (m)***	***Cover (%)***	***Dominant Species***
Overstorey			
Understorey			
Groundcover			

AGE STRUCTURE	Early regen	Uneven age	Advanced regen	Mature age	Old growth

DENSITY OF HOLLOWS	*Large (>15cm)*	*Medium (5-15m)*	*Small (<5cm)*
Live trees			
Dead trees			

 # Fallen Logs (Per 25m):

FAUNA FEATURES:

% of understorey vegetation within a 1ha area surrounding the quadrat/transect

% of trees/shrubs	*75-100%*	*50-75%*	*25-50%*	*5-25%*	*<5%*	*None*
Mistletoe	5	4	3	2	1	0
Epiphytes	5	4	3	2	1	0
Fleshy Fruit (excl figs)	5	4	3	2	1	0
Flowers	5	4	3	2	1	0
Tree or shrub Acacia	5	4	3	2	1	0
Tree or shrub Banksia	5	4	3	2	1	0
Tree or Shrub Allocasuarina	5	4	3	2	1	0
Figs	5	4	3	2	1	0
Decorticating bark	5	4	3	2	1	0
Tree or shrub Melaleucas	5	4	3	2	1	0

Additional habitat features present:

	Proximity (m)	*Type*					
Permanent water	_____	river	creek	dam	soak	wetland	drain
Temporary water	_____	river	creek	dam	soak	wetland	drain
Visible nest or roost sites	_____						
Frog Habitat	_____						
Fauna Corridor							

GROUND LAYER

Attribute	*% cover*	*Depth (cm)*	*Description*
Bare Earth			
Leaf Litter			

NOTES:

APPENDIX C – PRIORITY SPECIES WORKSHEET

											STREAM Order						Water	REGIONAL ECOSYSTEM																Value Added Regional Ecosystem			Other Bushland	LANDFORM				
	Common Name	Scientific Name	Class	Family	Q	A	DESC	MBRC	Potential Occurrence	Geoprocessing	SO_1	SO_2	SO_3	SO_4	SO_5	Buffer Total (each side)	Dams	12.3.1	12.3.2	12.3.5	12.3.7	12.3.11	12.5.3	12.5.6	12.11.5	12.11.10	12.11.14	12.11.18	12.11.3/ 12.11.18	12.11.3/ 12.11.10	12.11.14/ 12.11.5	12.11.18/ 12.11.14	12.11.10 gullies	12.11.10 Stream	12.11.3/ 12.11.10 Stream	Non-remnant	Q100 (Floodplain)*	Rises	Low Hills	Hills (nth & sth facing)	Mountains
Fauna	Richmond Birdwing	*Ornithoptera richmondia*	Insecta	Papilionidae	V				Low	As identified per RE and lowland rainforest (12.1.1.10)								y								y															
	Sapphire Rockmaster	*Diphlebia coerulescens*	Insecta	Lestoideidae				*	High	4m buffer (2m each side) 25k Drainage classified against stream order 2-3 (Ordered Drainage 100k – CWSA clip).		y	y			4 m (2m)																												
	Australian River Mussel	*Cucumerunio novaehollandiae*	Bivalvia	Hyriidae				*	High	4m buffer (2m each side) 25k Drainage classified against stream order 2-4 (Ordered Drainage 100k – CWSA clip).		y	y	y		4 m (2m)																												
	North Pine River Freshwater Snail	*Fluvidona anodonta*	Gastropoda	Hydrobiidae				*	Low			y	y	y																													
	Australian Lungfish	*Neoceratodus forsteri*	Osteichthyes	Ceratodontidae		V			Low					y	y																											
	Green thighed Frog	*Litoria brevipalmata*	Amphibia	Hylidae	NT				Moderate																														y				
	Cascade Treefrog	*Litoria pearsoniana*	Amphibia	Hylidae	V				Low			y																														
	Wallum Rocketfrog	*Litoria freycineti*	Amphibia	Hylidae	V				Nil											y																						
	Wallum Sedge-frog	*Litoria olongaburensis*	Amphibia	Hylidae	V	V			Nil																																	
	Tusked Frog	*Adelotus brevis*	Amphibia	Limnodynastidae	V				High	80m Buffer (40m each side) on stream orders 2-4 and dams that are intersected by the identfied RE. Also included Q100 for flooded grassland.		y	y	y	y	80m (40m)	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y										
	Wallum Froglet	*Crinia tinnula*	Amphibia	Myobatrachidae	V				Nil																																	
	Giant Barred Frog	*Mixophyes iteratus*	Amphibia	Myobatrachidae	E	E			High	60m Buffer (30m each side) on stream orders 2-4 clipped to the identfied RE.		y	y	y		60m (30m)		y	y	y	y	y	y	y	y	y		y	y	y	y	y										
	Frilled Lizard	*Chlamydosaurus kingii*	Reptilia	Agamidae				*	Low																																	
	Land Mullet	*Bellatorias major*	Reptilia	Scincidae				*	Low									y	y							y																
	Elf Skink	*Eroticoscincus graciloides*	Reptilia	Scincidae	NT				Low	As identified per RE and gullies (12.1.1.3/12.1.1.10)								y	y	y	y					y							y									
	Rainforest Skink	*Saproscincus rosei*	Reptilia	Scincidae	NT				Low	As identified per RE and gullies (12.1.1.3/12.1.1.10)																y							y									
	Common Death Adder	*Acanthophis antarcticus*	Reptilia	Elapidae	NT				Low																																	
	Emu	*Dromaius novaehollandiae*	Aves	Dromaiidae				*	Low																																	
	Black-breasted Button-quail	*Turnix melanogaster*	Aves	Turnicidae	V	V			Low																																	
	Cotton Pygmy-goose	*Nettapus coromandelianus*	Aves	Anatidae	NT				Low																																	
	Freckled Duck	*Stictonetta naevosa*	Aves	Anatidae	NT				Low																																	
	Eastern Osprey	*Pandion haliaetus*	Aves	Accipitridae		M			Moderate						y																											
	Grey Goshawk	*Accipiter novaehollandiae*	Aves	Accipitridae	NT				High	Areas verified with bushland cover that should be retained								y	y	y	y	y	y	y	y	y	y	y	y	y	y	y				y						
	Red Goshawk	*Erythrotriorchis radiatus*	Aves	Accipitridae	E	V			Low																																	
	Square-tailed Kite	*Lophoictinia isura*	Aves	Accipitridae	NT				High	Bushland for rehabilitation and retainment								y	y	y	y	y	y	y	y	y	y	y	y	y	y	y				y						
	Brolga	*Grus rubicunda*	Aves	Gruidae				*	Moderate	Open flood plain in the lower catchment																													y					
	Black-necked Stork	*Ephippiorhynchus asiaticus*	Aves	Ciconiidae	NT				Moderate								y																						y	dams			
	Little Tern	*Sterna albifrons*	Aves	Laridae					Occasional						y																											
	Australasian Bittern	*Botaurus poiciloptilus*	Aves	Ardeidae					Low																																	
	Glossy Black-cockatoo	*Calyptorhynchus lathami*	Aves	Cacatuidae	V				Moderate	As identified per RE												y	y	y	y	y	y	y	y	y	y	y						y	y	y	
	Coxen's Fig-Parrot	*Cyclopsitta diopthalma coxeni*	Aves	Psittacidae	E	E			Low									y	y		y					y															
	Turquoise Parrot	*Neophema pulchella*	Aves	Psittacidae	NT				Low																																	
	Swift Parrot	*Lathamus discolor*	Aves	Psittacidae	E	E			Occasional												y	y		y				y													
	Plumed Frogmouth	*Podargus ocellatus plumiferus*	Aves	Podargidae	V				Moderate	60m Buffer (30m each side) on stream orders 2-3 intersecting RE 12.11.10		y	y			60m (30m)									y																	
	Australian Swiftlet	*Aerodramus terrareginae*	Aves	Apodidae				*	Occasional		y	y	y	y	y		y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y				y	y	y	y	y	y
	Red-browed Treecreeper	*Climacteric erythrops*	Aves	Climatcteridae	NT				Low																																	
	Regent Honeyeater	*Anthochaera phrygia*	Aves	Meliphagidae	E	E			Occasional												y	y	y	y	y		y	y	y	y			y								
	Painted Honeyeater	*Grantiella picta*	Aves	Meliphagidae	V				Low																																	
	Black-chinned Honeyeater	*Melithreptus gularis*	Aves	Meliphagidae	NT				Moderate	As identified per RE											y	y	y		y		y	y	y	y			y								
	Lewin's Rail	*Lewinia pectoralis*	Aves	Rallidae	NT				Moderate	As identified per RE										y																						
	Australian Painted Snipe	*Rostratula australis*	Aves	Rostratulidae	V	V			Moderate	In all identified dams							y																										
	Powerful Owl	*Ninox strenua*	Aves	Strigidae	V				Moderate	Areas verified with bushland cover that should be retained								y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y				y						
	Sooty Owl	*Tyto tenebricosa tenebricosa*	Aves	Tytonidae	NT				Low																																	
	Wading birds		Aves		NT				Low																																	
	Platypus	*Ornithorhynchus anatinus*	Mammalia	Ornithorhynchidae	SLC			*	High	4m Buffer (2m each side) on stream orders 3 and 4			y	y		4 m (2m)																											
	Short-beaked Echidna	*Tachyglossus aculeatus*	Mammalia	Tachyglossidae	SLC			*	High	All landform data																													y	y	y	y	y
	Brush-tailed Phascogale	*Phascogale tapoatafa*	Mammalia	Dasyuridae				*	Low																																	

											STREAM Order						Water	REGIONAL ECOSYSTEM																Value Added Regional Ecosystem			Other Bushland	LANDFORM				
	Common Name	Scientific Name	Class	Family	Q	A	DESC	MBRC	Potential Occurrence	Geoprocessing	SO_1	SO_2	SO_3	SO_4	SO_5	Buffer Total (each side)	Dams	12.3.1	12.3.2	12.3.5	12.3.7	12.3.11	12.5.3	12.5.6	12.11.5	12.11.10	12.11.14	12.11.18	12.11.3/ 12.11.18	12.11.3/ 12.11.10	12.11.14/ 12.11.5	12.11.18/ 12.11.14	12.11.10 gullies	12.11.10 Stream	12.11.3/ 12.11.10 Stream	Non-remnant	Q100 (Floodplain)*	Rises	Low Hills	Hills (nth & sth facing)	Mountains
Flora	Spot-tailed Quoll	*Dasyurus maculatus maculatus*	Mammalia	Dasyuridae	V	E			Low																																
	Koala	*Phascolarctos cinereus*	Mammalia	Phascolarctidae	V	V			Moderate	Base data: RE, 100k Regrowth, Koala SPP (original and verified by SMEC) and remnant vegetation. Using the base data (see above) the following attributes were taken out: Verified non-bushland (field, data and imagery verified) Verified not koala habitat Water From Koala SPP: Rehab, Other and non-habitat Open floodplains and streams Rainforest: REs 12.3.1/12.11.10, 12.11.3/12.11.10 in gullies The following were attributes were kept in or added: Verified bushland habitat High value regrowth HV/MV/LV Bushland Floodplains and streams with treecover										y	y	y		y			y			y				y													
	Feathertail Glider	*Acrobates pygmaeus*	Mammalia	Acrobatidae				*	Low - Moderate	Dependant on hollows - very limited in Study Area																																
	Squirrel Glider	*Petaurus norfolcensis*	Mammalia	Petauridae				*	Low-Moderate	Dependant on hollows - very limited in Study Area																																
	Long-nosed Potoroo	*Potorous tridactylus*	Mammalia	Potoroidae	V	V			Low																																
	Grey-headed Flying-fox	*Pteropus poliocephalus*	Mammalia	Pteropodidae		V			Occasional	No roosting habitat identified within Study Area																																
	Black Flying-fox	*Pteropus alecto*	Mammalia	Pteropodidae				*	Occasional	No roosting habitat identified within Study Area																																
	Little Red Flying-fox	*Pteropus scapulatus*	Mammalia	Pteropodidae				*	Occasional																																
	Golden-tipped Bat	*Kerivoula papuensis*	Mammalia	Vespertilionidae	NT				Low																																
	Slender Milkvine	*Marsdenia coronata*	Magnoliopsida	Apocynaceae	V	V			Low																																
	Corky Milkvine	*Marsdenia longiloba*	Magnoliopsida	Apocynaceae	V	V			Low																																
	Rainforest Acomis	*Acomis acoma*	Magnoliopsida	Asteraceae	NT				Low																																
	Large-leaved Wonga Vine	*Pandorea baileyana*	Magnoliopsida	Bignoniaceae	NT				Low																																
	Wandering Pepper Cress	*Lepidium peregrinum*	Magnoliopsida	Brassicaceae		E			Low																																
	Mark's Cassia	*Cassia marksiana*	Magnoliopsida	Caesalpiniaceae	V				Low																																
	Bahr's scrub croton	*Croton mamillatus*	Magnoliopsida	Euphorbiaceae	E				High	60m Buffer (30m each side) on stream orders 1-4 clipped to identified REs															y		y	y	y			y								
	Long-haired Ricinocarpos	*Ricinocarpos speciosus*	Magnoliopsida	Euphorbiaceae	V				Low																																
	Brush Sophora	*Sophora fraseri*	Magnoliopsida	Fabaceae	V	V			Moderate	Intersection of stream orders 2-3 and lowland rainforest/ gullies.																																
	Cudgerie	*Hernandia bivalvis*	Magnoliopsida	Hernandiaceae	NT				Moderate	Removed 12.11.3 from 12.11.3/12.11.10								y			y				y				y												
	Giant ironwood	*Choricarpia subargentea*	Magnoliopsida	Myrtaceae	NT				Moderate	Lowland rainforest and gullies from 12.11.3/12.11.10 & 12.11.3/12.11.18																																
	Dunn's White Gum	*Eucalyptus dunnii*	Magnoliopsida	Myrtaceae	V				High	Drainage buffer of 50m (25 each side) clipped to identified RE and gullies												y					y	ny	y			y								
	Thready Barked Myrtle	*Gossia inophloia*	Magnoliopsida	Myrtaceae	NT				Low																																
	Red Lily Pilly	*Syzygium hodgkinsoniae*	Magnoliopsida	Myrtaceae	V	V			Moderate	As per RE and gullies from 12.11.3/12.11.18 and lowland rainforest								y							y			ny	y											
	Small-leaved Jasmine	*Jasminum jenniae*	Magnoliopsida	Oleaceae					Low																																
	Three-leaved bosistoa	*Bosistoa transversa*	Magnoliopsida	Rutaceae		V			Moderate									y							y			ny	ny			y								
	Austral Toadflax	*Thesium australe*	Magnoliopsida	Santalaceae	V	V			Low																																
	Fine-leaved tuckeroo	*Lepiderema pulchella*	Magnoliopsida	Sapindaceae	V				Moderate									ny							y			ny	y											
	Hairy Hazelwood	*Symplocos harroldii*	Magnoliopsida	Symplocaceae	NT				Moderate																y				y											
	Aponogeton	*Aponogeton elongatus fluitans*	Liliopsida	Aponogetonaceae	V				Low																																
	Missionary Nutgrass	*Cyperus semifertilis*	Liliopsida	Cyperaceae	V	V			Low																																
	Swamp Herb	*Maundia triglochinoides*	Liliopsida	Juncaginaceae	V				Low																																
		Romnalda strobilacea	Liliopsida	Laxmanniaceae	V	V			Low																																
	Lesser Swamp Orchid	*Phaius australis*	Liliopsida	Orchidaceae	E	E			Low																																
	Tangle orchid	*Papillilabium beckleri*	Liliopsida	Orchidaceae	NT				Low																																

APPENDIX D – HABITAT ASSESSMENT RESULTS

Appendix D - Habitat Assessment Survey Locations

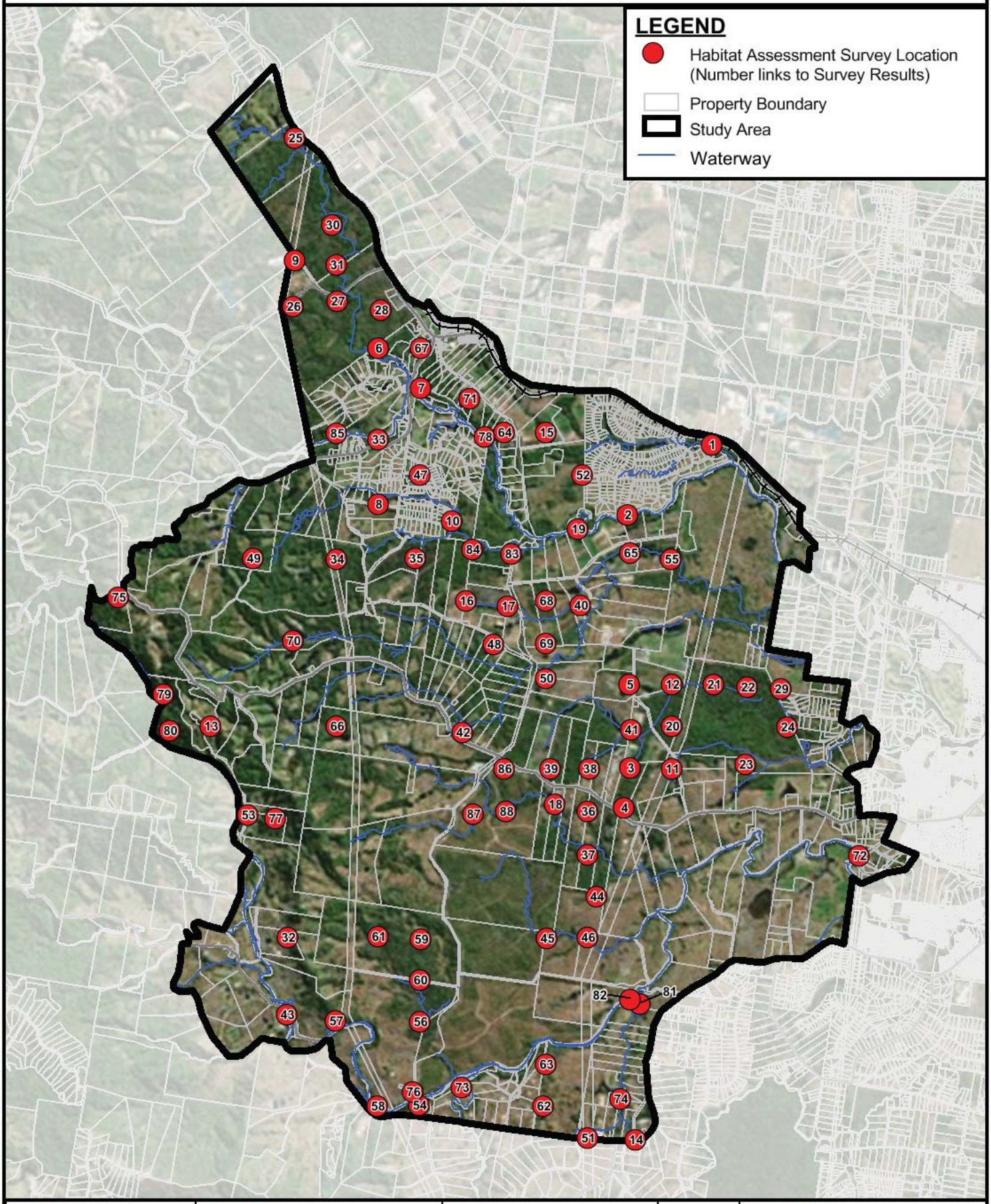

FIGURE Habitat Survey	**PROJECT NO.** 30031051	**SCALE** 0 1 2km Scale: 1: 60,000 @ A4	N	**CONSULTANT** SMEC Australia
CREATED BY AM11482	**PROJECT TITLE** Caboolture West Environmental Study			
REVISION 1				
STATUS FINAL	**COORDINATE SYSTEM** GDA 1994 MGA Zone 56			**CLIENT** Moreton Bay Regional Council
DATE 12/08/2013	**SOURCE** The State of Queensland (DEHP), Copyright 2012			
ISSUED FOR INFORMATION	**PATH** G:\Common Resources\Design Resources\Design aids\GIS DATA\West Caboolture\West Caboolture.wor			

#	LOT	PLAN	Coordinates	Date sampled	Disturbance Type	Level of Disturbance	Age Structure	Dominant Species	Fauna Features										Overstorey		Understorey		Groundcover		Leaf Litter		Bare Earth (%)	Hollows (per 25m x 25m)	Fallen Logs (per 25m x 25m)	Nests, roosts and termite mounds	Proximity to surface water	Frog Habitat	Fauna Corridor	Additional Notes
									Mistletoe	Epiphytes	Fleshy Fruit (excl figs)	Flowers	Acacia	Banksia	Allocasuarina	Fig	Decorticating Bark	Melaleuca	H (m)	FPC (%)	H (m)	FPC (%)	H (m)	FPC (%)	% Cover	Depth (cm)								
1	200	RP902525	489482, 7007862	26-Mar	Historical clearing, Weeds (Lantana)	Moderate	Advanced Regeneration	E. teriticornus C. intermedia E. microcorys E. siderophloia L. confertus Lantana	-	-	<5%	5% to 25%	<5%	-	-	-	<5%	<5%	18	20%	2-10	20%	0.5	90%	80%	3	5%	0	1	0	50m (Ephemeral Creek)	Yes	Yes	
2	200	RP902525	488468; 7007022	26-Mar	Historical clearing,	Moderate	Advanced Regeneration	E. teriticornus C. intermedia E. siderophloia L. confertus	-	-	<5%	<5%	<5%	-	-	-	<5%	<5%	20	10%	2-10	5%	0.05	100%	70%		20%	0	0	0	20m (Permanent Creek)	Yes	Yes	
3	4	RP137998	4885033; 7004008	26-Mar	Historic clearing; earthworks recently on track, wild pigs	Moderate	uneven age	L. confertus E. racemosa C. intermedia E. siderophloia E. teriticornus L. suaveolens	-	-	-	<5%	<5%	-	-	-	<5%	-	15-20	40%	3	10%	<0.5	90%	40%	2	10%	0	0	0	-	No	Yes	Lantana present, no waterways, little flowering vegetation. Not considered habitat for priority species.
4	4	RP137998	488437; 7003534	26-Mar	Historical clearing, wild pigs, fire	Moderate	uneven age	E. microcorys E. racemosa E. siderophloia E. carnea E.tereticornis Lantana	-	-	-	<5%	25-50%	-	-	-	<5%	-	20	30%	10	30%	0.3	80%	80%	3	20%	2	1	0	Drain	Yes	Yes	
5	1	RP187715	488497; 7005001	26-Mar	Recent clearing	High	Early Regneration	A. concurrens	-	-	-	-	75-100 %	-	-	-	-	<5%	-	0	2-6	50%	<1m	70%	-	-	-	0	0	0	Dam within 50m	Yes	No	
6	10	RP214503	485497; 7009004	26-Mar	Historic fire, clearing/ fragmentation; weeds	Moderate	uneven age	E. pilularis C .intermedia E. siderophloia	-	-	-	25-50%	<5%	-	-	-	<5%	-	25	25%	2-10	35%	0.5	30%	80%	3	5%	0	0	0	within 25m ephemeral wetland	Yes	Yes	Good quality fauna habitat
7	95	SP115603	486007; 7008532	26-Mar	Historic logging/clearing; moderate weeds	Moderate	Advanced Regeneration	E. siderophloia E. propinqua L. confertus	-	-	<5%	<5%	<5%	-	-	-	<5%	-	18	40%	2-6	40%	0.2	25%	80%	3	5%	0	1	0	50m permanent creek	Yes	Yes	
8	24	SP100203	485495; 7007146	26-Mar	Weeds	Moderate	Advanced regeneration	E. tereticornis C. intermedia E. siderophloia L. confertus L. suaveolens	-	-	-	5 - 25%	-	-	-	-	-	<5%	20	20%	2-12	60%	0.1	20%	70%	2	5%	0	2	0	50m temporary creek	Yes	Yes	
9	39	C311435	484499; 7010048	26-Mar	Historic fragmentation	Light	Early Regneration	E. siderophloia L. confertus E. carnea	-	-	-	<5%	<5%	-	-	-	-	-							75%		10%	0	0	0	80m to Dam	Yes	Yes	
10	903	SP217987	486373; 7006949	26-Mar	Historic fire, clearing/ fragmentation; Moderate weeds (Lantana)	Moderate	Advanced regeneration	C. intermedia E. racemosa E. siderophloia L. confertus	-	-	5 - 25%	5 - 25%	-	-	-	-	-	<5%	25	20%	3-10	70%	0.4	15%	60%	5	15%	0	1	1 medium sized stick nest.	20m Permanent creek	yes	Yes	Open Eucalypt canopy with rainforest understorey. One medium sized stick nest sighted.
11	2	RP149408	489000; 7004002	27-Mar	Historic clearing	Low	Early regeneration	E. tereticornis Acacia sp. M. quinquenervia Bracken fern L. confertus	-	-	-	25-50%	5 - 25%	-	-	-	<5%	25-50%	20	20%	<10	30%	<1	90%	-	-	-	0	0	0	within 25m Permanent Dam, Temporary Creek	Yes	Yes	25-50% flowering vegetation, and tree or shrub melaleucas.
12	10	RP43369	489000; 7004999	27-Mar	Area marked for Ksat is a Dam. Nearby Melaleuca forest is located on adjacent propoerty and not accessible.																													
13	18	RP902092	483501; 7004499	27-Mar	Historical clearing	Light	Advanced regeneration	E. propinqua L. confertus E. siderophloia											18	25%	2-10	20%	<1	50%	65%	5	-	10	1	0	-	-	Yes	Fauna corridor for arboreal mammals
14	30	CP898982	488573; 6999605	27-Mar	Weeds and Pine trees	Moderate	uneven age	E. tereticornis E. siderophloia E. suaveolens Lantana camara	-	-	-	<5%	<5%	-	<5%	-	<5%	-	18-20	30%	2-10	30%	<1	80%	-	-		0	0	0	within 25m Temporary creek	Yes	Yes	
15	1	SP113086	487500; 7008002	27-Mar	Historic Clearing	Severe	uneven age	C. intermedia Blady grass Acacia sp. A. woodsiana E. pilularis	-	-	-	<5%	5% to 25%	-	-	-	<5%	5% to 25%	20	<10%	4	60%	1	100%	10%	1		0	0	0	25m temporary creek	Yes	no	Poor quality habitat for fauna
16	1	RP101687	486550; 7000600	27-Mar	Light weeds	Light	uneven age	C. intermedia E. carnea E. siderophloia E. propinqua L. confertus	-	-	-	5% to 25%	5% to 25%	-	<5%	-	-	-							65%	3	5	3	2	0	50m temporary creek	yes	yes	*Allocasuarina littoralis* present but no evidence of Glossy Black feeding.
17	1	RP101687	487048; 7005944	27-Mar	Severe weeds	Severe	uneven age	C. intermedia E. siderophloia E. propinqua L. suaveolens E. tereticornis	-	-	-	5% to 25%	<5%	-	<5%	-	-	-	20	30%	2-10	60%	0.2	50%	90%	3	5	2	4	0	50m dam, 50m temporary creek	yes	yes	

#	LOT	PLAN	Coordinates	Date sampled	Disturbance Type	Level of Disturbance	Age Structure	Dominant Species	Fauna Features										Overstorey		Understorey		Groundcover		Leaf Litter		Bare Earth (%)	Hollows (per 25m x 25m)	Fallen Logs (per 25m x 25m)	Nests, roosts and termite mounds	Proximity to surface water	Frog Habitat	Fauna Corridor	Additional Notes
									Mistletoe	Epiphytes	Fleshy Fruit (excl figs)	Flowers	Acacia	Banksia	Allocasuarina	Fig	Decorticating Bark	Melaleuca	H (m)	FPC (%)	H (m)	FPC (%)	H (m)	FPC (%)	% Cover	Depth (cm)								
18	2	RP135402	487611; 7003582	27-Mar	historical clearing and grazing	Moderate	Early regeneration	C. intermedia E. carnea Acacia sp E. siderophloia E. propinqua L. confertus	-	-	-	5% to 25%	25% to 50%	-	-	-	<5%	-	15-20	20%	2-5	10%	<1	25%	80%	2	20	0	0	0	Nearby Dam	Yes	No	Potential frog habitat, but no connectivity.
19	6	RP35975	487874; 7006857	27-Mar	Weeds	Moderate	Advanced Regeneration	C. intermedia L. confertus E. grandis E. microcorys	-	-	5% to 25%	5% to 25%	<5%	-	<5%	-	<5%	-	25	20%	3-15	90%	0.5	25%	90%	10	5	0	0	0	30m creek	Yes	Yes	
20	2	RP185220	489003, 7004511	8-Apr	forestry, grazing, edge effects from Energex easement	Moderate	Advanced Regeneration	E. racemosa E. siderophloia C. intermedia L. confertus Lantana	-	-	-	5% to 25%	<5%	<5%	-	-	5% to 25%	-	15-25	10%	4	30%	<2	30%	80%	-	0	2	0	0	-	No	Yes	
21	2	RP185220	489504, 7005005	8-Apr	forestry, grazing, edge effects from Energex easement	Moderate	uneven age	E. racemosa C. intermedia L. suaveolens Blady grass	-	-	-	<5%	<5%	-	-	-	<5%	<5%	20	10%	4	30%	<1	80%	20%	2		0	2	0	25m Permanent Creek	Yes	Yes	
22	2	RP185220	489899, 7004971	8-Apr	forestry, grazing, edge effects from Energex easement	Moderate	early regeneration	E. racemosa C. intermedia L. suaveolens M. quinquenervia A. littoralis	-	-	-	<5%	<5%	-	5% to 25%	-	<5%	5% to 25%	20	10%	4	20%	0.3	80%	30%	2		0	0	0	25m Permanent Creek, 25m Temporary Creek	Yes	Yes	
23	2	RP185220	489888, 7004061	8-Apr	forestry, grazing, edge effects from Energex easement	Moderate	Advanced Regeneration	L. confertus C. intermedia C. trachyphloia	-	-	<5%	<5%	<5%	-	<5%	-	<5%	-	18-20	15%	4	25%	0.3	80%	40%	2		0	0	0	-	No	Yes	Not RE12.5.3 at this site.
24	2	RP185220	490383, 7004498	8-Apr	forestry, grazing, edge effects from Energex easement	Moderate	Advanced Regeneration	C. trachyphloia A. littoralis C. intermedia Acacia sp	-	-	<5%	<5%	<5%	-	5% to 25%	-	<5%	<5%	20	10%	10	20%	0.3	60%	40%	2		0	3	0	25m Permanent Creek	Yes	Yes	Very degraded habitat.
25	2	CG2096	484494; 7011495	8-Apr	Clearing, edge effects from highway	High	Early Regneration	Acacia sp E. siderophloia Lantana	-	-	-	-	50 - 75%	-	-	-	-	-	20	<5%	4-6	40%	<1	80%	10%	-		0	0	0	50m creek	No	Yes	Acacia regrowth, not enough Koala Habitat to conduct KSAT.
26	6	CG6213	484500; 7009502	8-Apr	Pine plantation	High	Early Regneration	Pinus sp. Acacia sp.	-	-	-	-	5-25%	-	-	-	-	-	20	<5%	10	10%	<1	100%	-	-	-	0	0	0	-	No	No	Pine plantation with regrowth. Not enough Eucalypts for KSAT
27	6	CG6213	485009; 7009565	8-Apr	Historical Clearing, Fire	Moderate - High	Early Regneration	L. suaveolens	-	-	-	<5%	<5%	-	-	-	-	-	20	<5%	10	10%	<1	100%	20%	1		0	0	0	25m permanent creek	Yes	Yes	Grassy understorey, *L. suaveolens* dominated regrowth. Degraded fauna habitat.
28	6	CG6213	485522; 7009457	9-Apr	Acacia regrowth, not adequate to conduct KSAT.																													
29	19	RP228479	490310; 7004957	9-Apr	Historical Clearing	Moderate	uneven age	E. racemosa C. intermedia Acacia sp.	-	-	-	<5%	5% to 25%	-	-	-	5% to 25%	-	18-25	20%	<10	20%	<0.4	60%	80%	5		1 Large, 2 Medium, 2 Small	6	0	-	No	Yes	High canopy cover, low species diversity. Numerous wallaby & kangaroo scats.
30	4	CG3363	484955; 7010496	9-Apr	Lantana Invasion	High	uneven age	Lantana Acacia Regrowth	-	-	-	-	5% to 25%	-	-	-	-	-	20	5%	2-6	80%	<0.1	10%	20%	1	80%	0	0	0	50m permanent creek	Yes	Yes	Lantana & Acacia regrowth dominated, with occasional E. siderophloia and E. teriticornus. Highly degraded.
31	4	CG3363	484998; 7009993	9-Apr	fire, clearing, easement edge effects	Moderate	Advanced Regeneration	E. racemosa C. intermedia E. teriticornis E. carnea E. microcorys	-	-	-	5% to 25%	<5%	-	-	-	<5%	-	20-25	20%	<10	20%	<1	100%	20%	2	-	1 medium, 1 large	2	0	25m permanent creek	Yes	Yes	Creek in good ecological condition with riparian vegetation established. Plenty of grey myrtle . Some lantana invasion. 5-25% flowering vegetation
32	89	CG4644	484416; 7001992	17-Apr	Historical Clearing, current grazing	Severe	Advanced Regeneration (canopy patchy & open)	L. confertus C.intermedia, E. siderophloia,	-	-	-	<5%	-	-	-	-	-	-	18	20%	1.5-6	8%	0.1-0.3	70%	30%	3	15%	0	0	0	100m dam	No	Yes	
33	8	RP859637	485498; 7007919	17-Apr	Weed infestation - lantana & camphor laurel, historical clearing	Moderate	Advanced Regeneration	L. confertus C.intermedia, E. siderophloia,	-	-	<5%	5% to 25%	<5%	-	<5%	-	-	-	18	35%	2.5-6	20%	.05-.3	50%	60%	3	5%	0	1	0	25m permanent creek	Yes	Yes	
34	1	SP218056	484996;7006496	17-Apr	Historical Clearing, weeds (lantana)	Low	Advanced Regeneration	E. siderophloia, E. propinqua, L. confertus	-	-	-	5% to 25%	<5%	-	-	-	-	-	20	30%	1.5-9	25%	0.1-.3	50%	45%	2.5	5%	0	1 (cut)	0	-	No	Yes	
35	5	RP200935	485937; 7006502	18-Apr	Clearing, weeds.	moderate	Advanced Regeneration	L. suaveolens E. propinqua E. carnea Blady grass Lantana Lantana E. teriticornus	-	-	-	5% to 25%	-	-	-	-	5% to 25%	5% to 25%	20	10%	2-8m	15%	1	80%	50%	2	<5	0	4	0	Permanent Creek	Yes	No	Situated at the bottom of a gully, moderate weeds,

#	LOT	PLAN	Coordinates	Date sampled	Disturbance Type	Level of Disturbance	Age Structure	Dominant Species	Fauna Features										Overstorey		Understorey		Groundcover		Leaf Litter		Bare Earth (%)	Hollows (per 25m x 25m)	Fallen Logs (per 25m x 25m)	Nests, roosts and termite mounds	Proximity to surface water	Frog Habitat	Fauna Corridor	Additional Notes
									Mistletoe	Epiphytes	Fleshy Fruit (excl figs)	Flowers	Acacia	Banksia	Allocasuarina	Fig	Decorticating Bark	Melaleuca	H (m)	FPC (%)	H (m)	FPC (%)	H (m)	FPC (%)	% Cover	Depth (cm)								
36	2	RP134785	487999; 7003491	18-Apr	Weeds, Clearing and fragmentation	Light to Moderate	Acacia regrowth	Lantana A. concurrens E. propinqua	-	-	-	-	25%-50%	-	5% to 25%	-	-	-												0		No	No	Acacia regrowth with very sparse immature Eucalypt sp. Not adequate trees for KSAT.
37	2	RP134785	487999; 7002978	18-Apr	Clearing and Fragmentation; Weeds	Moderate	Advanced Regeneration	C. Intermedia A. siderophloia L. suaveolens	-	-	-	<5%	-	-	5% to 25%	-	-	-	20	<5%	1-10m	25%	0.5	95%	10%	1	80%	0	0	0	10m Permanent Dam, 20m Temporary Creek	Yes	No	Slight slope
38	1	RP108978	488016; 7004003	18-Apr	Historical clearing	Light to Moderate	Advanced Regeneration	E. racemosa E. carnea E. intermedia E. teriticornis E. siderophloia	-	-	-	5% to 25%	-	-	5% to 25%	-	5% to 25%	5% to 25%	20-30	20%	1-15m	20%	<1	80%	20%	2	5%	0	2	Owner noted presence of nesting cockatoos. Roost site was not sighted during survey.	20m to Dam, 10m to ephemeral creek	Yes	Yes	Good habitat condition, Landowner noted sightings of Koala (Including young), nesting cockatoos (Sulphur crested and black) and gliders utilising the habitat.
39	2	RP187716	487554; 7004003	18-Apr	Clearing, weeds.	Moderate	Regrowth	A. concurrens Pinus radiata Lantana																				0	0	0		no	No	Acacia regrowth in semi-cleared pine forest. No Eucalypts.
40	5	RP222902	487908; 7005951	18-Apr	Historical clearing	Light	regrowth	A. leiocarpa																				0		0	25 Ephemeral creek	Yes	No	Acacia regrowth, inadequate trees for survey
41	2	RP150179	488521; 7004465	18-Apr	Recent clearing	Moderate	Regrowth	A. concurrens L. suaveolens Lantana																	70%	2	0%			0		No	No	Acacia regowth, not mature enough for Ksat. Moderate weeds.
42	17	RP122628	486499; 7004437	18-Apr	Clearing/Residential	Moderate	uneven age	M. quinquenervia E. teriticornis L. suaveolens Jacaranda											20	5%	-	-	0.3	100%						0	0m Dam	Yes	No	Area marked for Ksat was a Dam with not enough Koala habitat trees for survey.
43	2	CG3645	484411; 7001085	18-Apr	Clearing, weeds, flooding	Light to Moderate	Regrowth	Syzagium francisii Tristanopsis laurina A. littoralis Lomandrax sp. Longifolia	-	-	-	-	-	-	5% to 25%	<5%	-	<5%	15-20	30%	2	15%	<1	80%	0%			9	8	0	5m to permanent river	Yes	Yes	Good quality habitat , high diversity of birdlife,
44	100	C311086	488104; 7002480	18-Apr	Grazing, historical clearing,	Moderate		C. intermedia Acacia sp. L. suaveolens A. leiocarpa E. siderophloia	-	-	-	<5%	25-50%	-	-	-	<5%	5% to 25%	20	20%	3	10%	0.1	60%	80%	1		1	0	0	Emphemeral Creek	Yes	Yes	
45	100	C311086	487510; 7001991	18-Apr	Grazing, historical clearing,	moderate	advanced regen	E. carnea A. leiocarpa E. siderophloia	-	-	-	<5%	25-50%	-	-	-	<5%	<5%	20-25	10%	2-10m	30%	1	80%				0	0	0	permanent creek	yes	yes	
46	4	RP886161	487999; 7002000	18-Apr	Fire, clearing, grazing	Light to Moderate	regrowth	Pinus sp. L confertus M.quinquenervia Brackenfern Acacia sp.	-	-	-	-	<5%	-	-	-	-	5% to 25%	15	1%	1-12m	20-40%	0.3	60%						0				
47	2	SP235197	485997; 7007500	19-Apr	historical clearing	moderate	advanced regen	C. intermedia M. quinquenervia Acacia sp.	-	-	<5%	<5%	5% to 25%	-	-	-	-	50-75%	20	20%	1-6m	20%	0.3	70%	90%	3		3	3	0	10m to dam	yes	yes	Landowner noted inhabiting tawny frog mouths and high bird life. Isolated site but potential for fauna corridor.
48	6	RP122628	486875; 7005487	19-Apr	historical clearing	high	early regen	E. siderophloia C. intermedia L. suaveolens L. camara	-	-	-	<5%	<5%	-	-	-	-	-	15-20	10%	1-10m	30%	<0.5	90%	50%	2				0		No	Yes	Owner noted no sightings of koala for over 15 yrs. Previously koalas were sighted between W Lindsay and Jackson rd. Antechinus are observed but no longer echidnas. Fauna corridor as it connects to Highway 100m south.
49	2	SP161037	483997; 7006506	19-Apr	clearing, cropping, fire, weeds	Light to Moderate	advanced regen	E. siderophloia E. teriticornis A. concurrens Molasses grass	-	-	-	<5%	5% to 25%	<5%	-	-	-	-	20	10%	2-5m	10%	<1	100%				2		1 Bowerbird bower.		No	Yes	Advanced regrowth on ex-banana country, steep terrain, large patches of remnant least concern corridors. Bowerbird bowers observed. See photo
50	7	RP200248	487500; 7005073	23-Apr	Fragmentation, weeds	Moderate	Early regen	Acacia concurrens Grasses Lantana	-	-	-	<5%	50-75%	-	-	-	-	<5%	20	5%	1-6m	55%	0.2-1	70%	10%	2	0%	0	0	0		No	No	Acacia regrowth, sparse eucalypt species.
51	Road Reserve		487999; 6999617	23-Apr	Fragmentation, clearing, weeds	Light	Advanced regen	A. leiocarpa E. mollucana L. confertus E. siderophloia				<5%							20-25	40%	1-8m	35%	0.3-0.5	90%	80%	2	10%	0	1	0	50m permanent dam	Yes	Potential	Good habitat though some fragmentation by road.
52	11	SP235220	487928; 7007500	23-Apr	Grazing, historical clearing,	light	Advanced regen	E. racemosa Brachenfern C. intermedia				<5%						5% to 25%	20-25	30%	1-10m	45%	0-1.5	95%	40%	2	10%	2	3	0	50 permanent creek	Yes	Yes	

#	LOT	PLAN	Coordinates	Date sampled	Disturbance Type	Level of Disturbance	Age Structure	Dominant Species	Fauna Features									Overstorey		Understorey		Groundcover		Leaf Litter		Bare Earth (%)	Hollows (per 25m x 25m)	Fallen Logs (per 25m x 25m)	Nests, roosts and termite mounds	Proximity to surface water	Frog Habitat	Fauna Corridor	Additional Notes
									Mistletoe	Epiphytes	Fleshy Fruit (excl figs)	Flowers	Acacia	Banksia	Allocasuarina	Fig	Decorticating Bark	Melaleuca	H (m)	FPC (%)	H (m)	FPC (%)	H (m)	FPC (%)	% Cover	Depth (cm)							
53	3	SP178503	483946; 7003452	23-Apr	clearing, weeds,	light	Advanced regen	Propinqua C. intermedia Lantana grasses				<5%			<5%			<5%	25	25%	1-5m	50%	1	100%	70%	3	0%	2	4	0	20m Permanent creek	Yes	yes	Koala activity evident, scratch marks visible on majority of L. confertus, E. propinqua, and missing bark of C. intermedia, and E. siderophloia (See photos). Visibility of scats poor due to overgrown groundcover. Owners noted frequent use by Koala, and common place for relocation of koalas from Beerwah.
54	18	SP141493	485987; 7000008	23-Apr	Clearing, weeds	moderate	Early regen	Acacia sp. Lantana				<5%	50-75%		<5%		<5%											0	0	0	100m permanent creek	Yes	No	
55	13	RP158044	488996; 7006500	23-Apr	Weeds	light		M. quinquenervia C. intermedia E. siderophloia L. confertus				<5%	<5%					5% to 25%	25	35%	1-8m	50%	0.3-1	85%	70%	2	25%	2	3	0	5m permanent creek	Yes	Yes	Scratch marks observed on A. leiocarpa and Propinqua.
56	8	RP220229	486001; 7001003	23-Apr	Grazing	moderate	Advanced regen	E. crebra E. teriticornus A. woodsiana E. melanophloia Allocasuarina torulosa Bluegrass				<5%			5% to 25%		<5%		15-20	15%			<1	80%				4	1	0	100m permanent creek	Yes	Yes	Landowner noted that Koala surveys had been conducted 1 year prior (by a company situated at Mt Cotton?), and 3 Koalas (transient) were observed on his properties.
57	8	RP220229	484999; 7001003	23-Apr	Grazing	High	Advanced regen	E. teriticornis E. crebra			5% to 25%			5% to 25%		<5%			20	10%			<0.1	100	0%	0		7	0	0	20m to creek	Yes	Yes	Mowed grassland with occasional Eucalypt sp (every 10m). Heavily felled grazing land, but fauna features, frog habitat and fauna corridor were observed within creek in close proximity to the south. Landowner noted that Koala surveys had been conducted 1 year prior, and 3 Koalas (transient) were observed.
58	8	RP220229	485494; 6999999	23-Apr	Grazing, felling,	moderate	Advanced regen	C. citriodora E. siderophloia E. teriticornus L. suaveolens				<5%					<5%		20-22	15%	4-8m	10%	<0.1	90%				1	0	0	50m permanent creek	yes	yes	Landowner noted that Koala surveys had been conducted 1 year prior, and 3 Koalas (transient) were observed in the area.
59	2	RP206112	486008; 7001978	23-Apr	grazing, clearing, weeds, flooding	moderate	Mature age	E. mollucana C. intermedia L confertus E. carnea				<5%					5% to 25%		20-25	10%	6-15m	20%	<1	70%	20%	1		3	0	0	20m ephemeral creek	Yes	Yes	
60	2	RP206112	485997; 7001498	2-May	clearing, grazing, weeds	Moderate	Mature age	L. confertus C. citriodora E. carnea				5% to 25%	<5%		<5%				20	20%	10m	10%	1-5m	<5	80%	2	10%	0	3	0	100m permanent creek	yes	yes	
61	2	RP206112	485501; 7002006	2-May	logging, grazing, weeds	moderate	Mature age	E. moluccana C. citriodora E. carnea				5% to 25%	<5%						20	15%	10-15m	10%	0-1m	70%	60%	1	10%	2	2	0		No	Yes	
62	42	531500	487471; 6999998	24-Apr	clearing, Grazing	moderate	Mature age	E. siderophloia C. intermedia A. leiocarpa E. teriticornus	-	-	-	-	-	-	-	-	-	-	20	20%	0.1m	<5	0.3	90%					7	0	30m permenent wetland	yes	yes	
63	42	531500	487500; 7000491	24-Apr	grazing, weeds,	Moderate	Mature age	E. teriticornis E. siderophloia C. citriodora				<5%	5% to 25%				<5%		20	20%	0.1m	5%	20	90%	70%		10%	0	3	0		no	no	
64	11	SP110039	487002; 7008003	24-Apr	Weeds, Clearing and fragmentation	Moderate	Mature age	E. microcorys C. intermedia L. confertus																						0				
65	14	SP113085	488499; 7006575	24-Apr	Weeds	light	Mature age	E. microcorys L. confertus C. intermedia				<5%	<5%	<5%			<5%	<5%	15	75%	0.1m	50%	0.1	5%	90%			0	4	1 roost - Scrub Turkey	30m permanent creek and dam	Yes	Yes	Lantana and mixed rainforest. Situated on slope down towards creek.
66	2	SP231512	484999; 7004505	24-Apr	weeds, grazing	moderate	Mature age	L. confertus E. acmenoides E. moluccana				<5%	5% to 25%				5% to 25%		20	50%	4-5m	5%	1	70%	10%		10%	0	5	0	300m permanent dam	Yes	Yes	
67	3	RP190250	486000; 7009001	24-Apr	weeds, historic clearing	Moderate	Mature age	C. intermedia E. acmenoides C. confertus				<5%	<5%		<5%		5% to 25%		25	40%	7-8m	10%	0.3	20%	90%					0		No	Yes	
68	10	RP187714	487500; 7006000	30-Apr	clearing, weeds, grazing	Severe	Advanced Regeneration	M. quinquenervia C. intermedia Lantana				25 - 50%	<5%					50 - 75%	15	10%	2-4m	40%	0.1-0.4m	50%	70%	3		0	0	0	10m permanent creek	Yes	Yes	
69	10	RP187714	487500; 7005500	30-Apr	clearing, weeds, grazing	Moderate	Early regeneration	E. pilularis E. microcorys E. grandis Lantana				<5%	<5%				<5%		12	20%	2-6m	15%	0.1	100%	-	-	-	0	0	0	100m temporary creek	Yes	No	
70	3	SP218056	484480, 7005530	30-Apr	Clearing (+10yrs), weeds	Low - Moderate	Advanced Regeneration	E. acmenoides L. confertus Acacia sp				<5%	5% to 25%						18	20%	2-7m	55%	0.65	60%	70%	2	10%	0	3 (1 hollow)	0	20m permanent creek	Yes	Yes	

#	LOT	PLAN	Coordinates	Date sampled	Disturbance Type	Level of Disturbance	Age Structure	Dominant Species	Fauna Features									Overstorey		Understorey		Groundcover		Leaf Litter		Bare Earth (%)	Hollows (per 25m x 25m)	Fallen Logs (per 25m x 25m)	Nests, roosts and termite mounds	Proximity to surface water	Frog Habitat	Fauna Corridor	Additional Notes
									Mistletoe	Epiphytes	Fleshy Fruit (excl figs)	Flowers	Acacia	Banksia	Allocasuarina	Fig	Decorticating Bark	Melaleuca	H (m)	FPC (%)	H (m)	FPC (%)	H (m)	FPC (%)	% Cover	Depth (cm)							
71	9	RP190256	486,585, 7,008,408	30-Apr	Logging (+10yrs), weeds	Moderate	uneven age	E.pilularis E. microcorys E. siderophloia Acacia sp. Lantana				<5%	5% to 25%						25	25%	5-8m	50%	0.1-0.5	30%	80%	2	10%	0	2	0	100m permanent creek	Yes	Yes	
72	231	CG4057	491235, 7002973	1-May	Flooding, weeds	Moderate - High	uneven age	Castanospermum australe (Black bean) Lantana			5% to 25%	<5%							18	75%	1.5	90%	-	-	80%	3	20%	0	0	0	20m permanent river	Yes	Yes	
73	12	RP224249	486499; 7000219	1-May	Grazing, weeds	Moderate	Early regeneration	E. tereticornis E. siderophloia C. tesselaris				5% to 25%	<5%						15	5%	-	-	0.2	50%	20%	1	30%	0	0	0	20m river	Yes	No	Landowner provided SMEC with detailed list of species found on her property to date. Priority species include: Echidna, platypus, black-necked stork (2-3 times/yr), microbats, planigales, feathertail gliders, curlew, owls, pale-headed lorikeet, various hawks.
74	12	RP907788	488395; 7000079	8-May	grazing, weeds, logging	Moderate	advanced regen	C. intermedia E. siderophloia A. leiocarpa			<5%	25 - 50%	5% to 25%			<5%		<5%	22	10%	1-3m	20%	0-1m	30%	80%	2			1	0	10m permanent creek	yes	yes	
75	1	RP188419	482388; 7006037	8-May	Clearing, fragmentation, weeds	light to moderate	mature age	E. teriticornis E. racemosa L. confertus				5% to 25%	5% to 25%		<5%				20	15%	1-5m	<5	0.1m	80%	30%	3			2	0	-	no	yes	
76	Road Reserve		485920; 7000162	8-May	weeds, historical logging	Light	uneven age	E. siderophloia E. teriticornis				5% to 25%	<5%			<5%			20	15%	1-5m	50%	<5	<5	90%		<5	1	0	0	100m permanent creek	Yes	Yes	
77	3	SP178503	484266; 7003403	8-May	grazing, weeds	moderate	advanced regen	Acacia disparrima lantana pasture grasses			<5%	50-75%	75-100 %			<5%			15	60%	1-3m	70%	0-1m	30%	<5	<5			1	0	-	no	yes	
78	31	RP892901	486764; 7007953	2-May	clearing, weeds	moderate	Mature age	Camphor laurel, giant water gum lomandra Ferns			<5%	<5%						<5%	15-20	60%	1-5m	<5	0-1	10%	5%	1	80%	0	3	0	0m to permenent creek	yes	yes	Density taken over by Camphor laurels, flowing creek with regenerating understorey.
79	18	RP902092	482937, 7004879	2-May	clearing, weeds	moderate	uneven age	L. confertus E. propinqua mixed rainforest		<5%	5% to 25%	25-50%				<5%			20	40%	1-5m	4%	5	5%	90%	>5	0%	0	2	0	100m permenent river	yes	yes	Croton mamillatus occurs on property within vicinity of the survey.
80	18	RP902092	483010, 7004445	2-May	historical logging	light	Mature age	Ficus sp. Rose marara mixed rainforest sp.		<5%	25-50%	5% to 25%				5% to 25%			>30	15%	1-5m	1%	1	<5	90%	>5	5%	0	0	0	100m to permenent creek	yes	yes	Potential habitat for threatened flora.
81	3	RP13771	488644; 7001154	22-May	clearing, grazing, weeds	severe	uneven age	Hoop pine, Fig spp. E. teriticornis Acacia spp.																				0	0	0	0m temporary river	Yes	Yes	Degraded and fragmented rainforest w current cattle access. Rainforest sp still evident amongst pines and weeds.
82	3	RP13771	488508; 7001267	22-May	clearing, weeds, grazing	light	uneven age	mixed rainforest waterhasea floribunda lantana			50-75%					5% to 25%			5-15m	80	1-5m	25	0-1m	90	<5			0	2	0	0m permenent river	Yes	Yes	On creek, flood prone, shallow creek with debris and gravel base.
83	3	RP101687	487080; 7006560	22-May	Clearing, weeds, flooding	moderate	Advanced regen	E. tereticornis L. confertus E. siderophloia			<5%	25-50%	<5%						20-25	30	1-5m	80	0-1m	60	90	3	0	0	0	0	10m temporary creek	Yes	Yes	
84	3	RP101687	486623; 7006608	22-May	clearing, weeds	moderate	advanced regen	E. Carnea L. confertus C. intermedia E. siderophloia			<5%	25-50%	5% to 25%						20-25	35	1-7m	70	0-1m	80	70	2	0	0	4	0	20m temporary creek	Yes	Yes	
85	10	RP222918	485000; 7007993	22-May	clearing, weeds, flooding	moderate	uneven age	E. tereticornus L. confertus C. intermedia			<5%	5% to 25%	<5%			<5%			25	20	1-5m	40	0-1m	40	90	5	0	0	4	0	10m permanent creek	Yes	Yes	Weedy undertorey, giant devils fig, lantana, cats claw.
86	2	RP197793	487,000, 7,004,000	30-May	logging, clearing, grazing, weeds	Moderate	advanced regen	L confertus A leiocarpa C intermedia				25-50%			<5%		<5%		15	5	2-10m	40	20	80	50	1	0	0	0	0	-	No	Yes	
87	2	RP197793	486,633, 7,003,463	30-May	Weeds, grazing	moderate	advanced regen	E. siderophloia M. quinquenervia L. confertus Lantana Lomandra longifolia				25-50%	25-50%				<5%	<5%	20	10	2-10m	40	0.3	30	50	1	0	0	0	0	0m temporary creek	Yes	Yes	Metamorphic/alluvium on creek. Good creek habitat, rocks and lomandra.
88	2	RP197793	487,025, 7,003,500	30-May	clearing, grazing	moderate	advanced regen	A. leiocarpa C. intermedia E. siderophloia Lantana Acacia spp.				25-50%	25-50%				<5%		20	10	2-10m	50	0.2	50	60	1	0	0	0	0	30m temproary creek	Yes	Yes	Metamorphic

APPENDIX E – PRIORITY SPECIES LIKELIHOOD

Threatened and other priority species in the Caboolture West Study Area

Based on the presence/absence of key habitat type and/or habitat features, an assessment (high, moderate, low, nil, occasional) is made of the likelihood of each species occurring and a brief rationale is given for this conclusion.

Flora

(an "x" indicates no record within 15km of the centre of the study area, so only given as priority species by MBRC)*

Family	Scientific Name	Common Name	Q	A	Habitat	Potential Occurrence	Rationale	No Record*
Dicots								
Apiaceae	*Lilaeopsis brisbanica*		E		Tidal riverbanks in grey saline mud, in association with mangrove trees; tolerates fresh water	Nil	No suitable habitat	
Apocynaceae	*Marsdenia coronata*	Slender Milkvine	V	V	Eucalypt forest; possibly open grassland among rocks	Low	Potential habitat in the hilly western part of the study area	
Apocynaceae	*Marsdenia longiloba*	Corky Milkvine	V	V	Subtropical and warm temperate forest, lowland moist eucalypt forest near rainforest; sometimes in areas with rocky outcrops	Low	Potential habitat in the hilly western part of the study area	x
Apocynaceae	*Marsdenia hemiptera*	Rusty Vine	NT		Rainforest within 2 km of the sea, palm-dominated rainforest swamps and sandstone gorges	Nil	No suitable habitat	x
Aristolochiaceae	*Pararistolochia praevenosa*		NT		Upland rainforest on basaltic and metamorphic rocks	Nil	No suitable habitat on appropriate substrate	
Asteraceae	*Acomis acoma*	Rainforest Acomis	NT		Rainforest margins and roadside	Low	Limited potential habitat in study area	x
Bignoniaceae	*Pandorea baileyana*	Large-leaved Wonga Vine	NT		Subtropical and warm-temperate rainforest	Low	Limited potential habitat in study area	x

Family	Scientific Name	Common Name	Q	A	Habitat	Potential Occurrence	Rationale	No Record*
Bignoniaceae	*Tecomanthe hillii*	Fraser Island Creeper	NT		Grows along creek banks on sandy soil	Nil	No suitable sandy habitat	x
Brassicaceae	*Lepidium peregrinum*	Wandering Pepper Cress		E	Open forest in the edge of creeks and streams	Low	Potential habitat in the study area	x
Cabombaceae	*Brasenia schreberi*		NT		Shallow freshwater lagoons or backwaters	Low	Limited suitable natural habitat in study area	
Caesalpiniaceae	*Cassia marksiana*	Mark's Cassia	V		Coastal and riverine rainforest, sometimes in regrowth on farmland and along roadsides; usually on fertile soils at low elevation on flat sites	Low	Suitable habitat present, but study area appears to be north of generally known distribution	x
Cucurbitaceae	*Nothoalsomitra suberosa*	Corky Cucumber	NT		Rainforest in the coastal ranges	Nil	No suitable habitat	X
Elaeocarpaceae	*Elaeocarpus coorangooloo*	Brown Quandong	NT		Rainforest, but appears to occur in Nth Qld – location may be in error	Nil	Study area appears to be outside natural distribution	
Euphorbiaceae	*Croton mamillatus*	Bahr's scrub croton	E		Edges of dry rainforest	High	Likely to occur on rainforest edges in the far west of the study area	
Euphorbiaceae	*Ricinocarpos speciosus*	Long-haired Ricinocarpos	V		Sub-tropical, warm temperate and cool temperate rainforest along streams	Low	Potential habitat in the study area	
Fabaceae	*Sophora fraseri*	Brush Sophora	V	V	Hilly country at altitudes of 60–660 m on shallow soils; grows along rainforest margins in eucalypt forests or in large canopy gaps in closed forest	Moderate	Potential habitat in gullies in hilly west part of study area	x
Haloragaceae	*Gonocarpus effusus*		NT		Endemic to Glasshouse Mountains	Nil	Outside known distrbution	
Hernandiaceae	*Hernandia bivalvis*	Cudgerie	NT		Dry rainforest & vine scrubs	Moderate	Potential habitat in west of study area	
Laminaceae	*Plectranthus*	Nightcap	E	E	Rocky cliff faces or among rocky outcrops	Nil	Lack of rainforest on rocky	x

Family	Scientific Name	Common Name	Q	A	Habitat	Potential Occurrence	Rationale	No Record*
	nitidus	Plectranthus			and boulders in damp, sheltered sites in rainforest		land	
Mimosaceae	*Acacia baueri baueri*	Tiny Wattle	V		Wet sandy heath	Nil	No suitable habitat	x
Moraceae	*Ficus macrophylla*	Moreton Bay Fig			Subtropical and dry rainforest, on alluvium or hillslopes	Moderate	Potential habitat present and seeds dispersed by birds and flying-foxes, sometimes over considerable distances	x
Myrtaceae	*Choricarpia subargentea*	Giant ironwood	NT		Regrowth in dry rainforest	Moderate	Potential habitat in the north-west of the study area	x
Myrtaceae	*Eucalyptus dunnii*	Dunn's White Gum	V		Valley bottoms & the lower slopes of hills and escarpments, but can also be found high on ridges in basalt soils, growing around the edges of rainforest. It prefers moist, highly fertile soils, particularly those of basaltic origin, but will grow on soils derived from sedimentary rocks, especially more freely drained shales. The preferred mean annual rainfall is around 1000–1750 mm	Moderate	Likely to occur in the west of the study area	
Myrtaceae	*Gossia inophloia*	Thready Barked Myrtle	NT		Shaded and semi-shaded conditions on well-drained soils in and on the margins of subtropical rainforest	Low	Potential habitat in the study area	x
Myrtaceae	*Leptospermum luehmannii*		V		Open shrubland on steep slopes of acid volcanic rock; Glasshouse Mountains	Nil	No suitable habitat	
Myrtaceae	*Leptospermum oreophilum*		V		Appears to be restricted to Glasshouse Mountains	Nil	No suitable habitat	
Myrtaceae	*Syzygium hodgkinsoniae*	Red Lily Pilly	V	V	Subtropical rainforest near rivers and creeks	Moderate	Suitable habitat along Wararba Creek, Caboolture	x

Family	Scientific Name	Common Name	Q	A	Habitat	Potential Occurrence	Rationale	No Record*
							River and their major tributories	
Oleaceae	*Jasminum jenniae*	Small-leaved Jasmine			Subtropical rainforest	Low	Limited habitat in study area	
Proteaceae	*Floydia praealta*	Ball Nut	V	V	Riparian margins in coastal scrub and subtropical rainforests; generally on basaltic soils	Nil	Lack of appropriate substrate (basalt)	x
Proteaceae	*Macadamia ternifolia*	Bopple Nut	V	V	Lowland warm complex notophyll vine forest and Araucarian notophyll vine forest on high-fertility basic and intermediate volcanic soils and alluvia in higher rainfall areas; soils free-draining	Nil	No suitable habitat	
Proteaceae	*Macadamia tetraphylla*	Rough-shelled Bush Nut	V	V	Subtropical rainforest, complex notophyll vineforest and mixed sclerophyll forest ; grows on moderate to steep hillslopes on alluvial, yet free-draining, soils	Low	Limited habitat in study area	X
Proteaceae	*Macadamia integrifolia*	Macadamia Nut	V	V	Rainforest and rainforest edges on ridges, hill slopes, scree slopes and foot slopes, gullies, benches and terrace plains on well-drained, high nutrient soils	Low	Limited habitat in study area	X
Rutaceae	*Bosistoa transversa*	Three-leaved bosistoa		V	Subtropical rainforest, wet Eucalypt forest and dry Eucalypt forest up to 300 m elevation	Moderate	Potential habitat in the study area	x
Santalaceae	*Thesium australe*	Austral Toadflax	V	V	Grasslands and grassy woodland; root parasite, most commonly of Kangaroo Grass (*Themeda triandra*).	Low	Limited potential habitat in the study area, potentially in the grassy forests in the hilly west of the study area. No *Themeda triandra* identified within the study area.	x

Family	Scientific Name	Common Name	Q	A	Habitat	Potential Occurrence	Rationale	No Record*
Sapindaceae	*Dodonaea rupicola*		V	V	Glasshouse Mountains in south-east Queensland, growing among rocks on the mountains; generally steep, in open shrubland to tall woodlands	Nil	Appears to be endemic to Glasshouse Mountains, outside of study area	
Sapindaceae	*Lepiderema pulchella*	Fine-leaved tuckeroo	V		Lowland subtropical rainforest, usually in riparian area	Moderate	Potential habitat in study area	x
Symplocaceae	*Symplocos harroldii*	Hairy Hazelwood	NT		Sub-tropical and dry rainforest, wet Eucalypt forest	Moderate	Potential habitat in study area	
Monocots								
Aponogetonaceae	*Aponogeton elongatus fluitans*	Aponogeton	V		Freshwater rivers and streams through rainforest	Low	Limited potential habitat in study area	x
Blandfordiaceae	*Blandfordia grandiflora*	Christmas Bells	E		Wet coastal heath and paperbark swamps on sandy soils	Nil	No suitable habitat	X
Cyperaceae	*Cyperus semifertilis*	Missionary Nutgrass	V	V	Open forest dominated by white mahogany (Eucalyptus acmenoides)	Low	White Mahogany uncommon in the study area	x
Juncaginaceae	*Maundia triglochinoides*	Swamp Herb	V		Swamps, creeks or shallow freshwater 30 - 60 cm deep on low nutrient, heavy clay; associates with other wetland species	Low	Limited potential habitat in study area	x
Laxmanniaceae	*Romnalda strobilacea*		V	V	Grows in subtropical rainforest as a tufted perennial among the ground flora; distribution sporadic & often clumped preferring moist gully or stream bank situations and level to steeply inclined slopes where the soil is nutrient rich	Low	Limited habitat in study area	

Family	Scientific Name	Common Name	Q	A	Habitat	Potential Occurrence	Rationale	No Record*
Orchidaceae	*Phaius australis*	Lesser Swamp Orchid	E	E	Coastal habitats on edges of swamps, occasionally further inland; typical habitat swamp sclerophyll forest (dominated by Paperbark) with rainforest elements; also recorded in wallum sedgeland, rainforest and closed forest. Soils generally sandy and damp, but not flooded for extended periods	Low	Preferred habitat not present	
Orchidaceae	*Phaius bernaysii*	Yellow Swamp Orchid	E	E	Low-lying areas with moist soils, but not flooded for lengthy periods; in the margins between open forest/woodland and sedgeland, along the perimeter of a swamp; usually in shady locations	Nil	Only known from the sandy islands of Moreton Bay	x
Orchidaceae	*Sarcochilus fitzgeraldii*	Ravine Orchid	E	V	Found in subtropical and temperate rainforest on rocks, in organic matter, in shady ravines, gorges and on cliff faces that are cool and moist; sometimes grows on the base of fibrous-barked trees	Nil	Lack of rainforest on rocky land	x
Orchidaceae	*Papillilabium beckleri*	Tangle orchid	NT		On the outer twigs of trees in rainforest, especially along creeks,	Low	Potential habitat but may be limited by previous clearing in the study area	x

Fauna

(an "x" indicates no record within 15km of the centre of the study area, so only given as priority species by MBRC)*

Family	Scientific Name	Common Name	Q	A	Habitat	Potential Occurrence	Rationale	No Record*
Insects								
Nymphalidae	*Argyreus hyperbius inconstans*	Australian Fritillary	E		Open coastal swamps where larval food plant, *Viola betonicifolia*, present	Nil	No suitable habitat	
Lycaenidae	*Acrodipsas illidgei*	Illidge's Ant-blue Butterfly	V		Mangroves and adjacent brackish forest	Nil	No suitable habitat	x
Papilionidae	*Ornithoptera richmondia*	Richmond Birdwing	V		Lowland rainforests where larval food plant, *Pararistolochia praevenosa*, present	Low	General lack of lowland rainforest with vines	
Lestoideidae	*Diphlebia coerulescens*	Sapphire Rockmaster			Found along fast-flowing creeks and rivers	High	Suitable habitat along Wararba Creek and Caboolture River and large tributaries	x
Other Invertebrates								
Hyriidae	*Cucumerunio novaehollandiae*	Australian River Mussel			Moderate-strong currents in rivers and creeks, often in boulder-stabilised habitats on outer bends; pools at the base of riffles and cascades	High	Suitable habitat along Wararba Creek and Caboolture River and large tributaries	x
Hydrobiidae	*Fluvidona anodonta*	North Pine River Freshwater Snail			Found under rocks in small streams in the headwaters of the Pine River	Low	Only known from the Pine River system and would have limited ability to disperse into other catchments; however, a poorly known species and future targeted surveys could locate it in adjacent areas, such as the study area	x

Family	Scientific Name	Common Name	Q	A	Habitat	Potential Occurrence	Rationale	No Record*
Bony fish								
Ceratodontidae	*Neoceratodus forsteri*	Australian Lungfish		V	Slow-moving rivers and still water (including dams) that have some aquatic vegetation on banks and muddy, sandy, or gravelly bottoms; usually in 3–10 m deep; occurs naturally only in Mary and Burnett Rivers, though introduced into other systems	Low	Was introduced into Caboolture River, but fate unknown	
Nannopercidae	*Nannoperca oxleyana*	Oxleyan Pygmy Perch	V	E	Swamps, creeks and lakes of coastal 'wallum', water usually acidic and tannin-stained	Nil	No suitable habitat	
Amphibians								
Hylidae	*Litoria brevipalmata*	Green thighed Frog	NT		Breeds in temporarily flooded grassy areas in or near forests following heavy rain	Moderate	Specific habitat requirements poorly known, but generally suitable habitat appears to be present across the study area	
Hylidae	*Litoria freycineti*	Wallum Rocketfrog	V		Near temporary coastal swamps in Wallum, a mosaic of wet heath and paperbark swamp with acid groundwater	Nil	No suitable habitat	
Hylidae	*Litoria pearsoniana*	Cascade Treefrog	V		Dense rainforest gullies near fast flowing rocky streams	Low	Possible habitat in the hilly far west of the study area	
Hylidae	*Litoria olongburensis*	Wallum Sedge-frog	V	V	Coastal swamps with sedges and rushes in wallum country	Nil	No suitable habitat	x

Family	Scientific Name	Common Name	Q	A	Habitat	Potential Occurrence	Rationale	No Record*
					where groundwater is acidic			
Limnodynastidae	*Adelotus brevis*	Tusked Frog	V		Associates with dams, ditches, flooded grassland and creeks in open country and a variety of forest types; males build nests in leaf litter	High	Known records along major drainage lines in the study area; may also occur around dams proximate to trees	
Myobatrachidae	*Assa darlingtoni*	Pouched Frog	NT		Cool, moist rainforest and wet eucalypt forest >800 m elevation	Nil	No suitable habitat	x
Myobatrachidae	*Crinia tinnula*	Wallum Froglet	V		Wallum, a mosaic of wet heath and paperbark swamp with acid groundwater	Nil	No suitable habitat	
Myobatrachidae	*Mixophyes fleayi*	Fleay's Barred Frog	E	E	Montane rainforest; amongst deep leaf litter around permanent shallow, flowing, rocky streams	Nil	Lack of suitable montane rainforest	x
Myobatrachidae	*Mixophyes iteratus*	Giant Barred Frog	E	E	Amongst deep leaf litter in rainforest and wet eucalypt forest below 1000 m elevation, usually in gullies near water; breeds around permanent, shallow, flowing rocky streams	High	Middle sections of Wararba Creek and Caboolture River and larger tributaries with pool/riffle sequences, particularly where riparian rainforest present	
Myobatrachidae	*Taudactylus diurnus*	Southern Dayfrog	E		In and around pools and flowing streams in montane rainforest	Nil	No suitable habitat; listed as extinct by ICUN	x
Reptiles								
Cheloniidae	Caretta caretta	Loggerhead Turtle	E	E	Oceans, nests on beaches	Nil	No suitable habitat	X

Family	Scientific Name	Common Name	Q	A	Habitat	Potential Occurrence	Rationale	No Record*
Agamidae	*Chlamydosaurus kingii*	Frilled Lizard			Grassy dry Eucalypt forests and woodland	Low	Some suitable habitat present, but much of area cleared in past; limited dispersal abilities	x
Scincidae	*Bellatorias major*	Land Mullet			Rainforest and rainforest margins, rarely Eucalypt forest; habitats with lots of fallen logs favoured	Low	Fallen logs absent from many forested areas due to previous land clearing; possibly in small pockets of rainforest if logs present	x
Scincidae	*Eroticoscincus graciloides*	Elf skink	NT		Vine thickets, rainforest and wet Eucalypt forest; shelters beneath damp leaf litter, logs, stones; forages in moist, shaded positions	Low	Logs rare due to previous clearing and leaf litter generally thin; possibly in small pockets of rainforest or wetter Eucalypt forest if logs and deep leaf litter present	
Scincidae	*Saproscincus rosei*	Rainforest skink	NT		Rainforest of coastal ranges & eastern GDR; amongst fallen logs and deep, decaying leaf litter	Low	Logs rare due to previous clearing and leaf litter generally thin; possibly in small pockets of rainforest or wetter Eucalypt forest if logs and deep leaf litter present; would be restricted to hilly country in western part of study area	
Elapidae	*Acanthophis antarcticus*	Common Death Adder	NT		Found in a variety of habitats, including rainforest, wet sclerophyll forest, woodland, grassland and coastal heathland; the common factors appears to be deep leaf litter	Low	Leaf litter in general only moderately developed, but may occur in small pockets where this micro-habitat is better developed	x
Birds								
Dromaiidae	*Dromaius novaehollandiae*	Emu			Forests, woodlands, coastal heath, grasslands; usually	Low	Regrowth forests lack complex understorey; large distinctive bird	x

Family	Scientific Name	Common Name	Q	A	Habitat	Potential Occurrence	Rationale	No Record*
					with a diverse understorey, including fruiting shrubs			
Turnicidae	*Turnix melanogaster*	Black-breasted Button-quail	V	V	Prefers drier rainforests and viney scrubs, often in association with Hoop Pine and a deep, moist leaf litter layer	Low	Lack of suitable habitat, but possible in gullies in west of study area	
Procellariidae	*Macronectes giganteus*	Southern Giant Petrel	E	E	Oceans	Nil	No suitable habitat	x
Diomedeidae	*Diomedea exulans*	Wandering Albatross	V	V	Oceans	Nil	No suitable habitat	x
Diomedeidae	*Thalassarche cauta*	Shy Albatross	V	V	Oceans	Nil	No suitable habitat	x
Diomedeidae	*Thalassarche melanophris*	Black Albatross		V	Oceans	Nil	No suitable habitat	x
Phaethontidae	*Phaethon rubricauda*	Red-tailed Tropicbird	V		Oceans	Nil	No suitable habitat	
Anatidae	*Nettapus coromandelianus*	Cotton Pygmy-goose	NT		Freshwater swamps, lagoons and dams, with water lilies and emergent vegetation; dead hollow-bearing trees near water for nesting	Low	Numerous farm dams but in general appear to lack suitable vegetative cover	
Anatidae	*Stictonetta naevosa*	Freckled Duck	NT		Prefers heavily vegetated wetlands; uses more open wetlands during drought in non-breeding period	Low	Lack of suitable habitat, but may use farm dams during drought	X
Accipitridae	*Pandion haliaetus*	Eastern Osprey		M	Estuaries, large rivers and lakes; feeds over open water;	Low	Potential occasional use of the lower reaches of Wararba Creek and Caboolture	x

Family	Scientific Name	Common Name	Q	A	Habitat	Potential Occurrence	Rationale	No Record*
					builds a stick nest in a large tree		River	
Accipitridae	*Accipiter novaehollandiae*	Grey Goshawk	NT		Rainforest and open forest, open country during autumn dispersal; feeds on birds, small to medium-sized mammals, reptiles, and insects; breeds mainly in dense, moist forest; builds a large stick nest	High	Potential to forage over treed portions of the study area, particularly in autumn/winter; unlikely to breed in study area	
Accipitridae	*Erythrotriorchis radiatus*	Red Goshawk	E	V	Very large home-range of 50-220 km^2; prefers a mosaic of habitat types, on the coastal plain often found near watercourses in forests of; feeds mainly on birds, intolerant of dense regrowth forests which restrict manoeuvrability when hunting; builds a large stick nest	Low	May utilise the study area occasionally, but dense regrowth forests generally unsuited to foraging; would mainly hunt along forest edges, particularly along major drainage lines	
Accipitridae	*Lophoictinia isura*	Square-tailed Kite	NT		Forests & woodlands, particularly along edges; preys on passerine birds, mainly nestlings; builds a large stick nest	High	Potential foraging and nesting habitat in the study area, particularly more structurally complex, floristically diverse open forests that support a higher diversity and abundance of passerine birds	
Burhinidae	*Esacus neglectus*	Beach Stone-curlew	V		Undisturbed beaches, intertidal sandflats, occasionally mudflats	Nil	No suitable habitat	x

Family	Scientific Name	Common Name	Q	A	Habitat	Potential Occurrence	Rationale	No Record*
Haematopodidae	*Haematopus fuliginosus*	Sooty Oystercatcher	NT		Rocky headlands, rock shelves, occasionally beaches	Nil	No suitable habitat	x
Gruidae	*Grus rubicunda*	Brolga			Freshwater swamps, floodplains, flooded grassland, margins of lagoons	Moderate	Floodplain of Caboolture River and larger vegetated farm dams	x
Ciconiidae	*Ephippiorhynchus asiaticus*	Black-necked Stork	NT		Permanent freshwater wetlands and floodplains, occasionally mangroves and mudflats in estuaries	Occasional	Likely to occur on floodplains, particularly after major rain events and occasionally use larger farm dams	
Laridae	*Sterna albifrons*	Little Tern	E		Primarily sheltered coastal waters such as bays, estuaries, coastal lagoons and large rivers; sometimes off ocean beaches. Nests on sandy beaches or in low dunes	Occasional	May occasionally forage on lower reaches of Wararba Creek and Caboolture River; no suitable nesting habitat	
Ardeidae	*Botaurus poiciloptilus*	Australasian Bittern		E	Heavily vegetated permanent freshwater wetlands	Low	Lack of heavily vegetated wetlands	
Cacatuidae	*Calyptorhynchus lathami*	Glossy Black-cockatoo	V		Forests and woodlands with she-oaks (*Allocasuarina* spp.); nests in large tree hollow	Moderate	Two Allocasuarina spp. present (*A. torulosa*, *A. littoralis*), but in low abundance; paucity of large hollows for nesting	
Cacatuidae	*Lophochroa leadbeateri*	Major Mitchells Cockatoo	V		Drier woodlands and semi-arid country	Nil	Humid coastal environment	x
Psittacidae	*Cyclopsitta diopthalma coxeni*	Coxen's Fig-Parrot	E	E	Rainforest, particularly stands with figs; sometimes isolated trees	Low	Extensive clearing in the locality, but figs and small patches of rainforest suggest potential movement habitat	x
Psittacidae	*Neophema pulchella*	Turquoise Parrot	NT		Open grassy woodland with dead trees, forested hills,	Low	Possibly in the drier hilly country in the west of the study area, perhaps	

Family	Scientific Name	Common Name	Q	A	Habitat	Potential Occurrence	Rationale	No Record*
					coastal heath, pastures with exotic grass		occasionally exotic pastures	
Psittacidae	*Lathamus discolor*	Swift Parrot	E	E	Over-winters on mainland, extending to SE Qld; associates with winter flowering trees (e.g. spotted gums, red gums, ironbarks)	Occasional	Suitable winter foraging tree species, but not common for it to reach so far north	x
Podargidae	*Podargus ocellatus plumiferus*	Plumed Frogmouth	V		Sheltered gullies in subtropical rainforest	Moderate	May occur in deeper gullies in the western part of the study area	
Apodidae	*Aerodramus terraereginae*	Australian Swiftlet			An aerial species that flies over a variety of habitats, including cleared land	Occasional	South of main area of distribution, but highly mobile	x
Climatcteridae	*Climacteric erythrops*	Red-browed Treecreeper	NT		Feeds in the upper parts of trees in tall Eucalypt forest, usually in hilly country with deep rainforest gullies	Low	Lack of preferred habitat	x
Meliphagidae	*Anthochaera phrygia*	Regent Honeyeater	E	E	Associates with nectar-producing trees, particularly those that flower in winter	Occasional	Species is highly nomadic and study area at northern edge of range; not known to breed in the locality of the study area	
Meliphagidae	*Grantiella picta*	Painted Honeyeater	V		Drier Eucalypt forests and woodlands where mistletoes are abundant; diet mostly mistletoe fruit, but also nectar and insects	Low	Lack of mistletoes throughout the study area, perhaps attributable to the general immaturity of forests	
Meliphagidae	*Melithreptus gularis*	Black-chinned Honeyeater	NT		Drier forests and woodlands; have a large territory, but may be seasonally nomadic; feeds mainly on honeydew	Moderate	Dry open forest present across the study area; most likely in larger forest patches	

Family	Scientific Name	Common Name	Q	A	Habitat	Potential Occurrence	Rationale	No Record*
					and insects rather than nectar			
Rallidae	*Lewinia pectoralis*	Lewin's Rail	NT		Swamps & swamp forest with dense low cover; rank grasslands	Moderate	Likely to occur along major watercourses where there are tall grasses on banks; also areas of rank pasture or heavily vegetated farm dams	
Rostratulidae	*Rostratula australis*	Australian Painted Snipe	V	V	Well-vegetated shallow margins of freshwater wetlands, lakes and swamps, forages for invertebrates on muddy edges; nests in dense reeds near water	Moderate	Likely to occur around the muddy edges of farm dams, particularly well-vegetated dams	
Maluridae	*Stipiturus malachurus*	Southern Emu-wren	V		Heaths and heathy woodlands	Nil	No suitable habitat	x
Strigidae	*Ninox strenua*	Powerful Owl	V		Woodland, open and wet eucalypt, and rainforest; can persist in fragmented landscapes; diet largely dependent on medium-large arboreal mammals; nests in a tree hollow; large territory	Moderate	Paucity of tree hollows suggest its main prey (arboreal mammals) would be in low abundance, but a large home-range and occasional to semi-regular use of study area possible; large tree hollows for nesting in low abundance	
Tytonidae	*Tyto tenebricosa tenebricosa*	Sooty Owl	NT		Rainforest & wet eucalypt forest; nests in large tree hollow	Low	Paucity of suitable habitat, would be confined to far west of study area	
Wading birds					Intertidal mudflats and sandspits, beaches, rocky foreshores, shallow freshwater wetlands with muddy edges; most species	Low	A large group of species with similar habitat requirements, most species migratory; many species require intertidal habitats and in this case there is no suitable habitat, however, a small number	

Family	Scientific Name	Common Name	Q	A	Habitat	Potential Occurrence	Rationale	No Record*
					breed in the northern hemisphere		of species (including the Vulnerable Australian Painted Snipe Rostratula australis) may utilise farm dams in the study area	
Mammals								
Ornithorhynchidae	*Ornithorhynchus anatinus*	Platypus			Permanent freshwater rivers and creeks with banks suitable for burrows	High	Major rivers and permanent creeks, extending upstream to permanent pools	X
Tachyglossidae	*Tachyglossus aculeatus*	Short-beaked Echidna			Any habitat with ants and termites	High	Broad habitat requirements; evidence of feeding activity	x
Dasyuridae	*Phascogale tapoatafa*	Brush-tailed Phascogale			Drier forests and woodland; shelters in tree hollow by day	Low	Suitable foraging habitat, but likely to be limited by the availability of hollows and fragmentation	X
Dasyuridae	*Dasyurus maculatus maculatus*		V	E	Forests, woodlands, coastal heath; uses hollow-bearing trees, fallen logs and rock crevices as den sites; territories very large ~7.5 km^2 for females and 35 km^2 for males	Low	Likely in the hilly country west of the study area.	
Dasyuridae	*Dasyurus hallucatus*	Northern Quoll		E	Open forests and rocky country; shelters in tree hollows	Nil	Appears to be extinct in the far south of its range	x
Phascolarctidae	*Phascolarctos cinereus (southeast Queensland*	Koala (southeast Queensland bioregion)	V	V	Forests containing primary browse trees, e.g. Forest Red Gum (Eucalyptus tereticornis), Tallowwood (E.	Moderate	Suitable browse trees present, but most tree cover advanced regrowth and may have been insufficient time for colonisation to occur	

Family	Scientific Name	Common Name	Q	A	Habitat	Potential Occurrence	Rationale	No Record*
	bioregion)				microcorys) and Scribbly Gum (E. racemosa)			
Acrobatidae	*Acrobates pygmaeus*	Feathertail Glider			Eucalypt forests and woodlands with hollow-bearing trees; feeds heavily on nectar and other exudates	Low - Moderate	Suitable foraging habitat, but likely to be limited by the availability of hollows and fragmentation	x
Petauridae	*Petaurus norfolcensis*	Squirrel Glider			Eucalypt forests and woodlands with hollow-bearing trees; usually associates with winter/spring flowering trees (e.g. red gums, ironbarks)	Low - Moderate	Suitable foraging habitat, but likely to be limited by the availability of hollows and fragmentation	x
Potoroidae	*Potorous tridactylus*	Long-nosed Potoroo	V	V	Coastal heaths, dry and wet eucalypt forests, rainforest margins; requires a dense understorey with occasional open areas; soil typically a sandy loams; digs for the underground fruit bodies of fungi	Low	Possibly in dense gullies in hilly western portion of study area	x
Pteropodidae	*Pteropus poliocephalus*	Grey-headed Flying-fox		V	Forests with fruiting or flowering trees; roosts in forest near water (including mangroves)	High	A highly mobile species and suitable flowering and fruiting trees present; potential for large numbers during times of high food availability, lower numbers likely to be present at other times. No roosting habitat identified within Study Area.	
Pteropodidae	*Pteropus alecto*	Black Flying-fox			Forests with fruiting or flowering trees; roosts in	High	A highly mobile species and suitable flowering and fruiting trees present;	X

Family	Scientific Name	Common Name	Q	A	Habitat	Potential Occurrence	Rationale	No Record*
					forest near water (including mangroves)		potential for large numbers during times of high food availability, lower numbers likely to be present at other times. No roosting habitat identified within Study Area.	
Pteropodidae	*Pteropus scapuatus*	Little Red Flying-fox			Forests with fruiting or flowering trees; roosts in forest near water (including mangroves); more nomadic than other Flying-foxes	Occasional	A highly mobile species and suitable flowering and fruiting trees present; potential for large numbers during times of high food availability, likely to be absent at other times	x
Vespertilionidae	*Kerivoula papuensis*	Golden-tipped Bat	NT		Rainforest and rainforest gullies in Eucalypt forest in tangled vegetation supporting abundant spiders webs	Low	Preferred habitat generally lacking, but may occurred in gullies in hilly far west of study area	x
Dugongidae	*Dugong dugon*	Dugong	V	V	Estuaries, bays, near-shore waters; feeds on seagrass	Nil	No suitable habitat	x
Muridae	Xeromys myoides	Water Mouse	V	V	Mangroves and adjacent freshwater swamps	NIl	No suitable habitat	X

APPENDIX F – PRIORITY SPECIES HABITAT MAPS

Legend

- Study Area
- Potential Habitat

0 500 1,000 1,500 2,000

Metres

bing

Priority Species - Australian River Mussel	DRAWING NO. 1	REVISION E	STATUS
PROJECT NO. 30031051	CREATED BY EH11799	DATE 24/07/2013 Time: 12:51:53 PM	N
PROJECT TITLE Caboolture West Environmental Study			
COORDINATE SYSTEM GDA 1994 MGA Zone 56	SOURCE Bing Maps etc		CLIENT MBRC
PAGE SIZE A3 SCALE 1:40,000			CONSULTANT SMEC Australia

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Legend

- Study Area
- Potential Habitat

0 500 1,000 1,500 2,000

Metres

Priority Species - Australian Painted Snipe

PROJECT NO. 30031051
PROJECT TITLE Caboolture West Environmental Study

DRAWING NO. 1 **REVISION** D **STATUS**

CREATED BY EH11799 **DATE** 26/06/2013
Time: 5:21:30 PM

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CLIENT Moreton Bay Regional Council

CONSULTANT SMEC Australia

COORDINATE SYSTEM GDA 1994 MGA Zone 56
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SOURCE Bing Maps etc

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Legend

- Study Area
- Potential Habitat

0 500 1,000 1,500 2,000

Metres

Priority Species - Black-chinned Honeyeater

PROJECT NO. 30031051

PROJECT TITLE Caboolture West Environmental Study

DRAWING NO. 1 REVISION D STATUS

CREATED BY EH11799 DATE 26/06/2013

Time: 5:05:59 PM

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CLIENT

COORDINATE SYSTEM GDA 1994 MGA Zone 56

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CONSULTANT SMEC Australia

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Legend

- Study Area
- Potential Habitat

0 500 1,000 1,500 2,000

Metres

bing

Priority Species - Black-necked Stork

PROJECT NO. 30031051

PROJECT TITLE Caboolture West Environmental Study

DRAWING NO. 1 **REVISION** D **STATUS**

CREATED BY EH11799 **DATE** 26/06/2013

Time: 12:57:42 PM

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COORDINATE SYSTEM GDA 1994 MGA Zone 56

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CONSULTANT SMEC Australia

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Legend

- Study Area
- Potential Habitat

0 500 1,000 1,500 2,000

Metres

bing

Priority Species - Brolga

PROJECT NO. 30031051
PROJECT TITLE Caboolture West Environmental Study

DRAWING NO. 1 **REVISION** D **STATUS**

CREATED BY EH11799 **DATE** 26/06/2013
Time: 1:02:20 PM

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COORDINATE SYSTEM GDA 1994 MGA Zone 56
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CONSULTANT SMEC Australia

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Legend

- Study Area
- Potential Habitat

0 500 1,000 1,500 2,000

Metres

bing

Priority Species - Giant Barred Frog

PROJECT NO. 30031051
PROJECT TITLE Caboolture West Environmental Study

DRAWING NO. 1 **REVISION** E **STATUS**

CREATED BY EH11799 **DATE** 25/07/2013
Time: 7:47:49 AM

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COORDINATE SYSTEM GDA 1994 MGA Zone 56
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Legend

- Study Area
- Potential Habitat
- Allocasuarinas

0 500 1,000 1,500 2,000

Metres

Priority Species - Glossy Black-cockatoo

PROJECT NO. 30031051

PROJECT TITLE Caboolture West Environmental Study

DRAWING NO. 1 REVISION D STATUS

CREATED BY EH11799 DATE 26/06/2013

Time: 3:28:57 PM

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COORDINATE SYSTEM GDA 1994 MGA Zone 56

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Legend

- Study Area
- Potential Habitat

0 500 1,000 1,500 2,000

Metres

bing

Priority Species - Green Thighed Frog

PROJECT NO. 30031051

PROJECT TITLE Caboolture West Environmental Study

DRAWING NO. 1 **REVISION** D **STATUS**

CREATED BY EH11799 **DATE** 26/06/2013

Time: 6:49:35 PM

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Legend

- Study Area
- Potential Habitat

0 500 1,000 1,500 2,000

Metres

Priority Species - Grey Goshawk

PROJECT NO. 30031051
PROJECT TITLE Caboolture West Environmental Study

DRAWING NO. 1 **REVISION** D **STATUS**

CREATED BY EH11799 **DATE** 26/06/2013
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Legend

- Study Area
- Potential Habitat

0 500 1,000 1,500 2,000

Metres

Priority Species - Koala

PROJECT NO. 30031051

PROJECT TITLE Caboolture West Environmental Study

DRAWING NO. 1 **REVISION** E **STATUS**

CREATED BY EH11799 **DATE** 3/07/2013

Time: 5:59:03 PM

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Legend

- Study Area
- Potential Habitat

0 500 1,000 1,500 2,000

Metres

bing

Priority Species - Lewin's Rail

PROJECT NO. 30031051

PROJECT TITLE Caboolture West Environmental Study

DRAWING NO. 1 REVISION D STATUS

CREATED BY EH11799 DATE 26/06/2013

Time: 5:17:21 PM

N

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Legend

- Study Area
- Potential Habitat

0 500 1,000 1,500 2,000

Metres

bing

Priority Species - Platypus

PROJECT NO. 30031051
PROJECT TITLE Caboolture West Environmental Study

DRAWING NO. 1 **REVISION** E **STATUS**

CREATED BY EH11799 **DATE** 25/07/2013
Time: 8:21:29 AM

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Legend

- Study Area
- Potential Habitat

0 500 1,000 1,500 2,000

Metres

Priority Species - Plumed Frogmouth

PROJECT NO. 30031051

PROJECT TITLE Caboolture West Environmental Study

DRAWING NO. 1 REVISION E STATUS

CREATED BY EH11799 DATE 25/07/2013

Time: 10:15:35 AM

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CONSULTANT SMEC Australia

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Legend

- Study Area
- Potential Habitat

0 500 1,000 1,500 2,000

Metres

Priority Species - Powerful Owl	DRAWING NO. 1	REVISION D	STATUS
PROJECT NO. 30031051	CREATED BY EH11799	DATE 26/06/2013 Time: 6:10:04 PM	
PROJECT TITLE Caboolture West Environmental Study			
COORDINATE SYSTEM GDA 1994 MGA Zone 56	SOURCE Bing Maps etc		
PAGE SIZE A3 SCALE 1:40,000			

CLIENT Moreton Bay Regional Council

CONSULTANT SMEC Australia

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Legend

- Study Area
- Potential Habitat

0 500 1,000 1,500 2,000

Metres

Priority Species - Sapphire Rockmaster

PROJECT NO. 30031051
PROJECT TITLE Caboolture West Environmental Study

DRAWING NO. 1 **REVISION** E **STATUS**

CREATED BY EH11799 **DATE** 24/07/2013
Time: 12:43:49 PM

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CLIENT Moreton Bay Regional Council

CONSULTANT SMEC Australia

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Legend

- Study Area
- Potential Habitat

0 500 1,000 1,500 2,000

Metres

Priority Species - Short-beaked Echidna

PROJECT NO. 30031051
PROJECT TITLE Caboolture West Environmental Study

DRAWING NO. 1 **REVISION** D **STATUS**

CREATED BY EH11799 **DATE** 26/06/2013
Time: 6:46:58 PM

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CONSULTANT SMEC Australia

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Legend

- Study Area
- Potential Habitat

0 500 1,000 1,500 2,000

Metres

Priority Species - Square-tailed Kite

PROJECT NO. 30031051

PROJECT TITLE Caboolture West Environmental Study

DRAWING NO. 1 REVISION D STATUS

CREATED BY EH11799 DATE 26/06/2013

Time: 8:41:48 PM

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CLIENT Moreton Bay Regional Council

CONSULTANT SMEC Australia

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Legend

- Study Area
- Potential Habitat

0 500 1,000 1,500 2,000

Metres

bing

Priority Species - Tusked Frog

PROJECT NO. 30031051
PROJECT TITLE Caboolture West Environmental Study

DRAWING NO. 1 **REVISION** F **STATUS**

CREATED BY EH11799 **DATE** 24/07/2013
Time: 2:06:51 PM

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CLIENT Moreton Bay Regional Council

CONSULTANT SMEC Australia

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Legend

- Study Area
- Potential Habitat
- Species Record (SMEC,2013)

0 500 1,000 1,500 2,000

Metres

bing

Priority Species - Bahr's Scrub Croton

PROJECT NO. 30031051

PROJECT TITLE Caboolture West Environmental Study

DRAWING NO. 1 REVISION D STATUS

CREATED BY EH11799 DATE 26/06/2013

Time: 9:15:39 PM

N

CLIENT Moreton Bay Regional Council

CONSULTANT SMEC Australia

COORDINATE SYSTEM GDA 1994 MGA Zone 56

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Legend

- Study Area
- Potential Habitat

0 500 1,000 1,500 2,000

Metres

bing

Priority Species - Brush Sophora

PROJECT NO. 30031051
PROJECT TITLE Caboolture West Environmental Study

DRAWING NO. 1 **REVISION** E **STATUS**

CREATED BY EH11799 **DATE** 2/07/2013
Time: 12:55:54 PM

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CONSULTANT SMEC Australia

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Legend

- Study Area
- Potential Habitat

0 500 1,000 1,500 2,000

Metres

bing

Priority Species - Cudgerie

PROJECT NO. 30031051
PROJECT TITLE Caboolture West Environmental Study

DRAWING NO. 1 **REVISION** D **STATUS**

CREATED BY EH11799 **DATE** 15/08/2013
Time: 9:50:56 AM

N

CLIENT Moreton Bay Regional Council

COORDINATE SYSTEM GDA 1994 MGA Zone 56
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Legend

- Study Area
- Potential Habitat

0 500 1,000 1,500 2,000

Metres

bing

Priority Species - Dunn's White Gum

PROJECT NO. 30031051

PROJECT TITLE Caboolture West Environmental Study

DRAWING NO. 1 **REVISION** D **STATUS**

CREATED BY EH11799 **DATE** 27/06/2013

Time: 7:01:52 PM

N

CLIENT Moreton Bay Regional Council

SMEC

CONSULTANT SMEC Australia

COORDINATE SYSTEM GDA 1994 MGA Zone 56

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Legend

- Study Area
- Potential Habitat

0 500 1,000 1,500 2,000

Metres

bing

Priority Species - Fine-leaved Tuckeroo

PROJECT NO. 30031051

PROJECT TITLE Caboolture West Environmental Study

DRAWING NO. 1 **REVISION** D **STATUS**

CREATED BY EH11799 **DATE** 27/06/2013

Time: 6:48:41 PM

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CLIENT Moreton Bay Regional Council

SMEC

CONSULTANT SMEC Australia

COORDINATE SYSTEM GDA 1994 MGA Zone 56

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Legend

- Study Area
- Potential Habitat

0 500 1,000 1,500 2,000

Metres

bing

Priority Species - Giant Ironwood **PROJECT NO.** 30031051 **PROJECT TITLE** Caboolture West Environmental Study	**DRAWING NO.** 1 **REVISION** D **STATUS** **CREATED BY** EH11799 **DATE** 2/07/2013 Time: 1:16:35 PM	N	**CLIENT** Moreton Bay Regional Council
COORDINATE SYSTEM GDA 1994 MGA Zone 56 **PAGE SIZE** A3 **SCALE** 1:40,000	**SOURCE** Bing Maps etc		**CONSULTANT** SMEC Australia

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Legend

- Study Area
- Potential Habitat

0 500 1,000 1,500 2,000

Metres

Priority Species - Hairy Hazelwood	DRAWING NO. 1	REVISION D	STATUS
PROJECT NO. 30031051	CREATED BY EH11799	DATE 27/06/2013 Time: 6:53:19 PM	
PROJECT TITLE Caboolture West Environmental Study			
COORDINATE SYSTEM GDA 1994 MGA Zone 56	SOURCE Bing Maps etc		
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CLIENT Moreton Bay Regional Council

CONSULTANT SMEC Australia

Path: R:\PROJECTS\30031051_MBRC_Caboolture\Products\MXD\30031093_Priority_Species\30031051_PS_Hairy_Hazelwood_A3_P_RevD.mxd

Legend

- Study Area
- Potential Habitat

0 500 1,000 1,500 2,000

Metres

bing

Priority Species - Red Lily Pilly

PROJECT NO. 30031051
PROJECT TITLE Caboolture West Environmental Study

DRAWING NO. 1 **REVISION** D **STATUS**

CREATED BY EH11799 **DATE** 27/06/2013
Time: 5:59:09 PM

N

CLIENT Moreton Bay Regional Council

COORDINATE SYSTEM GDA 1994 MGA Zone 56
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CONSULTANT SMEC Australia

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Legend

- Study Area
- Potential Habitat

0 500 1,000 1,500 2,000

Metres

Priority Species - Three-leaved Bosistoa

PROJECT NO. 30031051

PROJECT TITLE Caboolture West Environmental Study

DRAWING NO. 1 REVISION D STATUS

CREATED BY EH11799 DATE 27/06/2013

Time: 5:56:39 PM

N

CLIENT Moreton Bay Regional Council

CONSULTANT SMEC Australia

COORDINATE SYSTEM GDA 1994 MGA Zone 56

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APPENDIX G – REGIONAL ECOSYSTEM VERIFICATION

LOT	PLAN	Coordinates	Date sampled	Age Structure	Dominant Species	Mapped RE	Correct?	If Not, Ground-truthed RE	Comments	RE Description
200	RP902525	489482, 7007862	26-Mar	Mature age	E. microcorys C. intermedia E. siderophloia E. grandis L. confertus Lantana	12.3.2	Yes			
200	RP902525	488468; 7007022	26-Mar	Mature age	E. tereticornis L. confertus C. intermedia E. siderophloia	12.3.2	Yes	12.3.11 also	Mix of RE 12.3.2 and RE 12.3.11 (RE 12.3.11 occurring on the upper banks)	**12.3.11:** Eucalyptus siderophloia, E. tereticornis, Corymbia intermedia open forest on alluvial plains usually near coast
10	RP214503	485497; 7009004	26-Mar	uneven age	E. pilularis C .intermedia E. siderophloia	12.5.6	No	12.11.3b	Not 12.5.6 as not on old loamy & sandy plains. Least Concern, not endangered.	**12.11.3b:** Open-forest of Eucalyptus pilularis. Frequent species are E. microcorys, E. siderophloia, E. eugenioides, Corymbia intermedia. Occasionally present are Syncarpia verecunda, E. saligna. Occurs on higher altitude (>300m) subcoastal hills and ranges of Palaeozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. (BVG1M: 8b)
95	SP115603	486007; 7008532	26-Mar	Advanced Regeneration	E. siderophloia E. propinqua L. confertus	12.5.6	No	12.11.3b	Not 12.5.6 as not on old loamy & sandy plains. Least Concern, not endangered.	**12.11.3b:** Open-forest of Eucalyptus pilularis. Frequent species are E. microcorys, E. siderophloia, E. eugenioides, Corymbia intermedia. Occasionally present are Syncarpia verecunda, E. saligna. Occurs on higher altitude (>300m) subcoastal hills and ranges of Palaeozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. (BVG1M: 8b)
24	SP100203	485495; 7007146	26-Mar	Mature age	E. tereticornis C. intermedia E. siderophloia L. confertus L. suaveolens	12.3.11	Yes		RE 12.3.11 confirmed. Correct canopy species with some evidence of weed invasion.	
903	SP217987	486373; 7006949	26-Mar	Advanced Regeneration	C. intermedia E. siderophloia L. confertus E. racemosa	12.5.3	Yes		Species are relatively consistent and canopy heights suitable.	
18	RP902092	483501; 7004499	27-Mar	Advanced Regeneration	E. propinqua L. confertus E. siderophloia	12.11.3/12.11.10 (95/5)	Yes		12.11.3 confirmed. No evidence of 12.11.10 (notophyll vine forest), however, we weren't within a gully. Rainforest in gullies at a scale too small to be mapped. Hence the combined RE and percentages.	
1	SP113086	487500; 7008002	27-Mar	uneven age	C. intermedia Blady grass Acacia sp. A. woodsiana E. pilularis	12.5.6	No	12.11.3b	Not 12.5.6 as not on old loamy & sandy plains. Least Concern, not endangered.	**12.11.3b:** Open-forest of Eucalyptus pilularis. Frequent species are E. microcorys, E. siderophloia, E. eugenioides, Corymbia intermedia. Occasionally present are Syncarpia verecunda, E. saligna. Occurs on higher altitude (>300m) subcoastal hills and ranges of Palaeozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. (BVG1M: 8b)
1	RP101687	486550; 7000600	27-Mar	uneven age	C. intermedia E. carnea E. siderophloia E. propinqua L. confertus	12.3.11 (E Hab)	Yes		Predominant species and landform are consistent with the addition of E. propinqua and E. carnea.	

LOT	PLAN	Coordinates	Date sampled	Age Structure	Dominant Species	Mapped RE	Correct?	If Not, Ground-truthed RE	Comments	RE Description
1	RP101687	487048; 7005944	27-Mar	uneven age	C. intermedia E. siderophloia E. propinqua L. suaveolens E. tereticornis	12.3.11 (E Hab)	Yes		Predominant species and landform are consistent with the addition of E. propinqua.	
6	RP35975	487874; 7006857	27-Mar	Advanced Regeneration	C. intermedia L. confertus E. grandis E. microcorys	12.3.2	Yes			
2	RP185220	489003, 7004511	8-Apr	Advanced Regeneration	E. racemosa E. siderophloia C. intermedia L. confertus Lantana	12.5.3	Yes		Species are consistent with RE 12.5.3 + L. confertus.	
2	RP185220	489504, 7005005	8-Apr	uneven age	E. racemosa C. intermedia L. suaveolens Blady grass	12.3.11	Yes		No E. siderophloia observed but all other species consistent + E. racemosa (Adjacent RE is 12.5.3)	
2	RP185220	489899, 7004971	8-Apr	Early Regeneration	E. racemosa C. intermedia L. suaveolens M. quinquenervia A. littoralis	12.5.3	Yes		Species are consistent with RE 12.5.3 + A. littoralis.	
2	RP185220	489888, 7004061	8-Apr	Advanced Regeneration	C. intermedia E. siderophloia L. confertus C. trachyphloia E. racemosa	12.5.6	No	12.5.3 & 12.3.11	Species, landform and geographical location consistent with being on the boundary of 12.3.11 and 12.5.3.	**12.3.11:** Eucalyptus siderophloia, E. tereticornis, Corymbia intermedia open forest on alluvial plains usually near coast **12.5.3:** Eucalyptus tindaliae and/or E. racemosa subsp. racemosa open-forest with Corymbia intermedia, E. siderophloia +/- E. resinifera, E. pilularis, E. microcorys, Angophora leiocarpa. Occurs on complex of remnant Tertiary surfaces +/- Cainozoic and Mesozoic sediments.
2	RP185220	490383, 7004498	8-Apr	Advanced Regeneration	C. trachyphloia A. littoralis C. intermedia Acacia sp.	12.3.11	No	Of Concern Regrowth	Species are consistent with RE 12.3.11 + A. littoralis. However, vegetation does not make the % coverage to classify it as an RE - only 10% overstorey, and very degraded habitat. Good rehab area	
19	RP228479	488497; 7005001	9-Apr	uneven age	E. racemosa C. intermedia Acacia sp.	12.5.3	Yes		Species are consistent with RE 12.5.3.	
4	CG3363	484998; 7009993	9-Apr	Advanced Regeneration	E. racemosa C. intermedia E. teriticornis E. carnea E. microcorys	12.3.11	Yes		RE 12.3.11 confirmed + E. microcorys and E. carnea	
8	RP859637	485498; 7007919	17-Apr	Advanced Regeneration	L. confertus, C. intermedia, E. siderophloia	12.3.11	Yes		RE 12.3.11 confirmed	
1	SP218056	484996;7006496	17-Apr	Advanced Regeneration	E. siderophloia, E. propinqua, L. confertus	12.11.3/12.11.18	Yes			
2	SP161037	486997; 7006506	19-Apr	Advanced Regeneration	E. siderophloia E. tereticornis A. concurrens Molasses grass	12.11.3/12.11.18	Yes		12.11.3 confirmed. No 12.11.18.	

LOT	PLAN	Coordinates	Date sampled	Age Structure	Dominant Species	Mapped RE	Correct?	If Not, Ground-truthed RE	Comments	RE Description
11	SP235220	487928; 7007500	23-Apr	Advanced Regeneration	E. racemosa C. intermedia Bracken fern	12.5.6	No	12.5.3	Species are more representative of RE 12.5.3, being dominated by E. racemosa and C. intermedia and no E. propinqua being evident.	**12.5.3:** Eucalyptus tindaliae and/or E. racemosa subsp. racemosa open-forest with Corymbia intermedia, E. siderophloia +/- E. resinifera, E. pilularis, E. microcorys, Angophora leiocarpa. Melaleuca quinquenervia is often a prominent feature of lower slopes. Minor patches (<1ha) dominated by Corymbia citriodora can sometimes occur. Occurs on complex of remnant Tertiary surfaces +/- Cainozoic and Mesozoic sediments.
13	RP158044	488996; 7006500	23-Apr	Advanced Regeneration	M. quinquenervia C. intermedia E. siderophloia L. confertus	12.3.11	Yes		RE species and landform consistent, although E. tereticornis was not observed.	
8	RP220229	486001; 7001003	23-Apr	Advanced Regeneration	E. crebra E. tereticornis A. woodsiana E. melanophloia A. torulosa Blady grass	12.11.18/ 12.11.14	Yes	12.11.14	12.11.14 confirmed. No evidence of 12.11.18 as no E. moluccana present.	**12.11.14:** Eucalyptus crebra, E. tereticornis grassy woodland. Other species including Eucalyptus melanophloia, Corymbia clarksoniana, C. erythrophloia, C. tessellaris, Angophora spp. may be present in low densities or in patches. Occurs on metamorphics +/- interbedded volcanics
8	RP220229	484999; 7001003	23-Apr	Advanced Regeneration	E. tereticornis E. crebra	12.11.14/ 12.11.5	Yes	12.11.14	12.11.14 confirmed. No evidence of 12.11.5 as no spotted gum present.	**12.11.14:** Eucalyptus crebra, E. tereticornis woodland on metamorphics +/- interbedded volcanics
8	RP220229	484713; 7001589	2-May	Early Regeneration	L. confertus Acacia sp. E. siderophloia	12.11.10	No	Least concern regrowth	No RE apparent. Primarily L. confertus and acacia spp. Fire has been through the area. Some scattered Ironbarks.	
42	S31500	487471; 6999998	24-Apr	Mature age	E. fibrosa C. intermedia E. moluccana E. tereticornis	12.11.18	Yes		RE 12.11.18 confirmed. Landform and vegetation characteristics consistent.	
42	S31500	487500; 7000491	24-Apr	Mature age	E. siderophloia C. citriodora E. tereticornis E. moluccana	12.11.18	Yes		RE 12.11.18 confirmed. Landform and vegetation characteristics consistent.	
2	SP231512	484999; 7004505	24-Apr	Mature age	L. confertus E. acmenoides E. moluccana	12.11.3/12.11.18 (70/30)	Yes		RE 12.11.18 confirmed. Landform and vegetation characteristics consistent. RE 12.11.3 not identified as no E. siderophloia or E. propinqua observed.	
3	RP190250	486000; 7009001	24-Apr	Mature age	C. intermedia E. acmenoides C. confertus	12.5.6	No	12.11.3b	Not 12.5.6 as not on old loamy & sandy plains. Least Concern, not endangered.	**12.11.3b**: Open-forest of Eucalyptus pilularis. Frequent species are E. microcorys, E. siderophloia, E. eugenioides, Corymbia intermedia. Occasionally present are Syncarpia verecunda, E. saligna. Occurs on higher altitude (>300m) subcoastal hills and ranges of Palaeozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. (BVG1M: 8b)
3	SP218056	484480, 7005530	30-Apr	Advanced Regeneration	E. acmenoides L. confertus Acacia sp	12.11.3/12.11.18 (70/30)	Yes			
9	RP190256	486585, 7008408	30-Apr	uneven age	E.pilularis E. microcorys E. siderophloia	12.5.6	No	12.11.3b	Not 12.5.6 as not on old loamy & sandy plains. Least Concern, not endangered.	**12.11.3b:** Open-forest of Eucalyptus pilularis. Frequent species are E. microcorys, E. siderophloia, E. eugenioides, Corymbia intermedia. Occasionally present are Syncarpia verecunda, E. saligna. Occurs on higher altitude (>300m) subcoastal hills and ranges of Palaeozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. (BVG1M: 8b)

LOT	PLAN	Coordinates	Date sampled	Age Structure	Dominant Species	Mapped RE	Correct?	If Not, Ground-truthed RE	Comments	RE Description
231	CG4057	491235, 7002973	1-May	uneven age	Castanospermum australe, Lantana	12.3.1	Yes			
231	CG4057	491230, 7002930	1-May	uneven age	Casuarina cunninghamiana	12.3.11	Yes		Plus 12.3.7	**12.3.7:** Eucalyptus tereticornis, Callistemon viminalis, Casuarina cunninghamiana fringing forest
18	RP902092	482937, 7004879	2-May	uneven age	L. confertus E. propinqua mixed rainforest	12.11.3/12.11.10 (95/5)	Yes		12.11.10 found with gullies	
18	RP902092	483010, 7004445	2-May	Mature age	Ficus spp., mixed rainforest	12.11.3/12.11.10 (95/5)	Yes		12.11.10 found with gullies	
1	RP188419	482388; 7006037	8-May	mature age	E. teriticornis E. racemosa L. confertus	12.11.3/12.11.10	Yes		RE 12.11.3 confirmed. This is most evident along the creek. Some sections of RE 12.11.10 also along the creek but not up on the hillside.	
Road Reserve		484919; 7005250	1-May	-	-	12.11.3	Yes			
Road Reserve		488850; 7003292	1-May	-	-	12.11.5	Yes		Confirmed but C. citriodora absent	
Road Reserve		488754; 7004464	30-Apr	-	-	12.5.3 & 12.3.1	Yes		12.3.11 situated on creek, not M. iteratus habitat.	
Road Reserve		491042; 7004428	30-Apr	-	-	12.3.11	Yes			
Road Reserve		487281; 7006892	1-May	-	-	12.11.3 and 12.3.11	Yes		Confirmed 12.11.3 exists on creek, 12.3.11 also ok but some scribbly gum present	
Road Reserve		485702; 7005947	30-Apr	-	E. propinqua L. confertus E. siderophloia	12.11.18/12.11.14	No	12.11.3	Eucalyptus siderophloia, E. propinqua open-forest on metamorphics +/- interbedded volcanics	**12.11.3** - Eucalyptus siderophloia, E. propinqua open-forest on metamorphics +/- interbedded volcanics
Road Reserve		491274; 7002958	1-May	-	-	12.3.1 & 12.3.7	Yes		12.3.1 on river, but elements of 12.3.7 on upper bank. cunninghamiana present	
Road Reserve		488998; 7004164	30-Apr	-	-	12.5.3 and 12.3.11	Yes		Confirm 12.5.3 & 12.3.11	
Road Reserve		486141; 7005870	1-May	-	-	12.5.3	No	12.11.3	RE Not confirmed Appears to be 12.11.3	**12.11.3** - Eucalyptus siderophloia, E. propinqua open-forest on metamorphics +/- interbedded volcanics
Road Reserve		487016; 7005414	1-May	-	-	12.5.3	Yes		Confirm RE 12.5.3	
Road Reserve		484955; 7007357	1-May	-	-	12.11.18/12.11.14	No	12.11.5j	RE NOT CONFIRMED Possibly 12.11.5j	**12.11.5** - Corymbia citriodora subsp. variegata, Eucalyptus siderophloia, E. major open-forest on metamorphics +/- interbedded volcanics
Road Reserve		488621; 7006709	1-May	-	-	12.5.3	Yes			
Road Reserve		486668; 7008469	30-Apr	-	-	12.5.6	No	12.11.3b	Not 12.5.6 as not on old loamy & sandy plains. Least Concern, not endangered.	**12.11.3** - Eucalyptus siderophloia, E. propinqua open-forest on metamorphics +/- interbedded volcanics
Road Reserve		490509; 7004638	30-Apr	-	-	12.3.11	Yes			
Road Reserve		487210; 7005523	1-May	-	-	12.5.3	Yes			
Road Reserve		485303; 7005861	30-Apr	-	-	12.11.3	Yes		12.11.3 + e. moluccana	
Road Reserve		485422; 7005290	1-May	-	-	12.11.3	Yes		Just Re 12.11.3	
Road Reserve		486216; 7004731	1-May	-	E. propinqua L. confertus C. intermedia	12.11.5j	No	12.11.3		**12.11.3** - Eucalyptus siderophloia, E. propinqua open-forest on metamorphics +/- interbedded volcanics

LOT	PLAN	Coordinates	Date sampled	Age Structure	Dominant Species	Mapped RE	Correct?	If Not, Ground-truthed RE	Comments	RE Description
3	RP13771	488485; 7001266	22-May	uneven age	mixed rainforest W. floribunda lantana	12.3.1	Yes			
3	RP101687	487053; 7006560	22-May	Advanced Regeneration	E. tereticornis L. confertus E. siderophloia	12.5.3	No	12.3.11		**12.3.11 -** Eucalyptus siderophloia, E. tereticornis, Corymbia intermedia open forest on alluvial plains usually near coast
3	RP101687	486623; 7006608	22-May	Advanced Regeneration	E. Carnea L. confertus C. intermedia E. siderophloia	12.3.11	Yes			
10	RP222918	485000; 7007993	22-May	uneven age	E. tereticornus L. confertus C. intermedia	12.3.11	Yes			