Silver Springs Underground Gas Storage Project

Ecological Assessment Report

Prepared by:

RPS AUSTRALIA EAST PTY LTD

743 Ann Street
PO Box 1559
FORTITUDE VALLEY QLD 4006

T: 617 3237 8899
F: 617 3237 8833

W: rpsgroup.com.au

Prepared for:

AGL ENERGY LIMITED

Stuart Galway
GPO Box 1048
BRISBANE QLD 4000

T: (07) 3023 2426
F: (07) 3220 1274

W: www.agl.com.au

Report Number: PR105109
Version / Date: November 2010

Important Note

We have prepared this report for the sole purposes of AGL Energy Limited ("Client") for the specific purpose only for which it is supplied. This report is strictly limited to the purpose and the facts and matters stated in it and does not apply directly or indirectly and will not be used for any other application, purpose, use or matter.

In preparing this report we have made certain assumptions. We have assumed that all information and documents provided to us by the Client or as a result of a specific request or enquiry were complete, accurate and up-to-date. Where we have obtained information from a government register or database, we have assumed that the information is accurate. Where an assumption has been made, we have not made any independent investigations with respect to the matters the subject of that assumption. We are not aware of any reason why any of the assumptions are incorrect.

This report is presented without the assumption of a duty of care to any other person (other than the Client) ("Third Party"). The report may not contain sufficient information for the purposes of a Third Party or for other uses. Without the prior written consent of RPS Australia East Pty Ltd:

a) This report may not be relied on by a Third Party; and

b) RPS Australia East Pty Ltd will not be liable to a Third Party for any loss, damage, liability or claim arising out of or incidental to a Third Party publishing, using or relying on the facts, content, opinions or subject matter contained in this report.

If a Third Party uses or relies on the facts, content, opinions or subject matter contained in this report with or without the consent of RPS Australia East Pty Ltd, RPS Australia East Pty Ltd disclaims all risk and the Third Party assumes all risk and releases and indemnifies and agrees to keep indemnified RPS Australia East Pty Ltd from any loss, damage, claim or liability arising directly or indirectly from the use of or reliance on this report.

In this note, a reference to loss and damage includes past and prospective economic loss, loss of profits, damage to property, injury to any person (including death) costs and expenses incurred in taking measures to prevent, mitigate or rectify any harm, loss of opportunity, legal costs, compensation, interest and any other direct, indirect, consequential or financial or other loss.

Document Status

Version	Purpose of Document	Orig	Review	Review Date	QA Review	RPS Release Approval	Issue Date
1	*Draft*	*SB, LF, CA*	*BD*	*08/11/2010*			
2	*Draft – reduced scope*	*CA, LF*	*BD*	*10/11/2010*			
3	*Final*	*CA*	*BD, JW*	*12/11/2010*			

Contents

Tables

Figures

Appendices

1.0 Introduction

1.1 Background

AGL Energy Limited (AGL) are proposing to construct a new gas storage facility and associated infrastructure ('the Project'), at the existing Silver Springs Gas Plant on Petroleum Licence (PL) 16, situated approximately 44 km south of Surat in south-west Queensland. Whilst PL 16 is located in both the Maranoa Regional Council and Balonne Regional Council areas, the Project area itself is located entirely within the Maranoa Regional Council area.

The proposed storage facility will allow the storage of coal seam gas (CSG) in the depleted Silver Springs and Renlim gas reservoirs. The main components of the Project include:

- Construction of a new compressor station on the Silver Springs site; and
- Construction of a concrete batching plant.

RPS has been commissioned to undertake an ecological assessment of the proposed works. **Figure 1.1** outlines the study area, which includes Lot 3 & 11 on EG243 and Lot 5 on EG41 ("the site"), with **Figure 1.2** providing high-resolution aerial photography of the existing compound facility.

1.2 Objectives

The objectives of this assessment were to identify the ecological values of the study area and to determine potential impacts arising from the construction of a new gas compression facility and concrete batching plant, as well as recommend appropriate mitigation measures.

1.3 Scope of Works

The scope of work for this ecological assessment is as follows:

- A review of relevant background, database and mapping information;
- Confirm the actual or likely presence / absence of flora and fauna species and vegetation communities protected under State and Commonwealth legislation and as identified on Commonwealth and State database lists and the regional and local significance of the vegetation communities present;
- Document all identified and likely flora and fauna species of Regional, Local, State and Commonwealth conservation significance;
- Collect floristic data at representative sites throughout the study area to determine the composition and condition of vegetation communities;
- Assess available habitat resources within the study area;
- Record incidental fauna observations and carry out targeted searches at vegetation survey sites for diurnal fauna species and evidence of scats and tracks;
- Identify the presence and extent of feral or exotic animals and pest plants and make recommendations for avoidance or management;

- An assessment of the biodiversity and conservation values of the study area and the connectivity of the study area with areas of habitat in the locality; and
- Evaluate the potential impacts associated with the project and recommend mitigation measures to protect and manage the study area's ecological values

The Ecological Assessment focuses on areas within the designated 'study area' (**Figure 1.1**).

1.4 Assumptions and Limitations

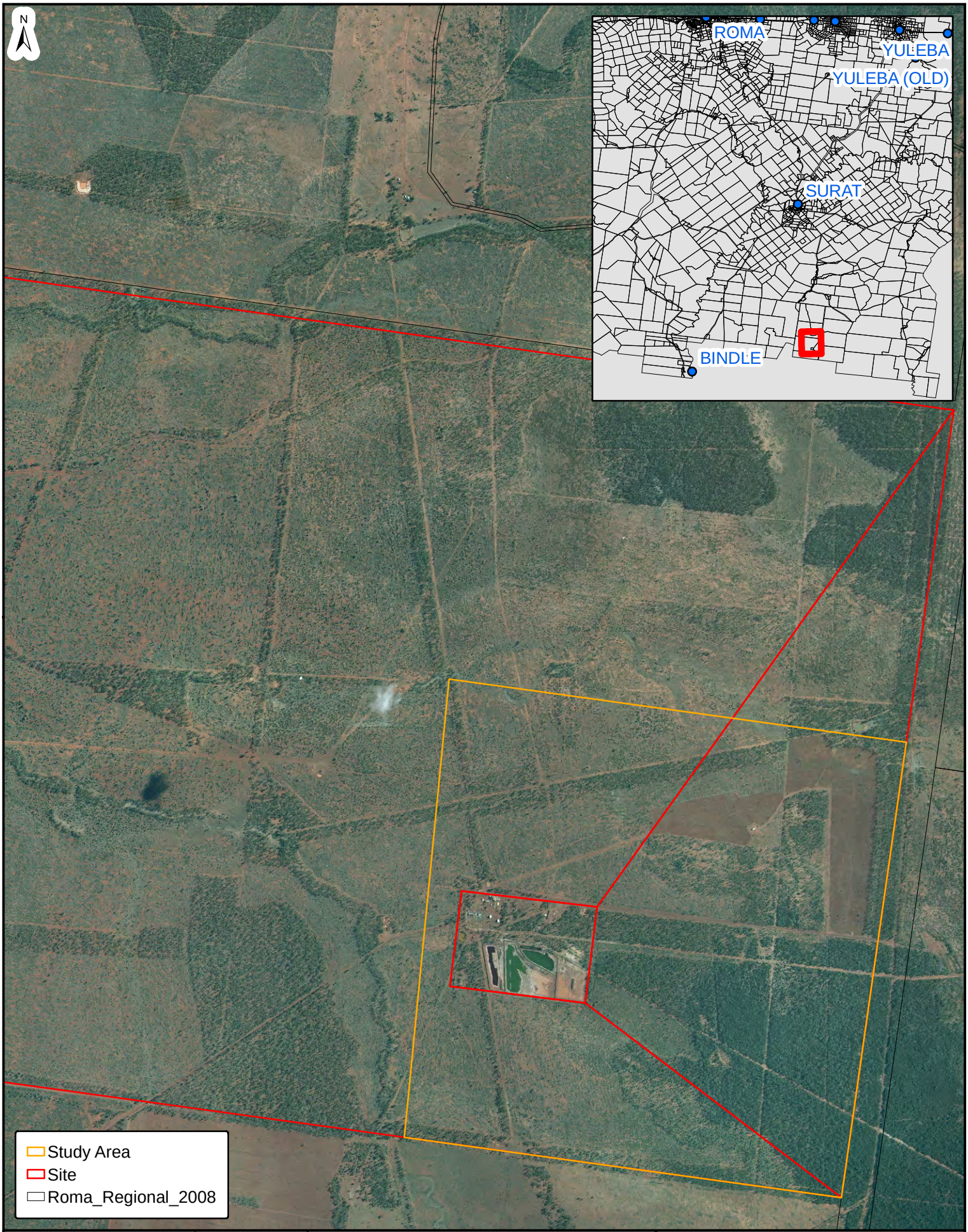
Limited project specific information was available at the time of the field investigation and as such a general ecological assessment of a 'study area' was undertaken. Designation of a 'study area' was based on the potential areas that may be utilised for the proposed project. Information and the subsequent assessment contained within the report are reflective of this general assessment. Site specific ecological information on areas contained within the proposed project's disturbance footprint is limited. Due to this limitation, a number of assumptions have been made regarding disturbance areas and associated impacts, including:

- Construction will occur within areas that are predominantly void of woody vegetation; and
- Potential impacts on vegetation communities and habitats surrounding areas of existing easements and pre-disturbed cleared areas will be avoided, through appropriate locations of proposed infrastructure.

There are a number of factors that can influence findings during the assessment. The detectability of plants and the ability to accurately identify plants to species level may vary greatly with the time of year, prevailing climate conditions and the presence of reproductive material (e.g. flowers, fruit, and seed capsules). Consequently, the flora list compiled for the study area should not be regarded as an exhaustive list of species occurring on site and it should be noted that certain significant plant species may occur even though they may not have been detected during the site survey period. However, every effort has been made to detect these species in habitat/areas considered suitable.

The presence and detection of fauna species is also affected by several factors including:

- The survey period not coinciding with the period that some migratory or nomadic species occur in the locality;
- Species with a large home ranges (e.g. owls and raptors) not present in this part of their home range during the survey period;
- The difficulty in detecting certain species during the survey period (e.g. cryptic species, species present in the study area at very low densities);
- Biological factors such as sex, age-class, and breeding biology, which may influence species' habitat use and detectability during different times of the year; and
- The lack of suitable climatic conditions necessary for the presence and / or detectability of certain species (e.g. amphibians following heavy rainfall).



0 200 400 600 800 1,000
Meters (A4)

DIGITAL CADASTRAL DATA BASE - BOUNDARY INFORMATION.
REGIONAL ECOSYSTEM VERSION 6 DATA.
DERM AERIAL PHOTOGRAPHY.
Based on or contains data provided by the State of Queensland (Department of Environment and Resource Management) 2010. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws.

Regional ecosystem linework compiled at scale greater than 1:100,000, except in designated areas, where a compilation scale of 1:50,000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100,000 is +/- 100 metres.

The aerial photography used in this plan has not been rectified.
The image has been overlaid as a best fit on the boundaries shown and position is approximate only.

Date of Capture: August 2008.

Project Manager	PW
Compiled by	CA
Map Projection	MGAz55
Map Datum	GDA94
File Reference	PR105109-1
Sheet Number	1 of 1

Client: AGL Pty Ltd

Title: Figure 1.1 - Study Area

RPS

SCALE (A4)	DATE	DRAWING NO.	ISSUE
1:30,000	10/11/10	PR105109-1_1.1	A

0 20 40 60 80 100
Meters (A4)

DIGITAL CADASTRAL DATA BASE - BOUNDARY INFORMATION.
REGIONAL ECOSYSTEM VERSION 6 DATA.
DERM AERIAL PHOTOGRAPHY.
Based on or contains data provided by the State of Queensland (Department of Environment and Resource Management) 2010. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws.

Regional ecosystem linework compiled at scale greater than 1:100,000, except in designated areas, where a compilation scale of 1:50,000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100,000 is +/-100 metres.

The aerial photography used in this plan has not been rectified.
The image has been overlaid as a best fit on the boundaries shown and position is approximate only.

Date of Capture: August 2006.

Project Manager	PW
Compiled by	CA
Map Projection	MGAz55
Map Datum	GDA94
File Reference	PR105109-1
Sheet Number	1 of 1

Client: AGL Pty Ltd

Title: Figure 1.2 - Aerial Photography
Silver Springs Plant Location

RPS

SCALE (A4)	DATE	DRAWING NO.	ISSUE
1:3,500	10/11/10	PR105109-1_1.2	A

2.0 Method

2.1 Flora Assessment

2.1.1 Desktop Assessment

Relevant environmental databases and maps were reviewed to identify potential ecological communities, habitats and significant species that may occur within the study area. The following databases and maps were reviewed:

- EPBC Act Protected Matters Report (compiled 16 September 2010; DEWHA 2010a) (**Appendix A**);
- Wildlife Online database (compiled 16 September 2010; DERM 2010b) (**Appendix B**);
- Regional Ecosystem (RE) mapping (Version 6.0) (DERM, 2009a) (**Appendix C**);
- Essential Habitat mapping (Version 3.0) (DERM, 2009a) (**Appendix C**); and
- High Value Regrowth Mapping (Version 2.0) (DERM, 2009b) (**Appendix D**).

2.1.2 Determination of Significance

Vegetation communities considered as significant are those listed as Threatened Ecological Communities under the *EPBC Act* and REs listed as Endangered, Of Concern and Least Concern under the *Vegetation Management Act 1999* (VMA). Significant species are considered those listed as Critically Endangered, Endangered or Vulnerable under the EPBC Act and/or identified as Endangered, Vulnerable and Rare under the *Nature Conservation Act 1994* (NCA).

2.1.3 Field Survey

Field surveys were conducted on the 20th to 22nd September 2010 by two ecologists. The surveys were designed to collect floristic data at representative sites throughout the study area in order to determine the composition and condition of vegetation communities as well as identify any threatened species. Quaternary surveys were conducted at selected sites.

Quaternary surveys were undertaken within areas of remnant and regrowth vegetation. The intent of these surveys was to confirm the RE mapping and collect additional data regarding the composition and structure of vegetation communities. Quaternary surveys were undertaken along a random meander through each area to collect the following data:

- Identification of all dominant and common species;
- Identification of RE classification;
- Connectivity with nearby habitats; and
- Weed species.

Surveys were undertaken in accordance with Queensland Herbarium vegetation survey methodology (Nelder *et al*, 2005). Flora surveys were conducted continually during the field survey to provide an incidental flora list of species occurring within the study area.

2.2 Fauna Assessment

2.2.1 Desktop Assessment

Relevant environmental databases and maps were reviewed to identify potential ecological communities, habitats and significant species that may occur within the study area. The following databases and maps were reviewed:

- EPBC Act Protected Matters Report (compiled 16 September 2010; DEWHA 2010a) (**Appendix A**);
- Wildlife Online database (compiled 16 September 2010; DERM 2010b) (**Appendix B**);
- Referrable Area Mapping (compiled 1 November 2010; DERM 2010c) (**Appendix E**);
- Referrable Wetlands Mapping (compiled 1 November 2010; DERM 2010d) (**Appendix F**); and
- Essential Habitat mapping (Version 3.0) (DERM, 2009a) (**Appendix C**).

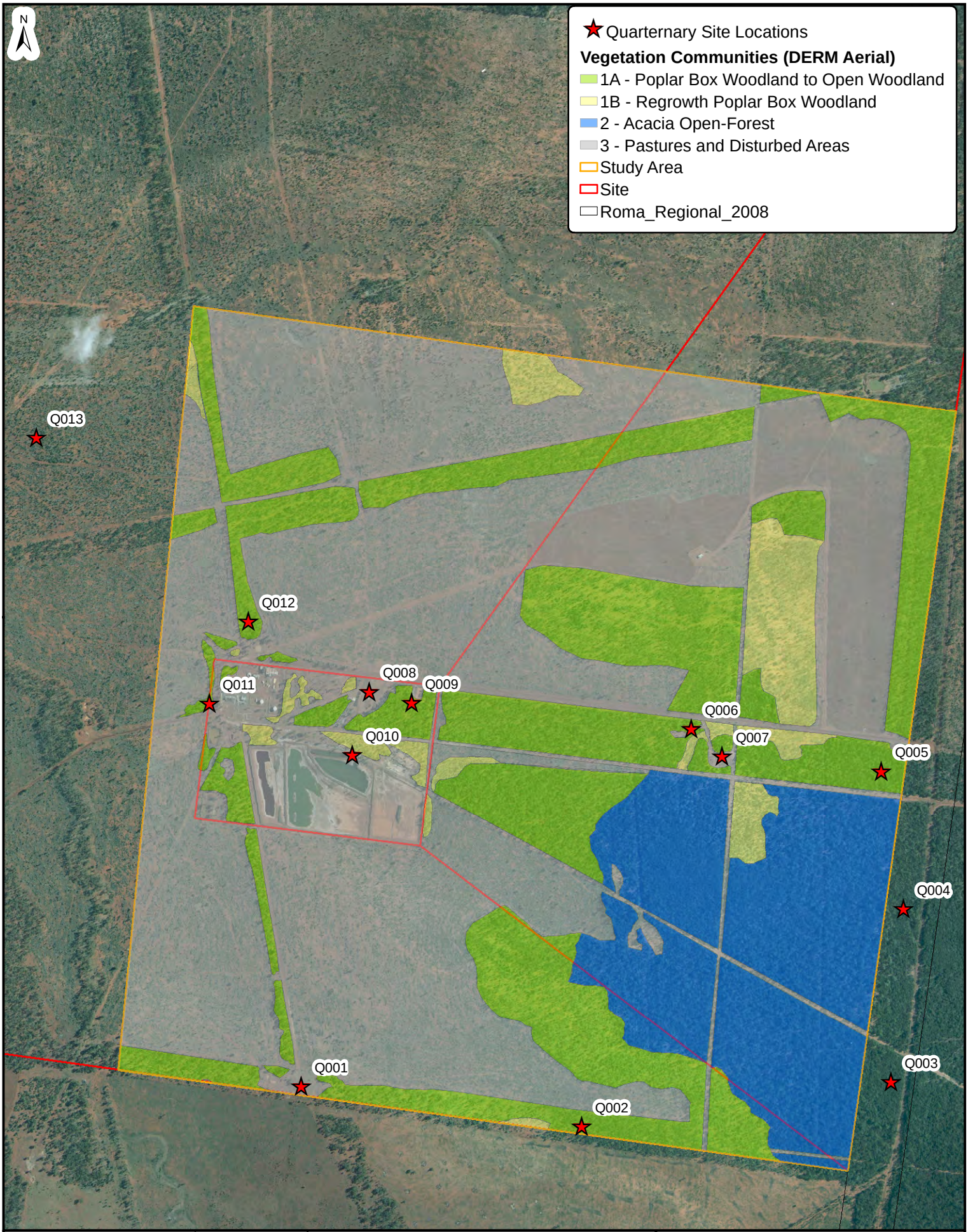
2.2.2 Determination of Significance

Significant fauna species are considered those listed as Critically Endangered, Endangered or Vulnerable under the EPBC Act and/or identified as Endangered, Vulnerable and Near Threatened under the NCA.

2.2.3 Field Survey

Field surveys were conducted between the 20th and 22nd September 2010 by two ecologists. The survey largely consisted of incidental fauna observations and habitat assessments; however targeted searches were conducted at quaternary survey sites for diurnal fauna species as well as evidence of scats and tracks. Incidental fauna observations were undertaken continually during the field survey. Habitat assessments were undertaken at quaternary sites and included identification of:

- Number of habitat trees especially those containing hollows;
- Fallen / felled timber, including hollow-bearing logs;
- Water sources particularly watercourses, wetlands and dams;
- Arboreal and terrestrial termite mounds;
- Leaf litter cover and depth;
- Cover of rocks; and
- Structural condition of vegetation community.



0 100 200 300 400 500
Meters (A4)

DIGITAL CADASTRAL DATA BASE - BOUNDARY INFORMATION.
REGIONAL ECOSYSTEM VERSION 6 DATA.
DERM AERIAL PHOTOGRAPHY.
Based on or contains data provided by the State of Queensland (Department of Environment and Resource Management) 2010. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws.

Regional ecosystem linework compiled at scale greater than 1:100,000, except in designated areas, where a compilation scale of 1:50,000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100,000 is +/- 100 metres.

The aerial photography used in this plan has not been rectified.
The image has been overlaid as a best fit on the boundaries shown and position is approximate only.

Date of Capture: August 2006.

Project Manager	PW
Compiled by	CA
Map Projection	MGAz55
Map Datum	GDA94
File Reference	PR105109-1
Sheet Number	1 of 1

Client: AGL Pty Ltd

Title: Figure 2.1 - Quaternary Survey Sites

RPS

SCALE (A4)	DATE	DRAWING NO.	ISSUE
1:18,000	10/11/10	PR105109-1_2.1	A

3.0 Vegetation

3.1 Environmentally Sensitive Areas (ESAs)

Category A & B ESAs have been described pursuant to Sections 25 & 26 of the *Environmental Protection Regulations 2008*. Category C ESAs have been taken from DERMs draft guidelines for *"Preparing an Environmental Management Plan (EM Plan) for Coal Seam Gas (CSG) activities"*. Of the ESA categories, only Of Concern REs (Category C ESA) was identified as occurring within the project area. This is discussed in greater detail in the **Section 3.2**.

3.2 Regional Ecosystems

3.2.1 Remnant Vegetation

A review of Regional Ecosystems (Version 6.0) Mapping (DERM 2009) for the study area identified 3 REs occurring within or adjacent to the areas of proposed disturbance (**Figure 3.1**). **Table 3.1** provides the short description and VMA status for each of these REs.

Table 3.1 Regional Ecosystems Mapped within the Study Area

RE	DESCRIPTION	VMA STATUS
11.3.2	*Eucalyptus populnea* woodland on alluvial plains.	Of Concern
11.5.13	*Eucalyptus populnea* +/- *Acacia aneura* +/- *E. melanophloia* woodland on Cainozoic sand plains/remnant surfaces.	Of Concern
11.7.2	*Acacia* spp. woodland on Cainozoic lateritic duricrust. Scarp retreat zone.	Least Concern

In addition, a polygon of RE 11.7.2 has been outlined as 'Remnant vegetation pursuant to Section 20AH of the VMA'. It is noted that since the release of the Version 6.0 electronic Regional Ecosystems data, a Property Map of Assessable Vegetation (PMAV) has been lodged for the site, which has slightly changed the extent of mapping. This minor change does not significantly affect the overall extent of mapped vegetation.

3.2.2 Regrowth

Desktop assessment identified two small areas of high-value regrowth mapped within the study area (**Appendix D**). Ground truthing conducted as part of this assessment found that this regrowth is mapped correctly. Mapped regrowth vegetation in this region was found to be generally analogous with identified remnant vegetation located on site.

It is noted that ground truthing of RE mapping for the study area revealed minor inconsistencies with the extent of vegetation. These differences can be associated with the scale at which the mapping is undertaken and the presence of regrowth vegetation contiguous with remnant vegetation. The actual coverage of remnant vegetation and REs throughout the study area was determined through ground truthing as discussed in **Section 3.2.3**.

3.2.3 Ground Truthing

With reference to **Table 3.2**, Ground truthing identified four vegetation communities within the study area (**Figures 3.2 & 3.3**). The majority of the study area has been degraded through various rural land-uses, particularly grazing, agriculture and gas mining. Numerous existing utility corridors have also fragmented and cleared vegetation communities within the study area.

Table 3.2 Ground Truthed Regional Ecosystems

VEGETATION COMMUNITY	SHORT DESCRIPTION	ANALOGOUS RE	VMA STATUS
1A	Poplar Box Woodland to Open-Woodland	11.5.13	Of Concern
1B	Regrowth Poplar Box Woodland	Non-remnant 11.5.13	Nil
2	Acacia Open-Forest	11.7.2	Nil
3	Pastures and Disturbed Areas	Nil	Nil

Key vegetation communities identified within the study area are described in the following sections.

3.2.3.1 Vegetation Community 1A – Poplar Box Woodland to Open Woodland

This vegetation community occurs on gently undulating plains formed from unconsolidated Cainozoic deposits and is usually associated with shallow to moderately deep, loamy duplex soils or shallow to moderately deep, uniform, clay loam to deep red earth soils. With reference to **Figures 3.2** & **3.3**, this community is located throughout the site and is highly fragmented due to road and easements. This VC was observed at Q002, Q005, Q006, Q009, Q011 & Q012 (**Figure 2.1**). The canopy is dominated by Poplar Box (*Eucalyptus populnea*), which forms a discontinuous canopy. In areas of this community, associated species such as Kurrajong (*Brachychiton populneus*) and Belah (*Casuarina cristata*) were identified. Silver-Leaved Ironbark (*Eucalyptus melanophloia*) was identified as occasionally occurring within portions of this community.

The sub-canopy within this community includes species such as White Cypress Pine (*Callitris glaucophylla*), Wilga (*Geijera parviflora*), False Sandalwood (*Eremophila mitchellii*) and juvenile growth of canopy species.

The shrub layer for this community was highly variable throughout the distribution. Some areas were densely dominated by various Cassia species (*Senna* spp.). In areas not dominated by Cassias, other shrub species such as Sticky Hopbush (*Dodonaea viscosa* subsp. *spatulata*), Long-leaved Eremophila (*Eremophila longifolia*) and Broom Bush (*Apophyllum anomalum*) were present.

The ground cover is very sparse in sections, with large areas devoid of vegetation. Where present, native grass species included Kangaroo Grass (*Themeda triandra*), Love Grasses (*Eragrostis* sp.) and Wiregrasses (*Aristida* spp.). A variety of groundcover species were also dominant within this layer, including Yellow Buttons (*Chrysocephalum apiculatum*), Twining Glycine *(Glycine clandestina)*, Bluebells (*Wahlenbergia queenslandica & W. gracilis*), Pomax (*Pomax umbellata*), Yellow Burr Daisy (*Calotis lappulacea*), White Paper Daisy (*Rhodanthe floribunda*) and Plantain (*Plantago debilis*).

Weeds were also common within the ground cover layer of this community, with large infestations of Mayne's Pest (*Verbena aristigera*), Galvanised Burr (*Sclerolaena birchii*) and Grey Copper Burr (*Sclerolaena diacantha*). Disturbed grassland areas were dominated by Buffel Grass (*Cenchrus ciliaris*). Other common weeds included Prickly Pear (*Opuntia stricta*), Paddy's Lucerne (*Sida rhombifolia)*, Caustic Creeper (*Chamaesyce drummondii*), Paddy Melon (*Cucumis microcarpus*) and Gomphrena Weed (*Gomphrena celosioides*).

This vegetation community is analogous with RE 11.5.13, which is listed as *Of Concern* pursuant to the VMA.

3.2.3.2 Vegetation Community 1B – Regrowth Poplar Box Woodland

Small patches of regrowth vegetation were identified on site at locations Q010 & Q013 (**Figure 2.1**). These areas are generally associated with the periphery of VC 1B areas (**Figures 3.2** & **3.3**). These areas were dominated by regrowth Poplar Box between 6-10m in height. Species assemblage is reflective of that described as Vegetation Community 1A.

3.2.3.3 Vegetation Community 2 – Acacia Open Forest

This vegetation community was observed at Q003 & Q004 locations and consists of a scattered emergent canopy of Queensland Peppermint (*Eucalyptus exserta*) and Poplar Box (**Figure 2.1**). The main formed canopy is dominated by Bendee (*Acacia catenulata*) with a suppressed distribution of Green Wattle (*Acacia deanei*).

No discernable shrub layer was identified for this community. Scattered species such as Desert Phebalium (*Phebalium glandulosum* subsp. *glandulosum*), Butterfly Bush (*Petalostylis labicheoides)* and Cassia species are located through the area. The ground cover is quite sparse and generally consists of bare ground. No dominant species were identified.

This vegetation community is analogous with RE 11.7.2, which is listed as *Least Concern* pursuant to the VMA.

3.2.3.4 Vegetation Community 3 – Pastures and Disturbed Areas

Grazing pastures are common throughout the entire site and were located at locations Q001, Q007 & Q008 (**Figure 2.1**). These areas are dominated by introduced pasture grasses and native grasses with an abundance of shrub and ground layer weeds. Scattered trees and shrubs occur throughout some paddocks but these are generally limited and isolated.

Declared weed species that are common throughout these areas include Mayne's Pest and Prickly Pear. Heavy infestations of environmental weeds including, Galvanised Burr, Grey Copper Burr, Buffel Grass and Paddy Melon are also common throughout pasture areas.

This vegetation community is not analogous with any RE.

3.3 Threatened Ecological Communities

The EPBC protected matters search identified the Weeping Myall Woodlands TECs as potentially occurring within the study area. Ground truthing identified that this community does not occur within the study area. A mapped RE mosaic that incorporates the required essential habitat community for this species is noted as the sub-dominate portion of this RE. This polygon is mapped to the north-west of the study area. The potential for this TEC to occur within the entire site was not addressed within this scope.

3.4 Threatened Flora Species

A review of environmental databases identified 3 species, listed as significant under the *EPBC Act* and NCA, as potentially occurring within the study area (**Table 3.3**). Of these species, one (*Acacia wardellii*) was within the species range, with marginal habitat located on site.

Table 3.3 Threatened Flora Species Identified in Desktop Searches

SPECIES	COMMON NAME	NCA STATUS	EPBC STATUS	HABITAT	LIKELIHOOD OF OCCURRENCE
Acacia wardellii	-	V	V	Gravelly soil on shallow weathered sandstone in eucalypt woodland from south of Roma, south-west of Chinchilla and the Thomby Range in south-east Queensland.	Possible. Marginal habitat located on site and known within 10km of the site.
Cadellia pentastylis	Ooline	V	V	Occurs in vine thickets or dry rainforest, and more rarely woodlands. It is a relict rainforest species and tends to favour upper and mid slope positions, often with a northerly aspect. It commonly occurs on sandy-loam to clay soils of low to medium fertility	Unlikely. Required habitat not on site
Tylophora linearis	-	E	E	Dry scrub, open forest and woodlands. Recorded from low-altitude sedimentary flats in dry woodlands of *Eucalyptus fibrosa*, *Eucalyptus sideroxylon, Eucalyptus albens, Callitris endlicheri, Callitris glaucophylla* and *Allocasuarina luehmannii*. Also grows in association with *Acacia hakeoides, Acacia lineata, Melaleuca uncinata, Myoporum* species and *Casuarina* species. Known from near Glenmorgan in the western Darling Downs in Qld, and the Barraba, Mendooran, Temora and West Wyalong districts in NSW.	Unlikely. Required habitat not on site

(Source: DERM & SEWPAC): EX = Extinct PE = Presumed Extinct CE = Critically Endangered E = Endangered V = Vulnerable R = Rare M = Migratory

3.5 Essential Habitat

No Essential Habitat mapping is located on site, however a polygon of habitat for *Acacia wardellii* is mapped approximately 6km to the east of the site. Disturbance associated with this proposed project will not impact upon the essential habitat for this species.

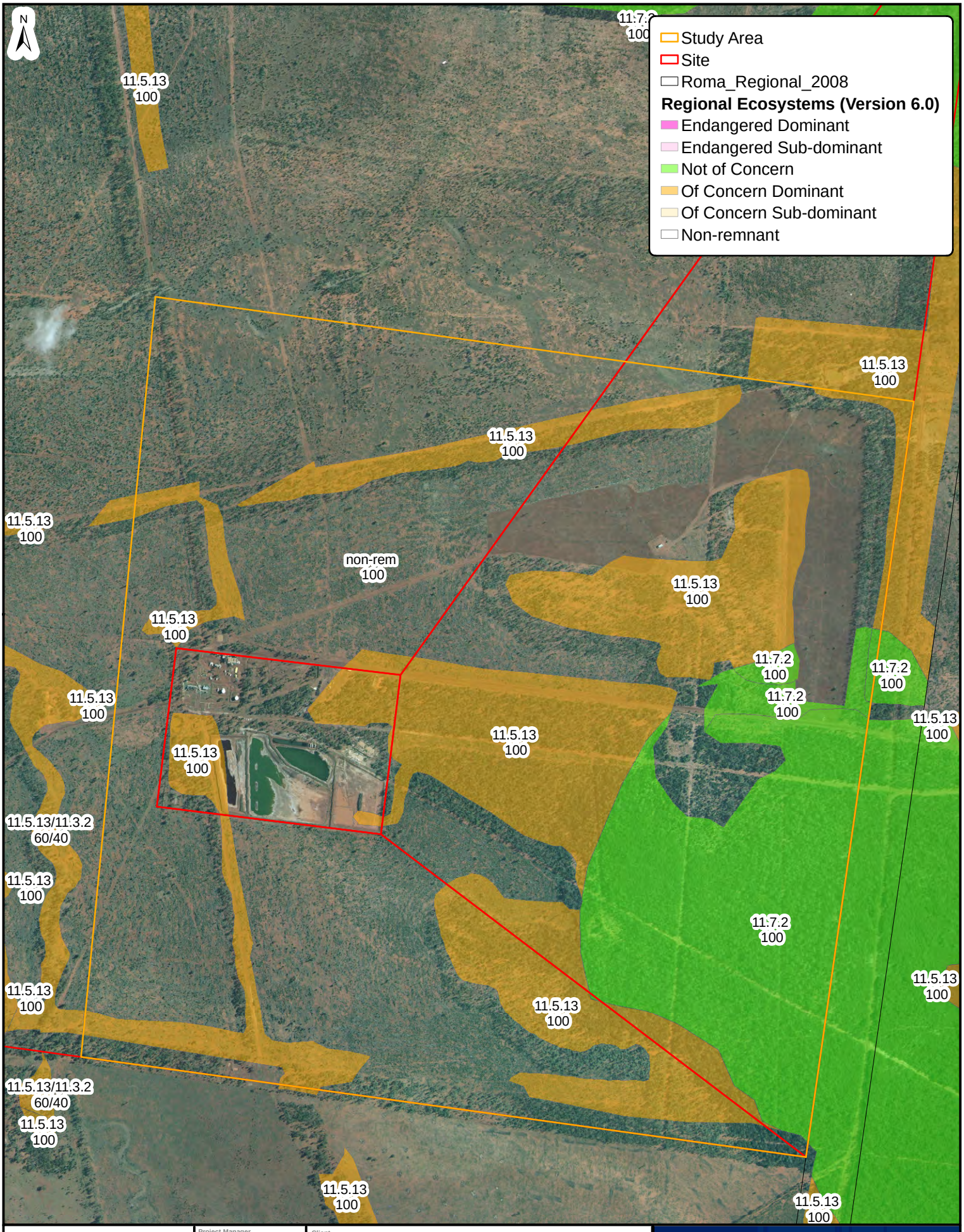
3.6 Weeds

The highly disturbed nature of the majority of the site has facilitated extensive weed invasions. Land management practices such as grazing, cultivation, cropping, maintenance and management of gas exploration and production infrastructure, as well as the ongoing access to the study area is likely to have aided the spread of weeds throughout the study area. Grazing areas are particularly prone to large numbers of weed species and these have spread into surrounding bushlands.

Several weeds were commonly encountered along much of the proposed area of disturbance, including declared pest species under the LPA. Common declared pests along the alignment are:

- Prickly Pear (*Opuntia stricta*) (Class 2). Occurrence of this species was low and generally associated with the disturbed woodland community.

Appendix G contains a full list of environmental weeds and introduced species observed on site.



0 100 200 300 400 500
Meters (A4)

DIGITAL CADASTRAL DATA BASE - BOUNDARY INFORMATION.
REGIONAL ECOSYSTEM VERSION 6 DATA.
DERM AERIAL PHOTOGRAPHY.
Based on or contains data provided by the State of Queensland (Department of Environment and Resource Management) 2010. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws.

Regional ecosystem linework compiled at scale greater than 1:100,000, except in designated areas, where a compilation scale of 1:50,000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100,000 is +/-100 metres.

The aerial photography used in this plan has not been rectified.
The image has been overlaid as a best fit on the boundaries shown and position is approximate only.

Date of Capture: August 2006.

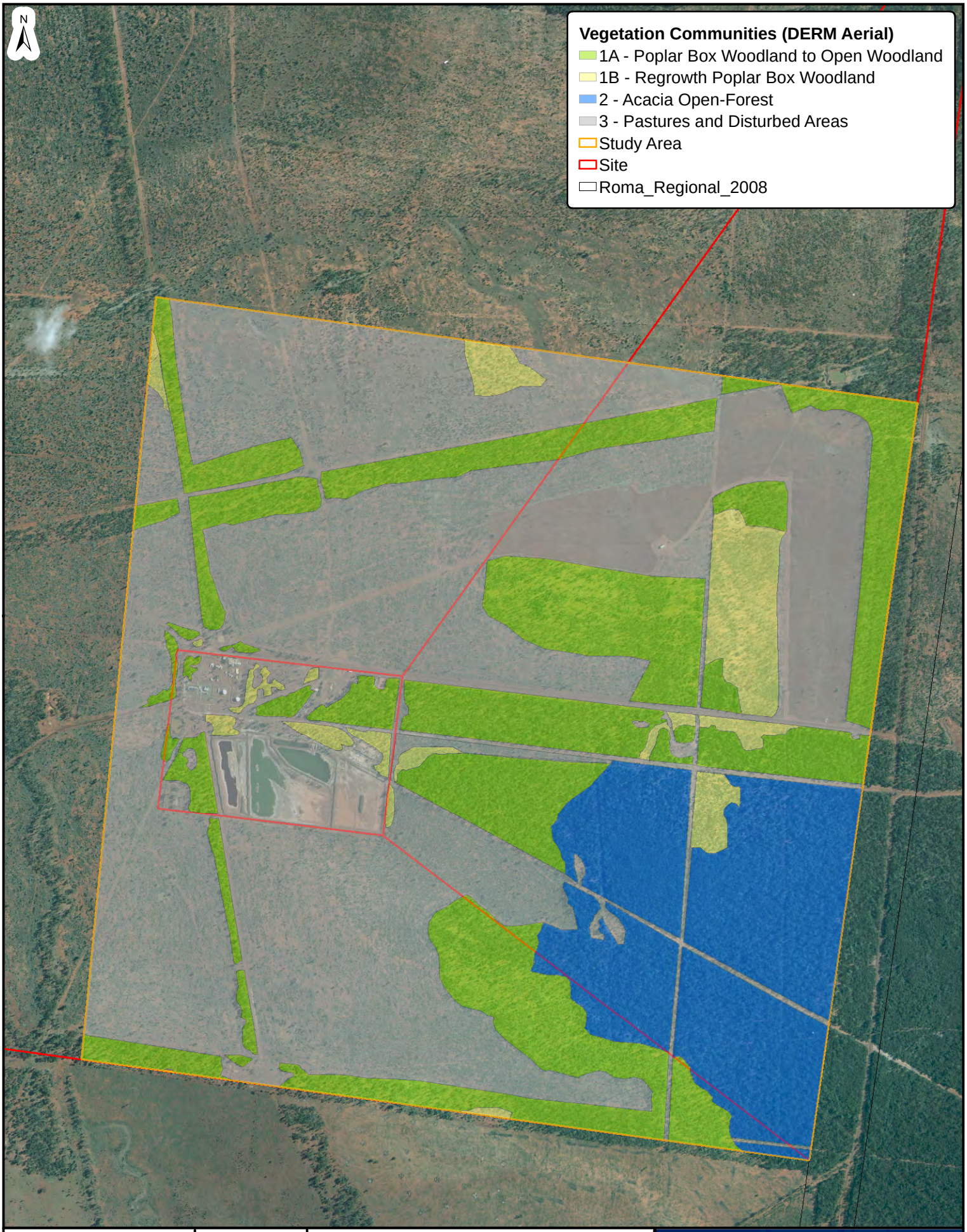
Project Manager	PW
Compiled by	CA
Map Projection	MGAz55
Map Datum	GDA94
File Reference	PR105109-1
Sheet Number	1 of 1

Client: AGL Pty Ltd

Title: Figure 3.1 - Regional Ecosystems (Version 6.0)

RPS

SCALE (A4)	DATE	DRAWING NO.	ISSUE
1:18,000	10/11/10	PR105109-1_3.1	A



0 100 200 300 400 500
Meters (A4)

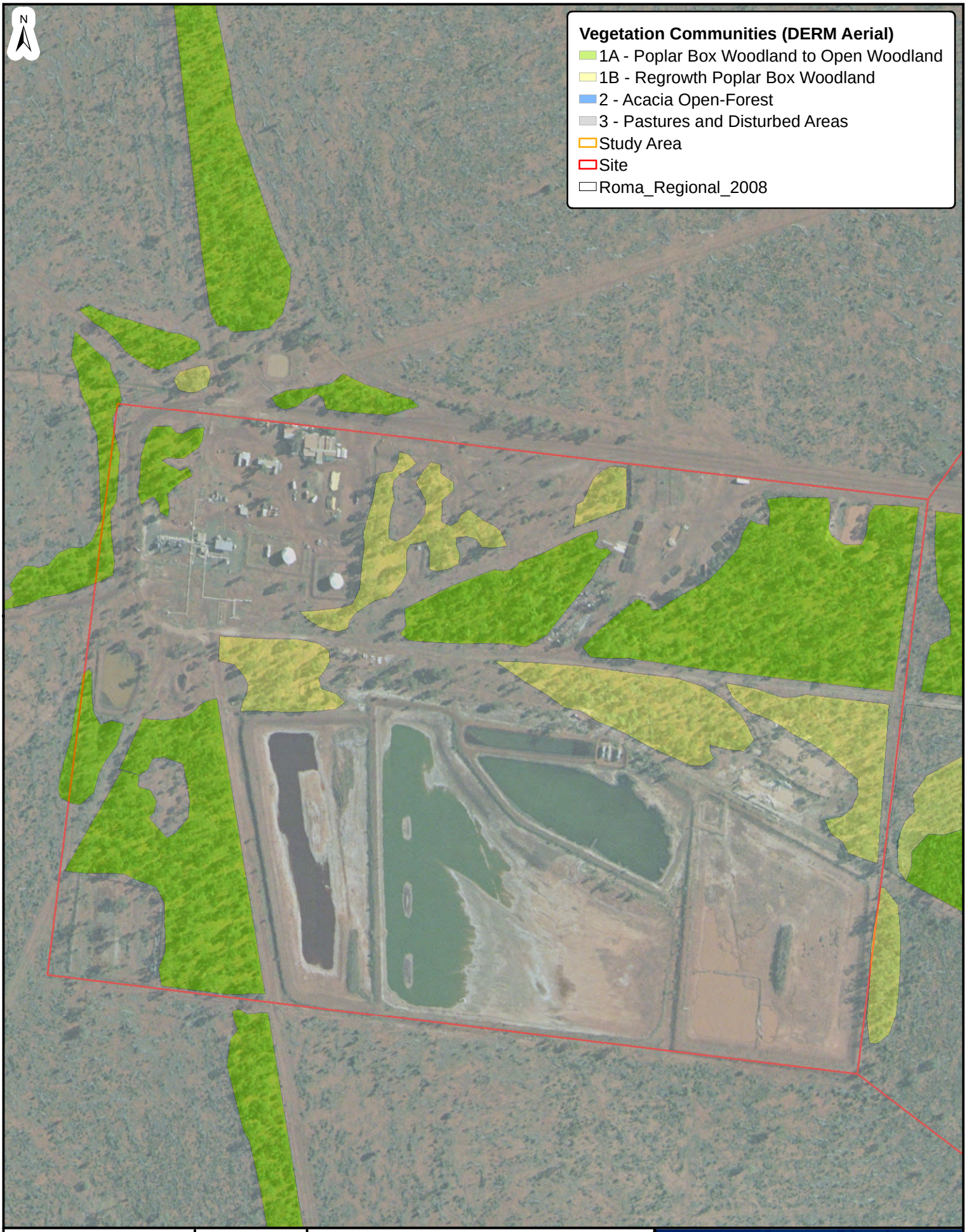
Project Manager	PW
Compiled by	CA
Map Projection	MGAz55
Map Datum	GDA94
File Reference	PR105109-1
Sheet Number	1 of 1

Client: AGL Pty Ltd

Title: Figure 3.2 - Vegetation Communities Study Area

RPS

SCALE (A4)	DATE	DRAWING NO.	ISSUE
1:18,000	10/11/10	PR105109-1_3.2	A



0 20 40 60 80 100
Meters (A4)

DIGITAL CADASTRAL DATA BASE - BOUNDARY INFORMATION.
REGIONAL ECOSYSTEM VERSION 6 DATA.
DERM AERIAL PHOTOGRAPHY.
Based on or contains data provided by the State of Queensland (Department of Environment and Resource Management) 2010. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws.

Regional ecosystem linework compiled at scale greater than 1:100,000, except in designated areas, where a compilation scale of 1:50,000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100,000 is +/-100 metres.

The aerial photography used in this plan has not been rectified.
The image has been overlaid as a best fit on the boundaries shown and position is approximate only.

Date of Capture: August 2006.

Project Manager	PW
Compiled by	CA
Map Projection	MGAz55
Map Datum	GDA94
File Reference	PR105109-1
Sheet Number	1 of 1

Client: AGL Pty Ltd

Title: Figure 3.3 - Vegetation Communities Silver Springs Plant Location

RPS

SCALE (A4)	DATE	DRAWING NO.	ISSUE
1:5,000	10/11/10	PR105109-1_3.3	A

4.0 Fauna

4.1 Common Species

A total of 48 native fauna species were identified during the field assessment, including 1 mammal, 37 birds, 5 reptiles and 5 amphibians (**Appendix H**). The identified fauna species are generally widespread throughout the region and indicative of grazing country in south-western Queensland. Fauna groups observed within the study area include generalist and disturbance tolerant species, woodland dependent species and species generally restricted to waterbodies such as semi-aquatic species, waterbirds and waders.

The majority of the study area has been disturbed and modified by historical and current land uses including cattle grazing and gas production. This alteration in ecological condition of the study area has favoured generalist and disturbance tolerant fauna species that are able to outcompete specialist fauna for limited food and habitat resources. These species have successfully adapted to the change in habitat condition. Common avian generalist species that dominate the degraded portions of the study area include Noisy Miner (*Manorina melanocephala*), Torresian Crow (*Corvus orru*), Magpie-lark (*Grallina cyanoleuca*), Pied Butcherbird (*Cracticus nigrogularis*), Australian Magpie (*Gymnorhina tibicen*) and Willy Wagtail (*Rhipidura leucophrys*).

The conversion of woodland to open grazing pastures as part of disturbance and land use changes within the study area has also increased the habitat availability and foraging resources for grazing mammals such as Eastern Grey Kangaroo (*Macropus giganteus*) as well as several bird species such as Galah (*Eolophus roseicapillus*), Cockatiel (*Nymphicus hollandicus*), Australian Pipit (*Anthus novaeseelandiae*), Crested Pigeon (*Ocyphaps lophotes*) and Double-barred Finch (Taeniopygia bichenovii). Predators such as Nankeen Kestrels (*Falco cenchroides*) and Black-shouldered Kite (*Elanus axillaris*) that favour open grazing country also occur within the study area.

Woodland dependant species that commonly occupy larger areas of remnant and regrowth vegetation are also present within the remaining patches of bushland that occur within the study area. These species are considered to be more specialist species that are sensitive to environmental changes. Such species include, Lace Monitor (*Varanus varius*), Shingleback Lizard (*Tiliqua rugosa*), Eastern Yellow Robin (*Eopsaltria australis*), Peaceful Dove (*Geopelia striata*), White-throated Gerygone (*Gerygone olivacea*), Laughing Kookaburra (*Dacelo novaeguineae*), Jacky Winter (*Microeca fascinans*), Striped Honeyeater (*Plectorhyncha lanceolata*), Spiny-cheeked Honeyeater (*Acanthagenys rufogularis*), Restless Flycatcher (*Myiagra inquieta*), and Rufous Whistler (*Pachycephala rufiventris*). Woodland areas within the study area also provide habitat for a range of nocturnal species such as owls, gliders, possums, bats and other native marsupials, however no nocturnal searches were conducted during the survey.

Numerous dams and large settling ponds occur throughout the study area and provide water, food and habitat for numerous semi-aquatic species, waterbirds and wadders. Species commonly observed in these areas include various frog species such Common Froglet (*Crinia signifera*), Verreaux's Tree Frogs (*Litoria verreauxxii*), Bleating Tree Frog (*Litoria dentata*) as well as waders and waterbirds such as Pacific Black Duck (*Anas superciliosa*), Hardhead (*Aythya australis*), Black-fronted Dotterel (*Elseyornis melanops*), Black-winged Stilt (*Himantopus himantopus*) and Pied Cormorant (*Phalacrocorax varius*).

4.2 Introduced Species

One introduced species, the European Rabbit (*Oryctolagus cuniculus*), was recorded within the gas facility stockpiling yards in the study area. The European Rabbit is a declared Class 2 pest species under the *Land Protection (Pest and Stock Route) Management Act 2002* (LPA). Tracks that appear to be Red Fox (*Vulpes vulpes*) and Cat (*Felis cattus*) were also recorded around the existing grounds of the gas compression facility. It is uncertain whether the Cat tracks were from a feral species as two domesticated Cats were observed around the existing plant during field investigations. Red Fox and Feral Cat are declared Class 2 pest species under the LPA, however domestic Cats are not listed.

All introduced species recorded in the study area are particularly common within disturbed and highly modified areas such as grazing pastures and gas extraction sites.

4.3 Threatened and Migratory Fauna Species

A review of environmental databases (EPBC protected matters search and Wildlife Online) identified 16 species, listed as significant under the EPBC and NCA, as potentially occurring or having suitable habitat within the study area (**Table 4.1**). None of these species were recorded within the study area.

Although the remaining significant species returned in the database searches were not identified during the site survey, the likelihood of their occurrence within the study area, based on the suitability of habitat was assessed, and a likelihood of occurrence rating of "likely", "possible" or "unlikely" assigned. A "likely" rating indicates that good quality suitable habitat occurs in the study area and/or within the study area locale, a "possible" rating indicates that suitable habitat occurs within the study area locale, but little or degraded habitat occurs within the study area, and an "unlikely" rating indicates that suitable habitat does not occur within the study area or study area locale and/or the study area is outside of the geographic range of the species.

Based on this classification, nine of the 16 species are considered possible and seven are considered unlikely to occur within the study area (**Table 4.1**). No significant species are considered a likely occurrence due to the relatively degraded and disturbed nature of the study area as well as the lack of ideal habitat conditions and absence of certain habitat feature requirements such as high levels of fallen woody debris or intact fringing waterside vegetation.

Table 4.1 Threatened and Migratory Fauna Species Identified in Desktop Searches

SPECIES NAME	COMMON NAME	NCA STATUS	EPBC STATUS	HABITAT	LIKELIHOOD OF OCCURRENCE
Reptiles					
Egernia rugosa	Yakka Skink	V	V	Usually takes refuge under dense vegetation, hollow logs, in cavities in soil-bound root systems of fallen trees and beneath rocks in open dry sclerophyll forest or woodland throughout its range	Possible within woodland habitat areas

SPECIES NAME	COMMON NAME	NCA STATUS	EPBC STATUS	HABITAT	LIKELIHOOD OF OCCURRENCE
Aves					
Apus pacificus	Fork-tailed Swift	-	M, LO	Aerial, over open country from semi-deserts to coasts, islands, sometimes over forests and cities	Possible fly-over
Gallinago hardwickii	Latham's Snipe	-	M	Freshwater wetlands on or near the coast, generally among dense cover. They are found in any vegetation around wetlands, in sedges, grasses, lignum, reeds and rushes and also in saltmarsh and creek edges on migration. This species is a migrant to the south east of Australia including Tasmania, passing through the north and New Guinea on passage.	Unlikely – unsuitable habitat
Geophaps scripta scripta	Squatter Pigeon	V	V	Grassy understorey of eucalypt woodland, usually with ready access to water.	Possible within woodland habitat and grazed pastures
Haliaeetus leucogaster	White-bellied Sea-Eagle	-	M	Coastal habitats and around terrestrial wetlands characterised by the presence of large areas of open water	Unlikely – unsuitable habitat
Hirundapus caudacutus	White-throated Needletail	-	M	Occurs over most types of habitat, recorded most often above wooded areas, including open forest and rainforest	Possible fly-over
Neochima ruficauda ruficausa	Star Finch	E	E	Swamp vegetation, open grassland with sparse vegetation, cultivated land	Possible within grazed pastures
Polytelis swainsonii	Superb Parrot	-	V	Throughout eastern inland NSW along timbered waterways and nearby well-watered woodlands, especially in River Red Gums along the Murray and Murrumbidgee Rivers	Unlikely – study area not within geographical range
Rostratula australis	Australian Painted Snipe	V	V	Well vegetated shallows and margins of wetlands and other water courses	Unlikely – unsuitable habitat
Rostratula benghalensis s. lat.	Painted Snipe	-	M	Well vegetated shallows and margins of wetlands and other water courses	Unlikely – study area not within geographical range
Merops ornatus	Rainbow Bee-eater	-	M, LO	Beaches, cliffs, rainforests, cliffs, dunes and open woodlands with sandy, loamy soils.	Possible foraging habitat within woodland areas

SPECIES NAME	COMMON NAME	NCA STATUS	EPBC STATUS	HABITAT	LIKELIHOOD OF OCCURRENCE
Ardea alba	Great Egret	-	M, LO	Wetlands, flooded pastures, dams, estuarine mudflats, mangroves and reefs.	Possible at dams and settling ponds
Ardea ibis	Cattle Egret	-	M, LO	Wide range of open habitats from grazing paddocks to wetlands and tidal mudflats.	Possible at dams, settling ponds and pastures
Mammals					
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Caves and mines in dry sclerophyll forests and woodlands as well as higher altitude moist eucalypt forest and edges of rainforest	Unlikely – unsuitable habitat
Nyctophilus timorensis (south-eastern form)	South-eastern Long-eared Bat	-	V	A range of dry woodland and shrubland communities, roosts mainly in tree hollows, forages low amongst the canopy and shrub layers.	Possible within woodland habitat
Fish					
Maccullochella peelii peelii	Murray Cod	-	V	Widely distributed in waterways of the Murray-Darling Basin, with a preference for woody debris (snags), debris piles and bank side vegetation that provides shelter from high water velocities	Unlikely – unsuitable habitat

(Source: DERM & SEWPAC) E = Endangered V = Vulnerable M = Migratory LO = Listed Overfly

4.4 Essential Habitat

No Essential habitat for significant fauna species has been mapped within or surrounding the study area.

4.5 Fauna Habitats

Four broad fauna habitat types are present within the study area which consist of and provide various quality (condition) habitats / resources for native fauna. The floristic composition, varying condition and quality of the vegetation communities (and thus their functional value as a habitat for native species) determined the classifications of habitat types within the study area. Habitat types observed within the study area include woodlands, artificial wetlands, regrowth and grazing pastures.

4.5.1 Habitat Type 1 – Open-forest & Woodland

This habitat type correlates with Vegetation Communities 1A and 2 (**Section 3.2.3**) within the study area. Open-forest and woodland habitat within the study area has undergone significant reduction in area due to historical and current land management practices such as logging, thinning, grazing as well as construction and maintenance of linear infrastructure such as roads, pipeline and powerline easements. These land management practices have also increased fragmentation of these habitats within the study area, although some large intact open-forest and woodland remnants still remain.

Evidence of disturbance and degradation is also apparent within the habitat as a result of these land practices and subsequently the habitat quality and condition of the remaining open-forest and woodland areas has been reduced. The understorey is often modified through weed and exotic pasture encroachment and within some portions of the open-forest and woodland habitat, higher rates of grazing has reduced the complexity of the understorey layer. In these areas the groundcover and the shrubby layer is sparse, which limits habitat resources and functional value for fauna, particularly those species reliant upon a dense cover for sheltering and nesting, such as various cryptic bird and mammal species.

Such disturbances are more prominent within the smaller and isolated patches of open-forest and woodland habitat within the study area, whereas in the larger remnants, disturbances are generally confined to the edges of the habitat. The larger remnant open-forest and woodlands still contain core habitat areas that are of a high quality and functional value, and provide a greater level of habitat resources.

Whilst some portions of the habitat have a reduced understorey layer, the overall vegetation structure of the open-forest and woodland habitat has remained relatively intact. Canopy connectivity is high, providing movement opportunities for arboreal mammals throughout the habitat as well as roosting and nesting habitat for bird species. Numerous bird nests were observed within the canopy layer of this habitat type during field investigations.

Mature trees are generally sparse due to historical clearing and thinning. However, where available they often contain hollows that provide breeding and sheltering habitat for hollow-dependant arboreal mammals as well as cockatoos, lorikeets, parrots and some reptiles. Some large stags (dead trees) were also observed within this habitat type, which also contain hollows. Fallen timber and coarse leaf litter is also present, which provides sheltering, foraging and breeding resources for reptiles and small terrestrial mammals. A number of large hollow logs also occur within the ground layer of this habitat type.

The value of the remaining patches is increased by the general lack of availability of this habitat within the landscape. Isolated remnants may provide refuge for declining, uncommon and specialist fauna species, and larger remnants with greater landscape connectivity may provide more core habitat for threatened species. In particular, these areas are important for several threatened species that are may occur within the study area and surrounding area such as Yakka Skink (*Egernia rugosa*), South-eastern Long-eared Bat (*Nyctophilus timorensis*), Squatter Pigeon (*Geophaps scripta scripta*) and Star Finch (*Neochima ruficauda ruficausa*).

Overall this habitat type is considered to have moderate to high habitat value. This habitat is comprised of REs 11.3.2, 11.5.13 and 11.7.2 within the study area.

4.5.2 Habitat Type 2 – Artificial Wetlands

Numerous dams and settling ponds associated with the existing gas compression facility and cattle grazing properties occur within Vegetation Community 3 (**Section 3.2.3**). These dams and settling ponds function as artificial wetlands providing aquatic and semi-aquatic habitat for various frogs and water birds. Due to the purpose that these waterbodies fulfil, these habitats are disturbed and degraded. It is noted that the settling ponds are subject to varying degrees of pollution due to gas production processes. These bodies of water are not in a healthy condition, however a large number of water birds were observed utilising the cleanest of these ponds. The banks of the farm dams, which are often located within grazing

pasture land, are highly eroded and compacted due to use as watering points for cattle. This often results in a lack of dense fringing vegetation, canopy trees and woody vegetation. The settling ponds have been constructed to capture the excess water utilised for clearing flow lines, and therefore water quality varies from poor to very poor. The gravel banks of the settling ponds support little native vegetation, with only exotic pasture grasses occurring on the higher banks of the ponds.

Despite the generally poor condition of this habitat, the artificial wetlands still play a valuable role in the landscape through the provision of water and food resources, shelter and breeding habitat for a range of fauna types. The banks of the dam provide thermoregulation, sheltering and nesting habitat for reptiles such as the Red-bellied Black Snakes (*Pseudechris porphyriacus*) and Water Dragon (*Physignathus lesuerii*). The artificial wetlands also provide habitat for in an otherwise dry inland landscape for various frog species. Numerous frog calls were heard at the artificial wetlands including Bleating Tree Frog (*Litoria dentata*), Peron's Tree Frog (*Litoria peronii*), Green Tree Frog (*Litoria caerulea*), Common Froglet (*Crinia signifera*) and Verreaux's Tree Frog (*Litoria verreauxxii*).

The artificial wetlands also provide stepping stone habitat for waterbirds moving throughout the area and a number of species were observed utilising the farm dams and settling ponds during field investigations including Pied Cormorant (*Phalacrocorax varius*), Black-fronted Dotterel (*Elseyornis melanops*), Black-winged Stilt (*Himantopus himantopus*) and various duck species. These habitat areas are particularly important for many migratory bird species, which may utilise these areas as 'stop over' habitat during their migratory movements.

This habitat is located in the non-remnant areas within the study area.

4.5.3 Habitat Type 3 – Regrowth

The habitat type correlates with Vegetation Community 1B (**Section 3.2.3**). Regrowth vegetation generally lacks structural complexity as well as important habitat elements such as mature canopy or hollow-bearing habitat trees and fallen woody debris. Due to the lack of a continuous canopy layer, exotic pasture grasses and weeds proliferate in the understorey of the habitat. Habitat resources are therefore limited within this habitat type and due to the higher level of disturbance that has occurred, habitat quality and condition are low.

Despite this, the habitat may provide resources such as shelter and food sources for a variety of species, particularly smaller birds and reptiles. Areas with dense cover of regenerating pioneer species often provide a dense cover of understorey vegetation that favours cryptic species. These areas may also provide important landscape function such as linking areas of isolated remnant habitats and stepping stones for mobile fauna.

This habitat is located in the non-remnant areas within the study area.

4.5.4 Habitat Type 4 – Grazing Pastures & Cleared Disturbed Land

This habitat type correlates with Vegetation Community 3 and is located within the cleared and disturbed areas that have been utilised as grazing pastures (**Section 3.2.3**). This habitat type has been highly modified and disturbed by historical and current land uses particularly cattle grazing and linear infrastructure development. As such the habitat resources and functional values of this habitat type are low. The lack of canopy and understorey vegetation, as well as the habitats poor native floristic diversity, has significantly reduced the availability of abundant nesting, foraging, roosting and dispersal opportunities for most native fauna species.

Nonetheless, the dense coverage of exotic pasture grasses and weeds do provide habitat for a variety of native generalist species such as Australasian Pipit, Australian Magpie and Magpie-lark. A variety of small birds may also nest within the grazing pastures and utilise that habitat for dispersal. Fairy Wrens and Finches were often observed utilising this habitat during the field inspection. The grazing pastures also provide foraging habitat for Galahs and macropods. Other fauna species that may utilise this area as a foraging habitat includes raptors and some snake species, which may prey on small native and exotic terrestrial mammals potentially inhabiting the cleared disturbed areas.

Overall, it is considered that habitat and resource values of this habitat type will be mostly suitable only for a subset of common, disturbance-tolerant native species as well as introduced species.

5.0 Biodiversity Values

5.1 Corridors & Linkages

In a broader landscape context, the study area is located within the vicinity of a mapped Brigalow Belt Terrestrial State Significant Corridor. Large patches of remnant vegetation within the eastern portion of the study area directly link to the mapped corridor (**Figure 5.1**). At this scale remaining vegetated areas within the study area have high landscape connectivity.

At a local level, connectivity of vegetated areas within the study area to surrounding areas is also relatively high. Vegetated drainage lines, shadelines and regenerating cleared paddocks provide linkages between on and off site vegetated areas.

Site specific fauna movement opportunities are likely to be restricted to the more intact bushland and regrowth areas within the study area. Fragmentation of these areas by pipeline easements and roads is evident but are considered to be relatively minor. No major barriers between bushland and regrowth vegetation exist within the study area. Isolated patches of vegetation occur within the southern portion of the study area, which are fragmented from the surrounding vegetated by cleared grazing pastureland. Nonetheless these cleared areas still allow for movement opportunities, albeit high risk, to other more areas within the study area.

It is noted that the proposed project is not anticipated to result in any disturbance to the connectivity values of the mapped Brigalow Belt Terrestrial State Significant Corridor.

5.2 Waterways & Wetlands

No mapped waterways or wetlands occur within the study area. Some minor ephemeral drainage lines that are tributaries of Noona Creek occur within the study area. No drainage lines are located within the proposed areas of disturbance.

As identified in **Section 4.5.2**, numerous dams and settling ponds associated with the existing gas compression facility and cattle grazing properties occur within Vegetation Community 3. These dams and settling ponds function as artificial wetlands providing aquatic and semi-aquatic habitat for various frogs and water birds. These dams are not mapped pursuant to any Federal, State or Local conservation mapping.

1:000,000
Meters (A4)

DIGITAL CADASTRAL DATA BASE - BOUNDARY INFORMATION.
REGIONAL ECOSYSTEM VERSION 6 DATA.
DERM AERIAL PHOTOGRAPHY.
Based on or contains data provided by the State of Queensland (Department of Environment and Resource Management) 2010. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws.

Regional ecosystem linework compiled at scale greater than 1:100,000, except in designated areas, where a compilation scale of 1:50,000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100,000 is +/-100 metres.

The aerial photography used in this plan has not been rectified.
The image has been overlaid as a best fit on the boundaries shown and position is approximate only.

Date of Capture: August 2006.

Project Manager	PW
Compiled by	CA
Map Projection	MGAz55
Map Datum	GDA94
File Reference	PR105109-1
Sheet Number	1 of 1

Client: AGL Pty Ltd

Title: Figure 5.1 - Corridors and Connectivity

RPS

SCALE (A4)	DATE	DRAWING NO.	ISSUE
1:110,000	10/11/10	PR105109-1_5.1	A

6.0 Potential Impacts

6.1 Concrete Batching Plant

At the time of writing of this report, the Batching Plant location was yet to be finalised. It has been advised that the footprint will be located within a predominately cleared area of the site, either at the permanent camp site or an abandoned seismic campsite. The development footprint of this plant is approximately 0.25ha; however the extent of disturbance is anticipated to be greater than this due to edge effects associated with anthropogenic disturbance.

The overall impact of construction within an area as described above is assumed to be low. It is recommended that if vegetation is proposed to be removed, that a pre-clearing survey be undertaken to identify the presence of flora and fauna within the project disturbance footprint as well as important habitat features such as nests and hollow-bearing trees. This survey should also identify and mark weed species to be removed prior to vegetation clearing.

6.2 New Gas Compression Facility

The new gas compression facility is to be located within the grounds of the existing gas facility. The area has been previously cleared as part of existing operations and contains no vegetation and associated habitat values. Potential impacts are not expected to occur from the construction of a new gas compression facility within the proposed location.

7.0 Recommended Mitigation Measures

Although ecological impacts are not expected to be significant in a regional context (as described in **Section 5.0**), some degree of impact to flora, fauna and ecosystems is generally unavoidable as a result of gas extraction projects. However, impacts can be effectively controlled through the implementation of measures to avoid, minimise and mitigate (in that order) impacts associated with the project. A mitigation strategy that employs this hierarchy should be implemented to reduce the ecological impacts associated with the project and where possible, avoid a net-loss of habitat, especially for threatened species that may occur within the study area.

Key elements of an effective control strategy are further described below.

7.1 Avoid

7.1.1 Concrete Batching Plant

The proposed batching plant has currently been located to avoid Regional Ecosystems, ESAs, high value habitat areas and key habitat features (dams, wetlands, creeks, etc) where possible. These areas have been avoided to reduce the likelihood of ecological impacts. Whilst the project has been sited outside of these areas, locations are still preliminary and potential still exists for surrounding features of environmental significance to be disturbed if the current proposal is altered. Consideration is also required for associated disturbance through bushfire management, anthropogenic disturbance and edge effects.

7.1.2 New Gas Compression Facility

There is no vegetation located within the footprint for the new gas compression facility, therefore no vegetation nor fauna habitat impacts will be imposed. As such, all impacts for this component of the project are avoided. This portion of the proposal is not discussed further.

7.2 Minimise

Where avoidance of vegetation and habitat clearing and disturbance is not possible due to other constraints (such as construction safety or physical impediments), efforts should be made to minimise impacts through:

- Limit the extent of clearing to the minimum that is required for the effective and efficient construction of the batching plant;
- Clearly marking the extent of vegetation clearing prior to clearing to protect vegetation and habitats to be retained (i.e. temporarily fence these areas off). All contractors are to be made aware of the location of retained vegetation and habitat areas and the activities prohibited in these areas;
- No stockpiling, storage of equipment or vehicle movement is to occur within retained vegetation and habitat areas;
- Restricting vehicle and machinery movements to designated tracks within the site to prevent additional clearing and disturbance of vegetation and habitat features; and

- Reducing speed limits near vegetated areas and avoiding driving at dawn and dusk wherever possible to prevent collision with native wildlife.

Where changes are made to the location of the project's disturbance footprint, a pre-clearance ecological survey should be undertaken.

7.3 Mitigate

The following mitigation measures are recommended to reduce the severity of ecological impacts:

- Pre-clearing surveys are recommended to be undertaken to identify the presence of threatened flora and fauna within the project disturbance footprint as well as important habitat features such as nests and hollow-bearing trees. These surveys should identify and mark weed species to be removed prior to vegetation clearing;
- Sensitive clearing techniques should be implemented (e.g. trimming branches wherever possible rather than tree removal, selective tree removal rather than broad scale clearing), where appropriate;
- Any vegetation required to be removed, is to be cleared in a sequential and staged manner to allow opportunities for fauna to vacate the affected area;
- Employment of qualified spotter-catchers to supervise clearing and to conduct regular inspections of open trenches;
- Stockpile topsoil and re-spread following construction to facilitate natural regeneration;
- Avoid burning and disposal of cleared native vegetation. This material should be stockpiled, then respread to provide habitat for fauna, facilitate natural seed regeneration and minimise weed invasion;
- Relocate excess fallen timber, rocks and boulders from the construction of easements, wells, work camps and batching plant to surrounding habitats in consultation with landholders;
- Where fences require replacement, the use of barbed wire should be avoided, especially on the top strand, although it is recognised that this is subject to landholder requirements;
- Implement erosion and sediment control measures to minimise impact of construction to nearby artificial wetlands;
- Establish and maintain vegetation cover as soon as possible after clearing;
- Undertake appropriate chemical storage to minimise pollution to surrounding environment, particularly artificial wetlands;
- No domestic animals should be allowed on the construction site; and
- Weed management measures should be implemented to minimise the spread of declared and environmental weed species. Measures include:
  - Removal and control of weeds identified during pre-clearing surveys. Weeds should be removed separately to reduce spread of seeds and be disposed of at a suitable local council facility;
  - Vehicle and machinery wash down in accordance with AGL's project specific procedures; and
  - Access along designated tracks only.

8.0 Conclusion

Limited project specific information was available at the time of the field investigation and as such a general ecological assessment of a 'study area' was undertaken. Designation of a 'study area' was based on the potential areas that may be utilised for the proposed project. Information and the subsequent assessment contained within the report are reflective of this general assessment. Site specific ecological information on areas contained within the current project's disturbance footprint is limited. Due to this limitation, a number of assumptions have been made regarding disturbance areas and associated impacts, including:

- Construction will occur within areas that are predominantly void of woody vegetation; and
- Potential impacts on vegetation communities and habitats surrounding areas of existing easements and pre-disturbed cleared areas will be avoided.

The current proposed location for the concrete batching plant is proposed within a predominantly cleared area, which is yet to be determined. The plant requires a 0.25ha formed footprint, however it is anticipated that the disturbance footprint will exceed this area. For the purpose of this report, it has been assumed that all vegetation clearing will be avoided for the construction of the new compressor facility and batching plant. From the information available it has been considered that construction and disturbance within these areas will have a low impact.

This ecological assessment has been based on site specific information available at the time of the survey. Where disturbance locations or project design changes significantly from those assessed as part of this report, it is recommended that additional field studies be undertaken to identify potential ecological impacts resulting from such changes.

Due to the lack of solid disturbance footprint information, it is recommended that a suitably qualified ecologist be on site and assess the proposed areas of disturbance prior to any works commencing. The majority of the study area has been previously cleared for rural land-uses and existing infrastructure. Given the highly disturbed nature of most of the study area, and the proximal availability of similar habitat to those areas that will be cleared, the potential impacts (based on the assumptions above) of the proposed disturbance range from Low to Moderate. These impacts can be generally minimised and avoided through measures identified in **Section 6.0**. In particular, efforts should be made to protect important habitat features such as hollow-bearing trees, limit clearing of native vegetation and to rehabilitate disturbed areas post-construction.

9.0 References

Department of Environment, Water, Heritage and the Arts (2010a) EPBC Act Protected Matters Report. Department of Environment, Water, Heritage and the Arts, Canberra.

Department of Environment and Resource Management (2009a) Regional Ecosystem Extract: Digital Data (Version 6.0). DERM, Brisbane, Australia.

Department of Environment and Resource Management (2010b) Wildlife Online Extract. (Database). Department of Environment and Resource Management / Queensland Parks and Wildlife Service. Brisbane, Australia.

Department of Environment and Resource Management (2010c) Referrable Areas Mapping. Department of Environment and Resource Management / Queensland Parks and Wildlife Service. Brisbane, Australia.

Department of Environment and Resource Management (2010d) Referrable Wetlands Mapping. Department of Environment and Resource Management / Queensland Parks and Wildlife Service. Brisbane, Australia.

Leiper, G. Glazebrook, J., Cox, D. & Rathie, K. (2008) *Mangroves to Mountains: A Field Guide to Native Plants of S.E. Queensland*. Logan River Branch S.G.A.P (Qld Region) Inc.

Lester, N. (2008) *Woodland to Weeds: Southern Queensland Brigalow Belt*. 2nd Edition. CopyRight Publishing Company Pty Ltd, Brisbane.

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

Morcombe, M. (2003) *Field Guide to Australian Birds*. Steve Parish Publishing Pty Ltd, Archerfield, Australia.

Neldner, V.J., Wilson, B. A., Thompson, E.J. and Dillewaard, H.A. (2005) *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland*. Version 3.1. Updated September 2005. Queensland Herbarium, Environmental Protection Agency, Brisbane.

Pizzey, G. & Knight, F. (2004) *The Field Guide to the Birds of Australia* 7th Edition. Harper Collins Publishers, Sydney

Queensland Museum (2007) *Wildlife of Greater Brisbane* (2nd edition) Queensland Museum, Brisbane, Australia.

Robinson, M. (1998) *A Field Guide to Frogs of Australia*. Reed New Holland, Sydney

Specht (1970) as cited in table 14A, Walker & Hopkins (1990) *Australian Soil and Land Survey: Field Handbook*, Inkata Press Australia.

Stanley, T. D. & Ross, E. M. (1989) *Flora of south-eastern Queensland Volumes I, II & III*, Queensland Department of Primary Industries.

Strahan, R. (2002) *The Mammals of Australia*, Angus and Robertsons Publishers, Sydney, Australia.

Wilson, S. (2005) *A Field Guide to Reptiles of Queensland*. Reed New Holland Publishers Pty Ltd. Sydney, Australia.

Appendix A

EPBC Protected Matters Report

Australian Government
Department of the Environment, Water, Heritage and the Arts

Protected Matters Search Tool

You are here: Environment Home > EPBC Act > Search

16 September 2010 14:08

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

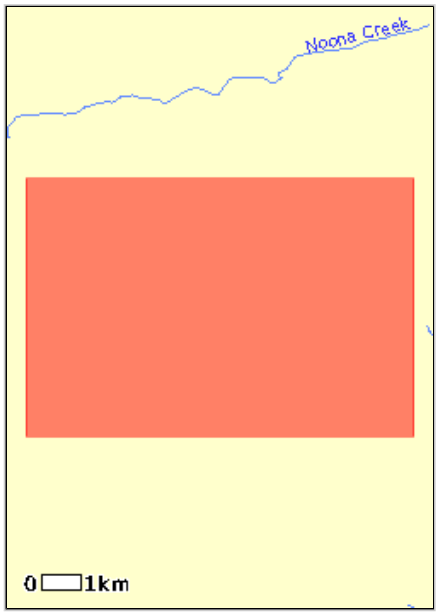
You may wish to print this report for reference before moving to other pages or websites.

The Australian Natural Resources Atlas at http://www.environment.gov.au/atlas may provide further environmental information relevant to your selected area. Information about the EPBC Act including significance guidelines, forms and application process details can be found at http://www.environment.gov.au/epbc/assessmentsapprovals/index.html

Search Type: Area

Buffer: 0 km

Coordinates: -27.5818,149.0843, -27.5818,149.1844, -27.64839,149.1844, -27.64839,149.0843



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

Report Contents:

Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance - see http://www.environment.gov.au/epbc/assessmentsapprovals/guidelines/index.html.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Significance: (Ramsar Sites)	1
Commonwealth Marine Areas:	None
Threatened Ecological Communities:	1

Threatened Species:	11
Migratory Species:	10

Other Matters Protected by the EPBC Act

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

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

Please note that the current dataset on Commonwealth land is not complete. Further information on Commonwealth land would need to be obtained from relevant sources including Commonwealth agencies, local agencies, and land tenure maps.

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species. Information on EPBC Act permit requirements and application forms can be found at http://www.environment.gov.au/epbc/permits/index.html.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Places on the RNE:	None
Listed Marine Species:	8
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves:	None

Extra Information

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

State and Territory Reserves:	None
Other Commonwealth Reserves:	None
Regional Forest Agreements:	None

Details

Matters of National Environmental Significance

Wetlands of International Significance [Dataset Information] (Ramsar Sites)		
NARRAN LAKE NATURE RESERVE		Within same catchment as Ramsar site
Threatened Ecological Communities [Dataset Information]	Status	Type of Presence
Weeping Myall Woodlands	Endangered	Community likely to occur within area
Threatened Species [Dataset Information]	Status	Type of Presence
Birds		
Geophaps scripta scripta Squatter Pigeon (southern)	Vulnerable	Species or species habitat likely to occur within area
Neochmia ruficauda ruficauda	Endangered	Species or species habitat likely to occur

Star Finch (eastern), Star Finch (southern)		within area
Polytelis swainsonii Superb Parrot	Vulnerable	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe	Vulnerable	Species or species habitat may occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat	Vulnerable	Species or species habitat may occur within area
Nyctophilus timoriensis (South-eastern form) Greater Long-eared Bat, South-eastern Long-eared Bat	Vulnerable	Species or species habitat may occur within area
Ray-finned fishes		
Maccullochella peelii peelii Murray Cod, Cod, Goodoo	Vulnerable	Species or species habitat may occur within area
Reptiles		
Egernia rugosa Yakka Skink	Vulnerable	Species or species habitat likely to occur within area
Plants		
Acacia wardellii	Vulnerable	Species or species habitat may occur within area
Cadellia pentastylis Ooline	Vulnerable	Species or species habitat likely to occur within area
Tylophora linearis	Endangered	Species or species habitat may occur within area
Migratory Species [Dataset Information]	Status	Type of Presence
Migratory Terrestrial Species		
Birds		
Haliaeetus leucogaster White-bellied Sea-Eagle	Migratory	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail	Migratory	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater	Migratory	Species or species habitat may occur within area
Migratory Wetland Species		
Birds		
Ardea alba Great Egret, White Egret	Migratory	Species or species habitat may occur within area
Ardea ibis Cattle Egret	Migratory	Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe	Migratory	Species or species habitat may occur within area
Rostratula benghalensis s. lat. Painted Snipe	Migratory	Species or species habitat may occur within area
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift	Migratory	Species or species habitat may occur within area
Ardea alba Great Egret, White Egret	Migratory	Species or species habitat may occur within area
Ardea ibis Cattle Egret	Migratory	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Dataset Information]	Status	Type of Presence
Birds		
Apus pacificus	Listed -	Species or species habitat may occur within

Fork-tailed Swift	overfly marine area	area
Ardea alba Great Egret, White Egret	Listed - overfly marine area	Species or species habitat may occur within area
Ardea ibis Cattle Egret	Listed - overfly marine area	Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe	Listed - overfly marine area	Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle	Listed	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail	Listed - overfly marine area	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater	Listed - overfly marine area	Species or species habitat may occur within area
Rostratula benghalensis s. lat. Painted Snipe	Listed - overfly marine area	Species or species habitat may occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the *Environment Protection and Biodiversity Conservation Act 1999*. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

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

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

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under "type of presence". For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the migratory and marine provisions of the Act have been mapped.

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

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

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

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

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

Acknowledgments

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

- New South Wales National Parks and Wildlife Service
- Department of Sustainability and Environment, Victoria
- Department of Primary Industries, Water and Environment, Tasmania
- Department of Environment and Heritage, South Australia Planning SA
- Parks and Wildlife Commission of the Northern Territory
- Environmental Protection Agency, Queensland
- Birds Australia
- Australian Bird and Bat Banding Scheme
- Australian National Wildlife Collection
- Natural history museums of Australia
- Queensland Herbarium
- National Herbarium of NSW
- Royal Botanic Gardens and National Herbarium of Victoria
- Tasmanian Herbarium
- State Herbarium of South Australia
- Northern Territory Herbarium
- Western Australian Herbarium
- Australian National Herbarium, Atherton and Canberra
- University of New England
- Other groups and individuals

ANUCliM Version 1.8, Centre for Resource and Environmental Studies, Australian National University was used extensively for the production of draft maps of species distribution. Environment Australia is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Last updated: Thursday, 20-Nov-2008 14:17:56 EST

Department of the Environment, Water, Heritage and the Arts
GPO Box 787 Canberra ACT 2601 Australia
Telephone: +61 (0)2 6274 1111

Appendix B

Wildlife Online Reports

Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

Wildlife Online Extract

Search Criteria: Species List for a Defined Area
Species: All
Type: All
Status: All
Records: All
Date: All
Latitude: 27.5818 to 27.6484
Longitude: 149.0844 to 149.1844
Email: Phillip.Wilkinson@rpsgroup.com.au
Date submitted: Thursday 16 Sep 2010 13:21:31
Date extracted: Thursday 16 Sep 2010 13:31:02

The number of records retrieved = 25

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	higher dicots	Acanthaceae	*Brunoniella australis*	blue trumpet		C		1
plants	higher dicots	Acanthaceae	*Rostellularia adscendens*			C		1
plants	higher dicots	Apocynaceae	*Parsonsia eucalyptophylla*	gargaloo		C		1
plants	higher dicots	Asteraceae	*Glossocardia bidens*	native cobbler's pegs		C		1
plants	higher dicots	Asteraceae	*Cyanthillium cinereum*			C		1
plants	higher dicots	Caesalpiniaceae	*Senna artemisioides subsp. zygophylla*			C		1
plants	higher dicots	Celastraceae	*Maytenus cunninghamii*	yellow berry bush		C		1
plants	higher dicots	Lamiaceae	*Spartothamnella puberula*			C		1
plants	higher dicots	Myoporaceae	*Eremophila mitchellii*			C		1
plants	higher dicots	Myrtaceae	*Eucalyptus populnea*	poplar box		C		1
plants	higher dicots	Myrtaceae	*Melaleuca pallescens*			C		1/1
plants	higher dicots	Rutaceae	*Geijera parviflora*	wilga		C		1
plants	higher dicots	Sapindaceae	*Dodonaea viscosa*			C		1
plants	monocots	Laxmanniaceae	*Lomandra multiflora subsp. multiflora*			C		1
plants	monocots	Poaceae	*Panicum effusum*			C		1
plants	monocots	Poaceae	*Aristida calycina*			C		1
plants	monocots	Poaceae	*Cymbopogon refractus*	barbed-wire grass		C		1
plants	monocots	Poaceae	*Aristida jerichoensis*			C		1
plants	monocots	Poaceae	*Aristida caput-medusae*			C		1
plants	monocots	Poaceae	*Bothriochloa decipiens*			C		1
plants	monocots	Poaceae	*Enneapogon polyphyllus*	leafy nineawn		C		1
plants	monocots	Poaceae	*Thyridolepis xerophila*			C		1
plants	monocots	Poaceae	*Ancistrachne uncinulata*	hooky grass		C		1
plants	monocots	Poaceae	*Paspalidium constrictum*			C		1
plants	monocots	Poaceae	*Chloris divaricata var. divaricata*	slender chloris		C		1

CODES

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

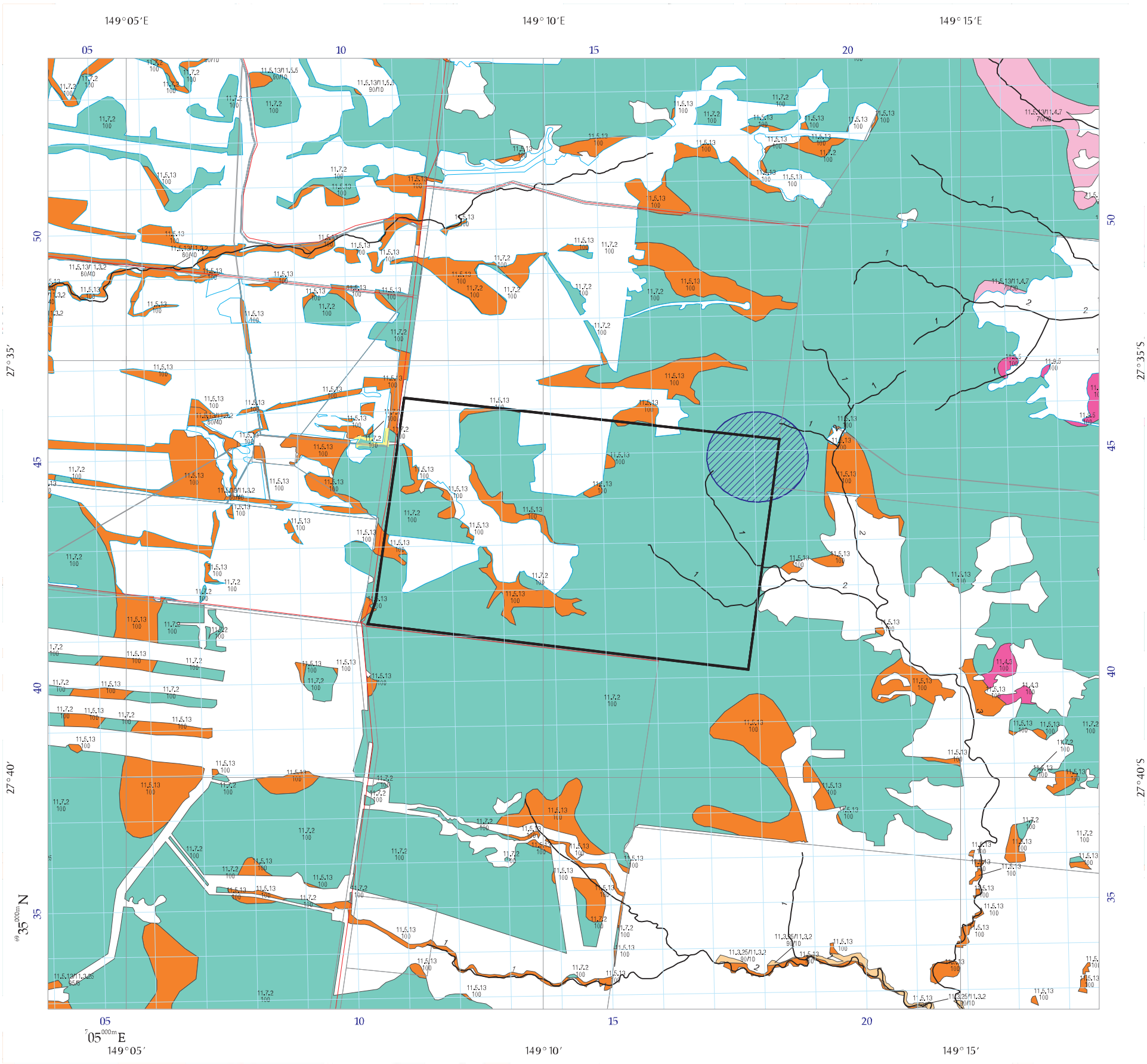
Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992.* The codes are Presumed Extinct (PE), Endangered (E), Vulnerable (V), Rare (R), Common (C) or Not Protected ( ).

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

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

Appendix C

Regional Ecosystems & Essential Habitat Mapping



Vegetation Management Act Regional Ecosystem and Remnant Map-Version 6

Remnant vegetation containing endangered regional ecosystems
- Dominant
- Sub-dominant

Remnant vegetation containing of concern regional ecosystems
- Dominant
- Sub-dominant

- Remnant vegetation that is a least concern regional ecosystem
- Remnant vegetation under Section 20AH of the VMA
- Non-remnant
- Plantation Forest
- Dam or Reservoir
- Remnant Vegetation
- PMAV Category X area
- Great Barrier Reef Wetlands
- Vegetation Management Act Essential Habitat
  For further information on VMA Essential Habitat, please see the attached VMA Essential Habitat map.
- Subject Lot
- Watercourse (Stream order shown as black number against stream where available)
- Bioregion boundary
- Roads © MapInfo Australia Pty Ltd 2009
- National Park, Conservation Area State Forest and other reserves
- Cadastral line
  The maximum spatial error of parcels extracted for this map from the Digital Cadastral Data Base(DCDB) range from: 14m to 251m at a 95% confidence level. Property boundaries shown are provided as a locational aid only.
- Towns

Based on 2006 Landsat TM imagery

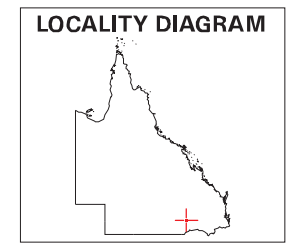
Requested By: LIZ.FISHER@RPSGROUP.COM.AU
Date: 27 Oct 10 Time: 17.56.22

Centered on Lot on Plan:
2 EG59

Bioregion: Brigalow Belt

Queensland Government

LOCALITY DIAGRAM



2000 0 2000 m

Horizontal Datum: Geocentric Datum of Australia 1994 (GDA94)

A remnant map covers areas not covered by a regional ecosystem map.

Defined map areas are labelled with the regional ecosystem (RE) code along with the percentage breakdown if more than one RE occurs within the area. Detailed definitions of regional ecosystems are available from www.derm.qld.gov.au/REDD. Defined map areas smaller than 5ha may not be labelled.

Regional ecosystem linework has been compiled at a scale of 1:100 000, except in designated areas where a compilation scale of 1:50 000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100 000 is +/-100 metres. The extent of remnant regional ecosystems as of 2006, depicted on this map is based on rectified 2006 Landsat TM imagery (supplied by the Statewide Landcover and Trees Study (SLATS), Department of Environment and Resource Management (DERM)).

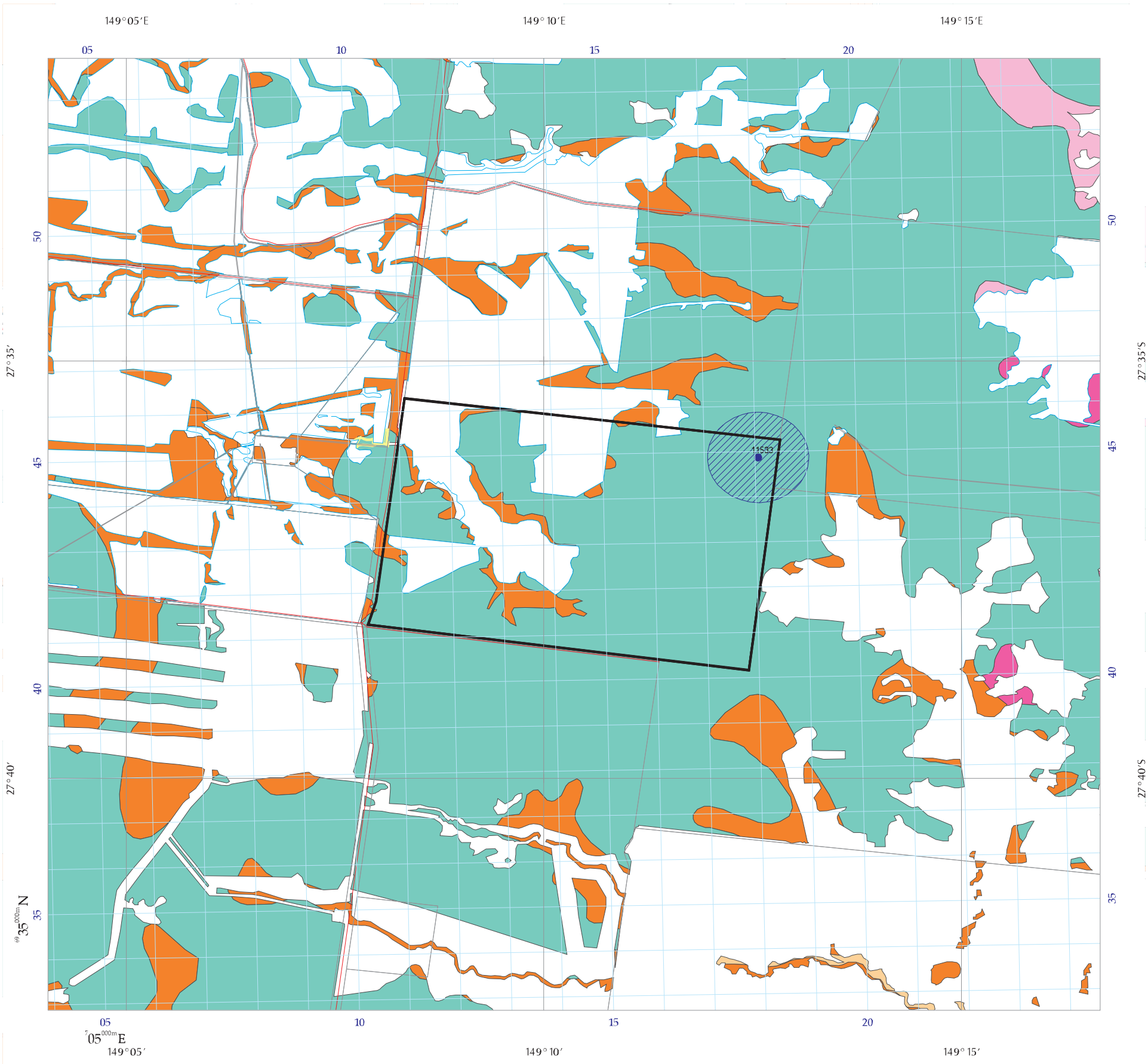
Some watercourse lines are derived from GeoScience Australia 1:250 000 mapping.

Disclaimer:
While every care is taken to ensure the accuracy of this product, the Department of Environment and Resource Management and MapInfo Australia Pty Ltd, makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the product being inaccurate or incomplete in any way and for any reason.

All datasets are updated as they become available to provide the most current information as of the date shown on this map.

Additional information is required for the purposes of land clearing or assessment of a regional ecosystem map or PMAV applications. For further information go to the web site: www.derm.qld.gov.au/vegetation or contact the Department of Environment and Resource Management.

Digital regional ecosystem data is available in shapefile format, for Lot on Plans from www.derm.qld.gov.au/REDATA or from DERM for larger areas.



Vegetation Management Act Essential Habitat Map Version 3.0

Remnant vegetation containing endangered regional ecosystems
- Dominant
- Sub-dominant

Remnant vegetation containing of concern regional ecosystems
- Dominant
- Sub-dominant

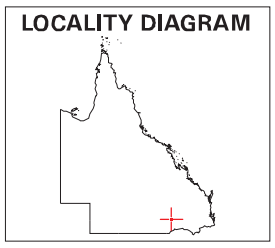
- Remnant vegetation that is a least concern regional ecosystem
- Remnant vegetation under Section 20AH of the VMA
- Non-remnant
- Plantation Forest
- Dam or Reservoir
- Remnant Vegetation
- PMAV Category X area
- Vegetation Management Act Essential Habitat
- Vegetation Management Act Essential Habitat Species Records
- Subject Lot
- Roads © MapInfo Australia Pty Ltd 2009
- National Park, Conservation Area State Forest and other reserves
- Cadastral line
  The maximum spatial error of parcels extracted for this map from the Digital Cadastral Data Base(DCDB) range from: 14m to 251m at a 95% confidence level. Property boundaries shown are provided as a locational aid only.
- Towns

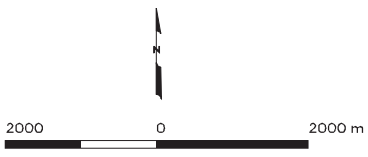
Requested By: LIZ.FISHER@RPSGROUP.COM.AU
Date: 27 Oct 10 Time: 17.56.36

Centered on Lot on Plan:
2 EG59

Queensland Government

LOCALITY DIAGRAM





Horizontal Datum: Geocentric Datum of Australia 1994 (GDA94)

Labels for the Vegetation Management Act Essential Habitat are centred on the subject lot (1.1km surrounding and including a Lot on Plan). Labels correlate to the label field in the attached essential habitat database.

Regional ecosystem linework has been compiled at a scale of 1:100 000, except in designated areas where a compilation scale of 1:50 000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100 000 is +/-100 metres. The extent of remnant regional ecosystems as of 2006, depicted on this map is based on rectified 2006 Landsat TM imagery (supplied by SLATS, Department of Environment and Resource Management).

Disclaimer:
While every care is taken to ensure the accuracy of this product, the Department of Environment and Resource Management and MapInfo Australia Pty Ltd, makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the product being inaccurate or incomplete in any way and for any reason.

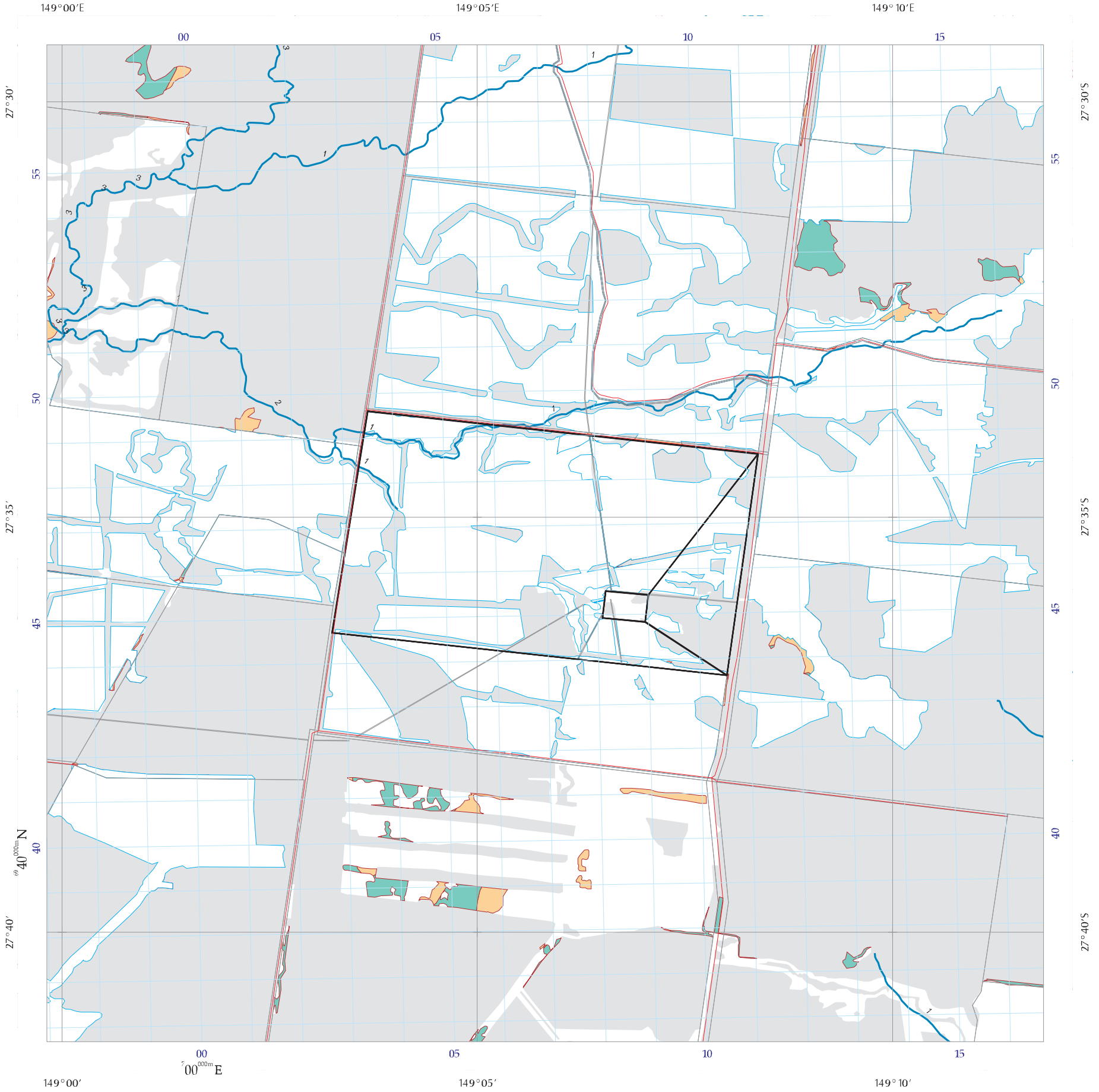
All datasets are updated as they become available to provide the most current information as of the date shown on this map.

Additional information is required for the purposes of land clearing or assessment of a regional ecosystem map or PMAV applications. For further information go to the web site: www.derm.qld.gov.au/vegetation or contact the Department of Environment and Resource Management.

Digital regional ecosystem data is available in shapefile format, for Lot on Plans from www.derm.qld.gov.au/REDATA or from DERM for larger areas.

Appendix D

High Value Regrowth Mapping



REGROWTH VEGETATION MAP - Version 2.0

1087 Vegetation Management Act Essential Regrowth Habitat with example label number

Great Barrier Reef Wetland Protection Area

High value regrowth vegetation containing Endangered regional ecosystems

High value regrowth vegetation containing Of Concern regional ecosystems

High value regrowth vegetation that is a Least Concern regional ecosystem

Remnant Vegetation
(Refer to the Vegetation Management Act Regional Ecosystem and Remnant Map also available from the Department of Environment and Resource Management website for further information on these areas)

Non-remnant

PMAV Category X area

Regrowth watercourse (Stream order shown as black number against stream)

Other watercourse(Stream order shown as black number against stream where available)

Subject Lot

Roads
© MapInfo Australia Pty Ltd 2009

Cadastral line
The maximum spatial error of parcels extracted for this map from the Digital Cadastral Data Base(DCDB) range from: 14m to 251m at a 95% confidence level. Property boundaries shown are provided as a locational aid only.

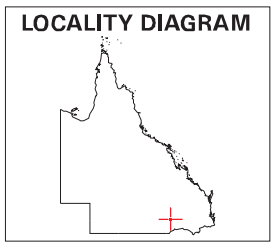
Towns

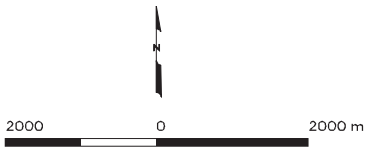
Requested By: CLAIRE.ARTHUR@RPSGROUP.COM.AU
Date: 01 Nov 10 Time: 10.30.12

Centered on Lot on Plan:
3 EG243

Queensland Government

LOCALITY DIAGRAM





Horizontal Datum: Geocentric Datum of Australia 1994 (GDA94)

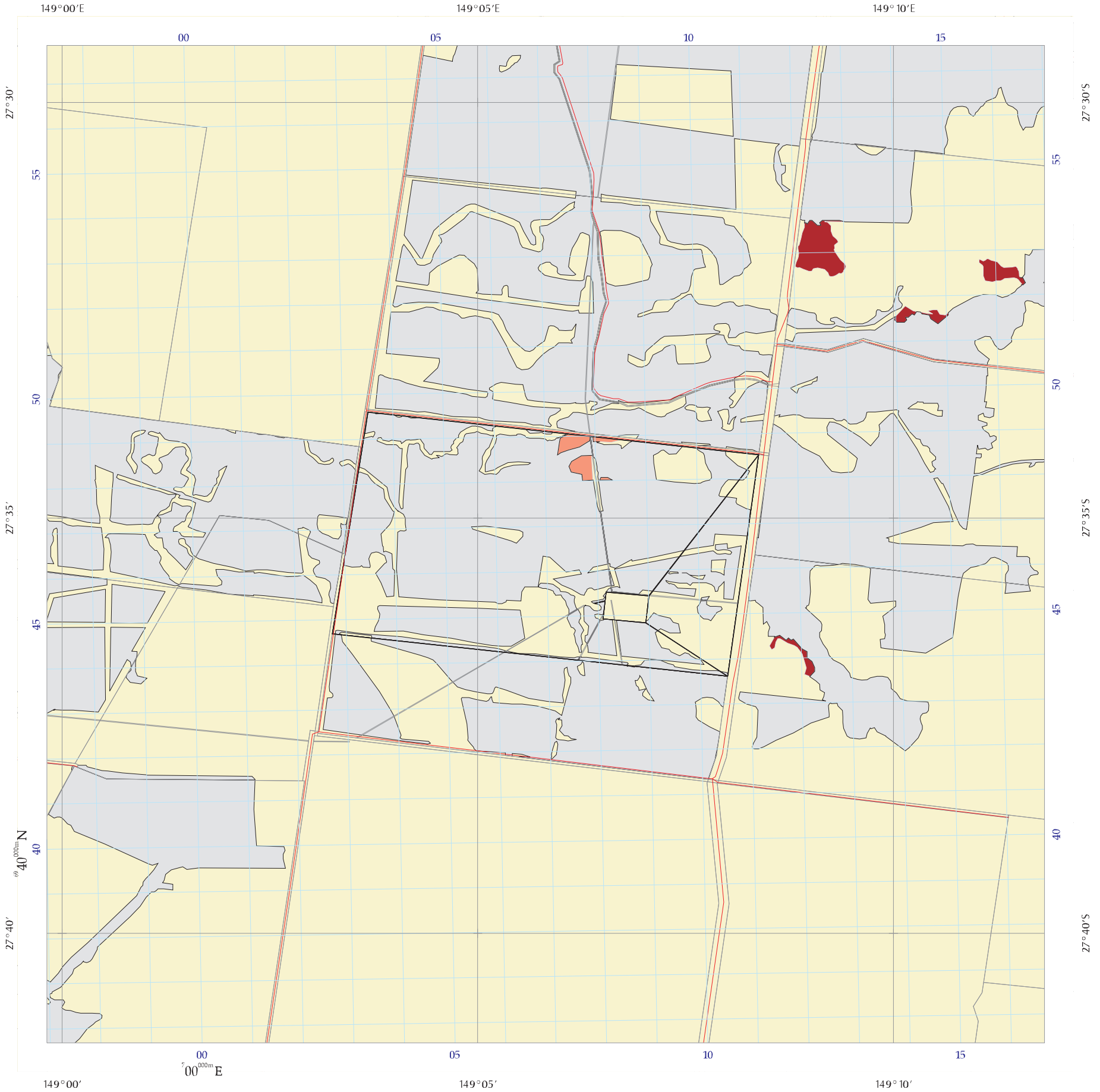
Labels for Vegetation Management Act Essential Regrowth Habitat are centred on the subject lot.
Labels correlate to the label field in the attached essential regrowth habitat database.

The high value regrowth, regrowth watercourse, other watercourse, Great Barrier Reef wetland protection area and essential regrowth habitat data shown on this map are representations of the preliminary data.

Some watercourse lines are derived from GeoScience Australia 1:250 000 mapping.

For further information go to the website:
http://www.derm.qld.gov.au or contact Vegetation Management, Department of Environment and Resource Management.

Areas covered by a Property Map of Assessable Vegetation (PMAV) are represented on the map attached as Page 2 to this Regrowth Vegetation Map and provided with it.



Property Maps of Assessable Vegetation (PMAVs)

Requested By: CLAIRE.ARTHUR@RPSGROUP.COM.AU
Date: 01 Nov 10 Time: 10.30.14

Centered on Lot on Plan:
3 EG243

The PMAV data shown on this map are a representation of the data used to create certified PMAVs. Variations may occur between PMAV boundaries and cadastral boundaries. PMAV data incorporates cadastral boundary data as at the time of certification of the PMAV. The cadastral boundaries shown on this map may have shifted relative to the PMAV boundaries as more accurate cadastral boundary data have become available.

All datasets are updated as they become available to provide the most current information as of the date shown on this map.

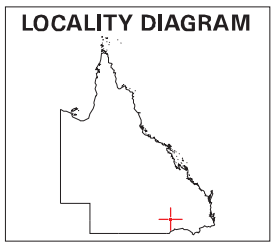
For further information go to the website:
http://www.derm.qld.gov.au/vegetation/index.html
or contact Vegetation Management, Department of Environment and Resource Management.

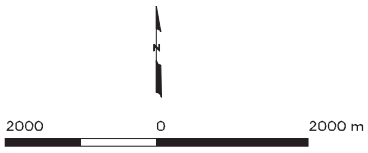
Property Map of Assessable Vegetation Vegetation Category Area

- Category A area
- Category B area
- Category C area
- Category X area
- Area that is subject to other PMAVs or, if no PMAV exists, a regional ecosystem map, remnant map or regrowth vegetation map
- Subject Lot
- Roads
  © MapInfo Australia Pty Ltd 2009
- Cadastral line
  The maximum spatial error of parcels extracted for this map from the Digital Cadastral Data Base(DCDB) range from: 14m to 251m at a 95% confidence level. Property boundaries shown are provided as a locational aid only.
- Towns

Queensland Government

LOCALITY DIAGRAM

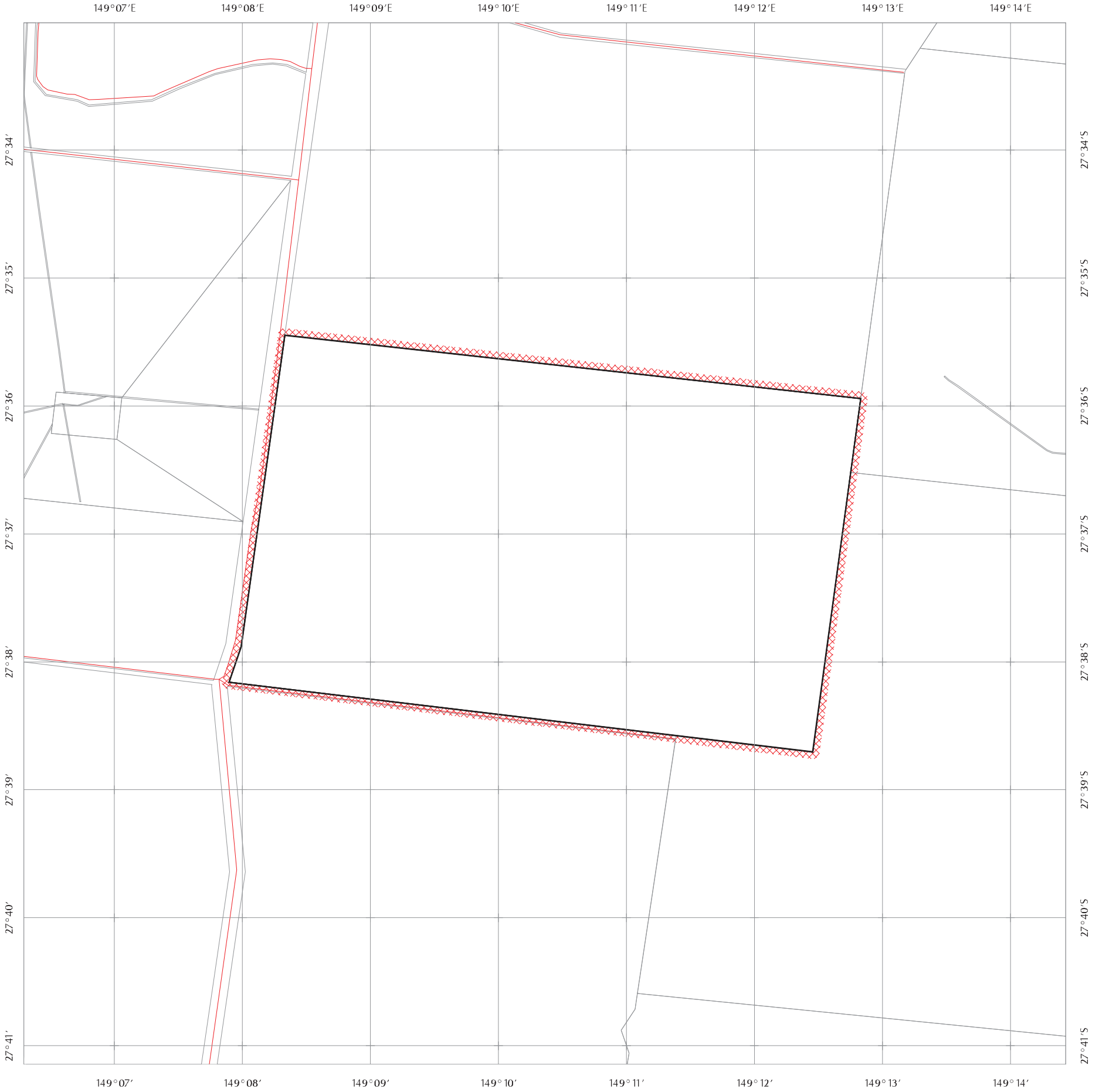




Horizontal Datum: Geocentric Datum of Australia 1994 (GDA94)

Appendix E

Referable Areas Mapping



SUSTAINABLE PLANNING REGULATION 2009

MAP OF REFERABLE AREAS (ADVICE)

Requested By: CLAIRE.ARTHUR@RPSGROUP.COM.AU
Date: 01 Nov 10 Time: 09.58.04

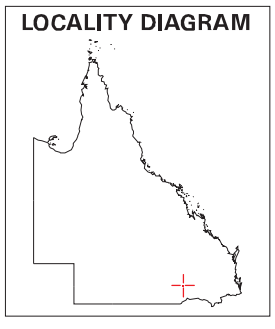
Centered on Lot on Plan:
2 EG59

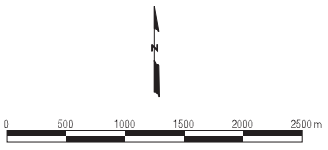
- Conservation Estate
- Heritage Places
- 100 metre buffer
- Subject Lot
- Roads

- Cadastral Boundaries
  Property boundaries shown are provided as a locational aid only.
- Towns

Queensland Government

LOCALITY DIAGRAM





This scale bar is approximate only
Horizontal Datum: Geocentric Datum of Australia 1994 (GDA94)
This product is unprojected and is not suitable for measuring distances

Development applications made under the Sustainable Planning Act 2009 must be referred to DERM if the subject lot is identified as sharing a common boundary with a heritage place or is in or within 100m of a conservation estate and meets the criteria required under Schedule 7 of the Sustainable Planning Regulation 2009.

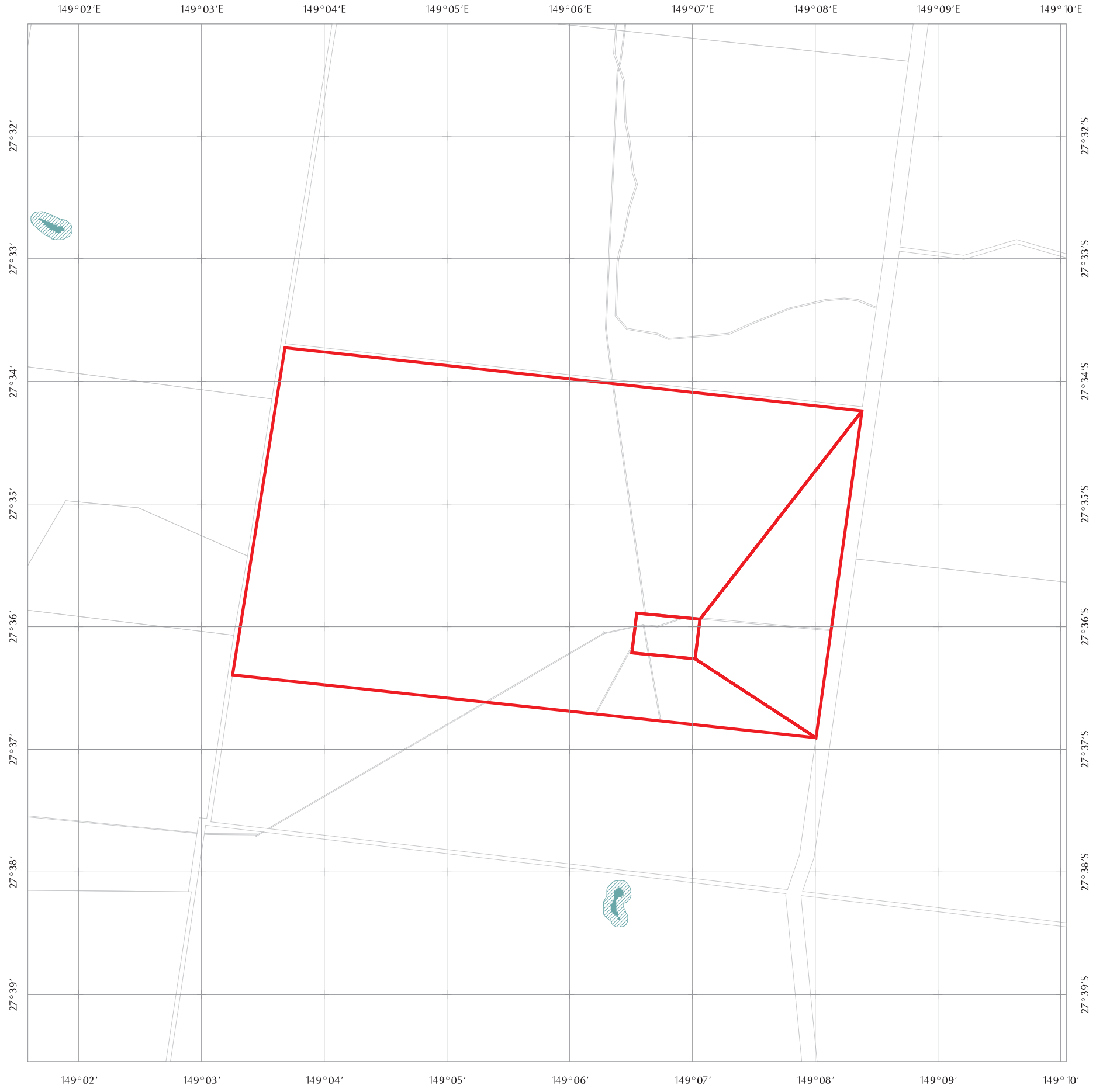
Information shown on this map includes current data for conservation estate and heritage places as required under Schedule 7 of the Sustainable Planning Regulation 2009. All datasets are updated as they become available to provide the most current information as of the date shown on this map.

Line work for the referable areas has been compiled at a variety of scales and should be used as a guide only. Consideration of the effects of mapped scale is necessary when interpreting the data. Buffer area shown is equivalent to approximately 100m from the boundary of the subject lot.

Disclaimer: Whilst every care is taken to ensure the accuracy of this product, the Queensland Government and Australian Government and MapInfo Australia Pty Ltd make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaim all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including direct or consequential damage) and costs which might be incurred as a consequence of reliance on the product, or as a result of the product being inaccurate or incomplete in any way and for any reason.

Appendix F

Referable Wetland Mapping



Map of Referable Wetlands

Requested By: CLAIRE.ARTHUR@RPSGROUP.COM.AU
Date: 01 Nov 10 Time: 10.00.58

Centered on Lot on Plan:
3 EG243

Legend

- Selected Land Parcel
- Property Boundary

GBR Wetland Protection Area

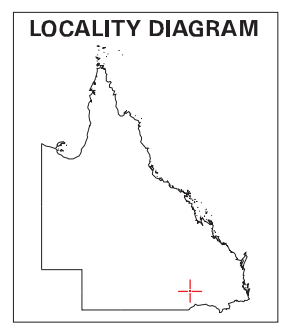
- Wetland
- Trigger Area

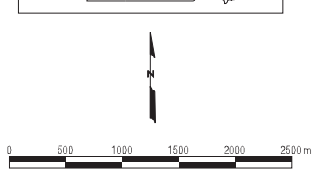
Wetland Management Area

- Wetland
- Trigger Area

Queensland Government

LOCALITY DIAGRAM





This scale bar is approximate only
Horizontal Datum: Geocentric Datum of Australia 1994 (GDA94)
This product is unprojected and is not suitable for measuring distances

This map should only be used to apply policies outlined in the Temporary State Planning Policy: Protecting Wetlands of High Ecological Significance in Great Barrier Reef Catchments (SPP for GBR Wetlands).

Information shown on the map includes multiple spatial datasets that define policies stated in the Temporary State Planning Policy: Protecting Wetlands of High Ecological Significance in Great Barrier Reef Catchments (SPP for GBR Wetlands). Datasets include wetlands, roads, rail lines and cadastral boundaries.

All datasets are current as at 30 April 2010.

The maps are produced at a scale relevant to the size of the lot on plan identified and should be printed as A4 size in portrait orientation. Consideration of the effects of mapped scale is necessary when interpreting data at a large scale i.e. property level. For property assessment, digital linework should be used as a guide only.

The Wetlands Regulatory Map is A4 portrait and should be printed at this size.

For further information or assistance with interpretation of this product, please contact the Department of Environment and Resource Management at planning.support@derm.qld.gov.au

Appendix G

Flora Species Recorded in the Study Area

FAMILY	SPECIES NAME	COMMON NAME
ACANTHACEAE	*Brunoniella australis*	Blue Trumpet
AMARANTHACEAE	*Gomphrena celosioides**	Gomphrena Weed
ASTERACEAE	*Calotis lappulacea*	Yellow Burr Daisy
ASTERACEAE	*Chrysocephalum apiculatum*	Yellow Buttons
ASTERACEAE	*Rhodanthe floribunda*	White Paper Daisy
ASTERACEAE	*Sonchus oleraceus**	Milk Thistle
ASTERACEAE	*Xerochrysum bracteatum*	Everlasting Daisy
CACTACEAE	*Opuntia stricta**	Prickly Pear
CAMPANULACEAE	*Wahlenbergia gracilis*	Small-flowered Bluebell
CAMPANULACEAE	*Wahlenbergia queenslandica*	Bluebell
CAPPARACEAE	*Apophyllum anomalum*	Currant Bush
CASUARINACEAE	*Casuarina cristata*	Belah
CHENOPODIACEAE	*Sclerolaena birchii**	Galvanised Burr
CHENOPODIACEAE	*Sclerolaena diacantha*	Grey Copper Burr
CUCURBITACEAE	*Cucumis microcarpus**	Paddy Melon
CUPRESSACEAE	*Callitris glaucophylla*	White Cypress Pine
CYPERACEAE	*Fimbristylis nutans*	Fringe Rush
EUPHORBIACEAE	*Chamaesyce drummondii**	Caustic Creeper
FABACEAE	*Desmodium nemorosum*	-
FABACEAE	*Glycine clandestina*	Twining Glycine
FABACEAE	*Medicago polymorpha**	Burr Medic
FABACEAE	*Petalostylis labicheoides*	Butterfly Bush
FABACEAE	*Senna artemisiodies* subsp. *coriacea*	Cassia
FABACEAE	*Senna artemisioides* subsp. *zygophylla*	Punty Bush
FABACEAE	*Senna pleurocarpa*	Fire Bush
GENTIANACEAE	*Schenkia australis*	Spiked Centaury
GOODENIACEAE	*Goodenia* sp.	-
GOODENIACEAE	*Velleia paradoxa*	-
LORANTHACEAE	*Amyema miquelii*	Bronze Mistletoe
LORANTHACEAE	*Amyema quandong*	Grey Mistletoe
MALVACEAE	*Sida cordifolia**	Flannel Weed
MALVACEAE	*Sida cunninghamii*	Ridged Sida
MALVACEAE	*Sida fibulifera*	Pin Sida
MALVACEAE	*Sida* sp.	-
MIMOSACEAE	*Acacia catenulata*	Bendee
MIMOSACEAE	*Acacia deanei*	Green Wattle
MYOPORACEAE	*Eremophila longifolia*	Berrigan
MYOPORACEAE	*Eremophila mitchellii*	Budda, False Sandalwood
MYRTACEAE	*Eucalyptus exserta*	Queensland Peppermint
MYRTACEAE	*Eucalyptus melanophloia*	Silver-leaved Ironbark
MYRTACEAE	*Eucalyptus populnea*	Poplar Box

FAMILY	SPECIES NAME	COMMON NAME
OXALIDACEAE	*Oxalis corniculata**	Creeping Oxalis
PLANTAGINACEAE	*Plantago debilis*	Plantain
POACEAE	*Austrostipa sp.*	Spear Grass
POACEAE	*Cenchrus ciliaris**	Buffel Grass
POACEAE	*Eragrostis* sp.	Love Grass sp
POACEAE	*Themeda triandra*	Kangaroo Grass
RUBIACEAE	*Pomax umbellata*	Pomax
RUTACEAE	*Geijera parviflora*	Wilga
RUTACEAE	*Phebalium glandulosum* subsp. *glandulosum*	Desert Phebalium
SAPINDACEAE	*Dodonaea viscosa subsp. angustifolia*	Sticky Hop Bush
SOLANACEAE	*Solanum* sp.	-
STERCULIACEAE	*Brachychiton populneus*	Kurrajong
VERBENACEAE	*Verbena aristigera**	Mayne's Pest

* denotes introduced species

Appendix H

Fauna Species Recorded in the Study Area

FAMILY	SCIENTIFIC NAME	COMMON NAME	METHOD
AMPHIBIANS			
HYLIDAE	*Litoria caerulea*	Green Tree Frog	C
HYLIDAE	*Litoria dentata*	Bleating Tree Frog	O
HYLIDAE	*Litoria peronii*	Peron's Tree Frog	C
HYLIDAE	*Litoria verreauxxii*	Verreaux's Tree Frog	C
MYOBATRACHIDAE	*Crinia signifera*	Common Froglet	C
BIRDS			
ACCIPITRIDAE	*Elanus axillaris*	Black-shouldered Kite	O
ANATIDAE	*Anas superciliosa*	Pacific Black Duck	O
ANATIDAE	*Aythya australis*	Hardhead	O
ANATIDAE	*Dendrocygna arcuata*	Wandering Whistling Duck	O
ARTAMIDAE	*Cracticus nigrogularis*	Pied Butcherbird	O
ARTAMIDAE	*Gymnorhina tibicen*	Australian Magpie	O
ARTAMIDAE	*Strepera graculina*	Pied Currawong	O
CACATUIDAE	*Cacatua roseicapilla*	Galah	O
CASUARIIDAE	*Dromaius novaehollandiae*	Emu	O
CACATUIDAE	*Nymphicus hollandicus*	Native Cockatiel	O
CHARADRIIDAE	*Elseyornis melanops*	Black-fronted Dotterel	O
CHARADRIIDAE	*Vanellus miles*	Masked Lapwing	O
COLUMBIDAE	*Geopelia striata*	Peaceful Dove	O
COLUMBIDAE	*Ocyphaps lophotes*	Crested Pigeon	O
CORCORACIDAE	*Struthidea cinerea*	Apostlebird	O
CORVIDAE	*Corvus orru*	Torresian Crow	O
DICRURIDAE	*Grallina cyanoleuca*	Magpie Lark	O
DICRURIDAE	*Myiagra inquieta*	Restless Flycatcher	O
DICRURIDAE	*Rhipidura leucophrys*	Willy Wag Tail	O
FALCONIDAE	*Falco cenchroides*	Nankeen Kestrel	O
HALCYONIDAE	*Dacelo novaeguineae*	Laughing Kookaburra	O
MALURIDAE	*Malurus lamberti*	Variegated Fairy-wren	O
MELIPHAGIDAE	*Acanthagenys rufogularis*	Spiny-cheeked Honeyeater	O
MELIPHAGIDAE	*Entomyzon cyanotis*	Blue-faced Honeyeater	O
MELIPHAGIDAE	*Manorina melanocephala*	Noisy Miner	O
MELIPHAGIDAE	*Plectorhyncha lanceolata*	Striped Honeyeater	O

FAMILY	SCIENTIFIC NAME	COMMON NAME	METHOD
MOTACILLIDAE	*Anthus novaeseelandiae*	Australasian Pipit	O
PACHYCEPHALIDAE	*Colluricincla harmonica*	Grey Strike-thrush	O
PACHYCEPHALIDAE	*Pachycephala rufiventris*	Rufous Whistler	O
PARDALOTIDAE	*Gerygone olivacea*	White-throated Gerygone	O
PARDALOTIDAE	*Pardalotus striatus*	Striated Pardalote	O
PASSERIDAE	*Taeniopygia bichenovii*	Double barred Finch	O
PETROICIDAE	*Eopsaltria australis*	Eastern Yellow Robin	O
PETROICIDAE	*Microeca fascinans*	Jacky Winter	O
PHALACROCORACIDAE	*Phalacrocorax varius*	Pied Cormorant	O
PSITTACIDAE	*Aprosmictus erythropterus*	Red-winged Parrot	O
RECURVIROSTRIDAE	*Himantopus himantopus*	Black-winged Stilt	O
REPTILES			
ELAPIDAE	*Pseudonaja textilis*	Eastern Brown Snake	O
SCINCIDAE	*Ctenotus sp.*	Skink	O
SCINCIDAE	*Tiliqua rugosa*	Shingleback Lizard	O
SCINCIDAE	*Tiliqua scincoides*	Blue-tongued Lizard	O
VARANIDAE	*Varanus varius*	Lace Monitor	O
MAMMALS			
CANIDAE	*Vulpes vulpes**	Red Fox*	T
FELIDAE	*Felis cattus**	Cat*	T
LEPORIDAE	*Oryctolagus cuniculus**	European Rabbit*	O
MACROPODIDAE	*Macropus giganteus*	Eastern Grey Kangaroo	O

* = Introduced

O = observed; T = Tracks; C = Call