18

ENVIRONMENTALLY SENSITIVE AREAS

ENTER HERE

BACK TO CONTENTS

arrow energy
go further

18 Environmentally Sensitive Areas

This section details the Environmentally Sensitive Areas (ESAs) present within the Project area and surrounding environs. ESAs include national parks, state forests, world heritage areas, Ramsar wetlands, nationally important wetlands, 'endangered' and 'of concern' Regional Ecosystems and Essential Habitat. In addition, there are feature areas of significant natural and cultural value such as habitat for conservation of significant flora and fauna and places of Aboriginal and European cultural heritage.

A cross reference to the locations where each of the requirements of the ToR has been addressed is given in Appendix B which references both the study chapters (Sections 1 through 34) and/or the Appendices (A through EE).

18.1 Approach

Searches of current data sources and previous ecological reports were undertaken in the preparation of this section. The database and literature review is described in the Terrestrial Ecology chapter (Section 17) of this EIS. ESA datasets provided by EHP were obtained to determine the location of ESAs in relation to the Project area (EHP, 2012). Additionally, an *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) protected matters search was undertaken to identify matters of national environmental significance (MNES) potentially present, as detailed within the Technical Report (Appendix CC of this EIS). A 25 km buffer was applied to the Project area for the searches to identify any ESAs in the adjacent environs of the Project area. ESAs within the search area were identified and the potential impacts identified. It is considered that any ESAs outside the 25 km buffer are unlikely to be impacted by the Project. However, due to the dynamic nature of waterways and aquatic habitats, the potential for impact on ESAs such as wetlands and fish habitats located downstream of the proposed Project area are taken into account by considering areas outside the search area. The level of protection applied to each ESA as declared under current legislation is discussed in Section 18.2.

18.2 Classification of Environmentally Sensitive Areas

Environmental authorisation for a petroleum related activity is regulated by the *Environmental Protection Act 1994* (EP Act). The EP Act regulates Environmentally Relevant Activities (ERAs), including those relating to mining and petroleum through the development of EISs. The *Environmental Protection Regulation 2008* (EP Regulation) provides a mechanism to enforce the EP Act and allows for an assessment of the risk that an ERA poses to ESAs. Details of ERAs for the petroleum industry are listed below:

- 'Level 1' Petroleum Activities, which are activities considered to have a high risk of causing significant environmental damage; and
- 'Level 2' Petroleum Activities, being activities considered to have low potential to cause environmental harm.

The classification of Category A, Category B or Category C ESAs is based on a ranking of environmental sensitivity. Category A and B ESAs are defined under the EP Regulations. Category C ESAs are not listed under the schedules of the EP Regulations although they are provided within the *Draft Code of Environmental Compliance for Level 2 Petroleum Activities* (EPA, 2008) forming part of the environmental compliance and conditioning framework. Level 2 petroleum activities must not cause an impact to Category A or Category B ESAs. Authority for Level 1 petroleum activities may be granted in association with an approved EM Plan with impacts to Category A and Category B ESAs addressed within this plan or assessed within the EIS Framework.

The ESAs that make up each category are described in the following sections.

18.2.1 Category A ESAs

Category A ESAs, as defined by the EP Regulation, are displayed in Table 18-1. Management options are discussed in Section 18.5.

Table 18-1 Category A ESAs and Administering Legislation

Category A Protected Areas	Administering Legislation
National Parks (Aboriginal Land)	*Nature Conservation Act 1992* (NC Act) and *Aboriginal Land Act 1991*
National Parks (Torres Strait Islander Land)	
National Park	NC Act
National Park (Scientific)	
National Park (Recovery)	
Conservation Park	
Forest Reserves	
Wet Tropics World Heritage Area	*Wet Tropics World Heritage Protection and Management Act 1993*
Great Barrier Reef Marine Park (GBRMP) Area	*Great Barrier Reef Marine Park Act 1975*
Marine Parks (other than general use zones)	*Marine Parks Act 2004*

18.2.2 Category B ESAs

Category B ESAs are defined in the EP Regulation, and are presented in Table 18-2. Management options are further discussed in Section 18.5.

Table 18-2 Category B ESAs and Administering Legislation

Category B Protected Areas	Administering Legislation
Coordinated Conservation Areas	NC Act
Wilderness area	
Areas of critical habitat, of major interest identified under a conservation plan or subject to an interim conservation order	

Category B Protected Areas	Administering Legislation
World Heritage Management Areas	
International Agreement Areas	
Endangered Regional Ecosystems (Biodiversity Status)	*Environmental Protection Regulation 2008* (*Vegetation Management Act 1999* (VM Act))
Ramsar Wetlands	*Ramsar Convention*
Protection of the World Cultural and Natural Heritage	*International Conventions (Paris, 16 November 1972).*
Conservation of Migratory species	*International Conventions (Bonn, 23 June 1979)*
General Use Zones of Marine Parks	*Marine Parks Act 2004*
Place of Cultural Heritage Significance (Registered Place, Protected Areas)	*Queensland Heritage Act 2004*
Aboriginal Cultural Heritage Areas	*Aboriginal Cultural Heritage Act 2003* (ACH Act)
Torres Strait Islander Cultural Heritage Areas	*Torres Strait Islander Cultural Heritage Act 2003*
Designated Landscape Areas – other than Stanbroke	*Cultural Record (Landscapes Queensland and Queensland Estate) Act 1987*
Feature Protection Area, State Forest Park or a Scientific Area	*Forestry Act 1959*
Fish Habitat Areas and areas of Marine Plants	*Fisheries Act 1994*
An Area to the Seaward Side of the Highest Astronomical Tide	Nil

18.2.3 Category C ESAs

Category C ESAs are listed in the *Draft Code of Environmental Compliance for Level 2 Petroleum Activities.* Category C ESAs are defined under the EA conditions for individual projects. Recent state government approvals granted for CSG projects within the region were reviewed to determine the values and conditions that have been of consideration to regulatory bodies. The ESAs listed in Table 18-3 are considered likely to apply to this Project. Management options are discussed in Section 18.5.

Table 18-3 Category C ESAs and Administering Legislation

Category C Protected Areas	Administering Legislation
Of Concern Regional Ecosystems (Biodiversity Status)	VM Act
Declared areas	
Nature Refuges and Resource Reserves	NC Act
Declared Catchment Areas; Declared Irrigation Areas; Water Supply Areas and Drainage Areas	*Water Act 2000*
River Improvement Areas	*River Improvement Trust Act 1940*
Stanbroke Designated Landscape Area	ACH Act
State Forests or Timber Reserves	*Forestry Act 1959*
Koala Habitat Area	*Nature Conservation (Koala) Conservation Plan 2006*
Essential Habitat	VM Act

Category C Protected Areas	Administering Legislation
Coastal Management Districts	*Coastal Protection and Management Act 1995*
Aboriginal and Torres Strait Islander owned land and identified interests	*Native Title Act 1993, Aboriginal Land Act 1991, Torres Strait Islander Act 1991, Community Services (Aboriginal) Act 1994 and Community Services (Torres Strait Islander) Act 1994*
Referable Wetlands	EP Act
Reserves under the Land Act 1994	*Land Act 1994*
Bureau of Sugar Experiment Stations (research sites)	*Sugar Industry Act 1999*
PI Research Site	Nil

18.2.4 Other Environmentally Sensitive Features

18.2.4.1 EPBC Matters of National Environmental Significance

The EPBC Act provides for the protection of the environment, especially MNES, and is administered by the Commonwealth Department for Sustainability, Environment, Water, Population and Communities (DSEWPaC). It is designed to provide for the conservation of biodiversity through the protection of threatened species and ecological communities, migratory and marine species listed under the EPBC Act.

18.2.4.2 Flora and Fauna Species Declared under the Nature Conservation Act 1992

The NC Act is administered by the EHP and is the principal legislation for the conservation and management of the State's native flora and fauna. The primary objective of the NC Act is the conservation of nature, namely the preservation of endangered, vulnerable and near threatened species of flora and fauna as listed under the *Nature Conservation (Wildlife) Regulation 2006*.

18.2.4.3 Directory of Important Wetlands

The Directory of Important Wetlands describes wetlands that have been qualified as nationally important (Environment Australia, 2001). A wetland may be considered nationally important if it meets at least one of the following criteria:

- It is a good example of a wetland type occurring within a bio-geographic region in Australia;
- It is a wetland that plays an important ecological or hydrological role in the natural functioning of a major wetland system / complex;
- It is a wetland that is important as the habitat for animal taxa at a vulnerable stage in their life cycles, or provides a refuge when adverse conditions such as drought prevail;
- The wetland supports one per cent or more of the national populations of any native plant or animal taxa;
- The wetland supports native plant or animal taxa or communities which are considered endangered or vulnerable at the national level; and
- The wetland is of outstanding historical or cultural significance.

18.3 Existing Environment

ESAs found within and surrounding the Project area are discussed in this section.

18.3.1 Category A ESAs

There is one National Park within the Project area, one bordering the Project area and four National Parks and one Forest Reserve within the surrounding area. There is one conservation park within five kilometres of the Project area and one adjacent to Blackdown Tableland National Park.

The Project area is not located within or adjacent to the Wet Tropics World Heritage Area or GBRMP Area and there are no marine parks within or surrounding the Project area. There is no Aboriginal or Torres Strait Islander Land (National Parks) within or surrounding the Project area.

18.3.1.1 National Parks, Conservation Parks and Forest Reserves

National parks are declared under the NC Act and defined as Category A ESAs. They include national parks (scientific), national parks (Aboriginal and Torres Strait Islander Land) and national parks (recovery). Conservation parks, as listed under the *Nature Conservation (Protected Areas) Regulation 1994* and forest reserves are protected areas under the NC Act.

The following table identifies national parks and conservation parks and forest reserves within 25 km of the Project area (Table 18-4). All Category A ESAs are shown in Figure 18-1.

Table 18-4 National Parks, Conservation Parks and Forest Reserves within the Project Area

Name of Category A ESA	Area within Project (ha) / Distance to Project Area	Values / Comments
Homevale National Park and Conservation Park	5275 ha within the Project area	Contains protected open woodland, brigalow and key fossil locations. Also grassy woodlands, notophyll vine forests, dry softwood scrub, and open eucalypt forests.
Dipperu National Park / Scientific Reserve	Adjacent to the furthest east (north) point of the Project area	Contains significant brigalow vegetation community used for research.
Blackdown Tableland National Park and Ghungalu Conservation Park	5.7 km from the furthest south-east corner of the Project area. This area is contiguous with Arthur's Bluff State Forest.	Contains plant communities including heathlands, dry eucalypt forests and moist pockets of ferns, mosses and orchids. Unique species include the Blackdown stringybark, macrozamia, red bottlebrush, the Blackdown "monster" (a type of underground cricket) and a Christmas beetle.
Taunton National Park / Scientific Reserve	25 km from the south-eastern portion of the Project area	Contains habitat for the endangered bridled nailtail wallaby (Onychogalea fraenata) population and maintains representative examples of REs in the Northern Brigalow Belt Bioregion.

Name of Category A ESA	Area within Project (ha) / Distance to Project Area	Values / Comments
Blackwater Brigalow Conservation Park	5 km from the south-western margins of the Project area enclosing Blackwater	Contains protected species found in brigalow ecosystems.
Credition Forest Reserve	13.5 km from the north east corner of the Project area.	Contains rainforest remnants and grassy open eucalypt forest. It is also a continuation of Homevale National Park and State Forest.
Junee National Park	19 km from the southern point of the northern section of the Project area.	Is contiguous with Junee State Forest.

18.3.1.2 Great Barrier Reef Marine Park and other Marine Parks

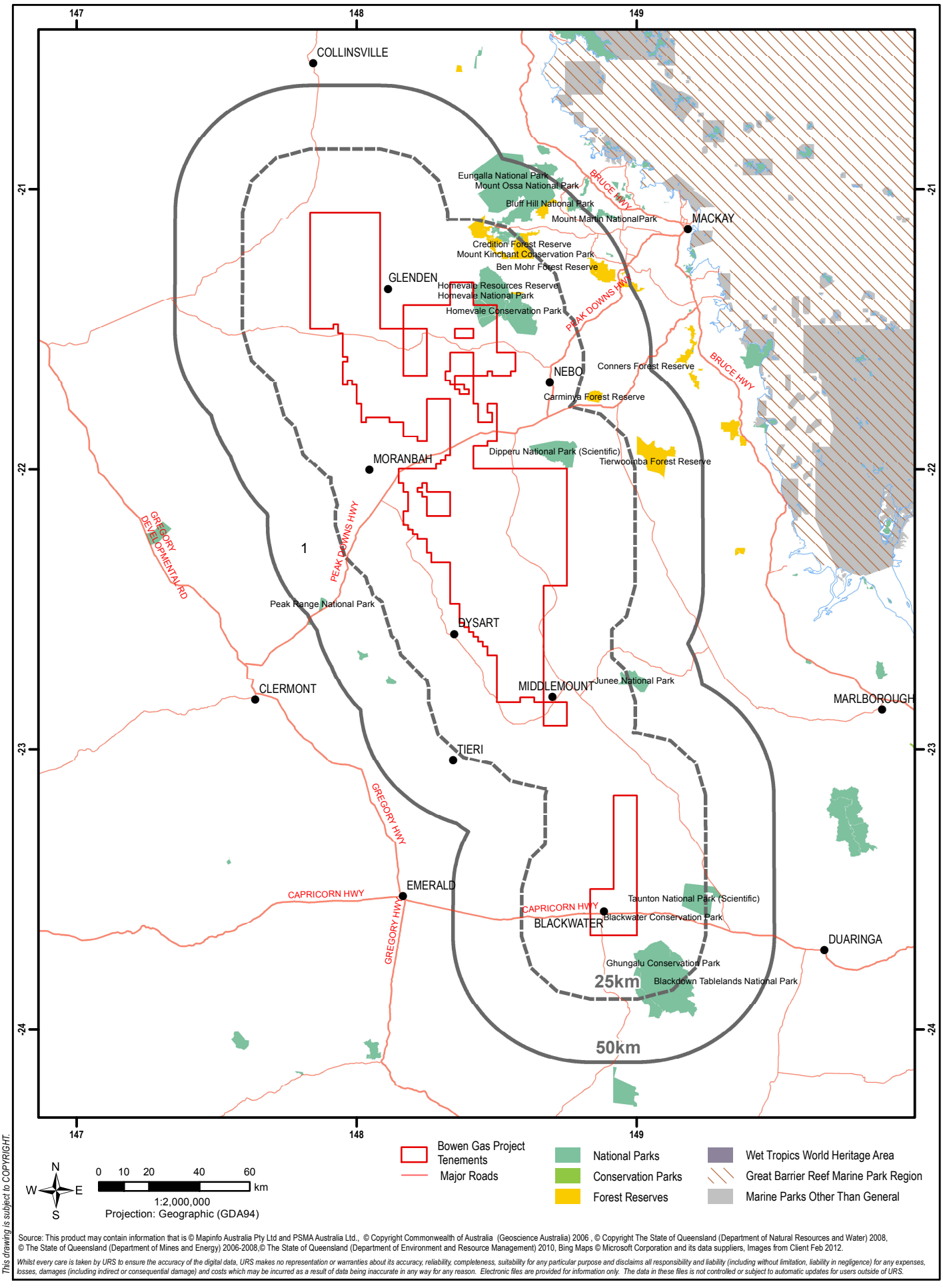
The GBRMP is declared under the *Great Barrier Reef Marine Park Act 1975.*

The majority of the Project's development area is located within the Fitzroy River catchment with a small northern part of the development area being located within the Burdekin catchment. The Fitzroy River catchment is the largest river basin draining to the east coast of Australia and flows into the southern end of the Great Barrier Reef Marine Park near Rockhampton.

Direct distances from the Project area to the GBRMP is approximately 100 km in the north of the Project area and approximately 200 km in the south.

The approximate downstream distance from the Project area in the Fitzroy catchment is greater than 420 km downstream to where the Fitzroy River system discharges at Rockhampton and the nearest marine park zone is approximately eight km from the mouth of the Fitzroy River.

The approximate downstream distance from the Project area in the Burdekin catchment is greater than 265 km downstream to where the Burdekin River system discharges southeast of Ayr.



arrow energy
go further

BOWEN GAS PROJECT EIS

CATEGORY A ESAS WITHIN AND SURROUNDING THE PROJECT AREA

URS

ENVIRONMENTALLY SENSITIVE AREAS

Figure: **18-1**

File No: **42626960-g-1126.mxd** Drawn: **RG** Approved: **DS** Date: **18-10-2012** Rev.**A** A4

18.3.2 Category B ESAs

Category B ESAs found within the Project area include 'Endangered' REs (EREs) (biodiversity status).

There are no coordinated conservation areas, wilderness areas, Ramsar wetlands, critical habitat areas, world heritage areas, international agreement areas, general use zones of marine parks, Place of Cultural Heritage Significance, aboriginal cultural heritage areas, Torres Strait Islander cultural heritage areas, designated landscape areas, Feature Protection Area, fish habitat areas, marine plants, or an area to the seaward side of the highest astronomical tide within or surrounding the Project area.

18.3.2.1 Endangered Regional Ecosystems

REs are based on vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil.

An RE is listed as having an 'Endangered' biodiversity status when:

- Less than ten percent of the pre-clearing extent of remnant remains unaffected by severe degradation and/or biodiversity loss; or
- Ten to thirty percent of its pre-clearing extent remains unaffected by severe degradation and/or biodiversity loss and the remnant vegetation is less than 10,000 ha; or
- It is a rare RE subject to a threatening process (DERM, 2011).

Eighteen EREs are mapped by the Queensland Herbarium as occurring within the EIS study area. Some have been confirmed or remapped by 3D Environmental during the ecology ground truthing survey (Terrestrial Ecology Technical Report (Appendix P) of this EIS). These are listed in Table 18-5 below and depicted on Figure 18-2.

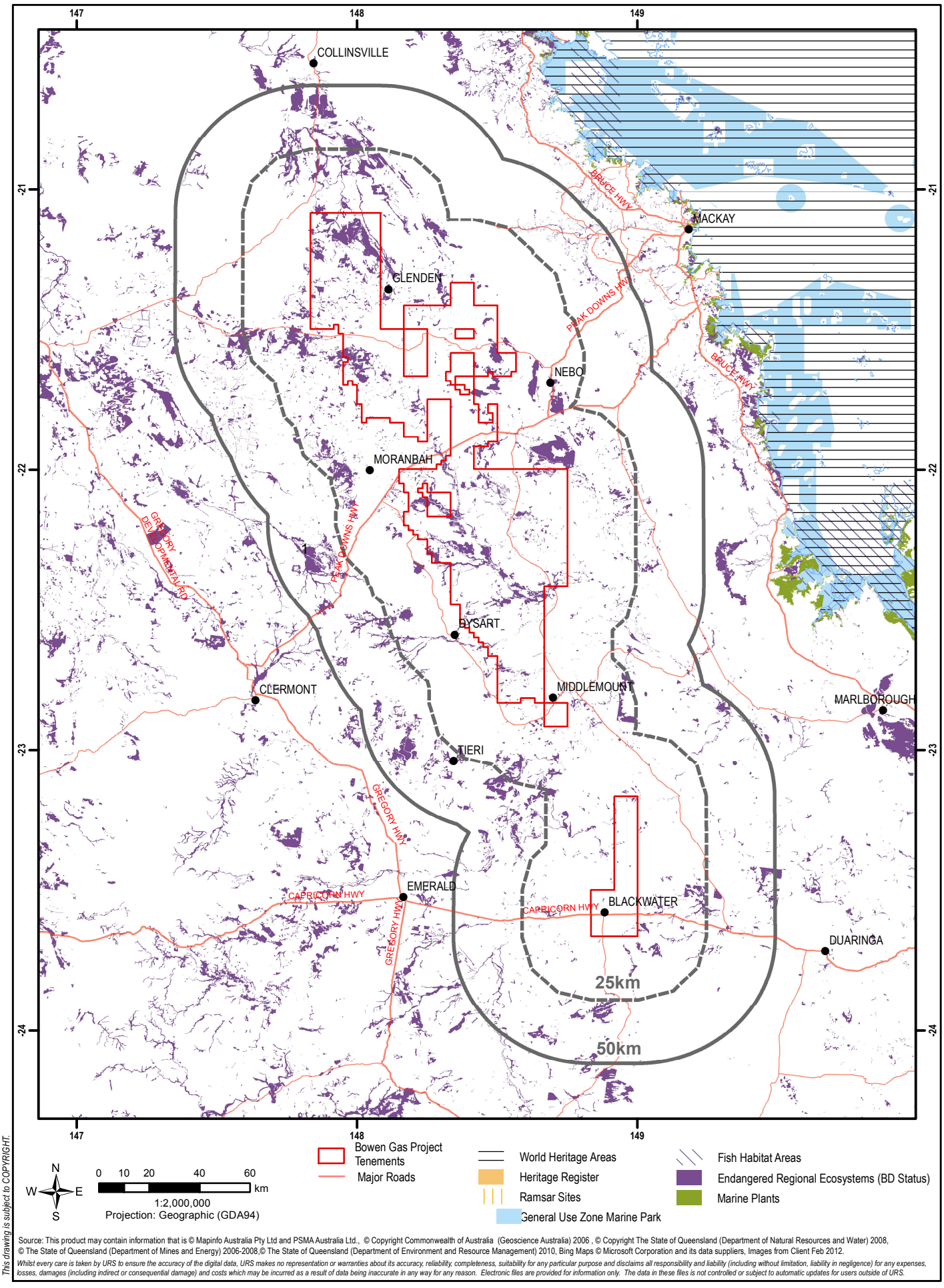
Table 18-5 Endangered REs (Biodiversity Status) Mapped within the Project Area

RE	Short Description	Area within Project Area (ha)[1]
11.3.1	*Acacia harpophylla* and/or *Casuarina cristata* open forest on alluvial plains	4,061
11.3.11	Semi-evergreen vine thicket on alluvial plains.	24
11.3.21	*Dichanthium sericeum* and/or *Astrebla* spp. grassland on alluvial plains. Cracking clay soils.	461
11.4.1	Semi-evergreen vine thicket +/- *Casuarina cristata* on Cainozoic clay plains.	24
11.4.7	*Eucalyptus populnea* with *Acacia harpophylla* and/or *Casuarina cristata* open forest to woodland on Cainozoic clay plains.	4
11.4.8	*Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla or A. argyrodendron* on Cainozoic clay plains.	1,822
11.4.9	*Acacia harpophylla* shrubby open forest to woodland with *Terminalia oblongata* on Cainozoic clay plains	9,083
11.4.13	*Eucalyptus orgadophila* open-woodland on Cainozoic clay plains	3,996

Section 18 Environmentally Sensitive Areas

RE	Short Description	Area within Project Area (ha)[1]
11.5.15	Semi-evergreen vine thicket on Cainozoic sand plains / remnant surfaces	1,193
11.5.16	*Acacia harpophylla* and/or *Casuarina cristata* open forest in depressions on Cainozoic sand plains / remnant surfaces.	190
11.5.17	*Eucalyptus tereticornis* woodland in depressions on Cainozoic sand plains / remnant surfaces.	72
11.8.13	Semi-evergreen vine thicket and microphyll vine forest on Cainozoic igneous rocks.	2,211
11.8.15	*Eucalyptus brownii* or *Eucalyptus populnea* woodland on Cainozoic igneous rocks.	370
11.9.1	*Acacia harpophylla-Eucalyptus cambageana* open forest to woodland on fine-grained	1,360
11.9.4	Semi-evergreen vine thicket or *Acacia harpophylla* with a semi-evergreen vine thicket understorey on fine grained sedimentary rocks.	686
11.9.5	*Acacia harpophylla* and/or *Casuarina cristata* open forest on fine-grained sedimentary rocks.	5,236
11.9.10	*Acacia harpophylla, Eucalyptus populnea* open forest on fine-grained sedimentary rocks	1,235
11.11.18	Semi-evergreen vine thicket on old sedimentary rocks with varying degrees of metamorphism and folding.	43

[1]Areas (ha) of REs present within the Project area are detailed in Table 10 of the Terrestrial Ecology Technical Report (Appendix P) of this EIS.



arrow energy
go further

BOWEN GAS PROJECT EIS

CATEGORY B ESAS WITHIN AND SURROUNDING THE PROJECT AREA

URS

ENVIRONMENTALLY SENSITIVE AREAS

Figure: **18-2**

File No: **42626960-g-1127.mxd** Drawn: **RG** Approved: **DS** Date: **18-10-2012** Rev.**A** A4

18.3.3 Category C ESAs

Category C ESAs found within and surrounding the Project area include, 'Of concern' REs, nature refuges, resource reserves, state forests, Essential Habitat, declared catchment areas and referable wetlands.

There are no koala habitat area, declared irrigation areas, drainage areas, river improvement areas, Stanbroke designated landscape area, coastal management districts, declared areas under the VM Act, reserves under the *Land Act 1994*, Aboriginal and Torres Strait Islander owned land or identified interests, areas identified for specific development proposals, or any listed research stations of the Department of Primary Industries or BSES Limited, found within or surrounding the Project area.

18.3.3.1 Of Concern Regional Ecosystems

REs considered 'Of concern' (biodiversity status) are Category C ESAs. An RE is listed as having an 'Of concern' biodiversity status when:

- Remnant vegetation is 10 to 30% of its pre-clearing extent across the bioregion; or
- More than 30% of its pre-clearing extent remains and the remnant extent is less than 10,000 ha, and 10 to 30% of its pre-clearing extent remains unaffected by moderate degradation and/or biodiversity loss (DERM, 2011).

Twenty-one 'Of concern' REs are mapped by the Queensland Herbarium as occurring within the EIS study area. Some have been confirmed or remapped by 3D Environmental during the ecology survey (Terrestrial Ecology Technical Report (Appendix P) of this EIS). These are listed in Table 18-6 below and depicted on Figure 18-3.

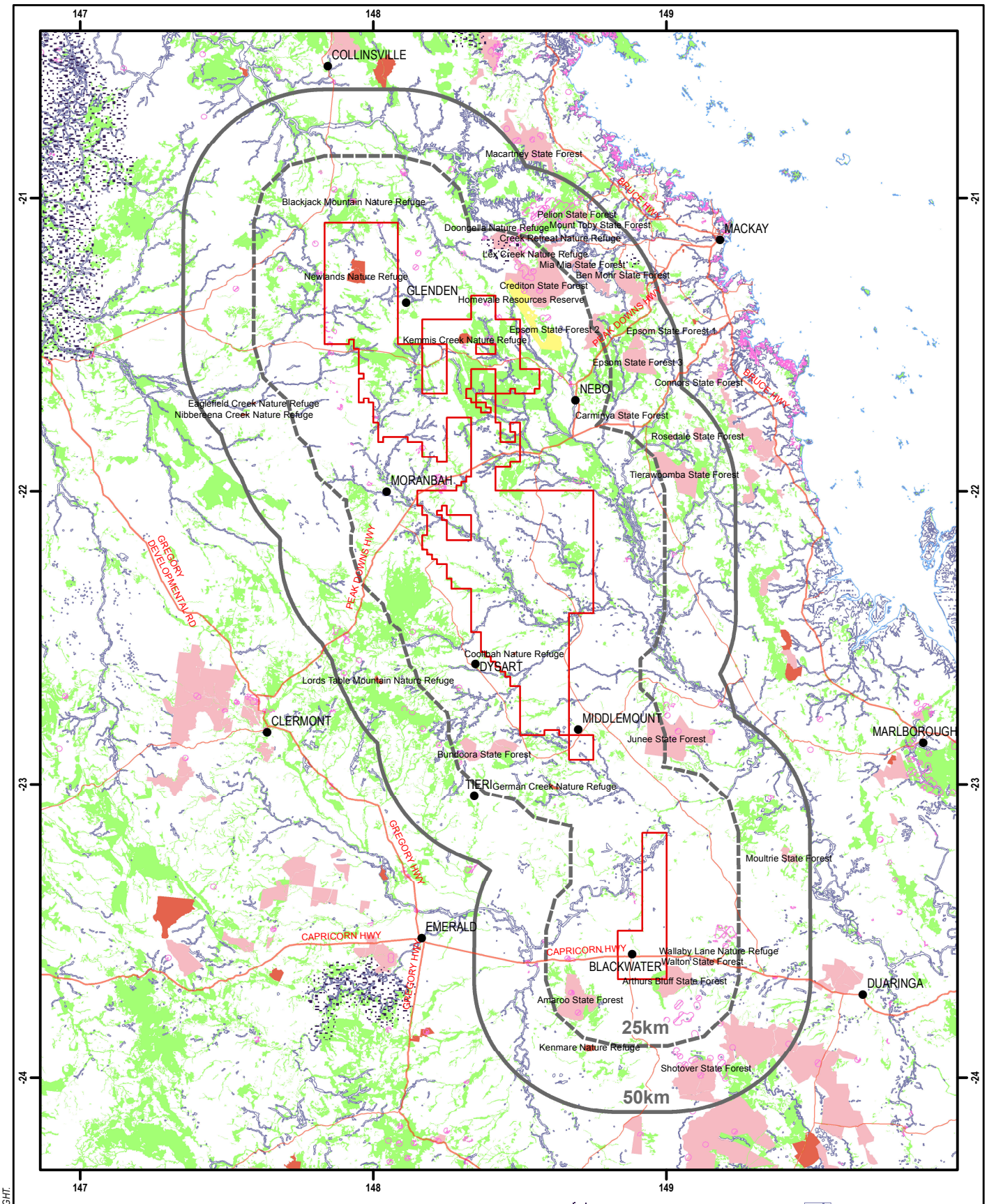
Table 18-6 Of Concern RE (Biodiversity Status) Located within the Projects Area

RE	Short Description	Area within Project Area (ha)[1]
11.3.2	*Eucalyptus populnea* woodland on alluvial plains	25,114
11.3.3	*Eucalyptus coolabah* woodland on alluvial plains	1,983
11.3.4	*Eucalyptus tereticornis* and/or *Eucalyptus* spp. tall woodland on alluvial plains.	7,445
11.3.6	*Eucalyptus melanophloia* woodland on alluvial plains	496
11.3.7	*Corymbia* spp. woodland on alluvial plains.	2,718
11.3.25	*Eucalyptus tereticornis or E. camaldulensis* woodland fringing drainage	14,904
11.3.27	Freshwater wetlands	946
11.3.36	*Eucalyptus crebra* and/or *E. populnea* and/or *E. melanophloia* woodland with a grassy ground layer. Occurs on Cainozoic alluvial plains. Older floodplain complexes and river terraces.	97
11.4.2	*Eucalyptus spp.* and/or *Corymbia spp*. grassy or shrubby woodland on Cainozoic clay plains.	3,641
11.4.4	*Dichanthium spp., Astrebla spp*. grassland on Cainozoic clay plains.	1,642

Section 18 Environmentally Sensitive Areas

RE	Short Description	Area within Project Area (ha)[1]
11.4.11	*Dichanthium sericeum, Astrebla* spp. *and patchy Acacia harpophylla, Eucalyptus coolabah* on Cainozoic clay plains	<1
11.5.18	*Dichanthium sericeum, Astrebla* spp. *and patchy Acacia harpophylla, Eucalyptus coolabah* on Cainozoic clay plains	243
11.7.1	*Acacia harpophylla* and/or *Casuarina cristata* and *Eucalyptus basaltica* or *E. microcarpa* woodland on lower scarp slopes on Cainozoic lateritic duricrust	312
11.8.3	Semi-evergreen vine thicket on Cainozoic igneous rocks	1,033
11.8.11	*Dichanthium sericeum* grassland on Cainozoic igneous rocks	13,827
11.8.14	*Eucalyptus crebra, Corymbia dallachiana* woodland on Cainozoic igneous rocks	40
11.9.7	*Eucalyptus populnea, Eremophila mitchellii* shrubby woodland on fine-grained sedimentary rocks.	18,873
11.9.13	*Eucalyptus moluccana* or *E. microcarpa* open forest on fine-grained sedimentary rocks	1,215
11.10.8	Semi-evergreen vine thicket in sheltered habitats on medium to coarse-grained sedimentary rocks	656
11.11.13	*Acacia harpophylla* or *A. argyrodendron, Terminalia oblongata* low open-forest on deformed and metamorphosed sediments and interbedded volcanics	0
11.11.16	*Eucalyptus cambageana, Acacia harpophylla* woodland on old sedimentary rocks with varying degrees of metamorphism and folding. Lowlands	0

[1]Areas (ha) of REs present within the Project area are outlined within Table 10 of the Terrestrial Ecology Technical Report (Appendix P) of this EIS.



arrow energy
go further

BOWEN GAS PROJECT EIS

CATEGORY C ESAS WITHIN AND SURROUNDING THE PROJECT AREA

URS

ENVIRONMENTALLY SENSITIVE AREAS

Figure: **18-3**

File No: **42626960-g-1128.mxd** Drawn: **RG** Approved: **DS** Date: **18-10-2012** Rev.**A** A4

18.3.3.2 Nature Refuges and Resource Reserves

A nature refuge is a voluntary agreement between a landholder and the Queensland Government, which acknowledges a commitment to manage and preserve land with significant conservation values while allowing compatible and sustainable land uses to continue (EHP, 2012).

A resource reserve is an area of land dedicated under the NC Act, and is administered by EHP.

There are three nature refuges within the Project area, and three nature refuges and one resource reserve exist within 25 km of the EIS study area, as listed in Table 18-7 below and shown in Figure 18-3.

Table 18-7 Nature Refuges and Resource Reserves Within or Surrounding the Project Area

Name of Nature Refuge / Resource Reserve	Area within Project (ha) / Distance to Project Area	Values / Comments
Kemmis Creek NR	1,471 ha within the Project area	Private conservation area located on the northeast section of the Project area.
Coolibah NR	1,19 ha within the Project area	No information available.
Blackjack Mountain NR	6.9 km from the Project area	No information available.
Homevale Resource Reserve	1.8 km from the Project area	Contains grassy woodlands, notophyll vine forests, dry softwood scrub, open eucalypt forests and brigalow-belah communities. It also contains the historic gold-mining township of Mt. Britton.
Newlands NR	4,362 ha within the Project area	Biodiversity offset reserve adjacent to provides habitat suitable for 14 threatened species known to occur in the area. Located in the north of the Project area
German Creek NR	10.8 km from the Project area	Biodiversity offset reserve Provides suitable habitat for threatened species *Eucalyptus raveretiana.*
Wallaby Lane NR	16.1 km from the Project area	Connects Walton State Forest and Arthurs Bluff State Forest (and Blackdown tableland NP)

18.3.3.3 State Forests

State forests are declared under the *Forestry Act 1959* and administered by EHP. Arthur's Bluff state forest is situated within the southeast corner of the Blackwater section of the Project area. Seven state forests are situated within 25 km of the EIS study area as listed in Table 18-8 below and shown in Figure 18-3.

Table 18-8 State Forests Within and Surrounding the Project Area

Name of State Forest	Area within Project (ha) / Distance to Project Area	Values / Comments
Arthur's Bluff State Forest	645 ha within the Project area	Is contiguous with Blackdown Tableland National Park
Crediton State Forest	6.2 km from the north-east corner of the Project area. This area is contiguous with Homevale NP	Contains rainforest remnants and grassy open eucalypt forest. It is also a continuation of Homevale National Park.
Amaroo State Forest	9.8 km from the Project area west of Blackwater	Located southwest of Blackwater
Walton State Forest	11 km from the Project area east of Blackwater	Located between Taunton National Park and Arthurs Bluff State Forest.
Bundoora State Forest	3.5 km from the south corner of the northern section of the Project area	Located west of the Project area
Junee State Forest	17.9 km from the Project area	Located east of the Project area

18.3.3.4 Koala Habitat Area

Koala habitat areas are declared under the *Nature Conservation (Koala) Conservation Plan 2006*. The plan provides for designation of koala districts and koala habitat areas in Queensland, sets sequential clearing and koala spotting requirements, and defines wildlife permit restrictions. The Project area is located in Koala District C in which koalas are listed as least concern wildlife and have a lower perceived threat to the species' survival.

18.3.3.5 Essential Habitat

Essential Habitat is vegetation in which a species that is endangered, vulnerable or near threatened under the NC Act have been known to occur. To fulfil its obligation under the VM Act to regulate vegetation clearing in a manner that prevents the biodiversity loss, EHP uses these Essential Habitat maps to help determine the habitat status of the vegetation when assessing vegetation clearing applications.

Essential Habitat is mapped in Figure 18-3 within the Project area between Glenden and Nebo, along the northwest boundary of the Project area, and west of the Blackwater segment of the Project area. Essential Habitat within and surrounding the Project area is dedicated to the species listed in Table 18-9.

Table 18-9 Essential Habitat Areas Within and Surrounding the Project Area

Species	Location of Recorded Species		Habitat
Chalinolobus picatus (Little Pied Bat)	148.230795 148.23295 148.230726 148.235728 148.231462	-22.007898 -22.006889 -22.006312 -22.005993 -22.004325	Dry open forest and woodland (e.g. *Eucalyptus melanophloia, E. populnea, E. crebra, E. moluccana, E. tereticornis, Corymbia citriodora, C. tessellaris)*, in more arid areas found in riparian areas *(E. camaldulensis, E. microtheca*), mulga

Species	Location of Recorded Species		Habitat
	148.233136	-22.003456	(*Acacia aneura*) and escarpment (*A. shirleyi*); also brigalow forest, Callitris / Allocasuarina with *E. dealbata* / *E. fibrosa*, and chenopod shrubland.
	148.223197	-22.000634	
	148.232723	-21.999249	
	148.230369	-22.001372	
	148.172611	-21.85085	
	148.418277	-21.497832	
	148.401505	-21.485238	
Denisonia maculata (Ornamental Snake)	148.418277	-21.497832	Under litter / fallen timber and in wide soil cracks, in riparian woodland / open forest and shrub / woodland including Brigalow *Acacia harpophylla*
	147.846834	-21.498055	
	147.860393	-21.496801	
	147.858886	-21.494226	
	147.846216	-21.493946	
	147.852881	-21.491687	
	147.859593	-21.475995	
	147.85249	-21.473817	
	147.850427	-21.473698	
	147.847504	-21.473287	
	148.401505	-21.485238	
	147.841731	-21.45289	
	147.8381	-21.448215	
	147.86653	-21.454865	
	147.840733	-21.441495	
	147.842728	-21.425142	
	147.838544	-21.37465	
Dichanthium setosum	148.015611	-21.737153	*Eucalyptus tereticornis, Angophora spp., Casuarina cunninghamiana, Arundinella nepalensis* on alluviums and colluviums or open woodland of *Eucalyptus orgadophila* on black soil, or woodland of *Eucalyptus crebra* with *Corymbia erythrophloia* on rolling metamorphic hills
	148.003393	-21.743467	
	147.841429	-21.370616	
	148.388517	-21.359495	
Cerbera dumicola	148.381246	-21.359303	Semi-evergreen vine thicket; low open woodland of *Eucalyptus exserta*; open woodland of *Eucalyptus melanophloia, Acacia shirleyi, E. populnea, E. brownii;* open woodland of *Corymbia tessellaris, Acacia aneura*; woodland of *Acacia rhodoxylon*; woodland to open forest of *Acacia shirleyi, Corymbia dolichocarpa,* or *Acacia catenulata, A. shirleyi, Eucalyptus thozetiana*; woodland to open forest of *Corymbia citriodora, Eucalyptus fibrosa* with *Triodia* understorey
	148.023044	-21.089269	
Eucalyptus raveretiana (black iron box)	148.461196	-21.557271	Gallery forest rainforest gully; tall open forest of *Eucalyptus tereticornis and Eucalyptus raveretiana*, with *Melaleuca fluviatilis and Casuarina cunninghamiana*; open forest of *Corymbia tessellaris, or Eucalyptus camaldulensis, Melaleuca leucadendra, Casuarina cunninghamiana*
	148.450274	-21.55158	
	148.461359	-21.544352	
	148.458067	-21.543598	

Species	Location of Recorded Species		Habitat
Macropteranthes leiocaulis	148.313978 148.307131 148.310987	-21.510977 -21.507721 -21.501375	Deciduous vine thicket; semi-evergreen vine thicket; brigalow-semi-evergreen vine thicket; softwood scrub; *Araucarian microphyll* or simple microphyll vine forest; brigalow / belah scrub

18.3.3.6 Referable Wetlands

Referable wetlands are areas shown as wetlands on the 'map of referable wetlands'. Referable wetlands include two categories:

- Wetland protection areas (WPAs); and
- Wetland management areas (WMAs).

WPAs are wetlands of high ecological significance (HES) in the Great Barrier Reef (GBR) catchments. WMAs are wetlands of general ecological significance (GES) within the GBR catchments and wetlands of general or high ecological significance outside GBR catchments.

Within the Project area, there are both WPA and WMA. Most major rivers are mapped as WMAs (Figure 18-3).

18.3.3.7 Declared Catchment and Irrigation Areas

Areas of land that immediately surround water storage areas are termed 'declared catchments'.

Eungella Dam Catchment Area is situated within 25 km of the Project area off the northeast corner. This catchment area is located within the Burdekin Basin and has no functional connectivity with water systems within the Fitzroy Basin.

There are no declared irrigation areas within the Project area or downstream of the Project.

18.3.4 Other Environmentally Sensitive Features

Other environmentally sensitive features include EPBC Act MNES, flora and fauna species protected under the NC Act, and a nationally important wetland.

18.3.4.1 EPBC Act Matters of National Environmental Significance

The EPBC Act provides for the protection of the environment, especially MNES, and is administered by DSEWPaC. It is designed to provide for the conservation of biodiversity through the protection of threatened species and ecological communities, migratory and marine species listed under the EPBC Act.

EPBC MNES are fully described in the Project MNES report (Appendix CC of the EIS). In summary the following MNESs were found within or surrounding the Project area:

- Three Threatened Ecological Communities (TECs) known to occur within the Project area and one TEC possibly occurring;

- Four threatened flora species known to occur within the Project area and two species possibly occurring;
- Five threatened fauna species known to occur within the Project area and two species possibly occurring; and
- Fourteen migratory birds known to occur within or surrounding (25 km buffer) the Project area.

18.3.4.2 Flora and Fauna Species Protected under the NC Act

Species protected under the NC Act are described in detail within the Terrestrial Ecology Technical Report (Appendix P, Section 5.2.2) of this EIS.

In summary, the following 62 flora species were identified as present or potentially present within or surrounding the Project area:

- Eleven known to occur within or surrounding (25 km buffer) the Project area (one endangered, three vulnerable, seven near threatened);
- Two likely to occur within or surrounding (25 km buffer) the Project area (one endangered, one near threatened);
- Five possibly occurring within or surrounding (25 km buffer) the Project area (one endangered, four vulnerable); and
- Forty-four unlikely to occur within or surrounding (25 km buffer) the Project area (eight endangered, 14 vulnerable, 22 near threatened).

The following 31 fauna species were identified as present or potentially present within or surrounding the Project area:

- Eight known to occur within or surrounding (25 km buffer) the Project area (four vulnerable, four near threatened);
- Three possibly occurring within or surrounding (25 km buffer) the Project area (two vulnerable, one near threatened);
- Eighteen unlikely to occur within or surrounding (25 km buffer) the Project area. (three endangered, four vulnerable, 11 near threatened); and
- Two presumed extinct.

18.3.4.3 Directory of Important Wetlands

Lake Elphinstone is not located within the Project area although it occupies an enclave that the Project area surrounds (Figure 18-3). Hence, it is considered as part of the Project potential impact area due to proximity. Lake Elphinstone is listed on the Directory of Important Wetlands and is recognised as significant at a national and state level due to being a bioregional example of a semi-permanent freshwater lake (Environment Australia, 2001). The lake is recognised as:

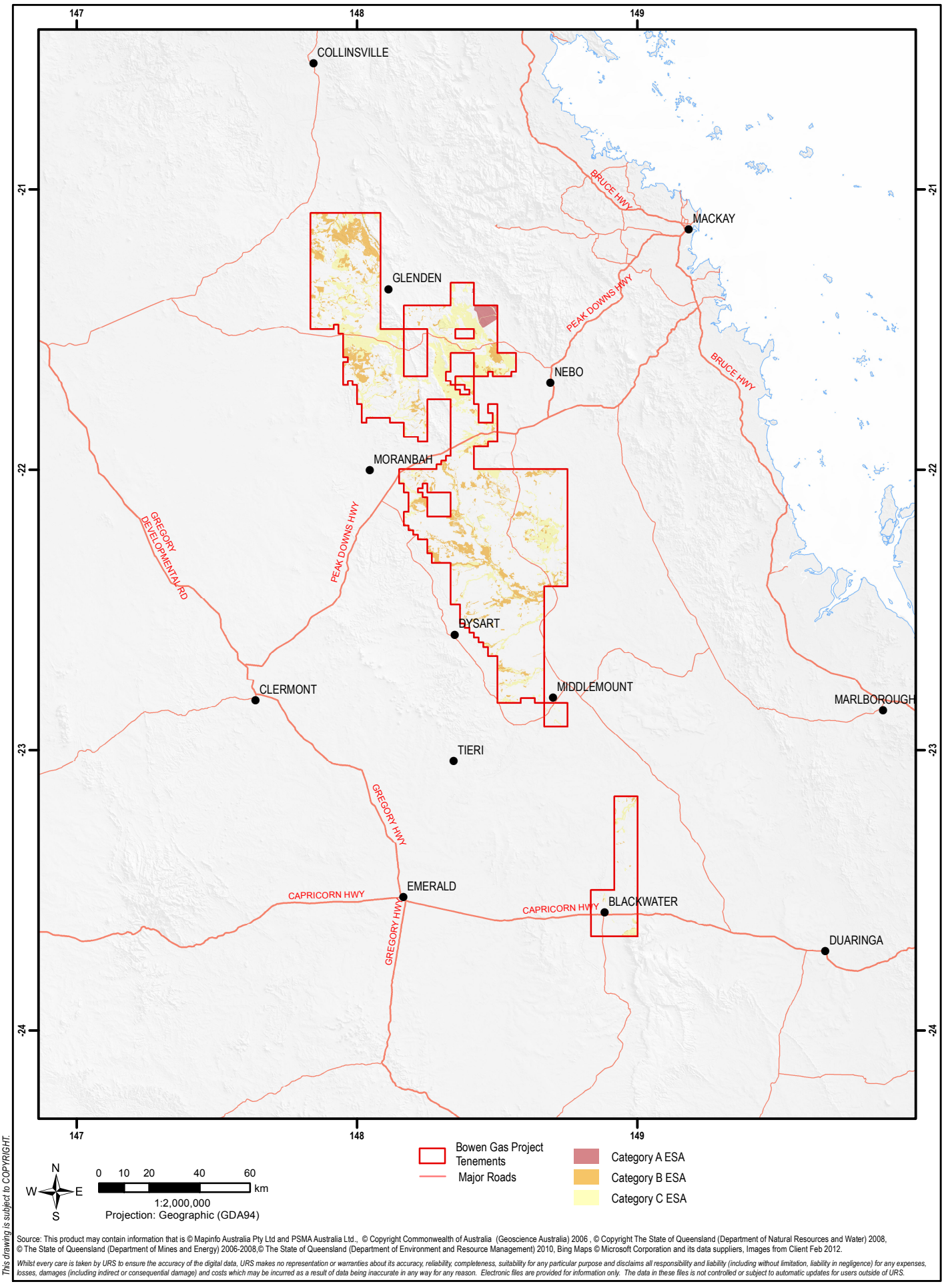
- A good example of a wetland type occurring within a biogeographic region in Australia;
- A wetland that plays an important ecological or hydrological role in the natural functioning of a major wetland system / complex;
- A wetland that is important as the habitat for animal taxa at a vulnerable stage in their life cycles, or provides a refuge when adverse conditions such as drought prevail;

- Supporting a host of aquatic vertebrates and several threatened species (e.g. cotton pygmy-goose, squatter pigeon); and
- Supporting many waterbird species protected under the China-Australia Migratory Bird Agreement, the Japan-Australia Migratory Bird Agreement and Republic of Korea – Australia Migratory Bird Agreement.

18.3.5 ESA Summary

There is one Category A, 18 Category B and 26 Category C ESAs within the Project area. These are displayed together in Figure 18-4 and include:

- Homevale National Park;
- Endangered REs;
- Of Concern REs;
- Referable Wetlands;
- Essential Habitat;
- State Forest;
- A Resource Reserve; and
- Nature Refuges.



arrow energy
go further

BOWEN GAS PROJECT EIS

ESA SUMMARY

URS

ENVIRONMENTALLY SENSITIVE AREAS

Figure: **18-4**

File No: **42626960-g-1131.mxd** Drawn: **RG** Approved: **DS** Date: **18-10-2012** Rev.**A** A4

18.4 Potential Impacts to ESAs

Potential impacts to ESAs would be similar to the potential impacts for terrestrial ecological values (Terrestrial Ecology chapter (Section 17) of this EIS) and MNES of the Project area. Detailed discussions of these potential impacts can be found in the Terrestrial Ecology Technical Report (Appendix P of this EIS), and in the MNES Report (Appendix CC of this EIS). A summary of potential impacts to ESAs is provided below.

18.4.1 Category A ESAs

Potential exists for Category A ESAs to be impacted by the Project's activities. Homevale National Park is located in the north-eastern portion of the Project area and Dipperu National Park fringes the Project area's eastern boundary. The most significant potential impacts posed to these areas that will be managed arise from infiltration of pest flora and fauna into the National Parks impacting on natural values. Potential indirect impacts include reduced connectivity of these national parks through the fragmentation of fauna corridors in surrounding areas.

18.4.2 Category B ESAs

Category B ESAs within the Project area include REs 11.3.1, 11.3.11, 11.4.1, 11.4.8, 11.4.9, 11.4.13, 11.8.13, 11.9.1 and 11.9.5.

These ecosystems are generally associated with fertile clay soils that are highly susceptible to both erosion and exotic species invasion. Infestations of prickly pear (*Opuntia stricta, O. tomentosa*) and harrisia cactus (*Harrisia martinii*) are prevalent in the majority of areas where these ecosystems were examined on the ground. Parthenium (*Parthenium hysterophorus*) was mapped by Queensland weed distribution mapping 2009 / 2010 in the Project area as abundant and widespread (Biosecurity Queensland, 2010). Failure to follow weed hygiene protocols coupled with increased vehicular traffic may facilitate increases in the rate and extent of exotic species invasion into these communities.

Another Category B ESA, RE 11.5.17, is a wetland habitat that is scattered throughout the Project area with some relatively pristine examples observed on the Spring Creek property. Without adequate management this habitat may potentially be threatened by proliferation of exotic species (pest plants and animals), and increased sedimentation.

18.4.3 Category C ESAs

Category C ESAs are designated due to the presence of an 'Of concern' RE and are often associated with alluvial areas and subject to both erosion and exotic species invasion. Management measures for weed hygiene protocols for increased vehicular traffic will be implemented to avoid increases in the rate and extent of any exotic species invasion (particularly parthenium (*Parthenium hysterophorus*), bellyache bush (*Jatropha gossypiifolia*) and mother of millions (*Bryophyllum delagoensis / Bryophyllum x houghtonii*) into these communities.

Other Category C ESAs including essential habitat and wetland habitats could potentially be subject to fragmentation. Correct management and placement of access tracks and gathering line infrastructure will minimise impact on habitat values in these areas. Wetland values will be assessed and managed

to avoid potential impacts by long term processes such as increasing sedimentation, weed invasion and changes to surface and sub-surface hydrology.

18.5 Avoidance, Mitigation and Management Measures

Environmental protection for ESAs and ecological values will be primarily achieved through a hierarchy of avoidance through site selection, impact minimisation, impact mitigation, and biodiversity offsetting when required.

Detailed mitigation and management measures for the potential impacts to values described in this ESAs chapter are described in detail in the:

- Aquatic Ecology chapter (Section 16);
- Aquatic Ecology Technical Report (Appendix O);
- Terrestrial Ecology chapter (Section 17);
- Terrestrial Ecology Technical Report (Appendix P);
- MNES Report (Appendix CC); and
- The EM Plan (Appendix Z) of this EIS.