Australia Pacific LNG Project

Volume 5: Attachments

Attachment 16: Terrestrial Ecology LNG Facility

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Executive summary

WorleyParsons was commissioned by Australia Pacific LNG to undertake a terrestrial flora and fauna assessment in support of the proposed part of the Australia Pacific LNG Project (Project) located near Laird Point and within the Curtis Island Industry Precinct of the Gladstone State Development Area, Curtis Island. The proposed Project will include the construction and operation of a liquefied natural gas processing facility and associated marine facility infrastructure. Two berthing options were assessed as part of this Project, Option 2a and Option 1b.

The assessment involved a review of current literature on the known and potential flora and fauna values on site and in the wider study area and field surveys to identify these values on site. Information gathered from the literature review and field surveys was used to assess the potential impacts of the proposed Project on these values, on site and in the surrounding area and to develop mitigation measures to minimise such impacts.

The proposed project area lies on the south-western coast of Curtis Island and south of Graham Creek. It is characterised by undulating hills and slopes and adjacent floodplains dominated by eucalypt open forests and woodlands, opening into expansive mudflats of saltpan vegetation and mangrove shrublands along the coastline. A small area of paperbark swamp is also present in the southern portion of the site.

Intertidal areas of the project site form part of the Port Curtis wetland aggregation, considered of importance for its flora and fauna habitat value and diverse range of species.

A total of 308.3ha of remnant vegetation is present on site and is generally in good to average condition with evidence of historical fires, logging, grazing and vehicle tracks present. Some weed infestations are present and mostly associated with drainage lines..

The proposed project area does not include any threatened ecological communities listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), endangered Regional Ecosystems (REs) or regrowth vegetation listed under the Queensland *Vegetation Management Act 1999* (VMA) or at threshold REs as described under the Regional Vegetation Management Code for the south-east Queensland bioregion.

Remnant vegetation listed as of concern and least concern is present on site. The proposed Project would require the clearing of 154.8ha of this vegetation, which represents 50.2% of the total extent of remnant vegetation on site. Implementation of the Option 1b berth arrangement would require an additional clearing of 0.7ha of least concern remnant vegetation on site. Vegetation proposed to be cleared is not recognised as having high biodiversity values and the proposed clearing would not result in any REs present on site falling into a higher conservation status.

Flora of the project area is diverse with 121 species across 51 families and 100 genera recorded during the field surveys (14-17 April 2009 and 7-9 October 2009) including 25 non-native species. Of the flora recorded on site, one, the banana orchid (*Cymbidium canaliculatum*), is considered of international significance and is listed under Appendix II of the Convention on International Trade in Endangered Species. Three species are declared by the State including the prickly pear (*Opuntia stricta*) and rubber vine (*Cryptostegia grandiflora*) which are class 2 declared plants whilst lantana (*Lantana camara*) is considered a class 3 declared plant. Rubber vine and lantana are also listed as weeds of national significance under the Australian Weeds Strategy (NRMMC 2006) and all were recorded on site in small, isolated infestations.

The proposed project area may support suitable habitat for up to four flora species listed under the EPBC Act, Queensland *Nature Conservation Act 1992* (NC Act) and/or considered of regional

significance; however, none of these species were recorded on site during the field survey and there are no historical records of these species occurring on site.

Marine plants and flora species considered of cultural, commercial and recreational significance were identified throughout the site and may be removed or disturbed as part of this Project.

Thirty-one threatened fauna species listed under the EPBC Act and/or NC Act were identified by database searches from the wider study area, including two species listed under the EPBC Act only, 17 species listed under the NC Act only and two species listed under both. Two of these species were recorded within the project area during the field survey; eastern curlew (*Numenius madagascariensis*) and beach stone-curlew (*Esacus magnirostris*).

Forty-nine regionally significant fauna species were identified by database searches from the wider study area. Based on their habitat preference, 43 species could potentially utilise habitats within the project area. One regionally significant fauna species, barking owl (*Ninox connivens*), was recorded within the project area during the field assessment.

A total of 48 fauna species were identified within the project area during the field survey including three non-native species.

The proposed Project has the potential to impact upon terrestrial flora and fauna values on site through direct loss or harm to individual species, populations and vegetation communities and degradation/modification of habitat areas. However, with the implementation of mitigation measures recommended in this assessment, these impacts can be managed to reduce their severity and longevity, thereby minimising the overall impact of the proposed Project on these values.

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1. Introduction

1.1 Background

WorleyParsons was commissioned by Australia Pacific LNG to undertake this flora and fauna assessment in support of the proposed part of the Australia Pacific LNG Project (Project) located near Laird Point and within the Curtis Island Industry Precinct of the Gladstone State Development Area, Curtis Island. The proposed project area lies on land on Lot 3 on SP225924 and extends seaward to North Passage Island in The Narrows (Figure 1). It is located solely within the south-east Queensland bioregion.

The proposed Project will involve the construction and operation of a liquefied natural gas (LNG) processing facility and associated marine facility infrastructure. Two options were assessed as part of this Project and are outlined in Figure 1.

1.2 Scope of works

This assessment was undertaken for the LNG component of the Australia Pacific LNG Project only with the aim to:

- Identify the key flora and fauna values of the proposed project site and wider study area (10km radius of the project site), through desktop and field studies, including:
  - Ecological communities and Regional Ecosystems (REs) listed under the Australian Government *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and/or the Queensland *Vegetation Management Act 1999* (VMA)
  - Regulated regrowth areas listed under the Queensland *Vegetation Management and Other Legislation Amendment Bill 2009*
  - Important fauna habitat types and movement corridors
  - Observed and potentially present threatened flora and fauna species listed under the EPBC Act and/or Queensland *Nature Conservation Act 1992* (NC Act)
  - Observed and potentially present flora and fauna species of regional significance
  - General flora and fauna values
  - Freshwater flora and fauna species
  - Weeds and animal pest species and infestations
  - Other sensitive ecological areas
- Identify potential impacts on these ecological features and values that may result from activities associated with the proposed Project
- Identify appropriate mitigation measures to help avoid and minimise potential impacts on these ecological features and values.

1.3 Assumptions and limitations

In the preparation of this flora and fauna assessment, the following assumptions and limitations have been made:

- The conservation status of flora species is based on the Commonwealth Department of Environment, Water, Heritage and the Arts species profiles and threats database viewed on 25 November 2009 and the Queensland *Nature Conservation (Wildlife Regulation) 2006* reprinted in November 2009.
- The assessment is based on Queensland Department of Environment and Resource Management (DERM) RE and regulated regrowth mapping data as of the 5 January 2010 i.e. version 6.0 RE mapping data, version 6.0b RE descriptions database and version 2.0 regulated regrowth mapping data. Information regarding extents of REs in the catchment, subregion and bioregion is derived from Accad et al. (2008).
- The DERM RE mapping is applicable except in those locations where site specific surveys identified inaccuracies at the local scale. Existing RE mapping and noted inaccuracies with this mapping have been used to determine proposed clearing requirements for the proposed Project and existing mapping was used to estimate the total area of each RE type occurring within the wider study area.
- The information gained from commonwealth and state flora and fauna databases has caveats attached to it regarding the robustness or completeness of the information. HERBRECS data is based almost exclusively on plant specimens actually recorded as recent in the given locations. The absence of any specimen record for a particular species from an area does not imply that that species does not occur in the area. Data from the protected matters search tool is based on a combination of actual records, primarily from State Government databases, combined with modelled distributions of species according to their ecological characteristics.
- This report focuses on land within the designated project area and any infrastructure outside of this area was not assessed at this time. The assessment of the gas pipeline part of the Project, that is proposed to provide CSG to the LNG plant, is described in a separate report.
- This report focuses on terrestrial flora and fauna species including freshwater species and excludes all marine-restricted species.
- As detailed targeted field surveys and nocturnal surveys within the study area were not undertaken, the precautionary approach was adopted throughout this assessment. As such, any species that could potentially occur within the study areas (as identified through ecological databases and the habitat knowledge of the flora and fauna by the botanist and fauna ecologist) have been assumed to occur in the project area.
- The field assessment was carried out during four days in April and three days in October, both of which are on average, milder months of the year for this area (Bureau of Meteorology Rockhampton long-term averages). No rainfall occurred during the field surveys. During the April survey, drainage lines within the project area did contain some water. During the October survey however, the project area was very dry. The conditions were not optimum for surveying frogs. Frog activity noted during the surveys was very low, with only the cane toad (*Rhinella marina*) recorded during the entire field assessment. There was some reptile activity noted during the October survey. Reptile activity however, during the April survey was very low.

2. Methodology

2.1 Flora

Taxonomic nomenclature of the flora is based on the The Census of Queensland Flora (Bostock and Holland 2007) and supercedes changes outlined in the Queensland Herbarium Achievements 2007 – 2008 (EPA 2008a).

2.1.1 Determination of flora species and ecological / vegetation community significance level

Significant ecological communities and REs are listed under the EPBC Act as critically endangered, endangered or vulnerable and/or the VMA as endangered, of concern or least concern. At Threshold REs includes those REs considered at risk of falling into a higher conservation status if clearing continues and are listed under the Regional Vegetation Management Code for south-east Queensland bioregion (DERM 2009a). REs of state biodiversity significance include those REs with less than 30% remaining extent in the subregion as defined in the draft Policy for Biodiversity Offsets (DERM 2008b) whilst regulated regrowth vegetation refers to high value regrowth as described under the Queensland *Vegetation Management and Other Legislation Amendment Bill 2009*.

Significant wetlands include those wetlands listed on Ramsar (of international significance) or the directory of important wetlands (of national significance).

Flora species listed under the EPBC Act and/or NC Act as critically endangered, endangered, vulnerable or rare are considered EVR.

Regionally significant flora are defined as those taxa not listed as EVR species under the EPBC Act and/or NC Act, but have been identified under a non-statutory conservation agreement as having restricted or disjunct geographical distributions or being at the extent of their geographical distribution, arerare or poorly known species, or are poorly conserved species or species with small population sizes (Briggs and Leigh 1995; EPA 2006a; Forster et al. 1991).

Flora species of other conservation significance include those taxa not listed as EVR or regionally significant species but that are afforded protection under a State or Local Government Area permit, and species considered of cultural (Aboriginal Art Online 2009; Borsboom 2005; Cribb and Cribb 1981; Cribb and Cribb 1974; Kamminga 2002; Lance 1982; Lassak and McCarthy 1983; Low 1989; McDonald et al. 2001), commercial (DPI 2009) and recreational significance (EPA 2003a).

Species recognised as of international significance under the International Union for Conservation of Nature (IUCN) Red List of Threatened Species (IUCN 2009) and under the Convention on International Trade in Endangered Species (CITES) (CITES 2009) and those listed under the DERM Back on Track framework (DERM 2009b) have also been recognised.

All other native flora species are designated as common.

2.1.2 Determination of weed species significance level

The Australian Weeds Strategy (NRMMC 2006) identifies priorities for weed management across the nation with the aim of minimising the impact of weeds on Australia's environmental, economic and social assets. As part of this, a list of nationally agreed priority plant species (weeds of national

significance) for control and management based on species high rankings of invasiveness, potential to spread, and impact on socio-economic and environmental assets, has been established.

The Queensland *Land Protection (Pest and Stock Route Management) Act 2002* also identifies target weed species that have, or may potentially have, a serious economic, environmental or social impact. Declared plants are classified into three management priorities, based on their current extent and potential to spread, including:

- Class 1 plants i.e. weed species that are not commonly present in Queensland and, if introduced, would cause an adverse economic, environmental or social impact. Current infestations in Queensland are subject to eradication from the state and landowners must take reasonable steps to keep their land free of these species.
- Class 2 plants i.e. weed species that are established in Queensland and have, or could have an adverse economic, environmental or social impact. Landowners must take reasonable steps to keep their land free of Class 2 plants.
- Class 3 plants i.e. weed species that are also considered established in Queensland and have, or could potentially have, an economic, environmental or social impact. The primary objective of this listing is to prevent the sale, and therefore spread of these pests into new areas, and landholders are not required to control these species unless their land is adjacent to an environmentally significant area i.e.
  - A protected area
  - Land dedicated as a reserve for environmental purposes under the Queensland Land Act 1994
  - A world heritage area listed under the World Heritage Convention
  - An area supporting a critically endangered ecological community in the list established under the EPBC Act
  - A declared Ramsar wetland under the EPBC Act
  - An area of high nature conservation value under the VMA
  - An area, other than State-controlled land, identified in a local government's pest management plan as an area that has special environmental significance for native wildlife.

High priority weed species have also been identified under the Regional Pest Management Strategy 2004 – 2009 (CPMG 2004) which includes species not declared by the State. Weeds of national significance, declared plants of Queensland and high priority regional weed species are considered significant weed species. All other non-native species are considered environmental weed species.

2.1.3 Flora desktop review

A desktop review was undertaken to identify the key flora and vegetation values of the wider study area and the likelihood of these values occurring within the project area including:

- A review of the DERM RE (version 6.0) and regulated regrowth vegetation mapping (version 2.0) and the RE description database (version 6.0b) to identify vegetation communities mapped within the wider study area
- A review of satellite imagery to identify vegetation patterns and key investigation areas and gain an appreciation of the proximity of the proposed project area to sensitive areas

- A review of the DERM essential habitat and environmentally sensitive area mapping to identify key ecological values of the wider study area including important habitat areas for EVR flora species, wetlands, marine plant populations, high biodiversity areas and nature refuges.
- A review of the directory of important wetlands database to identify nationally important wetlands within the wider study area (Blackman et al. 1999).
- A review of the Australian Government Department of Environment, Water, Heritage and the Arts (DEWHA) protected matters search tool to identify all matters of national environmental significance (NES) within the wider study area including Ramsar-listed wetlands, critical habitat areas, threatened ecological communities and flora species and other matters including conservation areas such as national parks.
- A review of the Queensland Herbarium flora collection records (HERBRECS) and DERM wildlife online databases to identify all flora species of conservation significance known or likely to occur within the wider study area.
- A review of the non-statutory conservation agreements and the former *Calliope Shire Council Planning Scheme 2007* to identify species and areas that are recognised as being of state, regional or local biodiversity significance or are flagged as important for their integrated biodiversity values within close proximity to the project area.
- A review of current plant literature to identify species of other conservation value including species of cultural, commercial and recreational significance.
- A review of the Queensland Primary Industries and Fisheries predictive pest mapping to identify significant non-native species known or likely to occur within or adjacent to the project area.
- A review of previous studies undertaken within the Curtis Island Industry Precinct (Shell Australia 2009; Unidel 2009; URS 2009a).

It is recognised that the information gained from these databases has caveats attached to it regarding the robustness or completeness of the information. HERBRECS data is based almost exclusively on plant specimens actually recorded as recent in the given locations. The absence of any specimen record for a particular species from an area does not imply that that species does not occur in the area. Data from the protected matters search tool is based on a combination of actual records, primarily from State Government databases, combined with modelled distributions of species according to their ecological characteristics.

Information from the desktop review was collated and assessed to determine the likelihood of key flora values occurring within the proposed project site.

2.1.4 Flora field survey

The flora field survey was undertaken by a qualified ecologist over seven days from 14-17 April 2009 and from 7-9 October 2009 and included:

- Ground-truthing of 29 sites including six ‘tertiary’ level sites and 23 ‘quaternary’ level sites in accordance with the methodology outlined by the Queensland Herbarium (Neldner et al. 2005). At least one tertiary assessment was undertaken in each RE type mapped within the project area and sites were established where the characteristics of the transected areas indicated the greatest chance of detecting significant species and other values. Information gathered during these surveys included confirmation of mapped RE, general description of vegetation, structural and groundcover characteristics, dominant species for each stratum, all woody flora species

and their average height and abundance, patch size and shape, overall condition/integrity, extent and distribution of weeds and other disturbance and landscape, soil and geological characteristics. Quaternary assessments were undertaken to confirm RE types and boundaries and were distributed so as to sample as much environmental variability within the project area as possible, within practical time and accessibility constraints, and information gathered included dominant canopy species, evidence of weed and other disturbance.

- Targeted searches for threatened flora species identified from the desktop review. Searches were undertaken in a 200 – 300 m^2 area surrounding each vegetation survey site.

The locations of flora field survey sites were largely based on existing RE mapping and are illustrated in Figure 2. GPS coordinates were taken using hand held GPS (accuracy +/- 10m) to assist in validating the existing DERM vegetation mapping. Photographs of vegetation communities traversed were also taken.

For the purposes of this assessment, comprehensive flora species lists and detailed abundance data were not collected or considered necessary to the assessment of the potential impacts of the proposed project on flora and vegetation values of the site.

2.1.5 Interpretation and documentation

Using information gathered from ground-truthing surveys, the likelihood of potential habitat for EVR flora species occurring within the proposed project area was determined. Likely impacts on those EVR species for which potential habitat was found to be present were analysed based on the known ecology of each species.

2.2 Fauna

Nomenclature used in this fauna assessment follows the online Australian Faunal Directory (DEWHA 2009f).

2.2.1 Determination of fauna species significance level

EVR fauna species include those taxa listed under the EPBC Act and/or NC Act as critically endangered, endangered, vulnerable or rare.

Regionally significant fauna species are defined as those species listed in the Back on Track framework and non-EVR priority taxa identified by DERM (DERM 2009b; EPA 2006b). Taxa that are not listed as EVR species under the EPBC Act and/or NC Act, but have been listed in the relevant action plan for their respective taxonomic group as vulnerable, rare, near threatened, insufficiently known or data deficient and / or identified as conservation significant in the south-east Queensland bioregion (Cogger et al. 1993; Duncan et al. 1999; Garnett and Crowley 2000; Maxwell et al. 1996; Lee 1995; Tyler 1997; Sands and New 2002) are also considered regionally significant.

All other native fauna have been designated as common. This includes those species that have been given extra protection as migratory species listed under international treaties including the Japan Australia Migratory Bird Agreement (JAMBA), China Australia Migratory Bird Agreement (CAMBA), Republic of Korea Australia Migratory Bird Agreement (ROKAMBA) and the Bonn Convention. Marine protected species listed under the EPBC Act are also included.

2.2.2 Fauna desktop review

A desktop survey was undertaken to document known fauna records for the project area, identify the potential presence of significant fauna species and assist in targeting areas for the field assessment. This survey involved a review of relevant consultant's reports and searches of databases and archives including:

- A review of the DEWHA protected matters search tool, Queensland Museum fauna collection records and DERM wildlife online database for the wider study area (Appendix A).
- A review of Birds Australia data for Curtis Island. There were no records from this database search for the wider study area (10km radius). As such, all records from Curtis Island from this data source were considered suitable to assess the potential occurrence of bird species within the proposed Project area (Appendix A).
- A review of the Directory of Important Wetlands database to identify nationally important wetland habitats within the wider study area.
- A review of the South-east Queensland Biodiversity Planning Assessment (EPA 2007) to identify areas that are recognised as state, regional or local biodiversity significant or flagged as important for their integrated biodiversity values that are within close proximity to the project area.
- A review of the DERM essential habitat area mapping to identify essential habitat areas for EVR fauna species within the wider study area and environmentally sensitive area mapping to identify key ecologically sensitive areas within the wider study area.
- A review of DERM RE mapping for the project area to establish those vegetation communities at a scale of 1:100,000 as well as satellite (Google) photography to gain an appreciation of potential fauna habitats and of the Project's proximity to sensitive areas.
- A review of consultant's reports on recent fauna surveys undertaken within the wider study area (Sandpiper 2008; Sandpiper 2009; BAMM 2009a; Unidel 2009; URS 2009b).

2.2.3 Fauna field survey

The fauna assessment was undertaken by a qualified ecologist over seven days from 14-17 April 2009 and from 7-9 October 2009. No fauna trapping methods (such as Elliott trapping, pitfall trapping, hair tube sampling or harp trapping) were employed during this rapid assessment. Rather, field surveys targeted habitat assessments and these involved one hectare plot assessments of selected sites. Representative habitats within the project area were selected for inspection based on the following:

- Occurrence of forested patches and other fauna habitats (such as riparian corridors, wetlands and dams) determined from aerial photography, combined with review of the South-east Queensland Biodiversity Planning Assessment (EPA 2007)
- Preferred habitat for EVR and regionally significant fauna identified from the database searches, determined from RE mapping combined with aerial photography

A total of 21 sites was visited and assessed within the project area. Habitat assessment site locations are illustrated in Figure 3 and datasheets for these sites and locations of habitat assessment sites are provided in Appendix B.

The primary aim of the field study was to assess presence of suitable habitat for significant fauna species and the likely presence of significant fauna species considering habitat types/features, habitat

integrity, habitat connectivity and significance of habitats. Assessments of the aforementioned attributes were supplemented by opportunistic searches for fauna and fauna signs at each site. Survey techniques employed included:

- Visual and audio (e.g. bird and frog calls) identification
- Opportunistic searches of likely faunal hotspots such as riparian vegetation, sources of water (e.g. dams, drainage lines) and tidal mudflats
- Opportunistic searches for animal signs (e.g. scats, tracks and feeding signs)
- Active searching for fauna species
- Opportunistic and incidental observations.

2.2.4 Interpretation and documentation

Using the habitat assessment and field observation data, a determination was made as to whether or not preferred habitat for EVR fauna species is present in the project area. Likely impacts on those EVR species for which preferred habitat was found to be present were analysed based on the known ecology of each species.

3. Existing environment

3.1 Bioregional context

The proposed project area (LNG facility) lies wholly within the Curtis Island catchment in the north-eastern portion of the Burnett-Curtis Hills and Ranges subregion within the greater south-east Queensland north bioregion. The Burnett-Curtis Hills and Ranges subregion is geologically and floristically diverse with granite hills and range to the east and low rolling hills on old sedimentary rocks to the west. Major vegetation types of this region include narrow-leaved red ironbark (*Eucalyptus crebra*) and lemon-scented/spotted gum (*Corymbia citriodora*) woodlands, eucalypt mixed open forests and araucarian microphyll rainforests.

3.2 Flora

The flora values and characteristics of the proposed project area were identified and are described in the vegetation survey summary provided in Appendix C. The project area lies on the south-western coast of Curtis Island and south of Graham Creek. It is characterised by undulating hills and slopes and adjacent floodplains dominated by eucalypt open forests and woodlands, opening into expansive mudflats of saltpan vegetation and mangrove shrublands along the coastline (mangroves, saltpan and saltmarsh communities on site are further discussed in Volume 4: Chapter 10). A small area of paperbark swamp is also present in the southern portion of the site.

Vegetation on site is generally in good to average condition with evidence of historical fires and grazing present. A total of 121 flora species was recorded within the project area during the field survey across 51 families and 100 genera. Of the species recorded on site, one, the banana orchid (*Cymbidium canaliculatum*) is listed as near threatened under CITES. No other internationally recognised significant species or back on track species were recorded during the field survey. Species identified by database searches from the wider study area and species recorded on site during the field survey are tabulated in Appendix D.

3.2.1 Ecological communities/regional ecosystems

Approximately 308.3ha of remnant vegetation is present within the project area comprising 73.4ha of concern RE and 234.9ha not of concern RE as listed under the VMA. The extent and distribution of REs on site are generally analogous with current mapping, with inaccuracies limited to refinement of the scale of mapping. Ground-truthed REs are summarised in Table 3.1 and illustrated in Figure 4 with detailed descriptions discussed in Appendix E.

The proposed project area does not contain any threatened ecological communities listed under the EPBC Act, endangered REs or regrowth vegetation listed under the VMA or at threshold REs as listed under the Regional Vegetation Management Code for the South-east Queensland Bioregion (DERM 2009a).

Table 3.1 Regional ecosystems of the project area

RE code	Community description	Status^		Total area within project site (ha)	Extent represented in*		
		VMA	DERM		catchment (%)	subregion (%)	Qld (%)
12.3.11	Queensland blue gum (*Eucalyptus tereticornis*), grey ironbark (*E. siderophloia*), pink bloodwood (*Corymbia intermedia*) open forest on alluvial plains near coast	OC	OC	28.5	3.3	2.4	0.1
12.11.14	Narrow-leaved red ironbark, Queensland blue gum woodland on metamorphics +/- interbedded volcanics	OC	OC	44.9	0.3	1.0	0.2
12.1.2	Saltpan vegetation including grassland, herbland and sedgeland on marine clay plains	LC	NC	34.1	0.4	0.2	0.1
12.1.3	Mangrove shrubland to low closed forest on marine clay plains and estuaries	LC	NC	30.1	0.5	0.2	0.1
12.3.7	Queensland blue gum, pendulous paperbark (*Melaleuca fluviatilis*) fringing forest	LC	NC	1.4	0.1	0.01	<0.01
12.11.6	Lemon-scented/spotted gum, narrow-leaved red ironbark open forest on metamorphics +/- interbedded volcanics	LC	NC	169.3	0.6	0.1	0.1

^Status: VMA = vegetation management status, DERM = biodiversity status, OC = of concern, LC = least concern, NC = no of concern at present. *RE extent derived from Accad et al. (2008) which is based on RE data up to 2005 and does not include any DERM amendments between 2005 and October 2009.

Of concern regional ecosystems listed under the VMA

Two of concern REs were recorded within the project area in association with drainage lines and floodplains (RE 12.3.11) and footslopes of metamorphic hills (RE 12.11.14) on site.

Approximately 28.5ha of RE 12.3.11 is present within the project area, which represents 2.4% of the total extent of this RE within the subregion, whilst the project area contains approximately 44.9ha of RE 12.11.14, which represents 1.0% of the subregional extent for this RE.

Of concern REs recorded on site (12.3.11 and 12.11.14) are considered poorly represented in conservation reserves although are both represented within the Curtis Island Conservation and National Parks.

These REs are considered in good condition with disturbance limited to historical fire, grazing, erosion and disused vehicle tracks. Small infestations of environmental weeds including balloon cotton (*Gomphocarpus physocarpus*) and flannel weed (*Sida cordifolia*) were recorded in these communities.

Least concern regional ecosystems listed under the VMA

Four least concern REs were recorded within the project area including mangrove shrublands (RE 12.1.3) which dominate the coastline, saltpan vegetation (RE 12.1.2) on mudflats in the central portion of the site and spotted gum-ironbark forests on the hills throughout the site (RE 12.11.6). A small paperbark swamp (RE 12.3.7) was also recorded in the southern portion of the site in association with a drainage line.

The proposed project area includes approximately 1.4ha of RE 12.3.7 and 169.3ha of RE 12.11.6, which represents 0.01% and 0.1% of the total subregional extent for these REs respectively. 30.1ha of RE 12.1.3 and 34.1ha of RE12.1.2 are present on site representing 0.2% of the total extent of these REs within the subregion.

Least concern REs are considered well represented in conservation reserves except RE 12.3.7 which is considered poorly represented and all have been mapped within the Curtis Island Conservation and National Parks. These communities range from very good condition in the east with little disturbance and weed infestations to good to average condition through the central and western portions of the site where disturbance including grazing, erosion, fencing, historical logging and fire are more apparent. Weed infestations were also more apparent in these communities including prickly pear (*Opuntia stricta*), rubber vine (*Cryptostegia grandiflora*) and lantana (*Lantana camara*), particularly in the western portion of the project site.

3.2.2 Environmentally sensitive areas

The proposed project area does not contain any National or Conservation Park, State Forest, Timber Reserve, nature refuges, critical habitat or essential habitat area for threatened flora species or Ramsar-listed wetlands of international significance.

However, the site is located within the Great Barrier Reef World Heritage Area (continental island) and has been recognised for its special biodiversity values under the Biodiversity Planning Assessment. Values identified as state significant include acting as wildlife refugia, containing poorly conserved REs and wetlands and waterways and consisting of vegetation with distinct species composition associated with geomorphology and other environmental variables.

The site also lies adjacent to Port Curtis which is listed on the Directory of Important Wetlands in Australia. The Port Curtis wetland is 31,264ha in area and is noted for its diverse, structured mangrove communities, seagrass populations and importance as wader bird habitat. The intertidal areas of the Project area are also mapped as coastal wetland area under the former *Calliope Shire Council Planning Scheme 2007*.

The proposed project area is transected by several drainage lines and gullies which drain to the coastline (Figure 5). Riparian areas on site are vegetated by Queensland blue gum dominated forests and paperbark woodlands.

Marine plants protected under the *Fisheries Act 1994* are present in association with intertidal areas on site (Figure 5).

3.2.3 EVR flora species

Database searches identified 11 threatened flora species listed under the EPBC Act and/or NC Act including two suspect records, translucent spleenwort (*Asplenium pellucidum*) and Story's wattle (*Acacia storyi*). These species are known only from their type localities i.e. Palmerston Valley in north-eastern Queensland and the Blackdown Tablelands in central Queensland respectively, and have been confirmed by DERM as incorrect records for the wider study area (DERM 2009, pers. comm. 27th October). As such, these species have been omitted from this assessment.

Of the remaining 9 EVR flora species identified (Table 3.2), two species are listed under the EPBC Act only, two species are listed under the NC Act only and five species are listed under both. The proposed project area does not contain any historical threatened flora species records and no threatened flora species were recorded on site during the field survey. The site may however support suitable habitat for two of these species including large-fruited zamia palm (*Cycas megacarpa*) and quassia (*Quassia bidwillii*) based on their habitat preferences and known geographical ranges. Further information on all EVR flora species of the wider study area are provided in Appendix F.

The large-fruited zamia palm is also considered of international significance and is listed as endangered on IUCN Red List. It is also recognised as near threatened under CITES and is listed as critical under the DERM Back on Track framework. The wedge-leaf tuckeroo (*Cupaniopsis shirleyana*) is also designated with a high rating under this framework.

3.2.4 Regionally significant flora species

Eleven regionally significant flora species were identified by database searches from the wider study area and habitat preferences for these species including three species recently delisted from the NC Act (in November 2009). The large-leaf chainfruit (*Alyxia magnifolia*), Bailey's indigo (*Indigofera baileyi*) and veiny whitewood (*Atalaya rigida*) were listed as rare under the NC Act and on the CSIRO ROTAP List. As such, it is assumed that the ROTAP list status is directly related to the NC Act and therefore these species have been omitted from this assessment.

Of the remaining 8 regionally significant species outlined in Table 3.3, Miquel's zamia palm (*Macrozamia miquelii*) is listed as lower risk (near threatened) under the IUCN Red List and near threatened under CITES. No regionally significant flora species were recorded on site during the field survey; however, the project area does contain suitable habitat for one of these species, the wanderrie grass (*Eriachne rara*) (Appendix F). There are no historical regionally significant flora records for the project area.

3.2.5 Flora species of other conservation significance

Marine and aquatic plants

Marine plants protected under the *Fisheries Act 1994* were recorded in association with the mudflats in the central portion of the site and coastline and on North Passage Island.

These species include eastern white mangrove (*Avicennia marina* ssp. *australasica*), large-leaved orange mangrove (*Bruguiera gymnorhiza*), yellow mangrove (*Ceriops tagal*), long-styled stilt mangrove (*Rhizophora stylosa*), salt couch (*Sporobolus virginicus*), prickly couch (*Zoysia macrantha*), beaded glasswort (*Sarcocornia quinqueflora* ssp. *quinqueflora*), sea purslane (*Sesuvium portulacastrum*) and seablite (*Suaeda australis*).

Table 3.2 Flora species listed as EVR known or likely to occur within the wider study area

Botanical species*	Status**		Habitat preference	Likelihood of occurrence^
	CTH	QLD		
Cycads and conifers				
Cycas megacarpa [1] large-fruited zamia palm (Cycadaceae)	E	E[CR]	Spotted gum-ironbark woodlands and open woodlands on rocky substrates derived from acid volcanics, ironstone and mudstone and at 40 to 680m altitude in the Bouldercombe-Woolooga area of south-eastern to central Qld (Botanic Gardens Trust 2008).	Possible. Spotted gum-ironbark woodlands on metamorphic hills are present throughout site and may provide some habitat for this species; although species was not recorded on site during survey.
Monocotyledons				
Bulbophyllum globuliforme [1] miniature moss-orchid (Orchidaceae)	V	R	Epiphyte on the scaly bark of the branches and upper trunk of mature hoop pine (*Araucaria cunninghamii*) trees of subtropical coastal ranges in south-eastern Qld and north-eastern NSW at 500 to 800m altitude (DNR 1999).	Unlikely. Hoop pines are not present within the project area.
Taeniophyllum muelleri [1] minute orchid (Orchidaceae)	V		Epiphyte on branches and branchlets of rainforest trees in coastal regions (DEWHA 2008a).	Unlikely. Whilst a few stunted rainforest derivatives were recorded along the coastline, this species was not identified during the field survey and trees are unlikely to support any significant habitat for this species.
Dicotyledons				
Cupaniopsis shirleyana [1, 3] wedge-leaf tuckeroo (Sapindaceae)	V	V[H]	Rainforests in a variety of soil types on hillsides, mountain tops, lower slopes of valleys, rocky headlands, stream beds and along riverbanks in central-eastern and south-eastern Qld (TSSC 2008a).	Unlikely. Rainforests are not present within the project area.
Parsonsia larcomensis [1, 2, 3] Mt Larcom monkey rope (Apocynaceae)	V	V	Open heathlands and shrublands at or near the summits of mountain peaks on cliffs or among outcrops of acid volcanic rocks and serpentinite and in shallow, loamy soils in association	Unlikely. Suitable habitat is not present on site. Species known to the mainland only.

Botanical species*	Status**		Habitat preference	Likelihood of occurrence^
	CTH	QLD		
			with broad-leaved red ironbark (*Eucalyptus fibrosa*) at 350 to 750m altitude (DNR 1999).	
Quassia bidwillii [1, 3] quassia (Simaroubaceae)	V	V	Lowland rainforests or rainforest margins and occasionally open forests, woodlands and mangroves in lithosols, skeletal soils, loamy sands, sands, silts and sands with clay subsoils at 1 to 617m altitude in coastal regions (DNR 1999).	Possible. Forests and mangrove communities on site may provide suitable habitat for this species; however, no individuals were recorded on site during the field survey.
Bosistoa transversa [1, 2, 3] heart-leaved bosistoa (Rutaceae)	V		Lowland subtropical rainforests of subtropical coastal regions to 300m altitude (TSSC 2008b).	Unlikely. Rainforests are not present on site.
Actephila sessilifolia [3] sessile-leaved actephila (Phyllanthaceae)		R	Notophyll and microphyll vine forests or vine thickets of the Bowling Green Bay-Mount Larcom area in coastal central Queensland and in red, talus or granite soils at 30 to 320m altitude (DNR 1999).	Unlikely. Species is restricted to the mainland and the Project site does not contain vine forests or thickets.
Hernandia bivalvis [3] grease nut (Hernandiaceae)		R	Rainforests, vine thickets and microphyll vine forests to 620m altitude on coastal ranges on rock pavements and outcrops in shallow soils (DNR 1999).	Unlikely. Suitable habitat is not present on site.

*Source: 1 = DEWHA protected matters search report, 2 = QLD Herbarium HERBRECS flora collection records, 3 = DERM wildlife online. **Status: CTH (EPBC Act): E = endangered, V = vulnerable; QLD (NC Act): E = endangered, V = vulnerable, R = rare. Superscript indicates Back on Track framework rating: CR = critical, H = high. ^Likelihood of occurrence: known = species recorded within the project area; likely = species identified by database searches as having geographical range overlapping the wider study area and suitable habitat is mapped within the project area; possible = species identified by database searches as having geographical range overlapping the wider study area and sub-optimal habitat or preferred habitat features are mapped within the project area; unlikely = species identified by database searches as having geographical range overlapping the wider study area and suitable habitat is not mapped within the proposed project area.

Table 3.3 Regionally significant flora species known or likely to occur within the wider study area

Botanical species*	Status**	Habitat preference	Likelihood of occurrence^
Cycads and conifers			
Macrozamia miquelii [3] Miquel's zamia palm (Zamiaceae)	RWC[c]	Sclerophyll forests on poor, stony soils in southern Qld and N NSW (Jones et al. 2001).	Unlikely. Suitable habitat is not present on site.
Monocotyledons			
Eriachne rara [2, 3] wanderrie grass (Poaceae)	RPC[c]	Open eucalypt woodlands, wallum and paperbark swamps and seasonal water channels in deep or shallow, sandy, sometimes gritty or stony soils in association with sandstone, laterite and granite of south-eastern Qld and north-eastern NSW (Lazarides 1995).	Possible. Suitable habitat is present in association with floodplains and drainage lines on site although no individuals were recorded on site during the field survey. Known from mainland only.
Dicotyledons			
Parsonsia paulforsteri [3] narrow-leaved silkpod (Apocynaceae)	1K[a]	Vine thickets and rainforest/gallery forests on river terraces and hillslopes and occasionally in eucalypt/paperbark woodlands in the coastal region of southern Qld (ABRS 1996).	Unlikely. Eucalypt/paperbark woodlands are present on site; however, species is known only from the type locality on the mainland.
Dissiliaria muelleri [3] Mueller's redheart (Picrodendraceae)	NPT-R[b]	Dry rainforests of central-eastern Qld, from Mount Larcom to Gladstone (Forster 1997).	Unlikely. Rainforests are not present on site.
Bosistoa medicinalis [3] Eumundi bosistoa (Rutaceae)	RPC[c]	Dry vine thickets of coastal regions of eastern Qld (Hartley 1977).	Unlikely. Vine thickets are not present on site.
Dinosperma melanophloia [3] black-barked doughwood (Rutaceae)	RPC[c]	Dry and subtropical rainforests of eastern Qld, north of Mt Nebo (Hartley 2001).	Unlikely. Rainforests are not present on site.

Botanical species*	Status**	Habitat preference	Likelihood of occurrence^
Croton stigmatosus [3] white croton (Euphorbiaceae)	RWC[c]	Dry and subtropical rainforests of north-eastern NSW and south-eastern Qld (Forster 2003).	Unlikely. Rainforests are not present on site.
Parsonsia ventricosa [3] acuminate silkpod (Apocynaceae)	RWC[c]	Dry and subtropical rainforests of southern Qld and northern NSW and Gladstone-Eungella region of CE QLD (ABRS 1996).	Unlikely. The project area does not support rainforest communities.

*Source: 2 = QLD Herbarium HERBRECS flora collection records, 3 = DERM wildlife online. **Status: a = CSIRO ROTAP List, b = DERM SEQ north expert panel report, c = vine forest plant atlas of SEQ; 1 = known from the type collection only, 3 = geographic range is more than 100 km, NPT-R = regionally significant non-EVR priority taxa, R = rare, K = poorly known, PC = poorly conserved, WC = well conserved., C- = conserved (with less than 1000 individuals in conservation reserve), ^Likelihood of occurrence: known = species recorded within the project area; likely = species identified by database searches as having geographical range overlapping the wider study area and suitable habitat is mapped within the project area; possible = species identified by database searches as having geographical range overlapping the wider study area and sub-optimal habitat or preferred habitat features are mapped within the project area; unlikely = species identified by database searches as having geographical range overlapping the wider study area and suitable habitat is not mapped within the proposed project area.

Other aquatic flora species including sedges were also recorded in association with the drainage lines in the southern and central portions of the site.

Plants of cultural significance

Indigenous people of the region traditionally used/use native plants for food, medicine, timber and tools. Species with these values were recorded throughout the project area and include:

- Food (seeds, leaves, berries, gum): eastern white mangrove, wattles (*Acacia* spp.), grayed canarium (*Capparis canescens*), native rosella (*Hibiscus heterophyllus*), broad-leaved ballart/cherry (*Exocarpus latifolius*), Burdekin plum (*Pleiogynium timorense*), currant bush (*Carissa ovata*), red cluster heath (*Acrotricha aggregata*), water chestnut (*Eleocharis dulcis*), sawsedge (*Gahnia aspera*), forest grasstree (*Xanthorrhoea johnsonii*), pigweed (*Portulaca oleraceus*), wombat berry (*Eustrephus latifolius*), austral sarsaparilla (*Smilax australis*), dodder (*Cassthya pubescens*), banana orchid (*Cymbidium canaliculatum*) and northern mistletoe (*Lysiana subfalcata*)
- Medicinal (for treatment of ailments such as stomach ailments, headaches and marine stings): wattles, red ash (*Alphitonia excelsa*), native quinine (*Petalostigma pubescens*), cockatoo apple (*Planchonella careya*) and river lily (*Crinum pedunculatum*)
- Timber and tools (such as utensils, spearthrowers, canoe paddles, boomerangs, fibre, digger sticks, dye): eucalypts (*Eucalyptus* and *Corymbia* spp.), paperbarks and tea-trees (*Melaleuca* and *Leptospermum* spp.), large-leaved orange mangrove, long-styled stilt mangrove, yellow mangrove, native quinine, cockatoo apple, lance-leaved hopbush (*Dodonaea lanceolata*), medicine bush (*Pogonolobus reticulatus*), poison peach (*Trema tomentosa*), forest grasstree, flax-lilies (*Dianella* spp.), mat-rushes (*Lomandra* spp.) and wonga vine (*Pandorea pandorana*).

Plants of commercial significance

Five plant species recorded within the project area are considered potential commercial resources and their uses are outlined below:

- Pink bloodwood: engineering (e.g. poles, railway sleepers and mining timbers), construction (e.g. fencing and housing stumps) and other uses such as hardwood manufacture
- Lemon-scented/spotted gum: engineering (e.g. wharf/bridge construction, poles, railway sleepers and mining timbers), construction (e.g. house framing, flooring, fencing and landscaping), decorative (e.g. furniture and joinery) and other uses such as tool handles, agricultural machinery, sporting goods, boat construction and carriage building
- Narrow-leaved red ironbark: engineering (e.g. wharf/bridge construction, poles and railway sleepers), construction (e.g. house framing, flooring, fencing and landscaping), and decorative uses such as furniture and joinery
- Queensland blue gum: engineering (e.g. wharf/bridge construction, poles, railway sleepers and mining timbers), construction (e.g. house framing, flooring, fencing, and landscaping), decorative (e.g. furniture and joinery), other uses such as structural plywood, boat construction and carriage building
- Burdekin plum: decorative (e.g. cabinet making, umbrella handles and walking sticks) and other uses such as brush stock.

Plants of recreational significance

Plants of the proposed project area may hold some recreational significance including:

- Fishing: mangrove shrublands/ mudflats provide habitat for mudcrabs, fish and worms
- Boating: shallow waters adjacent to the project area in Graham Drainage line provide safe mooring for small craft during heavy weather

3.2.6 Significant weed species

Current literature and predictive pest mapping by the Queensland Department of Primary Industries suggests there are seven significant weed species that have the potential to occur within the proposed Project area including three class 2 declared plants and four class 3 declared plants (Table 3.4).

Table 3.4 Significant weed species potentially occurring in the project area

Botanical species	Status*		Recorded on site
	CTH	QLD	
rubber vine (*Cryptostegia grandiflora*)**	WONS	2	✓
lantana (*Lantana camara*)**	WONS	3	✓
groundsel (*Baccharis halimifolia*)**		2	N
prickly pear (*Opuntia stricta*)		2	✓
creeping lantana (*Lantana montevidensis*)**		3	N
broad-leaved pepper tree (*Schinus terebinthifolius*)		3	N
Singapore daisy (*Sphagneticola trilobata*)		3	N

*CTH (australian weeds strategy): WONS = weeds of national significance; QLD (*Land Protection [Pest and Stock Route Management] Act 2002*): 1 = class 1 declared plant, 2 = class 2 declared plant, 3 = class 3 declared plant.
**Indicates high-priority weed species as identified under the regional pest management strategy.

Of these species, three were recorded on site including rubber vine and lantana in the north-western portion of the site. Prickly pear was observed throughout the project area with the largest infestations recorded along the western boundary of the island (Figure 6). Information on the ecology and distribution of significant weed species are provided in Appendix G.

3.3 Fauna environment

The project area is connected with the greater Curtis Island including the designated conservation areas at the northern end of Curtis Island. There are relatively few access tracks in the project area and this has limited vehicular disturbance. The influence of feral cattle and horses has degraded most of the habitat within the project area, excluding the mangrove habitat.

The wider study area for Curtis Island (Figure 7) has been designated as being an area of State biodiversity significance (DERM 2009c). This assessment is undertaken utilising a set of criteria outlined in the Biodiversity Assessment and Mapping Methodology (EPA 2002). Although this is not a legislative assessment, it provides a standardised approach to comparing the values inherent in various areas of remnant vegetation. This assessment system is very useful in that it provides an objective view of the habitat values of the remnant area. An expert panel assesses the criterion of

special biodiversity values of the remnant. The expert panel assessment of the area's value as a wildlife refuge (referred to as the Ib rating) is very high. The rating of very high, would in part be due to this area being an island.

The desktop review identified 441 fauna species known to or potentially utilising the wider study area (Appendix A) including 20 insects, 26 fishes, 25 amphibians, 66 reptiles, 245 birds and 59 mammals. Forty-eight fauna species were recorded during field survey efforts including one amphibian, six reptiles, 38 birds and three mammals. Species recorded on site are listed in Appendix H.

3.3.1 EVR fauna species

Database searches identified 31 EVR fauna species from the wider study area including four reptiles, 20 birds and seven mammals. Of these species, two are listed under the EPBC Act only, 17 are listed under the NC Act only and 12 are listed under both.

Two EVR fauna species were recorded within the project area during the field assessment in association with the intertidal area in the central and western portions of the site: eastern curlew (*Numenius madagascariensis*) and beach stone-curlew (*Esacus magnirostris*).

The proposed project area contains suitable habitat for another 20 EVR fauna species based on their habitat preference and fauna habitats present on site (Table 3.5).

Of the potentially occurring species, eight are listed under the Back on Track Framework. Under this framework the grey-headed flying-fox (*Pteropus poliocephalus*) is listed as critical. The remaining seven species are listed as high, these being red goshawk (*Erythrotriorchis radiatus*), yellow chat (Dawson) (*Epthanura crocea macgregori*), beach stone-curlew (*Esacus magnirostris*), little tern (*Sternula albifrons*), coastal sheathtail bat (*Taphozous australis*), false water-rat (*Xeromys myoides*) and rusty monitor (*Varanus semiremex*).

3.3.2 Regionally significant fauna species

Forty nine regionally significant fauna species were also identified from the desktop review including three fish, nine amphibians, 13 birds, 11 reptiles and 13 mammals. Based solely on the habitat preferences of these species, the proposed project area contains suitable habitat for 43 of these species (Table 3.6). Of these potentially occurring species, one is listed as a back on track species: yellow-bellied glider (southern subspecies) (*Petaurus australis australis*).

One regionally significant species was recorded on site during the field survey. The barking owl (*Ninox connivens*) was observed in the paperbark swamp in the south-central portion of the site.

3.3.3 Other fauna species of conservation significance

The desktop review identified 89 bird species listed under the EPBC Act as migratory and/or marine species from the wider study area including one listed as migratory only, 37 listed as marine only and 51 listed as both. These species and their habitat preferences are outlined in Appendix I and based on this information the proposed project area may support suitable habitat for 57 of these species.

Table 3.5 EVR fauna species identified by the desktop review from the wider study area

Scientific name*	Status**		Habitat preference	Likelihood of occurrence^
	CTH	QLD		
Reptiles				
Denisonia maculata[1] ornamental snake (Elapidae)	V	V	Poorly known species of low-lying areas with cracking clay soils in open forests, woodlands and riparian habitats. Shelters under fallen timber and in soil cracks, and forages for frogs at night (Cogger et al. 1993).	Possible
Egernia rugosa[1] yakka skink (Scincidae)	V	V	Dry open forests or woodland with dense ground vegetation, rocky areas, fallen timber and other debris (Cogger et al. 1993).	Possible
Paradelma orientalis[1] brigalow scaly-foot (Pygopodidae)	V	V	Eucalypt woodland, usually found under logs and debris. Also found climbing in rough *Acacia* trees (Tremul 2000). Known from Boyne Island.	Possible
Varanus semiremex[4] rusty monitor (Varanidae)		R	Distributed along the QLD coast from Gladstone to Cape York Peninsula. Found in coastal and estuarine mangroves and paperbark forests and in the associated rivers drainage lines and lakes. Reliant on hollow bearing trees for shelter (Fitzgerald 1997).	Possible
Birds				
Epthianura crocea magregori [2] yellow chat (Dawson) (Meliphagidae)	CE	E	This subspecies is known only from Curtis Island, the Torilla Plain and Fitzroy River Delta in central QLD, but it is seasonally mobile and possibly also occurs in other localities. It inhabits wetlands on seasonally inundated marine plains and the associated grasslands (Houston and Melzer 2008).	Possible
Macronectes giganteus[1] southern giant-petrel (Procellariidae)	E	E	Found in Antarctic to subtropical waters. Widespread in Southern Ocean and most abundant around ice packs where penguins are breeding or over the continental shelf. Nests on offshore islands, often near a steep drop or on slope (Morcombe 2003).	Unlikely
Erythrotriorchis radiatus[1]	V	E	Very rarely seen bird of prey of tropical	Possible

Scientific name*	Status**		Habitat preference	Likelihood of occurrence^
	CTH	QLD		
red goshawk (Accipitridae)			open woodland, edges of rainforest and dense riparian vegetation. Nests in trees taller than 20m and within 1km of a permanent drainage line or wetland. Forages in open forests and gallery forests (NSW NPWS 2002). Possibly within foraging range.	
Geophaps scripta scripta[1, 4] squatter pigeon (southern) (Columbidae)	V	V	Lightly timbered country, especially stony plains and lightly timbered acacia scrublands, in areas on sandy soil with low gravel ridges and nearby water. Widespread but rare (DEWHA 2009a).	Likely
Rostratula australis[1] Australian painted snipe (Rostratulidae)	V	V	Cryptic nomadic bird of shallow wetlands, nests on ground in reeds close to water. Found in areas with shallow muddy freshwater swamps and marshes (Garnett and Crowley 2000).	Unlikely
Turnix melanogaster[1] black-breasted button-quail (Turnicidae)	V	V	Usually low canopy, closed rainforest or monsoon forest, vine thickets and drier shrubby scrubs where there is a dense leaf-litter layer (DEWHA 2009b).	Unlikely
Pterodroma neglecta neglecta[1] kermadec petrel (western) (Procellariidae)	V		Oceanic and pelagic, extremely rare visitor to the east coast of QLD and NSW (Garnet and Crowley 2000).	Unlikely
Sternula albifrons[1, 4] little tern (Laridae)		E	Almost exclusively coastal, nesting on sandy beaches or shingle pits (Garnett and Crowley 2000).	Likely
Calyptorhynchus lathami[6] glossy black-cockatoo (Cacatuidae)		V	Coastal forest and open inland woodland, feeding on seeds of *casuarinas* (Garnett and Crowley 2000). Identified within the wider study area by recent studies on Curtis Island (URS 2009b) however, there are no significant quantities of feed trees within the immediate study area.	Possible
Esacus magnirostris[2, 4, 5, 6] beach stone-curlew (Burhinidae)		V	Occurs on open undisturbed beaches, islands, reefs and estuarine intertidal sand and mudflats (DERM 2007).	Known
Ninox strenua[6] powerful owl (Strigidae)		V	Eucalypt forests, preferring tall wet forests of ranges where the territories centre on densely vegetated gullies (Webster et al. 2004). Identified within the wider study	Likely

Scientific name*	Status** CTH	Status** QLD	Habitat preference	Likelihood of occurrence^
			area by recent studies on Curtis Island (Sandpiper 2008).	
Accipiter novaehollandiae [4] grey goshawk (Accipitridae)		R	Heavily timbered areas around coastal and sub coastal areas of northern and eastern Australia (Schodde and Tidemann 1990).	Possible
Ephippiorhynchus asiaticus[2] black-necked stork (Ciconiidae)		R	Widespread but uncommon in north and east Australia, in lakes, swamps, freshwater pools and mangroves and nesting in trees or large bushes, often over swamps. Considered relatively resilient to habitat changes (DECCW NSW 2005).	Possible
Haematopus fuliginosus[4, 6] sooty oystercatcher (Haematopodidae)		R	Favours rocky headlands, rocky shelves, exposed reefs with rock pools also found along beaches and muddy estuaries (Geering et al. 2007). Identified within the wider study area by recent studies on Curtis Island (BAMM 2009a).	Likely
Nettapus coromandelianus albipennis[1, 4] Australian cotton pygmy-goose (Anatidae)		R	Prefers large water impoundments, freshwater lakes and swamps (DECCW NSW 2005).	Unlikely
Numenius madagascariensis[1,2,4,5,6] eastern curlew (Scolopacidae)		R	Migratory species, arriving in Australia from July and departing from February to breeding grounds in China. Associated with sheltered coast, bays and estuaries. Moves between the low and high tide marks (Geering et al. 2007). EPBC search indicates roosting known to occur in the wider study area.	Known
Lophoictinia isura[4] square-tailed kite (Accipitridae)		R	Widespread but rare bird of prey that prefers a structurally diverse landscape of open eucalypt forests, woodlands and sand plains (NSW NPWS 1999).	Likely
Melithreptus gularis[4] black-chinned honeyeater (Meliphagidae)		R	Locally nomadic, following food sources. Widespread but rare in woodlands across north-eastern and central Qld. Found in open eucalypt woodland, especially ironbarks, box, paperbarks and tree-lined drainage lines of arid areas (DECCW NSW 2005).	Possible
Tadorna radjah[4]		R	Terrestrial wetlands, estuaries and the	Unlikely

Scientific name*	Status**		Habitat preference	Likelihood of occurrence^
	CTH	QLD		
radjah shelduck (Anatidae)			littoral zone of monsoonal regions, nesting in tree hollows during the wet season and forming flocks near the coast during the dry. In Queensland they are scarce south of Cape York Peninsula (Garnett and Crowley 2000).	
Mammals				
Xeromys myoides[1] false water-rat (Muridae)	V	V	Patchy distribution along coastal areas of Qld, in coastal wetlands such as lagoons, mangroves, swamps and sedged lakes close to fore dunes (DERM 2009c).	Possible
Chalinolobus dwyeri[1] large-eared pied bat (Vespertilionidae)	V	V	Dry forests and woodlands, moist eucalypt forests, roosting in caves and mines (DEWHA 2009d). Possibly within foraging range.	Possible
Dasyurus hallucatus [1] northern quoll (Dasyuridae)	E		Generally occurs in a range of habitats from rainforest through to woodland and coastal heathlands. Utilises logs, rocks and hollows for shelter (Van Dyck and Strahan 2008).	Possible
Pteropus poliocephalus[1, 4] grey-headed flying-fox (Pteropodidae)	V		Feeds on blossoms, fruits and leaves of many plants and commonly roosts by day in 'accommodation facilities' in dense riparian vegetation. It is highly mobile between these accommodation facilities (DEWHA 2009c).	Likely
Phascolarctos cinereus Essential Habitat Mapping koala (Phascolarctidae)		V	Restricted in its distribution to the eucalypt forests and woodlands of east Australia. Generally koalas inhabit open eucalypt forests with sparse ground cover and tend to avoid thick forests and steep slopes (EPA 2006c). There are no records of koalas within the wider study area and recent surveys have found no evidence of their presence within the Curtis Island Industry Precinct.	Possible
Taphozous australis[4] coastal sheathtail bat (Emballonuridae)		V	Very restricted in range, limited to the coast from Shoalwater Bay to Cape York Peninsula extending no more than a few kilometres inland. Roosts in caves and rock crevices along the coast and on islands along the coast. Forages within	Possible

Scientific name*	Status**		Habitat preference	Likelihood of occurrence^
	CTH	QLD		
			one kilometre of the ocean over a range of habitats (Duncan et.al. 1999). Possibly within foraging range.	
Chalinolobus picatus[4] little pied bat (Vespertilionidae)		R	Poorly known species of dry sclerophyll forest, woodland and scrub. Roosts in caves, mineshafts, tree hollows (Duncan et al. 1999).	Likely
Pteropus alecto[4] black flying-fox (Pteropodidae)		V	Found across the tropical and sub tropical north of Australia. Large groups roost by day in riparian habitat, travelling up to 20km by night to find suitable food sources (Van Dyck and Strahan 2008).	Likely

*Source: 1 = DEWHA protected matters search tool, 2 = Birds Australia, 3 = Qld Museum fauna collection records, 4 = DERM wildlife online, 5 = WorleyParsons 2009 field survey, 6 = record from previous studies. **Status: CTH (EPBC Act): E = endangered, V = vulnerable; QLD (NC Act): E = endangered, V = vulnerable, R = rare. ^Likelihood of occurrence: known = species has been previously recorded within project area; likely = species is known from the wider study area and preferred habitat is present on site; possible = species is known from the wider study area and suboptimal habitat is present on site; unlikely = species is known from the wider study area however, suitable habitat is not present on site.

Table 3.6 Regionally significant fauna species identified by the desktop review from the wider study area

Scientific name*	Status**		Habitat preference	Likelihood of occurrence^
	AP	SEQN		
Freshwater Fishes				
Ambassis agassizii[4] Agassiz's glassfish (Ambassidae)	R		Rivers, streams, billabongs and associated waters with plenty of weed cover. Comprised of eastern (coastal) and western (Murray-Darling) populations (Schmida 2008).	Unlikely
Mogurnda adspersa[4] southern purple-spotted gudgeon (Eleotrididae)	R		Usually found in water up to two metres deep associated with rocks, snags or aquatic vegetation at different sites (Schmida 2008).	Unlikely
Kuhlia rupestris[4] jungle perch (Kuhliidae)		NPT	Found in brackish-water in north Qld, preferring tidal waters but readily move into freshwaters where they are often seen in fast-flowing rivers and streams in coastal areas (Schmida 2008).	Unlikely
Frogs				
Limnodynastes salmini[4] salmon-striped frog (Limnodynastidae)		NPT	Found around the edges of inundated ponds, ditches and marshes. Spends much of the year buried under ground, emerging after rains (Robinson 1998).	Likely

Scientific name*	Status**		Habitat preference	Likelihood of occurrence^
	AP	SEQN		
Litoria dentata[4] bleating treefrog (Hylidae)		NPT	Coastal lagoons, ponds and swamps favouring areas with grassy edges (Robinson 1998).	Likely
Pseudophryne raveni[4] copper-backed broodfrog (Myobatrachidae)		NPT	Sclerophyll forests and marshy areas, shelters under logs and leaf litter in eastern NSW and south-eastern Qld (Robinson 1998).	Likely
Crinia deserticola[6] desert froglet (Myobatrachidae)		NPT	Usually found in damp areas associated with broad river channels in semi arid regions (Robinson 1998). It has however, been identified within the wider study area by recent studies on Curtis Island (BAMM 2009a).	Possible
Cyclorana brevipes[3] short-footed frog (Hylidae)		NPT	A burrowing frog found in dry savannah woodland, usually seen near clay pans after rain (Robinson 1998). Database searches indicated records on the mainland within the wider study area.	Likely
Litoria inermis[3, 4, 6] Peter's frog (Hylidae)		NPT	Distributed across northern Australia and extending down the Queensland coast. Found on flooded plains, woodlands and monsoonal forests (Robinson 1998).	Likely
Litoria peronii[6] Peron's tree frog (Hylidae)		NPT	Inhabits a variety of areas such as forests, grasslands and open areas. Found around drainage lines, rivers, dams and flooded areas (Robinson 1998). Identified within the wider study area by recent studies on Curtis Island (UNIDEL 2009).	Likely
Litoria rothii[3, 4, 6] Roth's tree frog (Hylidae)		NPT	Coastal and sub-coastal woodlands, open forests and grasslands from north-western WA to central-eastern Qld (Robinson 1998).	Likely
Pseudophryne major[3, 4] large toadlet (Myobatrachidae)		NPT	General coastal distribution from south-eastern Qld to Cape York. Found in damp or boggy areas in forests and heathlands (Robinson 1998).	Likely
Reptiles				
Emydura macquarii krefftii[4] Krefft's river turtle (Chelidae)	R/IK		East-flowing drainages of east Qld with permanent waterholes or billabongs (Wilson 2005).	Unlikely
Calyptotis lepidorostrum[4] cone-eared calyptotis		NPT	Endemic to rainforest, sclerophyll forest and heaths in southern coastal Qld (Wilson 2005).	Possible

Scientific name*	Status** AP	Status** SEQN	Habitat preference	Likelihood of occurrence^
(Scincidae)				
Carlia pectoralis[3, 4, 6] open-litter rainbow skink (Scincidae)		NPT	Endemic to dry sclerophyll forest, woodland and heath of eastern Qld (Wilson 2005).	Likely
Chlamydosaurus kingii[4, 6] frilled lizard (Agamidae)		NPT	Distributed across the tropical north of Australia, extending down the east coast as far as south east Queensland. Arboreal, seen mainly during the wet season when they descend to the lower trunks (Wilson 2005).	Likely
Diporiphora australis[3, 4, 6] tommy round-head (Agamidae)		NPT	Found along the Queensland coast and hinterlands, in heath, dry forest and woodland (Wilson 2005).	Likely
Eremiascincus richardsonii[6] broad-banded sand-swimmer (Scincidae)		NPT	Sand swimming species found in grassland, open woodland and shrublands (Wilson 2005). Identified within the wider study area by recent studies on Curtis Island (UNIDEL 2009).	Likely
Glaphyromorphus punctulatus[4] fine-spotted mulch-skink (Scincidae)		NPT	Endemic to the central east coast in woodlands, vine thickets and rock outcrops (Wilson 2005).	Likely
Menetia greyii[3, 4, 6] common dwarf skink (Scincidae)		NPT	Wide spread distribution throughout Qld in dry or well drained sites (Wilson 2005). Identified within the wider study area by recent studies on Curtis Island (UNIDEL 2009).	Likely
Menetia timlowi[6] dwarf litter-skink (Scincidae)		NPT	Distribution limited to eastern Qld. Found in a wide variety of habitat from open scrub and woodland to vine thickets (Wilson 2005). Identified within the wider study area by recent studies on Curtis Island.	Likely
Morethia taeniopleura[3, 4] north-eastern firetail skink (Scincidae)		NPT	Range extends from the top of Cape York Peninsula, along the coast and hinterland, also found on some islands down to south-eastern Qld. Found in dense leaf litter in coastal woodlands and hills, particularly in rocky areas (Wilson 2005).	Likely
Cryptophis nigrostriatus[4] black-striped snake (Elapidae)		NPT	Distributed from the Cape York Peninsula extending along the central coast of Queensland. Found in dry forest, woodland and rock outcrops (Wilson 2005).	Likely

Scientific name*	Status**		Habitat preference	Likelihood of occurrence^
	AP	SEQN		
Birds				
Turnix maculosus[4, 6] red-backed button-quail (Turnicidae)	VU		Inhabits grassland, woodlands and crops, usually near water (Morcombe 2003). Identified within the wider study area by recent studies on Curtis Island (Sandpiper 2008).	Likely
Ardeotis australis[4] Australian bustard (Otididae)	NT		Grasslands, open dry woodlands, mulga, mallee, heath across most of western, central and north-eastern Australia (Morcombe 2003).	Possible
Burhinus grallarius[4, 6] bush stone-curlew (Burhinidae)	NT	NPT	Prefers open woodlands, lightly timbered country, mallee and mulga (Morcombe 2003). Identified within the wider study area by recent studies on Curtis Island.	Likely
Ninox connivens[4, 5, 8] barking owl (Strigidae)	NT	NPT	Found over most of Australia except for the arid central region and Tasmania. It is considered common in the north of its range but uncommon in the south of its range. Found in eucalypt woodland, open forest, swamp forest and along timbered water courses, utilising denser vegetation to roost in during the day (Morcombe 2003).	Known
Pomatostomus temporalis[4] grey-crowned babbler (Pomatostomidae)	NT		Open forests, woodlands, roadsides with a grassy understorey (Morcombe 2003).	Likely
Artamus cinereus[4] black-faced woodswallow (Artamidae)		NPT	Distributed across much of mainland Australia. Generally found in drier open country such as woodlands, heath, spinifex and farmlands (Morcombe 2003).	Possible
Caprimulgus macrurus[4] large-tailed nightjar (Nectariniidae)		NPT	Distributed across northern Australia and extending down the Queensland coast. Found along margins of dense cover such as margins of rainforests and vine forest, providing concealment during the day and access to open woodland for night time hunting (Morcombe 2003).	Possible
Cinnyris jugularis[4, 6] olive-backed sunbird (Nectariniidae)		NPT	Distributed across Cape York Peninsula and extending down the Queensland coast. Found in rainforest including clearings and regrowth, lush drainage lines, mangroves and coastal scrub (Morcombe 2003).	Likely

Scientific name*	Status**		Habitat preference	Likelihood of occurrence^
	AP	SEQN		
Dacelo leachii[4, 6] blue-winged kookaburra (Alcedinidae)		NPT	Open forest, woodlands and tree-lined rivers (Morcombe 2003).	Likely
Gerygone palpebrosa[4] fairy gerygone (Acanthizidae)		NPT	Distributed throughout Cape York Peninsula and down the Queensland coast. Found in lowland rainforest, riverine forest, mangroves and water courses (Morcombe 2003).	Likely
Myiagra alecto[2, 4, 6] shining flycatcher (Monarchidae)		NPT	Found over water in areas of mangroves, rainforests and paperbark swamps (Morcombe 2003). Identified within the wider study area by recent studies on Curtis Island (URS 2009b).	Likely
Myzomela obscura[4] dusky honeyeater (Meliphagidae)		NPT	Found along the east coast of Queensland in rainforest, paperbarks, mangroves, drainage line thickets and nearby woodlands (Morcombe 2003).	Likely
Ptilinopus regina[2, 4, 6] rose-crowned fruit-dove (Columbidae)		NPT	Rainforest, vine scrubs, mangroves and swampy woodland (Morcombe 2003). Identified within the wider study area by recent studies on Curtis Island (Sandpiper 2008; URS 2009b).	Likely
Mammals				
Petaurus australis australis[4] yellow-bellied glider (sthn subsp.) (Petauridae) Note: ranked High under the Back on Track framework	LR(nt)	NPT	Distributed along the eastern coast to the western slopes of the Great Dividing Range, from southern Qld to VIC. Occurs in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Utilises hollows in large trees for dens and often dens in family groups (Menkhorst and Knight 2004).	Possible
Petaurus norfolcensis[4, 6] squirrel glider (Petauridae)	LR(nt)	NPT	Recorded in eucalypt woodland and open woodland and acacia open woodland. Requires abundant tree hollows for refuge and nesting (Menkhorst and Knight 2004). Identified within the wider study area by recent studies on Curtis Island (URS 2009b).	Likely
Scoteanax rueppellii[4, 6] greater broad-nosed bat (Vespertilionidae)	LR(nt)	NPT	Distributed along the east coast, roosting in tree hollows and usually found in tall wet forest, forest gullies and along stream lines (Menkhorst and Knight 2004). Identified within the wider study area by recent studies on Curtis Island (URS 2009b).	Likely

Scientific name*	Status**		Habitat preference	Likelihood of occurrence^
	AP	SEQN		
Mironomus norfolkensis[4] east coast freetail bat (Molossidae)	DD	NPT	Distributed along the east coast of NSW from south of Sydney to south-eastern Qld near Brisbane. Most records are from dry eucalypt forest and woodland. Roosts in tree hollows, buildings and under exfoliating bark (Churchill 2008).	Possible
Aepyprymnus rufescens[4] rufous bettong (Potoroidae)		NPT	Forests and woodlands along the east coast mainland from Cooktown, Qld to mid-NSW and around the Murray River (Menkhorst and Knight 2004).	Possible
Macropus dorsalis[4] black-striped wallaby (Macropodidae)		NPT	Rainforests, brigalow, vine thicket, eucalypt forest and woodland with a dense shrub layer (Menkhorst and Knight 2004).	Possible
Petauroides volans[4] greater glider (Pseudocheiridae)		NPT	Distributed along the east coast of Australia, in wet and damp sclerophyll forest on ranges and coastal plains. Requires large tree hollows for shelter (Menkhorst and Knight 2004).	Possible
Pseudomys gracilicaudatus[3] eastern chestnut mouse (Muridae)		NPT	Inhabits a variety of vegetation, such as heath, swampy depressions, healthy open forests and grasslands (Menkhorst and Knight 2004). Database searches indicated records on the mainland within the wider study area.	Possible
Pteropus scapulatus[3, 4] little red flying-fox (Pteropodidae)		NPT	Common in rainforest and sclerophyll forests (Menkhorst and Knight 2004).	Likely
Scotorepens orion[4] south-eastern broad-nosed bat (Vespertilionidae)		NPT	Known distribution in south-eastern Qld and along the coast of NSW. Roosts in tree hollows. Poorly known species. The study area is not within the known distribution of this species (Churchill 2008). There are however, known populations north and south of this study area with database searches indicating their presence in the area.	Possible
Sminthopsis murina[3, 4] common dunnart (Dasyuridae)		NPT	Potentially present in a range of habitats in the bioregion, although likely to be rare and sporadically distributed (Menkhorst and Knight 2004). Database searches indicated records on the mainland within the wider study area.	Possible
Taphozous troughtoni[4] common sheathtail bat (Emballonuridae)		NPT	Roosts either singly or in groups in caves, mine shafts or crevices. Fond in a variety of habitat such as wet and dry sclerophyll	Unlikely

Scientific name*	Status**		Habitat preference	Likelihood of occurrence^
	AP	SEQN		
			forests, woodland, mulga, shrublands, grasslands in areas where roosts are present (Churchill 2008).	
Vespadelus vulturnus[4] little forest bat (Vespertilionidae)		NPT	Distributed throughout south-eastern Australia extending into southern Qld. Found in a wide variety of forest and woodland types. This area is outside the normal range of this species (Menkhorst and Knight 2004).	Possible

*Source: 2 = Birds Australia, 3 = Qld Museum fauna collection records, 4 = DERM wildlife online, 5 = WorleyParsons 2009 field survey, 6 = previous studies. **Status: AP (action plan): VU = vulnerable, R = rare, LR(nt) = lower risk (near threatened)), IK = insufficiently known, DD = data deficient; SEQN (SEQ north bioregion): NTP = non-EVR priority taxon. ^Likelihood of occurrence: known = species has been previously recorded within project area; likely = species is known from the wider study area and preferred habitat is present on site; possible = species is known from the wider study area and suboptimal habitat is present on site; unlikely = species is known from the wider study area however, suitable habitat is not present on site.

Ten bird species listed as marine protected species and seven listed as both migratory and marine protected species were recorded within the project area during the field assessment. These species include the red-capped plover (*Charadrius ruficapillus*), black-faced cuckoo-shrike (*Coracina novaehollandiae*), spangled drongo (*Dicrurus bracteatus*), little egret (*Egretta garzetta*), magpie-lark (*Grallina cyanoleuca*), welcome swallow (*Hirundo neoxena*), tree martin (*Petrochelidon nigricans*), crested tern (*Thalasseus bergii*), forest kingfisher (*Todiramphus macleayii)*, brahminy kite (*Haliastur indus*), white-bellied sea-eagle (*Haliaeetus leucogaster)*, rainbow bee-eater (*Merops ornatus*), whimbrel (*Numenius phaeopus*), pacific golden plover (*Pluvialis fulva*), Caspian tern (*Hydroprogne caspia*) and the eastern reef egret (*Egretta sacra*).

3.3.4 Common fauna species

All habitats (even cleared and degraded land), provide habitat for a range of common native fauna species. Remnant vegetation provides higher habitat values and thus will have a larger range of more common and abundant species. The desktop study and field survey indicate that the Project area is utilised by a large number of common fauna species. A total of 256 common native fauna species were identified as potentially present by the database searches (excluding EVR and regionally significant fauna). These comprised 20 insects, 15 amphibians, 21 fish, 51 reptiles, 121 birds (excluding the 89 species listed as migratory and/or marine protected species under the EPBC Act) and 28 mammals. The complete list of common and significant fauna species identified as potentially present from the database searches is included in Appendix A.

Common native fauna species recorded during the field survey totalled 26 species, comprising 19 birds, six reptiles and one mammal. A complete list of fauna recorded during the field assessment is included in Appendix H.

3.3.5 Freshwater aquatic fauna

Twenty six aquatic fauna species have been identified through database searches from the wider study area and include species that are either freshwater species or species that utilise freshwater environments. Surveys for aquatic fauna were not undertaken (no permanent water on site) during this assessment; however, aquatic ecology for the Project area is discussed further in Volume 4 Chapter 9.

3.3.6 Animal pest species

Sixteen introduced species have been recorded within the wider area, including two fish, one amphibian, three birds and ten mammals. These species are included in Appendix A, where these are noted as introduced species.

Three introduced species were sighted in the study area during the field assessment including cane toad, european cattle (*Bos taurus)* and horse (*Equus caballus)*. The tracks of a dog (*Canis lupus familaris*) were also sighted, although it was unclear as to whether these tracks were created by a domestic dog, a wild dog or a dingo (*Canis lupus dingo*).

Mosquitoes and midge occur throughout the project area. The potential to create new mosquito breeding grounds is discussed in Section 4.2.4.

3.3.7 Fauna habitats

Seven different broad faunal habitats were identified as being present within the project area. These habitats were based on the categorisation of REs and field survey results (Table 3.7). The DERM essential habitat mapped on site is in association with RE 12.3.11 (Figure 8). All essential habitat mapped within this study area is suitable for the koala.

Table 3.7 Faunal habitats within the Laird Point LNG project area

Fauna habitat	Description
Eucalypt woodland	The lowland contains a dense grass understorey with a significant quantity of logs and tree branches. The hilltops and ridges provide areas of acacia thicket understorey, minor quantities of ground cover with significant quantities of logs, tree branches, leaf litter and surface rocks. Consistent with REs 12.3.11, 12.11.14, 12.3.7 and 12.11.6.
Paperbark wetland	Paperbark wetland community bordering the southern side of the saltpans, with a small paperbark swamp approximately 100m south of the saltpan. These are relatively small habitat areas within the landscape.
Saltpans	This habitat occurs on the large bay behind the mangrove community and includes the transitional zone from saltpan to the woodland areas. Consistent with RE12.1.2. The majority of the saltpan appears be inundated only during very high tide events, such as during the neap tide.
Mangroves	Mangrove communities exist along the majority of the foreshore. They are approximately 30 to 40m wide for the most part and are consistent with RE 12.1.3.
Beach/foreshore	The project area contains a small section of sandy beach associated with the sand bar behind the mangroves at the front of the saltpan. The remainder of the foreshore is predominantly rocky or stony.
Tidal mud flats	The exposed mudflat between the high and low tide and includes an area behind the mangrove community at the front of the saltpan.
North Passage Island	A mangrove community that is inundated during the high tide with exposed mud flats surrounding the island at low tide.

3.3.8 EVR fauna species and habitats

The potential for utilisation of the habitat types by the EVR and back on track fauna that may use the project area is described in Table 3.8.

Table 3.8 Potential EVR fauna presence in habitats within the project area

Common name	Fauna habitat					
	Eucalypt woodland	Paperbark wetlands	Saltpan	Mangroves	Beach/ foreshore	Tidal mudflats
ornamental snake	✓ (drainage lines)					
yakka skink	✓					
brigalow scaly-foot	✓					
rusty monitor		✓		✓		
grey goshawk	✓	✓				
glossy black cockatoo	✓					
black-necked stork			✓	✓		
yellow chat (Dawson)			✓			
red goshawk	✓	✓				
beach stone-curlew				✓	✓	
squatter pigeon (southern)	✓					
sooty oystercatcher					✓	✓
powerful owl	✓	✓				
eastern curlew				✓		✓
little tern					✓	✓
square-tailed kite	✓	✓		✓		
black-chinned honeyeater	✓					
large-eared pied bat	✓	✓		✓		
little pied bat	✓	✓		✓		
northern quoll	✓					
koala	✓					
yellow-bellied glider	✓					
grey-headed flying-fox	✓	✓		✓		
coastal sheathtail bat	✓	✓		✓		
false water-rat			✓	✓		
black flying-fox	✓	✓		✓		

4. Potential impacts

4.1 Flora

4.1.1 Ecological communities/regional ecosystems

The proposed Project would not remove or disturb any threatened ecological community listed under the EPBC Act, endangered RE or high value regrowth vegetation listed under the VMA. The project site is recognised as having state significant high biodiversity values (World Heritage Area) under the Biodiversity Planning Assessment however, remnant vegetation present is not mapped as having a high biodiversity status under the Regional Ecosystem Description Database suggesting its ranking under the Planning Assessment is not specifically related to the vegetation on site.

Approximately 155.9ha of remnant vegetation on site would be removed including 50.4ha of concern RE and 105.5ha least concern RE and representing 50.6% of the total extent of remnant vegetation on site (Table 4.1). Option 1b would require additional clearing of 0.7 ha of RE 12.1.3 from North Passage Island (Figure 1), which would bring the total extent of this RE to be cleared in the project area to 7.6% (Option 2a would result in the clearing of 5.3% of the total extent of this RE within the project area). This represents 0.01% of the subregional extent for this RE in both options.

Table 4.1 Proposed clearing areas in regional ecosystems within the project area

RE code*	Proposed clearing in project area (ha)	Extent represented in**			
		project area (%)	catchment (%)	subregion (%)	Qld (%)
Of concern Res					
12.3.11	23.9	83.9	2.8	2.0	0.1
12.11.14	26.4	58.9	0.2	0.6	0.1
Least concern Res					
12.1.2	29.5	86.7	0.3	0.2	0.1
12.1.3[2A]	1.6	5.3	0.03	0.01	<0.01
12.1.3[1B]	2.3	7.6	0.04	0.01	<0.01
12.3.7	1.3	94.2	0.1	0.01	<0.01
12.11.6	73.1	43.2	0.3	0.04	0.03

*superscript refers to design option. **Proposed clearing areas and areas of extent are based on ground-truthed RE data for the Project area and derived from Accad et al. (2008) for the catchment, subregion and Queensland.

The proposed Project would not remove any at threshold RE and the Project would not result in any RE present on site falling into a higher conservation status (Table 4.2), that is:

- Less than 10% of the remaining pre-clearing extent (endangered)
- Between 10 to 30% of the remaining pre-clearing extent (of concern).

Table 4.2 Proposed vegetation clearing and impact on conservation status

RE code*	Proposed area to be cleared** (ha)	Pre-clearing extent of RE (ha)	Current extent of RE (ha)	Total extent of RE post project^ (ha)	Current remaining pre-clearing extent of RE (%)	Remaining pre-clearing extent of RE post project^ (%)
Of concern Res						
12.3.11	23.9	193,141	47,883	47,859	24.79	24.78
12.11.14	26.4	120,693	30,130	30,104	25.0	24.9
Least concern Res						
12.1.2	29.5	32,713	28,533	28,503	87.2	87.1
12.1.31A	1.6	53,499	50,483	50,481	94.4	94.360
12.1.31B	2.3	53,499	50,483	50,481	94.4	94.358
12.3.7	1.3	103,884	53,259	53,258	51.268	51.267
12.11.6	73.1	378,000	241,682	241,609	63.94	63.92

*superscript indicates design option. **proposed clearing areas and areas of RE extent are based on ground-truthed RE data for the Project site and derived from Accad et al. (2008) for the catchment, subregion and Queensland. ^Project refers to the LNG component only of the Australia Pacific LNG Project.

The proposed Project has been located to minimise edge effects and fragmentation generally associated with vegetation clearing. Some fragmentation of intertidal vegetation communities on site may occur as a result of the Project; however, woodlands and forests on site are expected to be more robust due to their open nature and existing disturbance.

Other potential impacts associated with this clearing may include:

- Decrease in total area of remnant vegetation in the bioregion and subregion
- Degradation of vegetation (loss in condition) through dust emissions and erosion, air pollution, inappropriate handling and disposal of materials and harmful substances and changes to hydrological regimes and drainage
- Loss of ground cover resulting in soil compaction and destabilisation and loss of topsoil and seed bank from sediment runoff
- Loss of biodiversity through the introduction and/or spread of weed species
- Modification of floristic structure and composition leading to changes in fire regimes and nutrient availability.

4.1.2 Environmentally sensitive areas

The proposed Project lies wholly within the Great Barrier Reef World Heritage Area and adjacent to the Port Curtis Marine Park. Construction and operation activities associated with the proposed Project have the potential to impact upon these areas through loss or damage to marine plants, changes to

hydrological regimes and water quality and increased boat traffic increasing risk of injury to native wildlife.

The proposed Project (Option 2a) would require the clearing of 31.1ha of coastal wetland vegetation (i.e. REs 12.1.2 and 12.1.3) in the central and western portions of the site An additional 0.7ha of mangrove shrublands (RE 12.1.3) would be cleared for Option 1b.

4.1.3 EVR and regionally significant flora species

No EVR or regionally significant flora species were recorded on site during the field survey; however, the site supports suitable habitat for two EVR and two regionally significant species. Eucalypt dominated forests on metamorphic hills may support the large-fruited zamia palm and Queensland blue gum forests on the floodplains may support the regionally significant wanderrie grass whilst the entire project site except for the intertidal areas is considered suitable habitat for quassia.

Construction and maintenance activities associated with the proposed project area have the potential to impact upon these species through:

- Loss and/or harm to significant flora species and populations
- Increased fragmentation and genetic isolation of significant flora species populations
- Loss or degradation of key habitat areas through increasing edge effects and fragmentation, dust emissions and erosion, inappropriate handling and disposal of materials and harmful substances and changes to hydrological regimes and drainage
- Introduction and/or spread of weeds.

Whilst it is unlikely for these species to occur within the proposed project site, these potential impacts are still considered as part of this assessment and have been addressed in Section 6.

4.1.4 Flora species of other conservation significance

Protected marine plants and aquatic flora species were recorded on site in association with the intertidal areas in the central portion of the project area and on North Passage Island and include mangroves, saltpan species, couch grasses and sedges. The proposed project area also supports a number of culturally, commercially and recreationally significant species.

The proposed project has the potential to impact on these species through:

- Loss of or harm to individual species and populations
- Loss of cultural, economic and recreational values
- Increased fragmentation of habitats resulting in increased edge effects, particulate matter and modification of hydrological regimes and water quality
- Increased competition for resources with the introduction and/or spread of weed species.

4.1.5 Weeds

Movement of personnel, vehicles and equipment associated with construction and operational activities have the potential to facilitate the introduction and/or dispersal of weeds within the project area and to the surrounding lands. The introduction and/or dispersal of weeds have the potential to:

- Increase competition for resources (e.g. space, light, nutrients) with native species

- Reduce productivity of the land
- Reduce natural biodiversity
- Alter hydrological regimes, fire regimes and geomorphic processes
- Injury or loss of native animals through injury or toxic death through consumption/contact
- Facilitate animal pest movement and disease spread.

4.2 Fauna

4.2.1 Potential impacts on fauna in general

The habitat within the project area predominantly consists of eucalypt woodland with intermittent streams flowing into a saltpan. A small area of paperbark wetland associated with one of these streams exists on the southern side of the saltpan. The coastline consists of a generally rocky shoreline, with a border of mangroves of varying width and tidal mudflats. A sandy beach exists at Laird Point (outside the project area) with thin sandy beach combined with the mangroves stretching across the front of the saltpan (onto the project area). The project area contains potential habitat for several EVR, regionally significant and migratory species and a large range of common fauna species.

The Project requires the clearing of habitat. Considering the extent and location of the required clearing, it is unlikely that the direct impacts of this clearing can be reversed at the completion of the Project. There has been no significant development of this section of Curtis Island, to date. As such, the proposed development of this area has the potential to impact on fauna at several levels. The construction of the facility would result in the loss of potential fauna habitat. In relation to common fauna species, this is unlikely to result in a significant long-term impact, as similar habitats are available in areas adjacent to the study area and common species would utilise these habitats.

Nevertheless, some potential impacts to fauna species include:

- Unearthing of burrowing fauna species during construction
- Removal of mature vegetation and hollow bearing trees
- The disturbance of North Passage Island (option 1b)
- Edge effects associated with a development adjoining natural areas
- Increased exposure to artificial lighting
- Potential disturbance of migratory shorebird habitat
- Direct disturbance of migratory shorebirds (e.g. noise and increased activity).

Unearthing of fauna species during construction

There is potential for direct impact on some fauna species from being unearthed during construction of the proposed facility. While many larger and more mobile fauna such as birds, macropods and larger reptiles are likely to move away from the disturbance resulting from construction, smaller burrowing fauna (especially nocturnal species) are likely to remain under the surface and therefore risk being dug up resulting in injury or fatality. Burrowing fauna including frogs, lizards and snakes are potentially present within the Project area.

One EVR fauna species is potentially affected by unearthing: the yakka skink (*Egernia rugosa*).

Removal of mature vegetation and tree hollows

Mature vegetation generally provides more habitat opportunity for a wider range of fauna species than a cleared area or an area of regrowth vegetation. The habitat opportunities within mature vegetation are directly related to the complexity of the vegetation structure, including the living structure as well as the non-living structure such as hollows, stags, surface rocks, leaf litter and logs. Once this is removed, it takes a significant amount of time to develop again. Generally, hollows suitable for vertebrates do not occur in eucalypts until they are 120 to180 years old (Gibbons and Lindenmayer 2002). Tree hollows are common within the eucalypt woodland in the study area.

The powerful owl is one EVR fauna species identified as potentially utilising habitat within the project area. The powerful owl has been identified within the wider study area, by recent surveys on Curtis Island (Sandpiper 2008). This record was in eucalypt woodland adjacent to the southern boundary of the study area. Although the hollows sighted during the field trip would not be large enough to be utilised as breeding hollows for this species, they would be suitable for their prey. The powerful owl is an opportunistic, nocturnal hunter that preys mainly on arboreal and semi-arboreal marsupials such as gliders and possums.

The little pied bat is another EVR species identified as potentially utilising habitat within the project area. The little pied bat roosts in mines, caves and tree hollows. As there are no known mines or caves within the wider study area, the potential loss of tree hollows is a significant consideration for this species.

Disturbance to North Passage Island

The proposed Option 1b involves the construction of a trestle extending from the facility on Curtis Island to the eastern side of North Passage Island (Figure 4.1). North Passage Island comprises mangrove habitat surrounded by mudflats during low tide. During high tide, this island becomes inundated. Preliminary reporting of the Curtis Island Wader Bird Survey (BAAM 2009b) indicates the mudflats around North Passage Island are utilised as foraging habitat by a number of shorebirds and observations have been made of eastern osprey (*Pandion cristatus*) nesting on the island (i.e. a listed migratory species).

Isolated island habitats such as North Passage Island provide a relative sanctuary for nesting, roosting and foraging birds. Terrestrial predators, including feral predators, are currently not likely to be able to access the island. As such, these predators do not disturb birds utilising this habitat for roosting, nesting or foraging. The proposed marine facility infrastructure for Option 1b effectively creates a bridge over which terrestrial fauna can access the island. The most likely terrestrial species to access the island via the proposed marine facility infrastructure would be feral species, such as feral rodents, cats or foxes.

Edge effects

There are several forms of edge effects associated with a development adjoining natural areas. These include the alteration of hydrological regime, sediment runoff, increased nutrients or pollutants, increased light and the spread of weed species. The increased access to the area and the altered natural condition is beneficial for some fauna species leading to increased completion for resources by species that may not currently occur within the project area. One such native species is the noisy miner (*Manorina melanocephala*). The noisy miner inhabits open grassy forests and woodlands. It is commonly seen in fragmented landscapes such as parks and gardens around urban areas. This species aggressively competes with other birds for resources often chasing other species out of the

area. A second potentially significant faunal group favoured by increased access and fragmentation are feral species such as cats and foxes.

Edge effects are discussed in term of the degrees, distance or extent to which the various forms of edge effect extend into the natural area. The boundary of the remnant area will be disturbed to varying degrees, depending on the individual effect, with the core of the remnant area remaining intact, provided that the remnant area is large enough that the edge effects do not extend to the middle of the remnant area. The result of these altered conditions on the fauna and habitat within the Project area and the wider study area will depend on the effective management of each form of edge effect.

Potential edge effects associated with the proposed development may include the alteration of hydrological regime, increased nutrient or pollutants. Within this environment, the saltpan and associated vegetation acts as a filter for sediment and nutrient flowing into this area during rain events. The proposed development will alter the flow of water from these rain events and potentially introduce nutrients or pollutants into the system through the activities of the development. The mangroves, mudflats and associated habitat at the front of the saltpan have been identified as potential habitat for two EVR species; false water-rat and rusty monitor. This area also provides potential habitat for migratory birds and a range of common fauna species. Appropriate management of the stormwater associated with the development and the runoff from the wider study will be required to maintain the habitat values of this area. Provided adequate provisions are made for sediment management, storm water management and pollutant traps within the design of the proposed facility, the potential impacts of this alteration would not be significant.

An increase in human activity associated with the construction and operation of the proposed facility, has the potential to spread weed species in the area. Weed hygiene procedures, the maintenance of healthy vegetation in a buffer zone around the facility and active management of weeds will reduce the risk of serious weed species establishing in this area. Provided appropriate weed hygiene procedures are followed and a buffer zone around the facility is managed, it is unlikely that introduced weed species will significantly impact the wider study area.

Fragmentation of the eucalypt woodland has the potential to promote access to the area for some species such as the noisy miner and feral cat. An altered balance of native fauna species, such as the increase in noisy miner, may have to be accepted as a result of the proposed development. Feral animals however, will require active management to mitigate their effects on the wider study area. One of the potential benefits of the proposed development may be the active management of feral cattle and horses currently utilising habitats within the project area.

It is likely that active fire reduction management will be implemented in the vicinity of the proposed development. There is potential for this fire reduction management to alter the floristic composition and structure of the habitat around the proposed development. Short term fire intervals will benefit those flora species that are fast growing. Colonising species such as grasses and various weed species are beneficiaries of short term intervals in fire frequency. The floristic structure of a habitat provides the variety of niches available for fauna to utilise. As such, an altered floristic structure will favour some fauna species over others resulting in changes to the faunal species composition. Provided a fire management plan is developed and implemented and that healthy vegetation buffers are maintained, this edge effect would be limited and there would not be any significant alteration to the habitat in the wider study area.

Increased exposure to artificial lighting

Concern about the effects of artificial lighting on wildlife and plants has been a relatively recent phenomenon (Longcore and Rich 2007). The disorientation caused by artificial light on species such

as nocturnally migrating birds or marine turtles is well known. More subtle influences of artificial night lighting on behaviour and community ecology are less well recognised (Longcore and Rich 2004). Research and anecdotal evidence indicate potential for artificial lighting to influence the behaviour of both nocturnal and diurnal species. A well-known example of this influence is that of insect attraction to artificial light sources. There are potential benefits to insectivorous species that can exploit this opportunity. The apparent benefit of an increased food supply for insectivorous species, however, has other implications. The existing assembly of species utilising habitat within the area may alter, resulting in a local increase in species able to exploit this niche. The balance between the gains of this new opportunity and potential increased predation resulting from increased exposure for these species is not been well understood (Longcore and Rich 2004). The potential impacts of artificial lighting on any particular species and their severity will vary depending on the ecology of the species, their predator-prey relations, the distance of the core population from the source of light and the reaction of that species to light disturbance.

Reptiles and frogs that prey on invertebrates are likely to increase foraging activity in association with increased invertebrate activity around lights. Given the current knowledge, the relationship between increased activity and increased exposure to predation cannot accurately be assessed. Artificial lighting has, however, been implicated in the decline of reptile populations (Bieir et al. 2008). The mating behaviour of frogs is potentially altered by exposure to artificial lighting. Frogs have been observed to stop mating activity when exposed to artificial lighting, with mating calls resuming once the area was shielded from the light (Longcore and Rich 2004).

Small mammals have been observed to alter foraging behaviour in response to artificial light. The behavioural changes associated with illumination are likely to be an anti-predator response because the perceived risk of predation increases with increasing light (Bird et al 2004). Insectivorous bat species have been observed to congregate around artificial lights to feed on insects. It is, however, only the faster flying bats exploiting this niche while other slower flying insectivorous bat species tend to avoid artificially lit areas (Longcore and Rich 2004).

Artificial lighting impacts on birds include the disruption of nesting sites or the altered choice of nesting sites, disruption of roosting, the altered timing of a dawn chorus and general disturbance. The impact of artificially lit towers on nocturnal migratory birds is well documented (Longcore et al. 2008; Poot et al. 2008). Birds are known to become disoriented and entrapped by artificial lights. Once a bird is within a lighted area at night, the bird may become “trapped” and will not leave the lighted area (Longcore and Rich 2004). The disorientation of nocturnally migrating birds by lights results in either direct mortality or depletion of energy reserves (Poot et al. 2008). Under the conditions of the study conducted by Poot et al. (2008), the influence of light on nocturnal migrating birds was up to five kilometres. The proposed LNG facility is a different layout to the facility studied by Poot et al. (2008), which was an oil platform. The influence of the proposed LNG facility is unlikely to extend as far due to height of the facility, the location of the facility and the surrounding terrain. The study by Poot et al. (2008) does, however, illustrate the potential for influence by artificial light.

There is no one solution to mitigate the effects of artificial nightlight. Some species are sensitive to yellow light while other species are sensitive to blue (Longcore and Rich 2007). “Turtle friendly” lights have been demonstrated to affect the foraging activity of small mammals (Bird et al. 2004). “Bird friendly” green lighting has been demonstrated to significantly reduce the impact of artificial light on nocturnal migrating birds; however, this light form has not been tested on other faunal groups (Poot et al. 2008). Further study on the impacts of artificial lighting on specific faunal groups is required to accurately assess the impacts on individual species and develop suitable mitigation measures. Currently recognised strategies to reduce potential lighting impacts include strategic light placement,

lighting shields, the utilisation of motion detection lighting (where practical) and alternative lighting options such as, yellow insect lights (Witherington and Martin 1996).

4.2.2 Migratory shorebirds

For the purpose of this section, the definition of a shorebird species will be those species listed in the Draft EPBC Act policy statement 3.21 (DEWHA 2009e). As such, this section is not applicable to all migratory listed species.

Large numbers of migratory shorebirds over-winter in Australia or New Zealand before undertaking the return migration to breeding grounds in the Northern Hemisphere. The flight path which birds in Australia utilise, is known as the East Asian-Australasian Flyway, of which Australia and New Zealand comprise the southern end. During migration, these birds are dependent on a series of staging sites along the flyway, where they stop to feed for a short period before undertaking the next stage of migration. The loss of any one of these staging sites is considered the most significant conservation issue for these migrating birds (Geering et al. 2007).

Major shorebird feeding grounds and roosting sites have been identified within the greater Port Curtis area (Figure 9) (EPA 2003b). Intertidal habitat is not utilised evenly: mudflats with exposed sea grass beds are more intensely utilised and close proximity to a high-tide roost site is identified as one of the most important factors in determining the distribution of shorebirds on an intertidal flat. Of critical importance for shorebird roosting sites is the few roost sites that are available during the particularly high or spring tides when many alternative sites are inundated (Geering et al. 2007). The Project area itself has not been identified as a major location of shorebird feeding or roosting (Figure A.8). The Project area does however, contain intertidal flats suitable for foraging habitat for a range of migratory shorebird species.

Migratory shorebirds known to occur in the wider study area include eastern curlew, red-necked stint (*Calidris ruficollis),* bar-tailed godwit (*Limosa lapponica*), whimbrel, pacific golden plover, common greenshank (*Tringa nebularia*) and grey-tailed tattler (*Heteroscelus brevipes*). A further 16 species are considered to potentially occur within the wider study area based on their distribution and preferred habitat including the common sandpiper (*Actitis hypoleucos*), ruddy turnstone (*Arenaria interpres*), sharp-tailed sandpiper (*Calidris acuminata*), red knot (*Calidris canutus*), great knot (*Calidris tenuirostris*), double-banded plover (*Charadrius bicinctus*), greater sand plover (*Charadrius leschenaultii*), lesser sand plover (*Charadrius mongolus*), Latham's snipe (*Gallinago hardwickii*), oriental pratincole (*Glareola maldivarum*), broad-billed sandpiper (*Limicola falcinellus*), asian dowitcher (*Limnodromus semipalmatus*), black-tailed godwit (*Limosa limosa*), grey plover (*Pluvialis squatarola*), marsh sandpiper (*Tringa stagnatilis*) and terek sandpiper (*Xenus cinereus*).

Under the draft guidelines a sites is considered an important site for migratory shorebirds if:

- The site is identified as internationally important or
- The site supports at least 0.1% of the flyway population of a single species or
- The site supports at least 2000 migratory shorebirds or
- The site supports at least 15 shorebird species.

Important wetlands for the Latham’s snipe are considered using different criteria and identified as sites that:

- Support at least 18 individuals of the species and
- Are naturally occurring open freshwater wetland with vegetation cover nearby.

'Site' is defined for migratory shore birds as: 'the entire (discrete) area of contiguous habitat used by the group of migratory shorebirds, which may include multiple roosts and feeding areas'. For permanent wetlands, 'support' is defined as; 'migratory shorebirds are recorded during surveys and/or known to have occurred at the site within the previous five years' (DEWHA 2009e).

Considering these guidelines for the identification of an important site for migratory shorebirds, the site to be considered is the wetland habitat within the wider study area. According to identified internationally important wetlands for shorebirds and population estimates for migratory shorebirds in the East Asian Australasian Flyway (Bamford et al. 2008), the wider study area does not meet the first two criteria for important habitat for migratory shorebirds. Port Curtis is not identified as an internationally important wetland for shorebirds. The data from this study does not support the criteria of supporting at least 0.1 percent of the flyway population of a single species within the wider study area. If the data from the whole of the Port Curtis area was considered evidence to support this criterion may be found. Further survey effort is required in assessing this criteria and the remaining criteria of the site supporting at least 2000 migratory shorebirds, the site supporting a least 15 shorebird species and the criteria for Latham's snipe.

Current data indicates there is potential for the wetlands within the wider study area to be classified as an important site for migratory shorebirds through the criteria; the site supports at least 15 shorebird species. Six of the species listed for consideration under the draft policy statement 3.21, have been recorded within the wider study area during field surveys or during recent surveys of the Curtis Island Industry Precinct; common greenshank (*Tringa nebularia*), whimbrel (*Numenius phaeopus*), bar-tailed godwit (*Limosa lapponica*), grey-tailed tattler (*Heteroscelus brevipes*), red-necked stint (*Calidris ruficollis*) and pacific golden plover (*Pluvialis fulva*).

The EPBC data search is not necessarily a record however, a further ten species have been identified as known to roost in the area through the EPBC report for the wider study area. Considering the guideline definition for support being "within the last five years", it is not conclusive to classify the wetland as important habitat based on this information alone but it does provide a strong indication of the potential use of wetlands in the wider study area.

The construction of the facility and associated marine facility infrastructure will result in the loss of some foraging habitat for shorebirds. The shorebirds have been observed foraging on the saltpan and mudflats that are directly impacted by the proposed footprint for the development. Post-construction, there is potential for some shorebirds to continue to utilise mudflats outside of the immediate development footprint provided these areas are not significantly altered during construction. It is likely however, that the utilisation of this foraging habitat will be reduced due to the disturbance created by the operation of the facility. Shorebirds have differing levels of tolerance to disturbance, with species such as the bar-tailed godwit being particularly nervous (Davidson and Rothwell 1993).

Disturbance of shorebirds causes them to waste energy, which is required for migration. Shorebirds have limited opportunity for effective foraging, during the low tide. Disturbance during this period can prevent these birds from foraging effectively (Bamford et al. 2008). The disturbance to shorebirds resulting from human associated activity is a potential impact that can be minimised with appropriate management.

Of the different forms of human associated disturbance, small aircraft and helicopter disturbance is seen as the most disturbing and long lasting. Close approaches by various craft from the water generally disturb more birds than approaches by people from the land. This is due to the majority of the shore birds being close to the water's edge when foraging or roosting. Disturbance from the land is generally a result of movement along the tidal flat, which includes people and animals, particularly dogs (Davidson and Rothwell 1993). Studies undertaken on shorebirds in the Dutch Wadden Sea

suggest that shorebirds are impacted by high sound levels with the receptor threshold being at 120 dB(A). High sound levels result in birds moving away from the area (Smit and Visser 1993). The primary mode of access to the proposed facility will be via a boat. Although a helipad will be constructed on site, there will be minimal use of helicopters.

Considering the proposed facility there are two distinct periods of differing disturbance levels, construction and operation.

The construction period potentially involves a high level of disturbance with increased activity on the land, on the water and potentially in the air with the utilisation of helicopter access to the island. It is reasonable to assume that the level of disturbance resulting from the increased activity and potentially loud intermittent noise during this construction has the potential to result in a significant level of disturbance. The impact of this disturbance can be minimised by the timing of the construction activities. Although there are some shorebirds present all year round (as some birds do not undertake the annual migration) the majority of migrating shorebirds will utilise the area from November through to March each year. As such, the disturbance as a result of construction activity outside of this period will not significantly impact these shorebirds.

Once operational, activity may cause disturbance in the wider study area as a result of increased large shipping activity, smaller boats undertaking ferry roles and increased activity around the facility. High levels of operational activity around the immediate facility will potentially cause disturbance to shorebird foraging activity on this area of the mudflat. It can be expected that there will be a reduction in the use of the mudflat immediately around the marine facility infrastructure by more nervous species of shorebirds. There is however, a suitable distance between the proposed facility and identified major feeding and roosting locations within the wider study area, for the activity of the marine facility infrastructure not to disturb these areas. Buffer zones of 150 – 200m around identified important habitat have been determined as a requirement to minimise disturbance to more nervous shorebird species (Paton et al. 2000). Providing a buffer excluding boating activity around the identified important feeding and roosting sites is maintained, it can be reasonability determined there will be minimal disturbance to the identified major roosting and feeding areas as a result of the operational activity of this facility.

4.2.3 Potential impacts on EVR and back on track fauna

Of the 24 EVR fauna species identified as potentially utilising preferred habitat within the project area (Table 4.3), 11 have the potential to be impacted directly or indirectly by the proposed development due to potential effects such as loss of preferred habitat, impacts on preferred prey, potential unearthing or the potential increase in feral species. The 11 species include four birds, four mammals and three reptiles.

Eight of the EVR fauna species identified as potentially occurring within the study area are species that are nomadic, highly mobile or occupy very large home ranges. These comprise the grey goshawk, glossy black cockatoo, black-necked stork, red goshawk, square-tailed kite, black-chinned honeyeater, squatter pigeon and little tern (EPA 2002). Given the extent of the vegetation that may be cleared for construction of the proposed development, compared to the overall area over which individuals of these species range, it is considered that no significant impact is likely to occur to these species.

Table 4.3 Commonwealth and State listed EVR fauna potentially impacted by the proposed Project

Common name	Ecology and distribution notes	High mobility taxon*	Potential impacts
grey goshawk	Prefer heavily timbered areas. Sedentary once a home range is established with established pairs holding the same home range in consecutive years. The nests are large structures, up to 500mm in diameter and are often built on in consecutive years (Schodde and Tidemann 1990). No grey goshawk nests have been observed by recent studies on Curtis Island. It is likely this species would avoid any disturbance within its foraging range.	✓	No significant impact.
glossy black cockatoo	Specialised feeder, reliant on *Casuarina* and *Allocasuarina* seeds. Breeding occurs in hollows of living eucalypt trees (Garnett and Crowley 2000). The site does not contain significant quantities of casuarinas or permanent water.	✓	No significant impact.
black-necked stork	Found in freshwater wetlands and occasionally mangrove habitats (DECCW NSW 2005). The mangrove habitat provides some foraging potential for this species. The study area however, would not be critical habitat for this species.	✓	No significant impact.
yellow chat (Dawson)	Critical habitat is wetlands and associated grassland on seasonally inundated marine plains. Sensitive to trampling of habitat by feral pigs and cattle (Houston and Melzer 2008). Field survey found that the marine plains on site was heavily grazed and trampled by cattle and horses. As such the area does not provide suitable habitat for the Dawson yellow chat.	N	No significant impact.
red goshawk	Require very large territories with a mosaic of vegetation types, favouring areas with permanent water and large bird populations. Nest constructed within one kilometre of permanent water (NSW NPWS 2002). They often hunt at least three kilometres from the nest (Schodde and Tidemann 1990).	✓	Potential loss of habitat if this area is within the home range of an individual.
beach stone-curlew	Forages on the intertidal zone for crabs and invertebrates (DERM 2007). One individual sighted on the saltpan during the April field surveys. Three individuals were regularly observed at Laird Point during the October field surveys.	✓	Potential loss of habitat through increased disturbance.

Common name	Ecology and distribution notes	High mobility taxon*	Potential impacts
squatter pigeon (sthn)	Occurs mainly in grassy woodlands and open forests dominated by eucalypts, usually with access to water (DEWHA 2009a). This species is highly mobile usually found in areas with access to water (Garnett and Crowley 2000). There is no specific location identified where nesting is likely to occur.	✓	No significant impact.
sooty oystercatcher	Found on rocky headlands, beaches and exposed reefs (DECCW NSW 2005). The species has been recorded during recent surveys on Curtis Island (BAMM 2009a).	✓	Potential loss of habitat.
powerful owl	Preferred habitat is eucalypt forest with home ranges centred on densely vegetated gullies. Prey species are mainly arboreal and semi arboreal marsupials such as possums and gliders (Webster et al. 2004). One individual has been recorded in eucalypt woodland adjacent to the southern boundary of the study area (Sandpiper 2008).	✓	Potential loss of habitat and tree hollows utilised by prey species.
eastern curlew	A migratory species arriving in Australia around August. Forages on intertidal mudflats, particularly exposed seagrass beds (Geering et al. 2007). The species was observed on the intertidal mudflats and saltpan during the field surveys.	✓	Potential loss of habitat.
little tern	The identified critical habitat for this species is nesting sites. Nesting occurs on undisturbed beaches (Garnett and Crowley 2000). The sandbar across the front of the saltpan is heavily disturbed by horse activity, it is unlikely to be utilised as a nesting site for this species.	✓	No significant impact.
square-tailed kite	Prefers structurally diverse habitats with communities that are rich in passerines. Nests are located along drainage lines (NSW NPWS 1999). Recent studies of the Curtis Island Industry Precinct have not recorded any nests or observed any individuals of this species.	✓	No significant impact.
black-chinned honeyeater	Prefers open eucalypt woodland with an annual rainfall between 400 to 700mm. Locally nomadic foraging over areas of at least five hectares (DECCW NSW 2005). This species has not been record on Curtis Island during recent surveys of the Curtis Island Industry Precinct.	✓	No significant impact.
large-eared pied bat	Occurs in areas with extensive cliffs and caves,	N	No significant

Common name	Ecology and distribution notes	High mobility taxon*	Potential impacts
	which provide roosting sties, and in well-timbered areas with gullies close to these roosting areas (DECCW NSW 2005). The study area does not contain cliffs or caves required for roosting by this species.		impact.
little pied bat	Roosting occurs in mines, caves and tree hollows (Duncan et al. 1999). This species has been recorded in the wider study area and the site contains potential roosting sites in tree hollows.	N	Potential loss of tree hollows.
northern quoll	Major threatening process is the arrival of cane toads. Cane toads were observed on site. Populations of northern quoll are persisting in areas where there are cane toads. The terrain within the wider study area is consistent with the habitat of currently persisting populations.	N	Potential loss of habitat if a population persists on Curtis Island.
yellow-bellied glider (sthn ssp.)	In coastal forest the preferred habitat is moist gullies and drainage line line habitats. Requires mature forest with a mix of eucalypt species. Occurs in naturally low densities within the landscape. Den in family groups requiring large tree hollows (NSW NPWS 2003). The yellow bellied gilder has been recorded on the mainland within the wider study area. The study area contains habitat suitable for this species.	N	Potential loss of habitat.
koala	Generally koalas inhabit open eucalypt forests with sparse ground cover and tend to avoid thick forests and steep slopes (EPA 2006c). Essential habitat is mapped for koalas within the Project area and the wider study area. Recent studies within the Curtis Island Industry Precinct have indicated one record of scratches attributed to a koala (Santos 2009). A precautionary approach assumes there is a population within the wider study area.	N	Potential loss of habitat.
grey-headed flying-fox	The nearest known roosting site for this species is south of Gladstone, with Gladstone being the currently accepted north limit of its range. Night foraging is usually conducted within 15km of a daytime roost (DECC NSW 2009).	N	No significant impact.
coastal sheathtail bat	Found along the coastline from Shoalwater Bay to Cape York Peninsula, extending no more than a few kilometres inland. Roosting occurs in caves and rock crevices (Duncan et. al. 1999). The study area	N	No significant impact.

Common name	Ecology and distribution notes	High mobility taxon*	Potential impacts
	does not contain suitable roosting habitat for this species.		
false water-rat	Inhabits intertidal wetlands and adjacent habitats (DERM 2009c). The mangroves and associated grassland habitat at the front of the clay pan has been identified as suitable habitat for this species.	N	Potential loss of habitat.
black flying-fox	Daytime roosts can consist of large numbers of individuals in riparian habitat. The daytime roost is often shared with other species of flying-fox. (Van Dyck and Strahan 2008). Flying-fox roosting sites have been identified in the greater Gladstone region, the nearest roost to the study area is along Grahams Drainage line north of the site (DERM 2008a). The black flying-fox has been recorded within the wider study area.	✓	Potential loss of habitat.
ornamental snake	Inhabits low lying areas with deep cracking clay soils and adjacent slightly elevated ground. Diet is almost exclusively frogs (Cogger et al. 1993). The study area does not contain any deep cracking soils consistent with the known records of this species, as such it is not considered optimum habitat for this species.	N	No significant impact.
yakka skink	Usually found in open dry sclerophyll forest or woodland (Cogger et al. 1993). There are no records of this species within the wider study area, however Yakka skinks utilise burrows for shelter and can be elusive to observe in the field. A precautionary approach assumes a population is present.	N	Potential unearthing during construction and loss of habitat
brigalow scaly-foot	There is a known population on Boyne Island south of Gladstone. Found in a wide variety of dry open forest and woodland habitats (Tremul 2000). There are no records of this species within the wider study area, however this is a nocturnal species which can make observation difficult. A precautionary approach assumes a population is present.	N	Potential loss of habitat.
rusty monitor	Found in coastal and estuarine mangroves, paperbark forests and in the associated rivers (Fitzgerald 1997). The rusty monitor has been recorded within the wider study area. The habitat within the study area is suitable for this species.	N	Potential loss of habitat.

*High mobility taxon: EVR fauna with large home ranges (greater than 100ha per reproductive unit), as defined by EPA (2006b).

The field assessment has identified that the habitat potential for two known EVR species is low. These habitat areas have been degraded or do not contain suitable habitat characteristics. The Dawson yellow chat is one of these EVR species identified as potentially occurring in the Project area. Field assessment of the project area identified the potential habitat for this species is heavily grazed and disturbed by feral cattle and horses. As such, the Dawson yellow chat is unlikely to occur in the project area. The ornamental snake is another of the EVR species identified as potentially occurring in the Project area. Field assessment of the Project area identified the potential habitat for this species, the paperbark wetland to be a relatively small, disturbed by cattle and did not contain deep cracking clays. Deep cracking clays are a habitat feature associated with the known occurrences of this species. As such, it is unlikely that this species would occur within this project area.

The large-eared pied bat, coastal sheathtail bat and the grey-headed flying-fox are three other EVR fauna species identified as potentially occurring within the project area. They have been identified, given the potential for the Project area to fall within their foraging range. Given the size of the area that may be impacted for the proposed development, the extent of similar habitat for these species within the wider study area and the foraging range of these species, it is considered that there is minimal potential for the proposed development to impact significantly on these fauna species.

The little pied bat roosts in caves, mineshafts and tree hollows (Duncan et al. 1999). This species has been identified in the wider study area; however recent surveys have not recorded this species within the Curtis Island Industry Precinct. The proposed development may potentially impact this species through loss of tree hollows (roosting) and foraging habitat within its range. It is considered unlikely that this would be a significant impact for this species.

The yellow-bellied glider has a rank of high under the Back on Track Framework. Desktop review identified this species within the wider study area. Recent surveys within the wider study area have identified this species on the mainland but there were no sightings during studies within the Curtis Island Industry Precinct. The study area contains suitable foraging habitat for the yellow-bellied glider. If the yellow-bellied glider occurs within the wider study area on Curtis Island, there is a potential for loss of habitat resulting from the direct impact of clearing for the proposed development.

The red goshawk is sparsely distributed across its range. Individuals require very large territories and occur in area of high biodiversity (NSW NPWS 2002). Established pairs occupy the same large territories in successive years with hunting often occurring at least three kilometres away from the nest (Schodde and Tidemann 1990). There are no records of the red goshawk within the wider study area. Given however, the foraging range of this species a precautionary approach has been taken and the assumption made that the study area is within the foraging range of this species. As such, there is potential for loss of foraging habitat for this species.

Field surveys and recent studies conducted within the wider study area on Curtis Island, have identified four EVR bird species occurring within the Curtis Island Industry Precinct that are potentially impacted by the proposed development including the beach stone-curlew, sooty oystercatcher, powerful owl and eastern curlew. Based on habitat preference, three EVR reptile species and four EVR mammal species have been identified as potentially occurring within the project area and as such, potentially impacted by this proposed development through loss of habitat. These species include northern quoll, koala, false water-rat, black flying-fox, yakka skink, brigalow scaly-foot and rusty monitor.

Within the wider study area, there are similar habitats potentially suitable for these species. If these species are present in the project area, the potential impacts include the loss of habitat. These impacts are likely to be localised to the area directly impacted by the development.

The sooty oystercatcher, beach stone-curlew and eastern curlew utilise the foreshore habitat within the wider study area. The proposed development will result in disturbance of this habitat during construction and continued human activity within the area. The proposed development is likely to reduce the utilisation of this area by these species.

The powerful owl has been identified in habitat adjacent to the study area (Sandpiper 2008). The powerful owl occupies a large home range and the habitat within the study area is suitable for their prey species. The construction of the proposed development will impact habitat for prey species and reduce habitat within the foraging range of the identified individual.

The black flying-fox has been identified within the wider study area. The proposed facility is unlikely to impact on known flying-fox roosts. This species is however, potentially impacted through loss of foraging habitat.

The northern quoll and koala potentially occur within the wider study area. If they occur they may utilise the eucalypt woodland habitat within the development footprint. As such, they may be impacted by loss of habitat.

The yakka skink and brigalow scaly-foot potentially utilise eucalypt woodland habitat with the study. If these species occur within the study area they may be unearthed during construction of the proposed facility and impacted through loss or disturbance of habitat.

False water-rat and rusty monitor potentially utilise the mangrove habitat and adjacent foreshore habitats within the study area. The proposed development will directly impact on the mangrove habitat through the construction of the marine facility infrastructure. If these species occur within the study area they may be impacted through loss of habitat. The development footprint indicates the mangrove habitat in front of the saltpan will remain. These mangroves and associated habitat are considered the most likely habitat within the study area for these species to occur. Although the development footprint does not directly impact on this area, edge effects from development near this habitat may impact on these species if they are present. Edge effects relevant to these species or their prey include an altered hydrological regime and sediment or pollutants which may affect their preferred prey.

Of the species identified as potentially impacted by the proposed development, four are listed under the Back on Track Framework including the beach stone-curlew, false water-rat, yellow-bellied glider and rusty monitor.

Each EVR species identified as potentially utilising habitat within the project area is individually discussed in Appendix J and the potential impacts on these species are described.

4.2.4 Potential to create new mosquito breeding grounds

The potential for the proposed development to increase breeding sites for mosquitoes relates to altered hydrological regimes which cause water to be retained in environments amenable to mosquito breeding. This may include stored equipment and materials that retain water. The current hydrological regime results in shallow pools of standing water around the saltpan. This provides a suitable environment for mosquito breeding. Construction of the proposed facility will require the alteration of the current hydrological regime associated with the saltpan. Assuming the mitigation measures recommended in Section 6.4 are successfully implemented there is potential to reduce mosquito breeding sites within the project area.

5. Legislative and approval requirements

5.1 Commonwealth Government

5.1.1 Environment Protection and Biodiversity Conservation Act 1999

At the Commonwealth level, the EPBC Act is applicable to those developments/actions that are likely to impact on a matter of NES. Matters of NES potentially affected by the Project include threatened flora and fauna species and migratory species protected under international agreements.

The proposed project area lies wholly within the Great Barrier Reef World Heritage Area. It does not include or lie adjacent to any threatened ecological community or Ramsar-listed wetland listed under the EPBC Act; however, the Port Curtis Marine Park lies directly to the west of the site and the Great Barrier Reef Marine Park is situated just north of the site. No threatened flora species listed under the EPBC Act were recorded on site during the field survey and there are no historical flora records for these species on site; however, the project area supports suitable habitat for two of these species, quassia and the large-fruited zamia palm, based on habitat preference.

Based on habitat preference, nine EPBC-listed fauna species may potentially utilise habitat within the project area including red goshawk, squatter pigeon, large-eared pied bat, northern quoll, grey-headed flying-fox, black flying-fox, false water-rat, yakka skink and brigalow scaly-foot.

Seven migratory listed fauna species were also observed on site during the field survey including the eastern curlew, eastern reef egret, white-bellied sea-eagle, rainbow bee-eater, whimbrel, pacific golden plover and caspian tern. Based on habitat preference, a further 35 migratory listed fauna species may also potentially utilise habitat within the site (Appendix I).

5.2 Queensland Government

5.2.1 Environmental Protection Act 1994

The *Environmental Protection Act 1994* provides the framework to manage the environment within the principles of ecologically sustainable development and outlines responsibility and the duty of care all persons have to the environment and the scope and content for preparing environmental protection policies. This Act provides for the licensing of Environmental Relevant Activities as defined under the Act including activities that could cause actual or potential environmental harm by the generation of emissions or through carrying out the activity, cause contamination or are listed as 'other notifiable activities' under Schedule 2 of the Act.

The proposed Project will require an Environmental Authority under this Act.

5.2.2 Nature Conservation Act 1992

The NC Act provides a comprehensive strategy for the conservation and management of Queensland's native animals and plants. Under this Act, approval is required to remove or destroy scheduled flora and fauna species and protected areas and to remove or destroy least concern plants as defined under the *Nature Conservation (Protected Plants) Conservation Plan 2000*.

No threatened flora species listed under the NC Act were recorded within the project area during the field survey and there are no historical threatened flora species records for the site. The project area is

considered to support suitable habitat for two species under the NC Act both of which are also listed under the EPBC Act. The large-fruited zamia palm and quassia are considered vulnerable under both Commonwealth and State legislation.

The proposed Project will involve the removal and disturbance of common native plant species and as such, may require a permit under the NC Act.

Two NC Act listed fauna species, the beach stone-curlew and eastern curlew were observed on site during the field survey. Based on habitat preference, a further 19 NC Act listed fauna species may potentially utilise habitat within the project area including the grey goshawk, glossy black cockatoo, black-necked stork, red goshawk, squatter pigeon, sooty oystercatcher, powerful owl, little tern, square-tailed kite, black-chinned honeyeater, large-eared pied bat, little pied bat, koala, grey-headed flying-fox, coastal sheathtail bat, false water-rat, yakka skink, brigalow scaly-foot and rusty monitor.

5.2.3 Vegetation Management Act 1999

The VMA provides for the management of remnant vegetation and essential habitat areas whilst the Queensland *Vegetation Management and Other Legislation Amendment Bill 2009* provides for high value regrowth vegetation. The conservation status of remnant vegetation in Queensland is recognised under this Act and includes three categories:

- Endangered: which includes remnant vegetation where there is less than 10% of the pre-clearing extent remaining (or 10 to 30% remaining if the remnant is less than 10,000 hectares in area);
- Of concern: which includes remnant vegetation where there is less 10 to 30% of the pre-clearing extent remaining (or more than 30% remaining if the remnant is less than 10,000 hectares); and
- Not of concern: which includes remnant vegetation where there is over 30% of the pre-clearing extent remaining and the remnant is greater than 10,000 hectares.

Option 2a would result in the removal of approximately 50.3ha of concern and 105.5ha not of concern remnant vegetation and Option 1b would require an additional 0.7ha of not of concern remnant vegetation (RE. 12.1.3) to be removed. Vegetation clearing associated with both options would not impact upon the current conservation status of REs on site.

Under the *Integrated Planning Act 1997,* petroleum activities associated with the Project within the Project area are recognised as exempt activities and therefore are exempt from approval under the VMA. However, it is the intention of the Project to minimise environmental harm and as such, consideration has been made to minimise potential impacts on remnant vegetation on site and mitigation measures to achieve this have been discussed.

5.2.4 Fisheries Act 1994

The *Fisheries Act 1994* promotes ecological sustainability through accountability in terms of the use, conservation and enhancement of the community's fisheries resources and fish habitats. Under Section 51 (1) of the Act, a permit is required for activities which result in the removal, destruction or damage to marine plants.

Marine plants are present in the intertidal areas of the project area and on North Passage Island. Option 2a would require the clearing of 31.1ha of marine plant vegetation whilst Option 1b would require an additional 0.7 ha to be removed.

5.2.5 Water Act 2000

The Water Act 2000 provides for the sustainable management of water and other resources, a regulatory framework for providing water and sewerage services and the establishment and operation of water authorities. Under this Act, a riverine protection permit is required to undertake activities involving the disturbance and/or destruction of vegetation, excavation and placing fill below the high bank mark of any drainage line, lake or spring.

Several drainage lines are mapped within the proposed project area and as such, activities associated with the Project that would result in the removal or disturbance of these drainage lines would be subject to approval under this Act.

5.2.6 Land Protection (Pest and Stock Route Management) Act 2002

The *Land Protection (Pest and Stock Route Management) Act 2002* provides for the management of pests on land and the management of the stock route network. This Act identifies State declared plants (weeds) and animal pests and the management requirements of landholders to control these species.

Three declared plant species were recorded on site during the field survey including rubber vine and lantana in the north-western portion of the site. Prickly pear was recorded throughout the site and all declared plants were observed as small, isolated populations with the exception of a larger population of common prickly pear along the western boundary.

No declared animal pest species were observed on site during the field survey; however, current literature suggests up to five of these species may utilise the project area including the feral dog, feral cat (*Felis catus*), rabbit (*Oryctolagus cuniculus*), feral pig (*Sus scrofa)* and red fox (*Vulpes vulpes*).

5.3 Local Government

5.3.1 Calliope Shire Council Planning Scheme 2007

The Calliope Shire Council amalgamated with Gladstone City and Miriam Vale Shire Councils in March 2008 to form the Gladstone Regional Council; however, the *Calliope Shire Council Planning Scheme 2007* is still in force. This scheme was gazetted in April 2007 and provides the framework for managing development in a way that advances the purposes of the *Integrated Planning Act 1997* by identifying assessable and self-assessable development and outcomes sought to be achieved in the local government areas.

This scheme identifies coastal wetland and biodiversity areas within the shire and outlines performance requirements through the coastal management and biodiversity overlay code to manage potential impacts associated with proposed development in and adjacent to these areas such as restricting development in wetland communities and designating/protecting surrounding buffer areas.

Intertidal areas of the proposed project area are mapped as coastal wetland areas and wetland buffer areas under this scheme.

5.3.2 Curtis Coast Regional Coastal Management Plan 2003

The *Curtis Coast Regional Coastal Management Plan 2003* provides to the framework to manage the Curtis Coast region and guides the DERM's decisions regarding coastal development and management.

This plan identifies significant ecological characteristics in the region including habitat areas, shorebird populations, coastal wetlands and declared fish habitat areas and outlines provisions for their management. The proposed Project is mapped as containing eucalypt forest, riparian forest and coastal wetland habitats.

6. Mitigation and rehabilitation recommendations

Mitigation measures are recommended to minimise the potential impacts of the proposed Project on the terrestrial flora and fauna values on site and are summarised below.

6.1 Project design

- Option 2a is the preferred design layout as it would require less clearing of native and remnant vegetation and would result in less disturbance to habitat areas. Option 2a avoids direct disturbance to North Passage Island maintaining the habitat values of this island.

6.2 Vegetation communities and habitat areas

- Develop and implement a vegetation management plan which outlines procedures for clearing activities and revegetation/rehabilitation measures. All personnel associated with the construction of the Project should be inducted into this plan.
- Clearing should be limited to the minimum possible extent that is necessary to construct and operate the proposed facility where practicable. Existing tracks and open areas should be utilised where possible.
- Where clearing is unavoidable (e.g. coastal wetland area), clearing should be undertaken in such a way as to minimise disturbance. Clearing should be undertaken in dry weather conditions to reduce soil disturbance. Where clearing is required during wet weather conditions, sediment control measures should be implemented such as sediment trap devices to reduce sediment runoff and loss of topsoil.
- Clearing of native vegetation in and adjacent to drainage lines should be restricted where practicable.
- Areas cleared during construction which are not designated for infrastructure should be rehabilitated to reduce the potential for sediment runoff and erosion. Landscaping and revegetation should be employed in these areas to promote soil stabilisation and discourage weed establishment.
- Vegetated areas should be retained and created where practicable. Regeneration and revegetation efforts should be employed in these areas to promote native biodiversity, reduce weed invasion and improve habitat quality. Revegetation/reseeding efforts should be based on soil types, existing location vegetation characteristics and endemism of selected species and should involve the implementation of a monitoring program.
- Vegetation should be cleared in a staggered sequence to allow fauna species to relocate off site.
- Trees should be felled into the construction site or in natural slots between stands of trees to minimise damage to other trees during the clearing process. Machinery contact with standing trees on vegetated margins should be avoided.
- Ensure all vehicles contain spark arresters on diesel engines, fire extinguishers and other fire fighting equipment and personnel trained in fire fighting are on-hand during welding operations to minimise damage caused by accidental fires.

- Erosion control measures should be implemented to reduce sediment loss through run-off and vegetation clearing in erosion prone areas should be avoided.
- Topsoil should be retained where practicable and along with mulch and discard vegetation debris, be spread in retained vegetated areas.
- All hazardous substances and materials including fuels, oils and chemicals should be stored, handled and disposed of in such a way as to minimise potential leakage to the environment.

6.3 Flora and fauna species

6.3.1 Flora

- Pre-clearing surveys should be undertaken prior to all clearing activities within remnant vegetation area and riparian areas to identify the presence of EVR and other significant flora species. .
- Species specific management plans should be developed and implemented. Plans should include measures to identify significant species, options to retain populations where practicable on site and measures to mitigate or offset any loss of populations as a result of the Project. Where the clearing of significant plant species is unavoidable, measures to offset this impact should be implemented. These measures may include rehabilitating and increasing an existing population on the mainland or translocating populations to retained vegetated areas elsewhere on site.

6.3.2 Fauna

- Pre clearing inspections should be conducted by a qualified fauna spotter to identify potential nesting, roosting or refuge sites. If nesting sites are located and can not be avoided, individuals should be relocated if practical or a suitably qualified fauna carer should be engaged to look after the individuals until they can be released.
- The development of a clearing plan, which allows the more mobile fauna to move away from the construction area. Where practicable, clearing should be undertaken in a mosaic pattern with habitat trees removed last.
- A qualified fauna spotter/catcher to be present during clearing operations to provide direction on the clearing plan, to capture and relocate fauna and to treat injured fauna found during clearing program.
- Where it is not practical to avoid clearing of hollow bearing trees, the clearing plan should allow time for mobile species potentially utilising these hollows to move away from the clearing operation. Inspections of all hollows should be undertaken prior to removal of the tree. Tree sections containing hollows should be retained and placed in the retained vegetation areas for utilisation by ground dwelling fauna.
- The development of a feral animal management plan. This should prioritise the removal of the current major feral animal disturbance in the area (i.e. cattle and horses), the control of other known feral populations (i.e. cats, foxes and pigs), the prevention of new species being introduced to the area and the eradication of a new feral species outbreak.
- Limit activity on mudflats between November to March, to those activities which are essential to the construction or operation of the facility.

- During November to March, a buffer of 200m should be maintained around the identified major feeding and roosting sites on the mainland adjacent to the Project area , to minimise potential disturbance to migrating shorebirds. Boat skippers should be educated in maintaining distance from these sites during November to March and appropriate travel routes developed.
- Restrict vehicle and personnel movement at Laird Point to minimise disturbance to this shoreline habitat. Particularly effort should be made to minimise disturbance to the beach stone-curlew. Planned development site roads should be utilised to minimise potential disturbance

6.4 Biosecurity

6.4.1 Weeds and plant diseases

- Develop and implement a biosecurity management plan to manage weeds and diseases that may impact on the natural plant biodiversity values of the project site. This plan should be based on the principles of the Queensland Biosecurity Strategy 2009-14 (DPI 2009) for managing weed species including prevention and awareness, early detection and monitoring and control.

6.4.2 Animal pests and diseases

- All equipment and materials should be inspected for pest animals and weeds prior to delivery on Curtis Island.
- Mosquito and biting midge management should include the following strategies
  - Stagnant pools of water should be drained or filled (where practical) to minimise breeding sites
  - Depressions created during the construction or operation of the facility should be filled as soon as practical
  - Stored items, including waste materials, should be stored in such a manner as to avoid ponding water
  - Soil erosion should be monitored and control to prevent the formation of water pooling sites in drains and water courses within the Project area
  - Water holding facilities within the Project area should be regularly inspected for mosquito and midge activity
  - Insect repellent should be available as required
  - Where practical, facilities should incorporate mosquito and midge barriers, such as fly screens or utilise air conditioning.

7. Environmental offsets

Mitigation measures discussed in Section 6 are considered adequate to minimise the potential impacts of the proposed Project on the terrestrial flora and fauna values of the site. However, an environmental offset plan should still be considered as a viable option to managing impacts on site and particularly where those mitigation measures cannot be implemented or are considered inadequate to reduce those impacts.

Environmental offset policies have been developed at the Commonwealth and State level and an offset plan may involve:

- Direct offsets aimed at on-ground maintenance and improvement of habitat or landscape values through:
  - Long-term protection of existing habitat e.g. acquisition and inclusion of land under protected estate and covenanting arrangements on private land
  - Restoration or rehabilitation of existing degraded habitat
  - Re-establishment of habitat.
- Indirect offsets aimed at improving the knowledge, understanding and management leading to improved conservation outcomes including:
  - Implementation of recovery plan actions including surveys
  - Contributions to relevant research or education programs
  - Removal of threatening processes
  - Contributions to appropriate trust funds or banking schemes that can deliver direct offsets through a consolidation of funds and investment in priority areas
  - On-going management activities such as monitoring, maintenance, preparation and implementation of management plans.

7.1 Use of environmental offsets under the EPBC Act

Environmental offsets can be used under the EPBC Act to maintain or enhance the health, diversity and productivity of the environment as it relates to matters protected by the EPBC Act (i.e. matters of NES and more broadly for actions involving the Commonwealth).

Environmental offsets must be selected in accordance with the eight principles of the Draft Policy Statement (DEWHA 2007), i.e:

- Environmental offsets should be targeted to the matter protected by the EPBC Act that is being impacted
- A flexible approach should be taken to the design and use of environmental offsets to achieve long-term and certain conservation outcomes which are cost effective for proponents
- Environmental offsets should deliver a real conservation outcome
- Environmental offsets should be developed as a package of actions - which may include both direct and indirect offsets

- Environmental offsets should, as a minimum, be commensurate with the magnitude of the impacts of the development and ideally deliver outcomes that are 'like for like'
- Environmental offsets should be located within the same general area as the development activity
- Environmental offsets should be delivered in a timely manner and be long lasting
- Environmental offsets should be enforceable, monitored and audited.

7.2 Use of Queensland Government environmental offsets

Under the Queensland Government, environmental offsets provide measures to be taken to counterbalance certain unavoidable negative environmental impacts of a particular Project and can be applied to several aspects including vegetation management and other environmental management issues such as loss of habitat and biodiversity.

Environmental offsets policy

The Environmental Offsets Policy (EPA 2008b) provides policies for specific areas of environmental management and outlines the principles in which environmental offsets must be selected i.e:

- Environmental offsets will not replace or undermine existing environmental standards or regulatory requirements, or be used to allow development in areas otherwise prohibited through legislation or policy
- Environmental impacts must first be avoided, then minimised, before considering the use of offsets for any remaining impact
- Environmental offsets must achieve an equivalent or better environmental outcome
- Environmental offsets must provide environmental values as similar as possible to those being lost
- Environmental offset provision should minimise the time-lag between the impact and delivery of the offset
- Environmental offsets must provide additional protection to environmental values at risk, or additional management actions to improve environmental values
- Environmental offsets must be legally secured for the duration of the offset requirement.

Policy for biodiversity offsets

The objectives of the Queensland Government draft Policy for Biodiversity Offsets (DERM 2008b) are to improve the long-term protection and viability of the State's biodiversity, to increase the area of habitat restored and enhanced and to ensure development in Queensland is ecologically sustainable. It provides criteria for identifying and utilising biodiversity offsets to counterbalance an impact that causes a loss of biodiversity values.

Under the draft policy, biodiversity offsets must achieve an equivalent or better environmental outcome for the biodiversity values impacted and may include direct offsets (such as acquiring lands to be included in a protected estate or rehabilitation and protection of regrowth vegetation), or indirect offsets including removing threats to biodiversity values, providing fauna assisted crossings and implementing actions of a recovery plan, biodiversity action plan or management plan.

The draft Policy for Biodiversity Offsets may provide a useful guide to calculate potential offsets based on the conservation status of the values impacted. However, the policy in its present form is a consultation draft and is subject to considerable change. Therefore, it is not considered further here.

Policy for vegetation management offsets

The Policy for Vegetation Management Offsets (DERM 2009d) provides the criteria for vegetation offsets including limitations of offsets, values and regional ecosystems, ecological equivalence and legal requirements. Offsets under this policy may provide an alternative solution to ameliorating the potential impacts of the Project on vegetation values on site i.e. of concern and not of concern REs.

8. Conclusion

The proposed project area is well vegetated and supports a diverse range of terrestrial flora and fauna species. Whilst no significant flora species were recorded during the field surveys, the site may still support suitable habitat for some of these species. Several significant fauna species were also observed on site and the habitats present may support several more.

The proposed Project has the potential to impact upon terrestrial flora and fauna values on site through direct loss or harm to individual species, populations and vegetation communities and degradation/modification of habitat areas. Of the two options proposed, Option 2a is considered the preferred option as it does not require the disturbance of North Passage Island which is considered an important fauna habitat area and would require less clearing of remnant vegetation then Option 1b. With the implementation of mitigation measures recommended, the potential impacts associated with the Project can be managed to reduce their severity and longevity, thereby minimising the overall impact of the proposed Project on these values.

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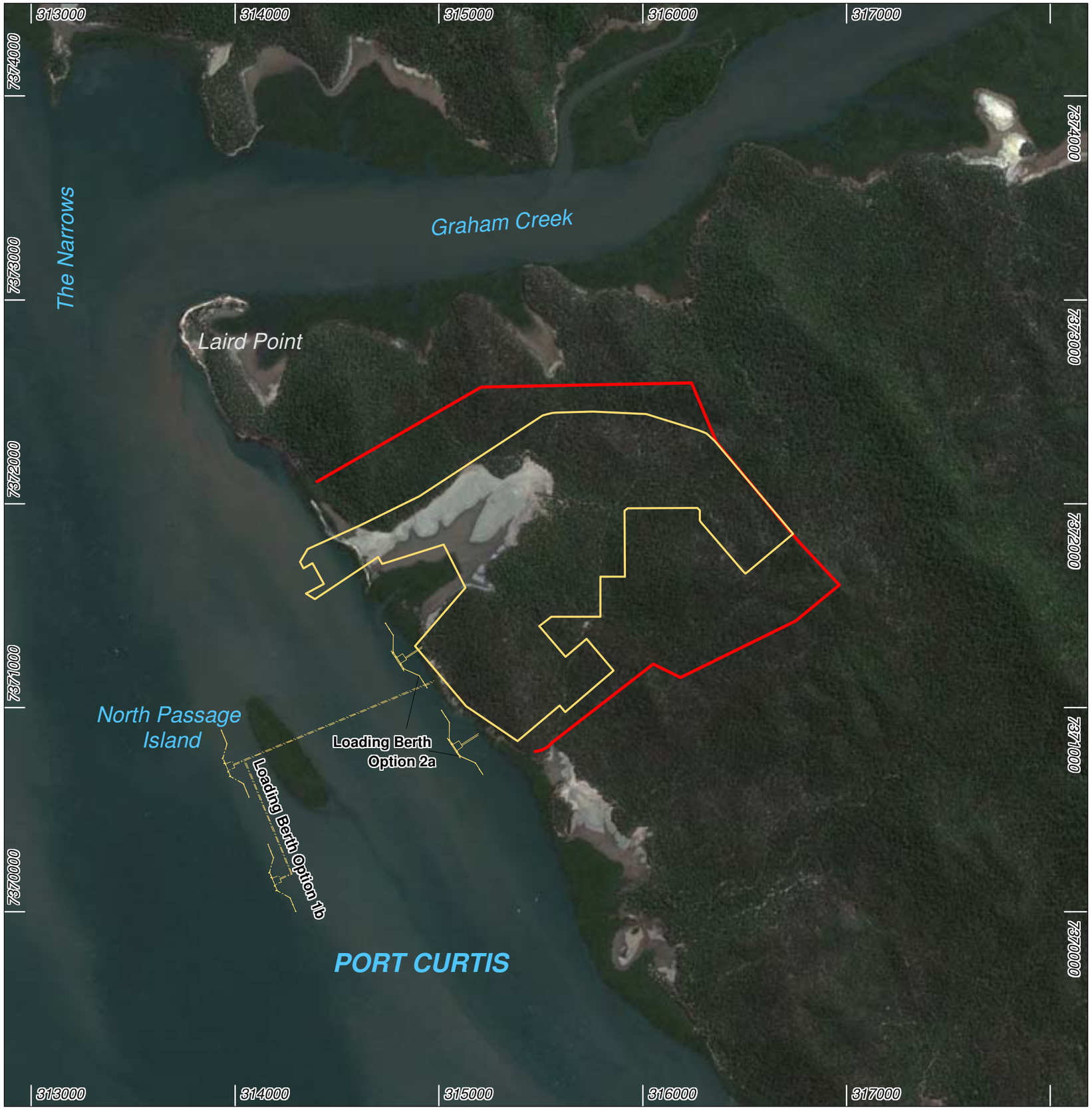
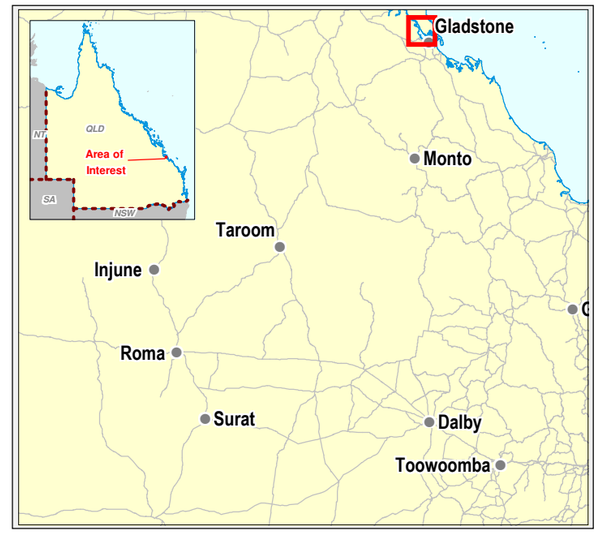
Figures





LEGEND

- Loading berth option 1b
- Loading berth option 2a
- Development footprint
- Study area

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SCALE - 1 : 20,000 (at A3)

Map Grid of Australia Zone 56
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Figure 1 LNG facility footprint - berth options 1b and 2a

Project No: 301001-00752	Figure: 00752-00-EN-DAL-0078	Rev: 0

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LEGEND

- Flora Survey Site
- Study area

Regional ecosystems

Remnant endangered regional ecosystem
- Dominant
- Sub-dominant

Remnant of concern regional ecosystem
- Dominant
- Sub-dominant

Other
- Least concern regional ecosystem

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Indicative Pipeline route supplied by Decmil. Drawing No. PI-000-5005

Satellite imagery captured by GeoEye-1 on 24 March 2009

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Figure 2 Regional ecosystem mapping (version 6.0)

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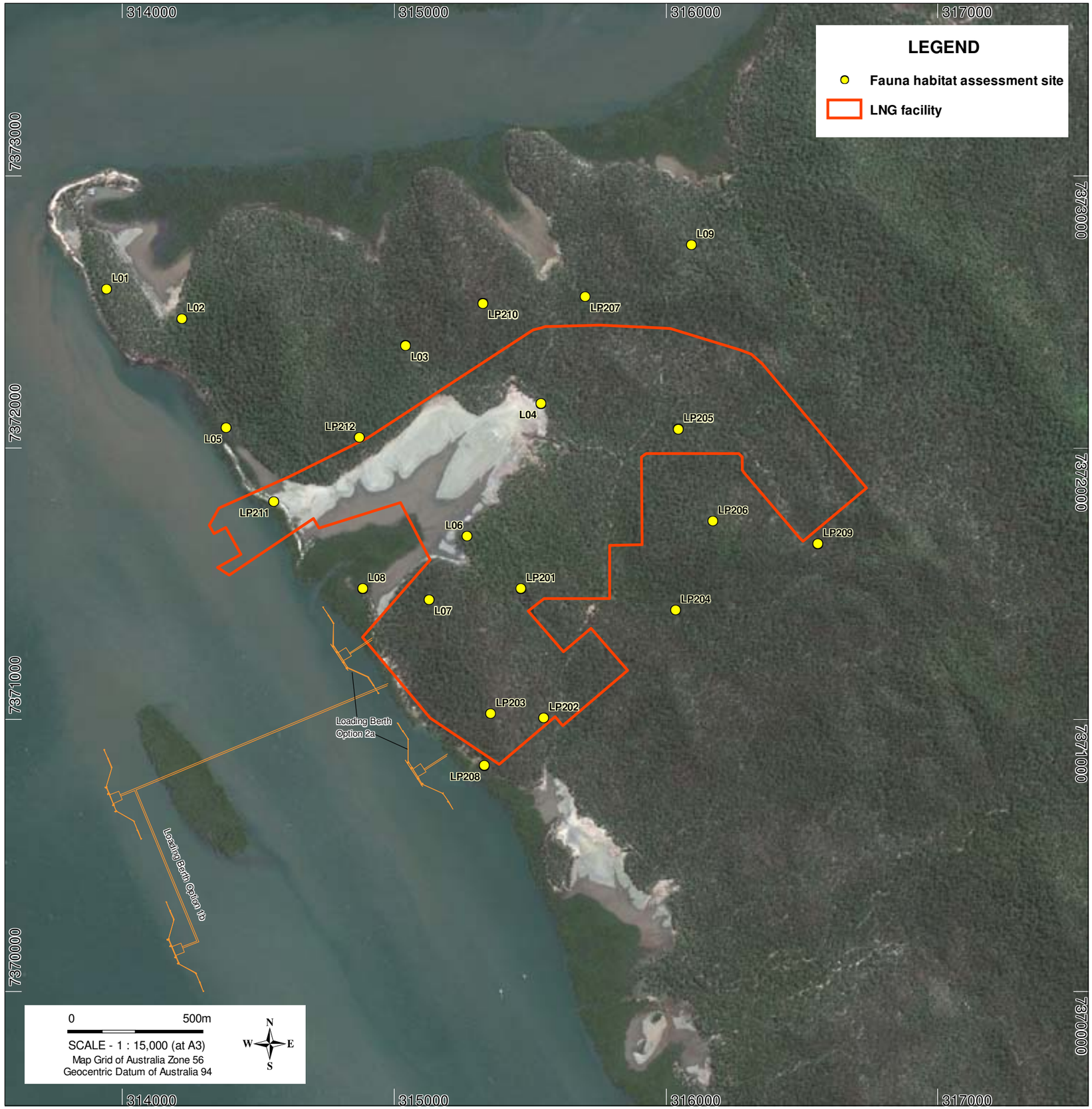

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Habitat Assessment Locations provided by B. Kuhlmann on 3/11/2009

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Figure 3 Fauna habitat assessment sites

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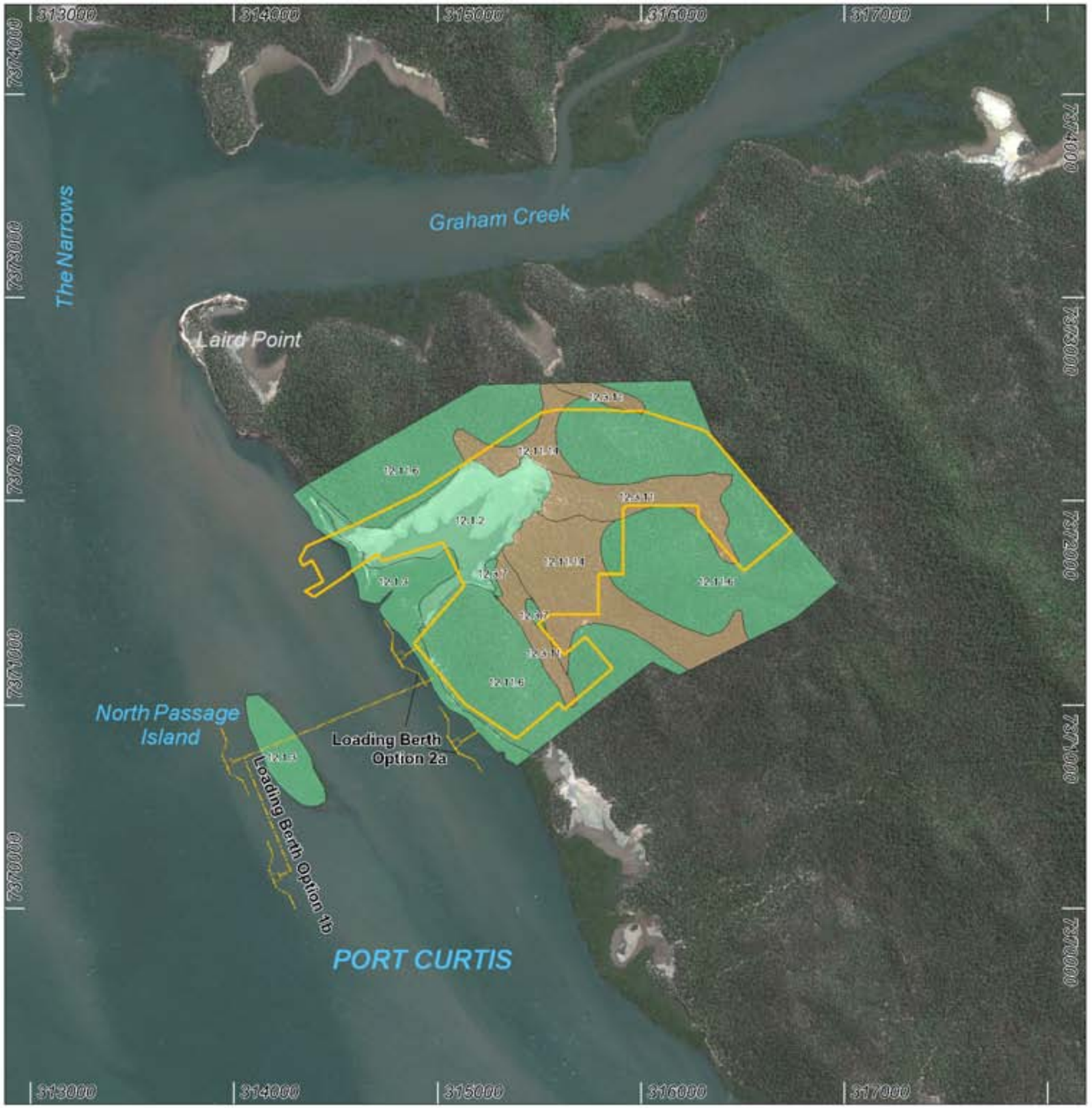

LEGEND

- Loading Berth Option 1b
- Loading Berth Option 2a
- Development footprint

Regional ecosystems

Remnant endangered regional ecosystem
- Dominant
- Sub-dominant

Remnant of concern regional ecosystem
- Dominant
- Sub-dominant

Other
- Least concern regional ecosystem

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Ground-truthed RE's are derived from field surveys undertaken by Worley Parsons in April and October 2009 and based on regional ecosystems defined in the Regional Ecosystem Description Database (Version 5.2).

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Figure 4 Ground-truthed regional ecosystems

Project No: 301001-00752	Figure: 00752-00-EN-DAL-0082	Rev: 0

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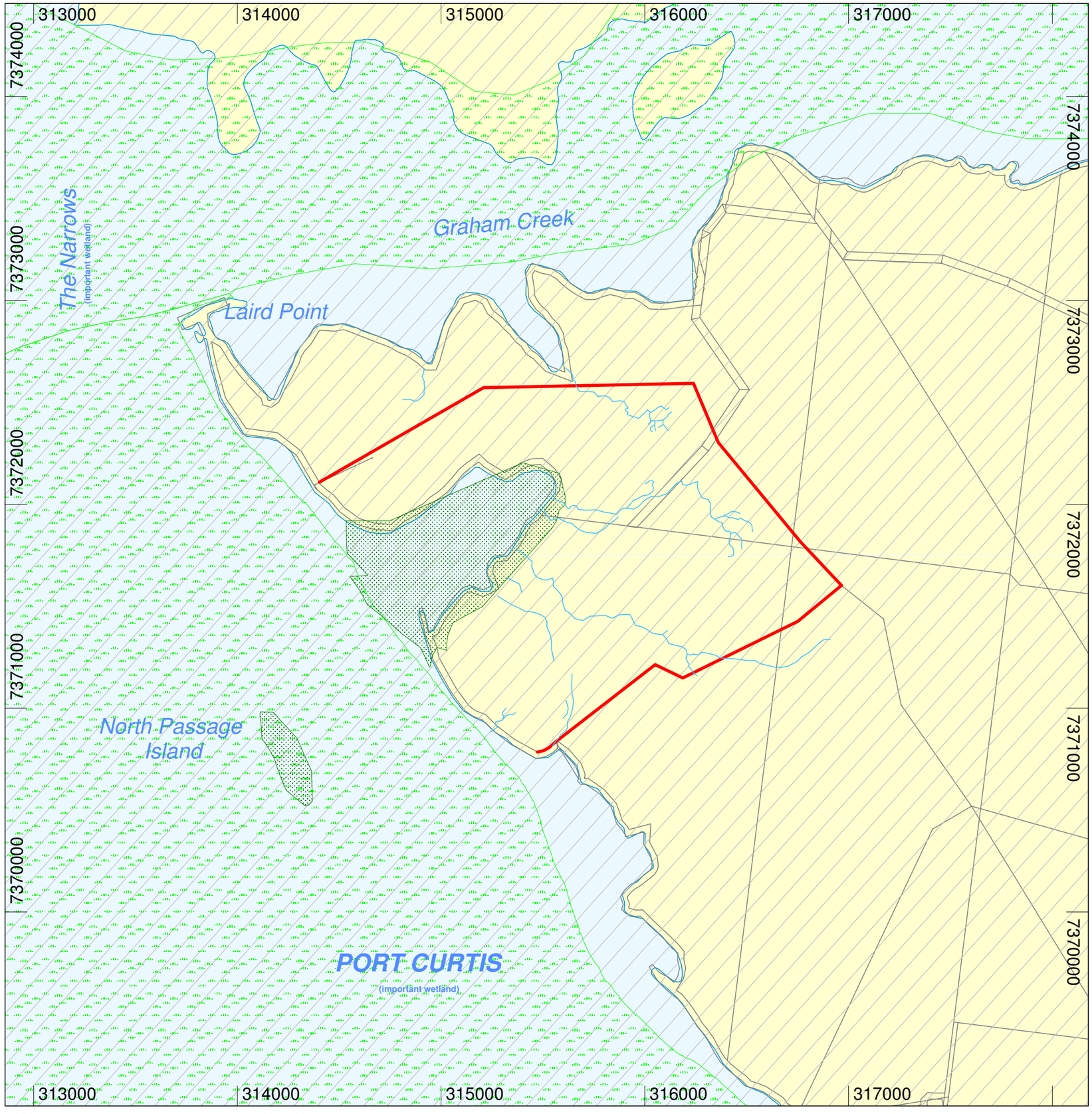

LEGEND

- Drainage line
- Directory of Important Wetlands
- Marine plants
- Marine Parks and World Heritage Area (Great Barrier Reef)
- Study area
- Cadastral parcel

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Drainage lines provided by K. Dawson of WorleyParsons on 21/09/2009

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Figure 5 - Environmentally sensitive areas

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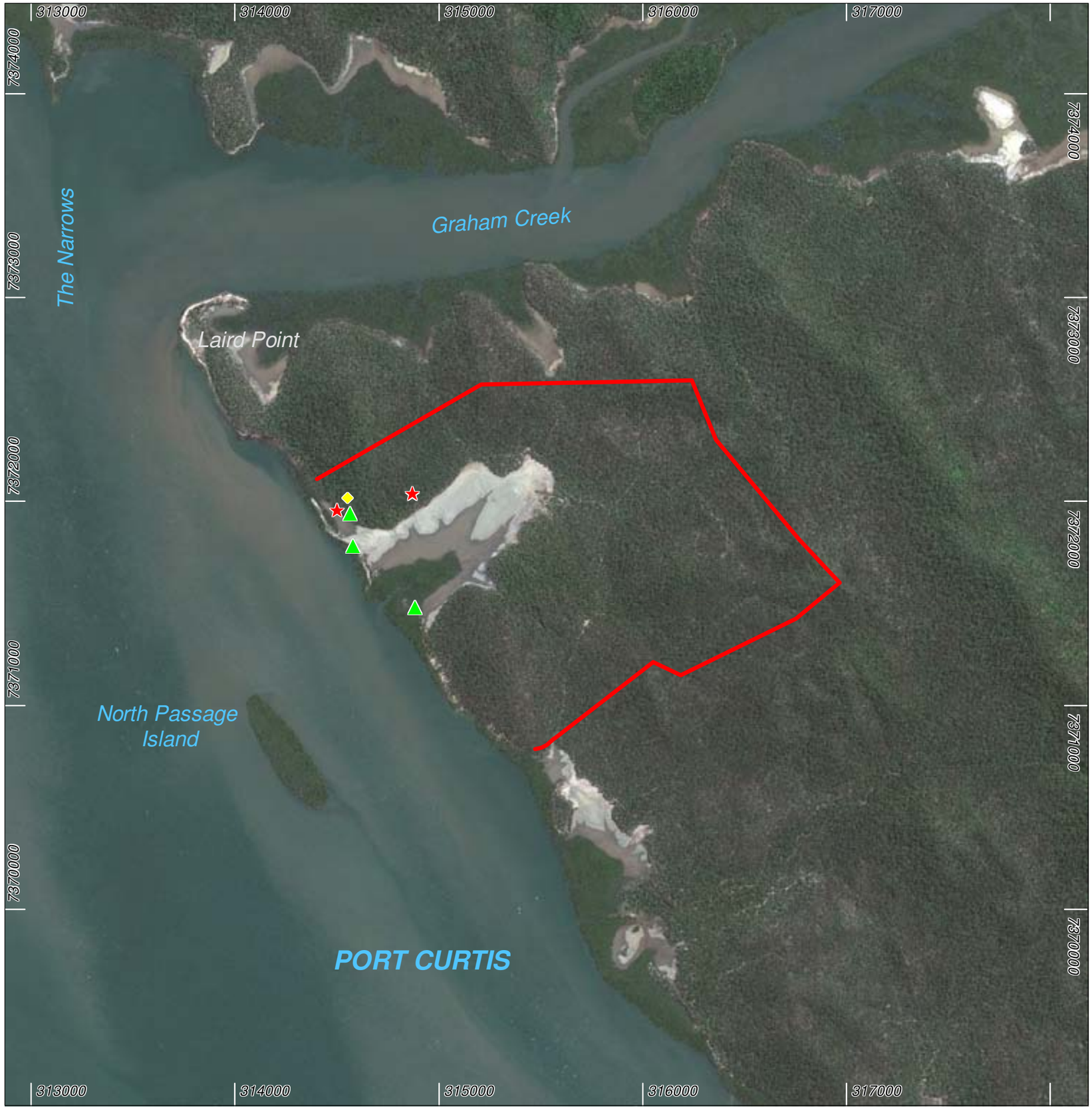

LEGEND

Significant weed species

- Rubber vine
- Lantana
- Prickly pear
- Study area

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Weed locations sourced from field survey conducted by WorleyParsons October 2009.

Satellite Imagery captured by GeoEye-1 on 24 March 2009

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Map Grid of Australia Zone 56
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Figure 6 Significant weed species (major infestations)

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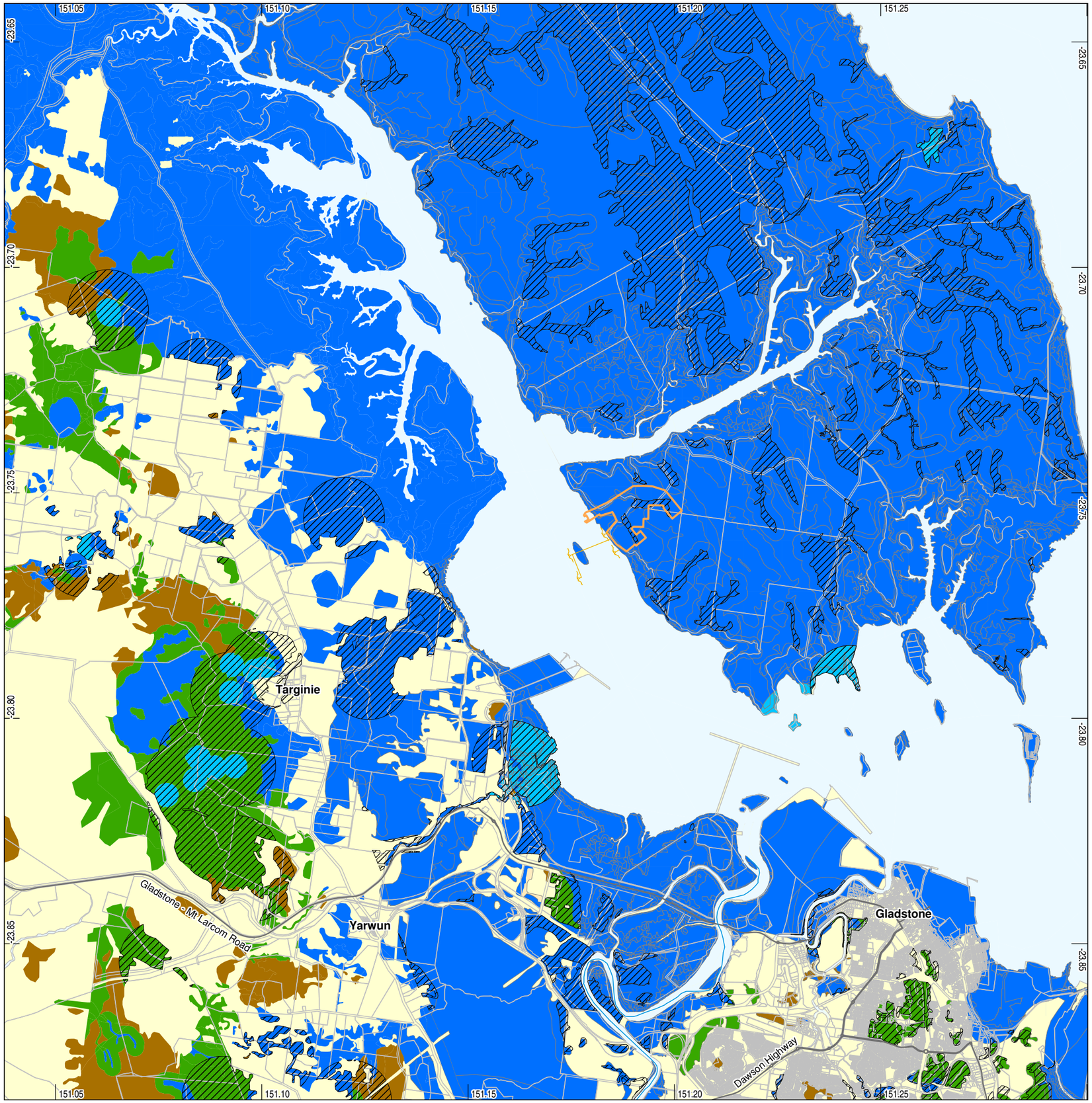

LEGEND

- Major drainage
- Road
- Railway
- LNG facility development footprint
- Cadastral parcel
- Essential Habitats v3.0

Biodiversity Planning Assessment

- State Habitat for EVR taxa
- State
- Regional
- Non Bioregion Ecosystem
- Local or other values

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Option 1b proposed Marine Structures
Extracted from Bechtel CAD drawing 25509-100-K0-K01-00001.dgn supplied by client on 15/09/2009.

Option 2a proposed Marine Structures
Extracted from Bechtel CAD drawing 25509-100-K0-K01-00002.dgn supplied by client on 11/09/2009.

Development footprint
Digitised from Conceptual Site Plan 25509-100-P1-000-10005.dgn supplied by client 24/07/2009

0 2 4km

SCALE - 1 : 100,000 (at A3)
Latitude/Longitude
Geocentric Datum of Australia 1994

N
W E
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Rev	Date	Revision Description	ORIG	CHK	ENG	APPD
0	17/02/2010	Issued for use	NA	KM		RB

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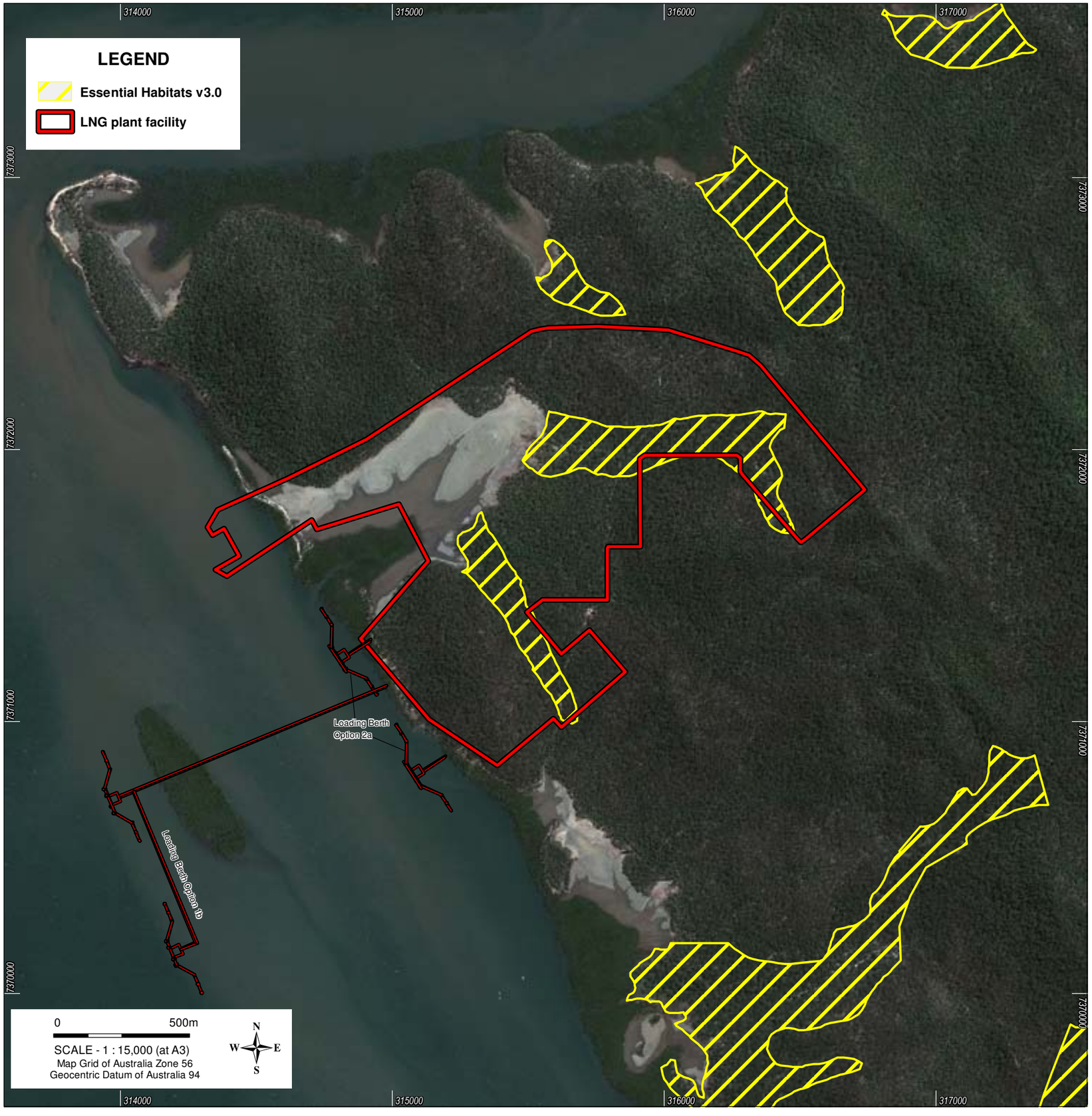
Figure 7 - Areas of State Biodiversity Significance

Project No: 301001-00752	Figure: 00752-00-EN-DAL-0104	Rev: 0

Compiled by BRISBANE INFRASTRUCTURE GIS SECTION

K:\CONOCOPHILLIPS\301001-00752\GIS\Maps\00752-00-EN-DAL-0104-Rev0(BPA).wor



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Boundary digitised from client supplied Conceptual Site Plan 25509-100-P1-000-10005.dgn 24/07/2009

Satellite imagery captured by GeoEye-1 on 24 March 2009

Rev	Date	Revision Description	ORIG	CHK	ENG	APPD
0	17/02/2010	Issued for use	NA	GSB		RB

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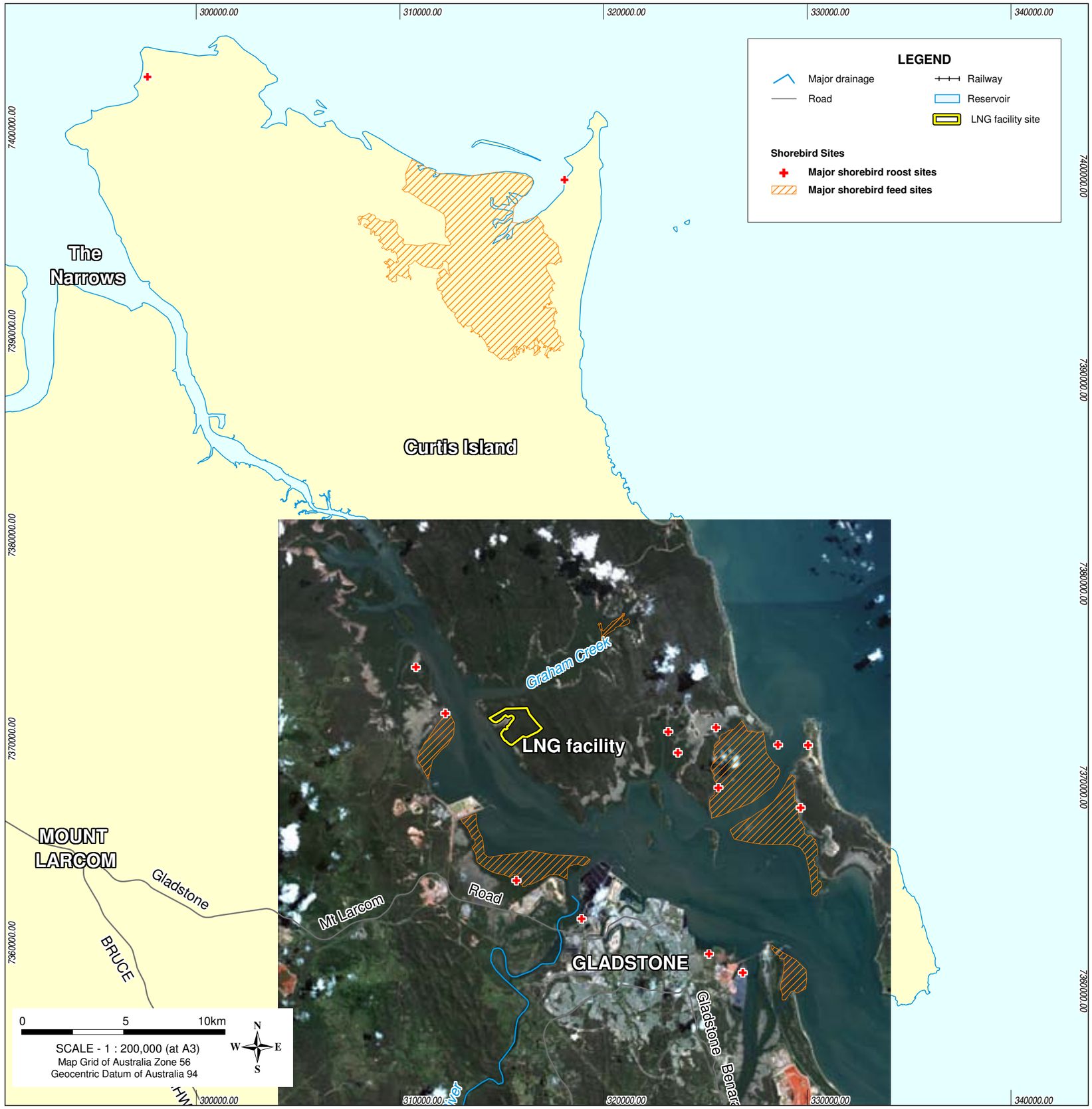
Figure 8 Koala essential habitat areas

Project No: 301001-00752	Figure: 00752-00-EN-DAL-0087	Rev: 0

Compiled by BRISBANE INFRASTRUCTURE GIS SECTION

K:\CONOCOPHILLIPS\301001-00752\GIS\Maps\00752-00-EN-DAL-0087-Rev0(Essential_Habitats).wor



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Satellite imagery - Captured by GeoEye-1 on 24 March 2009

Rev	Date	Revision Description	ORIG	CHK	ENG	APPD
1	09/03/2010	Re-issued for use	GSB	MZ		RB
0	17/02/2010	Issued for use	NA	GSB		RB

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Figure 9 Shorebird feeding grounds and roosting sites

Project No: 301001-00752	Figure: 00752-00-EN-DAL-0086	Rev: 1

Compiled by BRISBANE INFRASTRUCTURE GIS SECTION

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Appendix A Abbreviations

CITES	Convention on International Trade in Endangered Species
DERM	Queensland Department of Environment and Resource Management
DEWHA	Australian Government Department of Environment, Water, Heritage and the Arts
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
EVR	endangered, vulnerable or rare
IUCN	International Union for Conservation of Nature
NC Act	*Nature Conservation Act 1992* (Qld)
NES	national environmental significance
RE	regional ecosystem
VMA	*Vegetation Management Act 1999* (Qld)

Appendix B Fauna desktop assessment results

Common Name	Scientific Name	EPBC	Mi / Ma	NCA	BPA	AP	BACK ON TRACK	DECLARED	EXOTIC	OTHER STUDIES	WP	^SOURCE
Frogs												
striped burrowing frog	*Cyclorana alboguttata*			C								4
samon striped frog	*Limnodynastes salmini*			C	SEQ							4
bleating tree frog	*Litoria dentata*			C	SEQ							4
copper backed broodfrog	*Pseudophryne raveni*			C	SEQ							4
desert froglet	*Crinia deserticola*				SEQ					Y		6
short-footed frog	*Cyclorana brevipes*				SEQ							3
long-thumbed frog	*Limnodynastes fletcheri*			C								3,4
ornate burrowing frog	*Limnodynastes ornatus*			C						Y		3,4,6
brown-striped frog	*Limnodynastes peronii*			C						Y		3,4,6
spotted grass frog	*Limnodynastes tasmaniensis*			C						Y		3,4,6
northern banjo frog	*Limnodynastes terraereginae*			C						Y		3,4,6
green tree frog	*Litoria caerulea*			C						Y		3,4,6
eastern dwarf tree frog	*Litoria fallax*			C						Y		3,4,6
dainty green tree frog	*Litoria gracilenta*			C						Y		3,4,6
Peter's frog	*Litoria inermis*			C	SEQ					Y		3,4,6
broad-palmed rocketfrog	*Litoria latopalmata*			C						Y		3,4,6
rocket frog	*Litoria nasuta*			C						Y		3,4,6
Peron's tree frog	*Litoria peronii*				SEQ					Y		6
Roth's tree frog	*Litoria rothii*			C	SEQ					Y		3,4,6
desert tree frog	*Litoria rubella*			C						Y	Y	3,4,6
eastern stony creek frog	*Litoria wilcoxii*			C								3,4
large toadlet	*Pseudophryne major*				SEQ							3,4
cane toad	*Rhinella marina*							ND	Y	Y	Y	3,4,5,6
dusky toadlet	*Uperoleia fusca*									Y		6
wrinkled toadlet	*Uperoleia rugosa*											3,4

Common Name	Scientific Name	EPBC	Mi / Ma	NCA	BPA	AP	BACK ON TRACK	DECLARED	EXOTIC	OTHER STUDIES	WP	^SOURCE
Birds												
spiny-cheeked honeyeater	*Acanthagenys rufogularis*			C								4
yellow thornbill	*Acanthiza nana*			C							Y	4,6
brown thornbill	*Acanthiza pusilla*			C						Y		4,6
collared sparrowhawk	*Accipiter cirrocephalus*			C								4
brown goshawk	*Accipiter fasciatus*		Ma							Y		6
grey goshawk	*Accipiter novaehollandiae*			R								4
common sandpiper	*Actitis hypoleucos*		Mi/Ma	C								1,4
Australian owlet-nightjar	*Aegotheles cristatus*			C						Y		4,6
Australian brush-turkey	*Alectura lathami*			C						Y		2,4,6
Australian king-parrot	*Alisterus scapularis*			C								4
chestnut teal	*Anas castanea*											2,4
grey teal	*Anas gracilis*											2,4
Pacific black duck	*Anas superciliosa*			C						Y	Y	2,4,6
Australasian darter	*Anhinga novaehollandiae*			C								4
magpie goose	*Anseranas semipalmata*		Ma									1,4
Australasian pipit	*Anthus australis*		Ma	C						Y		2,4,6
red-winged parrot	*Aprosmictus erythropterus*			C								4
fork-tailed swift	*Apus pacificus*		Mi/Ma									1
wedge-tailed eagle	*Aquila audax*			C						Y		2,4,6
great egret	*Ardea alba*		Mi/Ma							Y		1,6
cattle egret	*Ardea ibis*		Mi									1,2
intermediate egret	*Ardea intermedia*		Ma	C						Y		2,4,6
white-necked heron	*Ardea pacifica*											2
Australian bustard	*Ardeotis australis*			C		NT						4
ruddy turnstone	*Arenaria interpres*		Mi/Ma									1

Common Name	Scientific Name	EPBC	Mi / Ma	NCA	BPA	AP	BACK ON TRACK	DECLARED	EXOTIC	OTHER STUDIES	WP	^SOURCE
black-faced woodswallow	*Artamus cinereus*			C	SEQ							4
white-breasted woodswallow	*Artamus leucorynchus*			C						Y		2,4,6
Pacific baza	*Aviceda subcristata*			C						Y		4,6
hardhead	*Aythya australis*			C								4
bush stone-curlew	*Burhinus grallarius*			C	SEQ	NT				Y		4,6
striated heron	*Butorides striata*			C						Y	Y	4,5,6
sulphur-crested cockatoo	*Cacatua galerita*											2,4
fan-tailed cuckoo	*Cacomantis flabelliformis*		Ma	C						Y		4,6
pallid cuckoo	*Cacomantis pallidus*											2
brush cuckoo	*Cacomantis variolosus*			C						Y		4,6
sharp-tailed sandpiper	*Calidris acuminata*		Mi/Ma									1,2,4
sanderling	*Calidris alba*		Mi/Ma									1,4
red knot	*Calidris canutus*		Mi/Ma									1,4
curlew sandpiper	*Calidris ferruginea*		Mi/Ma									1,2,4
pectoral sandpiper	*Calidris melanotos*		Mi/Ma									1
red-necked stint	*Calidris ruficollis*		Mi/Ma	C						Y		1,4,6
long-toed stint	*Calidris subminuta*		Mi/Ma									1
great knot	*Calidris tenuirostris*		Mi/Ma									1,2
red-tailed black-cockatoo	*Calyptorhynchus banksii*			C						Y	Y	4,5,6
glossy black-cockatoo	*Calyptorhynchus lathami*			V			High			Y		6
large-tailed nightjar	*Caprimulgus macrurus*			C	SEQ							4
pheasant coucal	*Centropus phasianinus*			C						Y	Y	2,4,5,6
Horsfield's bronze-cuckoo	*Chalcites basalis*			C						Y		4,6
shining bronze-cuckoo	*Chalcites lucidus*			C								4
little bronze-cockoo	*Chalcites minutillus*									Y		6
emerald dove	*Chalcophaps indica*			C								4

Common Name	Scientific Name	EPBC	Mi / Ma	NCA	BPA	AP	BACK ON TRACK	DECLARED	EXOTIC	OTHER STUDIES	WP	^SOURCE
double-banded plover	*Charadrius bicinctus*		Mi/Ma									1
little ringed plover	*Charadrius dubius*		Mi/Ma									1
greater sand plover	*Charadrius leschenaultii*		Mi/Ma									1
lesser sand plover	*Charadrius mongolus*		Mi/Ma									1
red-capped plover	*Charadrius ruficapillus*		Ma	C						Y	Y	1,2,4,5,6
Australian wood duck	*Chenonetta jubata*			C						Y		4,6
brown songlark	*Cincloramphus cruralis*											2
olive-backed sunbird	*Cinnyris jugularis*			C	SEQ					Y		4,6
golden-headed cisticola	*Cisticola exilis*			C								2,4
zitting cisticola	*Cisticola juncidus*											2
brown treecreeper	*Climacteris picumnus*			C								4
grey shrike-thrush	*Colluricincla harmonica*			C						Y		4,6
little shrike-thrush	*Colluricincla megarhyncha*			C						Y		2,4,6
rock dove	*Columba livia*								Y			4
black-faced cuckoo-shrike	*Coracina novaehollandiae*		Ma	C						Y	Y	2,4,5,6
white-bellied cuckoo-shrike	*Coracina papuensis*		Ma	C						Y		4,6
cicadabird	*Coracina tenuirostris*		Ma	C						Y		4,6
white-winged chough	*Corcorax melanorhamphos*			C						Y		4,6
white-throated treecreeper (southern)	*Cormobates leucophaea metastasis*			C								4
torresian crow	*Corvus orru*			C						Y	Y	2,4,5,5
brown quail	*Coturnix ypsilophora*			C						Y		4,6
pied butcherbird	*Cracticus nigrogularis*			C						Y	Y	2,4,5,6
grey butcherbird	*Cracticus torquatus*			C						Y		4,6
oriental cuckoo	*Cuculus saturatus*		Mi/Ma	C								4
black swan	*Cygnus atratus*			C								2,4

Common Name	Scientific Name	EPBC	Mi / Ma	NCA	BPA	AP	BACK ON TRACK	DECLARED	EXOTIC	OTHER STUDIES	WP	^SOURCE
blue-winged kookaburra	*Dacelo leachii*			C	SEQ					Y		4,6
laughing kookaburra	*Dacelo novaeguineae*			C						Y	Y	2,4,5,6
varied sittella	*Daphoenositta chrysoptera*			C						Y		4,6
wandering whistling-duck	*Dendrocygna arcuata*		Ma	C								4
mistletoebird	*Dicaeum hirundinaceum*			C						Y		2,4,6
spangled drongo	*Dicrurus bracteatus*		Ma	C						Y	Y	4,5,6
emu	*Dromaius novaehollandiae*			C								4
black bittern	*Dupetor flavicollis*									Y		6
little egret	*Egretta garzetta*		Ma	C						Y	Y	4,5,6
white-faced heron	*Egretta novaehollandiae*			C						Y	Y	2,4,5,6
eastern reef egret	*Egretta sacra*		Mi/Ma	C						Y	Y	2,4,5,6
black-shouldered kite	*Elanus axillaris*			C								4
black-fronted dotterel	*Elseyornis melanops*			C								4
blue-faced honeyeater	*Entomyzon cyanotis*			C						Y		2,4,6
galah	*Eolophus roseicapilla*			C						Y		4,6
black-necked stork	*Ephippiorhynchus asiaticus*			R		LC						2
yellow chat (Dawson)	*Epthianura crocea magregori*	CE		E			High					2
red goshawk	*Erythrotriorchis radiatus*	V		E		VU	High					1
beach stone-curlew	*Esacus magnirostris*		Ma	V		LC	High			Y	Y	2,4,5,6
eastern koel	*Eudynamys orientalis*		Ma	C						Y		2,4,6
white-throated nightjar	*Eurostopodus mystacalis*		Ma	C						Y		4,6
dollarbird	*Eurystomus orientalis*		Ma	C						Y		4,6
brown falcon	*Falco berigora*											2,4
Australian kestrel	*Falco cenchroides*		Ma									2,4
Australian hobby	*Falco longipennis*			C						Y		2,4,6
peregrine falcon	*Falco peregrinus*			C								4

Common Name	Scientific Name	EPBC	Mi / Ma	NCA	BPA	AP	BACK ON TRACK	DECLARED	EXOTIC	OTHER STUDIES	WP	^SOURCE
Latham's snipe	*Gallinago hardwickii*		Mi/Ma									1,2
Swinhoe's snipe	*Gallinago megala*		Mi/Ma									1
pin-tailed snipe	*Gallinago stenura*		Mi/Ma									1
dusky moorhen	*Gallinula tenebrosa*			C								4
buff-banded rail	*Gallirallus philippensis*											2
bar-shouldered dove	*Geopelia humeralis*			C						Y	Y	2,4,5,6
peaceful dove	*Geopelia placida*			C						Y		4,6
squatter pigeon (southern)	*Geophaps scripta scripta*	V		V		NT						1,4
mangrove gerygone	*Gerygone levigaster*			C						Y		4,6
white-throated greygone	*Gerygone olivacea*									Y		4,6
fairy gerygone	*Gerygone palpebrosa*			C	SEQ							4
oriental pratincole	*Glareola maldivarum*		Mi/Ma									1
little lorikeet	*Glossopsitta pusilla*			C						Y		4,6
magpie-lark	*Grallina cyanoleuca*		Ma	C							Y	2,4,5
brolga	*Grus rubicunda*											2,4
Australian magpie	*Gymnorhina tibicen*			C						Y	Y	2,4,5,6
sooty oystercatcher	*Haematopus fuliginosus*			R		LC				Y		4,6
pied oystercatcher	*Haematopus longirostris*			C						Y	Y	2,4,5,6
white-bellied sea-eagle	*Haliaeetus leucogaster*		Mi/Ma	C						Y	Y	1,2,4,5,6
brahminy kite	*Haliastur indus*		Ma	C						Y	Y	2,4,5,6
whistling kite	*Haliastur sphenurus*		Ma	C						Y		2,4,6
grey-tailed tattler	*Heteroscelus brevipes*		Mi/Ma	C						Y		1,2,4,6
wandering tattler	*Heteroscelus incanus*		Mi/Ma		SEQ							1
little eagle	*Hieraaetus morphnoides*			C								4
black-winged stilt	*Himantopus himantopus*		Ma	C								1,2,4
white-throated needletail	*Hirundapus caudacutus*		Mi/Ma							Y		1,2,6

Common Name	Scientific Name	EPBC	Mi / Ma	NCA	BPA	AP	BACK ON TRACK	DECLARED	EXOTIC	OTHER STUDIES	WP	^SOURCE
fairy martin	*Petrochelidon ariel*			C						Y		4,6
welcome swallow	*Hirundo neoxena*		Ma	C						Y	Y	2,4,5,6
tree martin	*Petrochelidon nigricans*		Ma	C						Y	Y	4,5,6
barn swallow	*Hirundo rustica*		Mi/Ma									1
comb-crested jacana	*Irediparra gallinacea*			C								4
varied triller	*Lalage leucomela*			C						Y		2,4,6
silver gull	*Chroicocephalus novaehollandiae*			C						Y	Y	2,4,5,6
wonga pigeon	*Leucosarcia picata*			C								2,4
mangrove honeyeater	*Lichenostomus fasciogularis*			C						Y		2,4,6
white-eared honeyeater	*Lichenostomus leucotis*			C								4
brown honeyeater	*Lichmera indistincta*			C						Y		2,4,6
broad-billed sandpiper	*Limicola falcinellus*		Mi/Ma									1
Asian dowitcher	*Limnodromus semipalmatus*		Mi/Ma									1
bar-tailed godwit	*Limosa lapponica*		Mi/Ma	C						Y		2,4,6
black-tailed godwit	*Limosa limosa*		Mi/Ma									1
chestnut-breasted mannikin	*Lonchura castaneothorax*			C								4
square-tailed kite	*Lophoictinia isura*			R								4
topknot pigeon	*Lopholaimus antarcticus*			C								2,4
southern giant-petrel	*Macronectes giganteus*	E	Mi/Ma	E		EN						1
brown cuckoo-dove	*Macropygia amboinensis*			C								4
variegated fairy-wren	*Malurus lamberti*			C								4
red-backed fairy-wren	*Malurus melanocephalus*			C						Y	Y	2,4,6
noisy miner	*Manorina melanocephala`*			C						Y	Y	2,4,6
tawny grassbird	*Megalurus timoriensis*											2,4
Lewin's honeyeater	*Meliphaga lewinii*											2,4
white-throated honeyeater	*Melithreptus albogularis*			C						Y	Y	2,4,5,6

Common Name	Scientific Name	EPBC	Mi / Ma	NCA	BPA	AP	BACK ON TRACK	DECLARED	EXOTIC	OTHER STUDIES	WP	^SOURCE
black-chinned honeyeater	*Melithreptus gularis*			R								4
white-naped honeyeater	*Melithreptus lunatus*			C						Y		4,6
rainbow bee-eater	*Merops ornatus*		Mi/Ma	C						Y	Y	1,2,4,5,6
black kite	*Milvus migrans*											2,4
white-eared monarch	*Monarcha leucotis*			C								2,4
black-faced monarch	*Monarcha melanopsis*		Mi/Ma	C						Y		1,2,4,6
spectacled monarch	*Symposiachus trivirgatus*		Mi/Ma	C						Y		1,2,4,6
shining flycatcher	*Myiagra alecto*			C	SEQ					Y		2,4,6
satin flycatcher	*Myiagra cyanoleuca*		Mi/Ma	C						Y		1,4,6
restless flycatcher	*Myiagra inquieta*			C								4
leaden flycatcher	*Myiagra rubecula*			C						Y		4,6
dusky honeyeater	*Myzomela obscura*			C	SEQ							4
scarlet honeyeater	*Myzomela sanguinolenta*			C								4
Australian cotton pygmy-goose	*Nettapus coromandelianus albipennis*			R		NT						1,4
barking owl	*Ninox connivens*			C	SEQ	NT				Y	Y	4,5,6
southern boobook	*Ninox novaeseelandiae*		Ma	C						Y		4,6
powerful owl	*Ninox strenua*			V						Y		6
eastern curlew	*Numenius madagascariensis*		Mi/Ma	R		LC				Y	Y	1,2,4,5,6
little curlew	*Numenius minutus*		Mi/Ma		SEQ	LC						1
whimbrel	*Numenius phaeopus*		Mi/Ma	C						Y	Y	1,2,4,5,6
nankeen night-heron	*Nycticorax caledonicus*		Ma	C								4
crested pigeon	*Ocyphaps lophotes*			C						Y		4,6
olive-backed oriole	*Oriolus sagittatus*			C						Y		4,6
golden whistler	*Pachycephala pectoralis*			C								4
rufous whistler	*Pachycephala rufiventris*			C						Y	Y	2,4,6

Common Name	Scientific Name	EPBC	Mi / Ma	NCA	BPA	AP	BACK ON TRACK	DECLARED	EXOTIC	OTHER STUDIES	WP	^SOURCE
Osprey	*Pandion haliaetus*		Mi/Ma	C						Y		2,4,6
spotted pardalote	*Pardalotus punctatus*			C						Y		4,6
striated pardalote	*Pardalotus striatus*			C						Y		4,6
house sparrow	*Passer domesticus*								Y			4
Australian pelican	*Pelecanus conspicillatus*		Ma	C						Y		2,4,6
little pied cormorant	*Microcarbo melanoleucos*									Y	Y	4,5,6
little black cormorant	*Phalacrocorax sulcirostris*			C						Y		4,2,6
pied cormorant	*Phalacrocorax varius*			C						Y		2,4,6
red-necked phalarope	*Phalaropus lobatus*		Mi/Ma									1
common bronzewing	*Phaps chalcoptera*			C						Y		4,6
helmeted friarbird	*Philemon buceroides*									Y		6
little friarbird	*Philemon citreogularis*			C						Y		4,6
noisy friarbird	*Philemon corniculatus*			C						Y	Y	2,4,5,6
ruff	*Philomachus pugnax*		Mi/Ma									1
yellow-billed spoonbill	*Platalea flavipes*			C								4
royal spoonbill	*Platalea regia*			C								4
eastern rosella	*Platycercus adscitus*			C						Y	Y	4,6
striped honeyeater	*Plectorhyncha lanceolata*									Y		6
Pacific golden plover	*Pluvialis fulva*		Mi/Ma	C							Y	1,2,4,5
grey plover	*Pluvialis squatarola*		Mi/Ma	C								1,4
tawny frogmouth	*Podargus strigoides*			C						Y	Y	4,5,6
hoary-headed grebe	*Poliocephalus poliocephalus*			C								4
grey-crowned babbler	*Pomatostomus temporalis*			C		NT						4
purple swamphen	*Porphyrio porphyrio*		Ma	C								2,4
Kermadec petrel (western)	*Pterodroma neglecta neglecta*	V				CE						1
rose-crowned fruit-dove	*Ptilinopus regina*			C	SEQ						Y	2,5,6

Common Name	Scientific Name	EPBC	Mi / Ma	NCA	BPA	AP	BACK ON TRACK	DECLARED	EXOTIC	OTHER STUDIES	WP	^SOURCE
red-necked avocet	*Recurvirostra novaehollandiae*		Ma	C								1,4
grey fantail	*Rhipidura albiscapa*			C						Y		4,6
willie wagtail	*Rhipidura leucophrys*			C						Y	Y	4,5,6
rufous fantail	*Rhipidura rufifrons*		Mi/Ma	C						Y		1,4,6
Australian painted snipe	*Rostratula australis*	V	Mi/Ma	V		VU						1
channel-billed cuckoo	*Scythrops novaehollandiae*		Ma	C						Y		4,6
white-browed scrubwren	*Sericornis frontalis*			C						Y		2,4,6
weebill	*Smicrornis brevirostris*			C						Y		4,6
Australasian figbird	*Sphecotheres vieilloti*			C						Y		2,4,6
little tern	*Sternula albifrons*		Mi/Ma	E		LC	High					1,4
crested tern	*Thalasseus bergii*		Ma	C						Y	Y	2,4,5,6
Caspian tern	*Hydroprogne caspia*		Mi/Ma	C						Y	Y	2,4,5,6
common tern	*Sterna hirundo*		Mi/Ma							Y		6
gull-billed tern	*Gelochelidon nilotica*		Ma	C						Y		2,4,6
Australian pratincole	*Stiltia isabella*		Ma									1
pied currawong	*Strepera graculina*			C						Y	Y	4,5,6
spotted turtle-dove	*Streptopelia chinensis*								Y		Y	6
brown booby	*Sula leucogaster*		Mi/Ma	C								4
Australasian Grebe	*Tachybaptus novaehollandiae*			C						Y		4,6
radjah shelduck	*Tadorna radjah*			R								4
double-barred finch	*Taeniopygia bichenovii*											2,4
hooded plover	*Thinornis rubricollis*		Ma									1
Australian white ibis	*Threskiornis molucca*		Ma	C						Y		2,4,6
straw-necked ibis	*Threskiornis spinicollis*		Ma	C								2,4
collared kingfisher	*Todiramphus chloris*			C						Y		2,4,6
forest kingfisher	*Todiramphus macleayii*		Ma	C						Y	Y	4,5,6

Common Name	Scientific Name	EPBC	Mi / Ma	NCA	BPA	AP	BACK ON TRACK	DECLARED	EXOTIC	OTHER STUDIES	WP	^SOURCE
sacred kingfisher	*Todiramphus sanctus*		Ma	C						Y		4,6
scaly-breasted lorikeet	*Trichoglossus chlorolepidotus*			C						Y		4,6
rainbow lorikeet	*Trichoglossus haematodus*			C						Y	Y	2,4,5,6
wood sandpiper	*Tringa glareola*		Mi/Ma									1
common greenshank	*Tringa nebularia*		Mi/Ma	C						Y		1,2,4,6
marsh sandpiper	*Tringa stagnatilis*		Mi/Ma	C								1,2,4
common redshank	*Tringa totanus*		Mi/Ma									1
red-backed button-quail	*Turnix maculosus*			C		VU	Critical			Y		4,6
black-breasted button-quail	*Turnix melanogaster*	V		V								1
painted button-quail	*Turnix varius*			C						Y		4,6
masked lapwing	*Vanellus miles*			C						Y	Y	2,4,5,6
banded lapwing	*Vanellus tricolor*									Y		6
terek sandpiper	*Xenus cinereus*		Mi/Ma	C								1,4
silvereye	*Zosterops lateralis*		Ma	C						Y		4,6
Fish												
Agassiz's glassfish	*Ambassis agassizii*					R						4
barred grunter	*Amniataba percoides*											4
longfin eel	*Anguilla reinhardtii*											4
snubnose garfish	*Arrhamphus sclerolepis*											4
flyspecked hardyhead	*Craterocephalus stercusmuscarum*											4
mosquitofish	*Gambusia holbrooki*								Y	Y		4,6
mouth almighty	*Glossamia aprion*											4
striped gudgeon	*Gobiomorphus australis*											4
empire gudgeon	*Hypseleotris compressa*											4
firetail gudgeon	*Hypseleotris galii*											4

Common Name	Scientific Name	EPBC	Mi / Ma	NCA	BPA	AP	BACK ON TRACK	DECLARED	EXOTIC	OTHER STUDIES	WP	^SOURCE
Midgley's carp gudgeon	*Hypseleotris species 1*											4
jungle perch	*Kuhlia rupestris*				SEQ							4
barramundi	*Lates calcarifer*											4
spangled perch	*Leiopotherapon unicolor*											4
mangrove jack	*Lutjanus argentimaculatus*											4
oxeye herring	*Megalops cyprinoides*											4
eastern rainbowfish	*Melanotaenia splendida splendida*											4
southern purplespotted gudgeon	*Mogurnda adspersa*					R						4
diamondfish	*Monodactylus argenteus*											4
sea mullet	*Mugil cephalus*											4
bony bream	*Nematalosa erebi*											4
guppy	*Poecilia reticulata*								Y			4
Pacific blue eye	*Pseudomugil signifer*											4
spotted scat	*Scatophagus argus*											4
striped scat	*Selenotoca multifasciata*											4
crescent grunter	*Terapon jarbua*											4
Insects												
glasswing	*Acraea andromacha*									Y		6
caper white	*Belenois java*									Y		6
small dusky blue	*Candalides erinus*									Y		6
lemon migrant	*Catopsilia pomona*									Y		6
clearwing swallowtail	*Cressida cresida*									Y		6
lesser wanderer	*Danaus chrysippus*									Y		6
monarch	*Danaus plexippus*									Y	Y	6
black jezebel	*Delias nigrina*									Y		6
common crow	*Euploea core*									Y		6

Common Name	Scientific Name	EPBC	Mi / Ma	NCA	BPA	AP	BACK ON TRACK	DECLARED	EXOTIC	OTHER STUDIES	WP	^SOURCE
grass yellow	*Eurema spp.*									Y		6
orange ringlet	*Hypochasta adiante*									Y		6
varied eggfly	*Hypolimnas bolina*									Y		6
meadow argus	*Junonia villida*									Y		6
evening brown	*Melantis leda*									Y		6
satin azure	*Ogyris amaryllis*									Y		6
dainty swallowtail	*Papilio anactus*									Y		6
chequered swallowtail	*Papilio demoleus*									Y		6
white-banded plane	*Phaedyma shepherdi*									Y		6
blue tiger	*Trimala hamata*									Y		6
Australian painted lady	*Vanessa kershawi*									Y		6
Mammals												
rufous bettong	*Aepyprymnus rufescens*			C	SEQ							4
European cattle	*Bos taurus*							ND	Y	Y	Y	4,5,6
dog	*Canis lupus familiaris*								Y			4
dingo	*Canis lupus dingo*									Y		4,6
northern freetail-bat	*Chaerephon jobensis*			C						Y		4,6
large-eared pied bat	*Chalinolobus dwyeri*	V		V		VU						1
Gould's wattled bat	*Chalinolobus gouldii*			C						Y		4,6
chocolate wattled bat	*Chalinolobus morio*			C								4
hoary wattled bat	*Chalinolobus nigrogriseus*			C						Y		4,6
little pied bat	*Chalinolobus picatus*			R		LR(nt)						4
northern quoll	*Dasyurus hallucatus*	E			SEQ	LR(nt)						1
horse	*Equus caballus*							ND	Y	Y	Y	5,6
cat	*Felis catus*							Class 2	Y			4
water rat	*Hydromys chrysogaster*			C								4

Common Name	Scientific Name	EPBC	Mi / Ma	NCA	BPA	AP	BACK ON TRACK	DECLARED	EXOTIC	OTHER STUDIES	WP	^SOURCE
northern brown bandicoot	*Isoodon macrourus*			C								4
brown hare	*Lepus capensis*							ND	Y			4
black-striped wallaby	*Macropus dorsalis*			C	SEQ							4
eastern grey kangaroo	*Macropus giganteus*			C						Y	Y	3,4,5,6
whiptail wallaby	*Macropus parryi*			C								4
euro	*Macropus robustus*			C								4
red-necked wallaby	*Macropus rufogriseus*											3
grassland melomys	*Melomys burtoni*			C								3,4
fawn-footed melomys	*Melomys cervinipes*			C								3,4
little bentwing-bat	*Miniopterus australis*			C						Y		4,6
eastern bentwing-bat	*Miniopterus orianae oceanensis*			C						Y		4,6
Beccari's freetail-bat	*Mormopterus beccarii*			C						Y		4,6
east coast freetail bat	*Micronomus norfolkensis*			C	SEQ	DD						4
eastern freetail-bat	*Mormopterus ridei*									Y		6
house mouse	*Mus musculus*							ND	Y			3,4
unkown long-eared bat	*Nyctophilus sp.*									Y		6
rabbit	*Oryctolagus cuniculus*							Class 2	Y			4
greater glider	*Petauroides volans*			C	SEQ							4
yellow-bellied glider (southern subspecies)	*Petaurus australis australis*			C	SEQ	LR(nt)	High					4
sugar glider	*Petaurus breviceps*			C								4
squirrel glider	*Petaurus norfolcensis*			C	SEQ	LR(nt)				Y		4,6
koala (southeast Queensland bioregion)	*Phascolarctos cinereus*			V	SEQ	LR(nt)						EH
common planigale	*Planigale maculata*			C								3,4
eastern chestnut mouse	*Pseudomys gracilicaudatus*				SEQ							3
black flying-fox	*Pteropus alecto*			V	SEQ							4

Common Name	Scientific Name	EPBC	Mi / Ma	NCA	BPA	AP	BACK ON TRACK	DECLARED	EXOTIC	OTHER STUDIES	WP	^SOURCE
grey-headed flying-fox	*Pteropus poliocephalus*	V		C	VU		Critical					1,4
little red flying-fox	*Pteropus scapulatus*			C	SEQ							3,4
black rat	*Rattus rattus*							ND	Y			4
yellow-bellied sheathtail-bat	*Saccolaimus flaviventris*			C						Y		4,6
greater broad-nosed bat	*Scoteanax rueppellii*			C	SEQ	LR(nt)				Y		4,6
inland broad-nosed bat	*Scotorepens balstoni*									Y		6
little broad-nosed bat	*Scotorepens greyii*			C						Y		4,6
eastern broad-nosed bat	*Scotorepens orion*			C	SEQ							4
common dunnart	*Sminthopsis murina*			C	SEQ							3,4
pig	*Sus scrofa*							Class 3	Y	Y		4,6
short-beaked echidna	*Tachyglossus aculeatus*			C								4
white-striped freetail-bat	*Austronomus australis*			C						Y		4,6
coastal sheathtail bat	*Taphozous australis*			V			High					4
common sheathtail bat	*Taphozous troughtoni*			C	SEQ							4
common brushtail possum	*Trichosurus vulpecula*			C						Y		3,4,6
eastern forest bat	*Vespadelus pumilus*			C								4
little forest bat	*Vespadelus vulturnus*			C	SEQ							4
red fox	*Vulpes vulpes*							Class 2	Y			4
swamp wallaby	*Wallabia bicolor*			C								4
false water-rat	*Xeromys myoides*	V		V		IK	High					1
Reptiles												
nobbi	*Amphibolurus nobbi*			C								4
Three-clawed worm-skink	*Anomalopus verreauxii*			C								3,4
spotted python	*Antaresia maculosa*									Y		6
black-headed python	*Aspidites melanocephalus*			C								4
major skink	*Bellatorias frerei*			C								4

Common Name	Scientific Name	EPBC	Mi / Ma	NCA	BPA	AP	BACK ON TRACK	DECLARED	EXOTIC	OTHER STUDIES	WP	^SOURCE
brown tree snake	*Boiga irregularis*			C						Y		4,6
white-crowned snake	*Cacophis harriettae*			C								4
cone-eared calyptotis	*Calyptotis lepidorostrum*			C	SEQ							4
Burnett's skink	*Lygisaurus foliorum*			C						Y		3,4,6
shaded-litter rainbow-skink	*Carlia munda*			C						Y	Y	3,4,5,6
open-litter rainbow skink	*Carlia pectoralis*			C	SEQ					Y		3,4,6
robust rainbow-skink	*Carlia schmeltzii*			C						Y		3,4,6
tussock rainbow-skink	*Carlia vivax*			C						Y		3,4,6
frilled lizard	*Chlamydosaurus kingii*			C	SEQ					Y		4,6
supralittoral shinning-skink	*Cryptoblepharus litoralis*									Y		6
cream-striped shinning-skink	*Cryptoblepharus virgatus*			C						Y	Y	3,4,5,6
Carpentaria snake	*Cryptophis boschmai*											3
robust ctenotus	*Ctenotus robustus*									Y		6
copper-tailed skink	*Ctenotus taeniolatus*			C						Y		3,4,6
yellow-faced whipsnake	*Demansia psammophis*			C								4
black whipsnake	*Demansia vestigiata*			C								3,4,6
common tree snake	*Dendrelaphis punctulata*			C						Y	Y	4,5,6
ornamental snake	*Denisonia maculata*	V		V								1
wood gecko	*Diplodactylus vittatus*			C						Y		3,4,6
tommy roundhead	*Diporiphora australis*			C	SEQ					Y		3,4,6
yakka skink	*Egernia rugosa*	V		V		R / IK						1
Krefft's river turtle	*Emydura macquarii krefftii*			C		R / IK						4
broad-banded sand-swimmer	*Eremiascincus richardsonii*				SEQ					Y		6
northern barsided skink	*Eulamprus brachysoma*			C								4
dark barsided skink	*Eulamprus martini*			C								4
eastern water-skink	*Eulamprus quoyii*			C								3,4

Common Name	Scientific Name	EPBC	Mi / Ma	NCA	BPA	AP	BACK ON TRACK	DECLARED	EXOTIC	OTHER STUDIES	WP	^SOURCE
bar-sided skink	*Eulamprus tenuis*			C								3,4
red-naped snake	*Furina diadema*											3
chain-backed dtella	*Gehyra catenata*			C								4
dubious dtella	*Gehyra dubia*			C						Y	Y	3,4,5,6
fine-spotted mulch-skink	*Glaphyromorphus punctulatus*			C	SEQ							4
black-bellied swamp snake	*Hemiaspis signata*			C								4
Bynoe's gecko	*Heteronotia binoei*			C						Y	Y	3,4,5,6
elegant seasnake	*Hydrophis elegans*			C								4
diamond-shielded sunskink	*Lampropholis adonis*			C								4
dark-flecked garden sunskink	*Lampropholis delicata*			C						Y		3,4,6
eastern mulch-slider	*Lerista fragilis*			C								3,4
Burton's snake-lizard	*Lialis burtonis*			C						Y		3,4,6
common dwarf skink	*Menetia greyii*			C	SEQ					Y		3,4,6
dwarf litter-skink	*Menetia timlowi*				SEQ					Y		6
carpet python	*Morelia spilota*			C								4
fire-tailed skink	*Morethia taeniopleura*			C	SEQ							3,4
ocellated velvet gecko	*Oedura monilis*			C								4
zigzag velvet gecko	*Oedura rhombifer*			C								3,4
southern spotted velvet gecko	*Oedura tryoni*			C								4
taipan	*Oxyuranus scutellatus*											3,4
brigalow scaly-foot	*Paradelma orientalis*	V		V								1
bearded dragon	*Pogona barbata*			C								4
king brown snake	*Pseudechis australis*			C								4
red-bellied black snake	*Pseudechis porphyriacus*			C						Y		4,6
eastern brown snake	*Pseudonaja textilis*			C								4
claw-snouted blind snake	*Ramphotyphlops unguirostris*			C								3,4

Common Name	Scientific Name	EPBC	Mi / Ma	NCA	BPA	AP	BACK ON TRACK	DECLARED	EXOTIC	OTHER STUDIES	WP	^SOURCE
brown-snouted blind snake	*Ramphotyphlops wiedii*			C						Y		3,4,6
eastern small-eyed snake	*Cryptophis nigrescens*			C								4
black-striped snake	*Cryptophis nigrostriatus*			C	SEQ							4
freshwater snake	*Tropidonophis mairii*			C						Y		6
Gould's goanna	*Varanus gouldii*			C								4
rusty monitor	*Varanus semiremex*			R			High					4
black-headed monitor	*Varanus tristis*			C						Y	Y	3,4,5,6
lace monitor	*Varanus varius*			C								4
bandy-bandy	*Vermicella annulata*			C								3,4

^Source: 1 = EPBC Protected Matters Search Tool, 2 = Birds Australia (includes studies undertaken on all of Curtis Island), 3 = QLD Museum Fauna Collection Records, 4 = EPA Wildlife Online, 5 = WorleyParsons this study, 6 = Other Studies within the wider study area, EH = DERM Essential Habitat mapping only (i.e. this is not a record).
EPBC: E = Endangered, V = Vulnerable
Mi / Ma: Mi = Migratory listed species, Ma = Marine listed species
NCA: E = Endangered, V = Vulnerable, R = Rare, C = Common
BPA (Biodiversity Planning Assessment for Non-EVR Priority Taxa): SEQ = South East Queensland Bioregion
AP (Action Plan): VU = Vulnerable, R = Rare, LR(nt) = Lower Risk (near threatened)), IK = Insufficiently Known, DD = Data Deficient.

Appendix C Fauna habitat survey data

Fauna Assessment Site Locations

Site No	Habitat	RE	Date	Easting	Northing	Survey*
L01	Eucalypt woodland	12.11.6	14/04/2009	0313943	7372586	HA
L02	Eucalypt woodland	12.11.6	14/04/2009	0314221	7372476	HA
L03	Eucalypt woodland	12.11.14	14/04/2009	0315043	7372378	HA
L04	Ecotone from the saltpan to eucalypt woodland	12.1.2/12.11.14	14/04/2009	0315542	7372165	HA/OB
L05	Mangroves	12.11.3	14/04/2009	0314383	7372075	HA
L06	Ecotone from the saltpan to Melaleuca wetland	12.1.2/12.3.7	15/04/2009	0315269	7371676	HA/OB
L07	Eucalypt woodland	12.11.6	15/04/2009	0315129	7371444	HA
L08	Mangroves	12.11.3	15/04/2009	0314887	7371485	HA
L09	Eucalypt woodland	12.11.6	15/04/2009	0316094	7372750	HA
LP201	Melaleuca wetland	12.3.7	07/10/2009	0315467	7371485	HA/OB
LP202	Eucalypt woodland	12.11.6	07/10/2009	0315552	7371008	HA/OB
LP203	Eucalypt woodland	12.11.6	07/10/2009	0315356	7371023	HA/OB
LP204	Eucalypt woodland	12.11.6	07/10/2009	0316036	7371406	HA/OB
LP205	Eucalypt woodland	12.3.11	07/10/2009	0316046	7372070	HA/OB
LP206	Eucalypt woodland	12.11.6	07/10/2009	0316175	7371732	HA/OB
LP207	Eucalypt woodland	12.3.11	07/10/2009	0315705	7372558	HA/OB
LP208	Mangroves	12.1.3	08/10/2009	0315334	7370834	HA/OB
LP209	Eucalypt woodland	12.11.6	08/10/2009	0316559	7371649	HA/OB
LP210	Eucalypt woodland	12.11.6	08/10/2009	0315327	7372534	HA/OB
LP211	Mangroves	12.1.3	08/10/2009	0314559	7371803	HA/OB
LP212	Eucalypt woodland	12.11.6	08/10/2009	0314873	7372041	HA/OB

*HA = Habitat Assessment, OB = Observation

Appendix D Vegetation survey data

VEGETATION SURVEY

Mangrove Shrubland on Marine Clay Plain (V301)

Regional Ecosystem Profile	
Regional Ecosystem Type:	**RE 12.1.3**
EPBC Status:	**n / a**
VMA Status:	**Not Of Concern**
EPA Status:	**Not Of Concern**
DNRW Mapped as:	12.1.3
Width of Vegetation:	Not linear
Total Area of Vegetation:	> 50 ha

Site Description	
Bioregion / Locality:	Curtis Island, CE QLD (CQC Bioregion)
KP / Site Description:	Laird Point Project Area, NW
Photo Numbers:	1187 - 1188
Datum:	WGS84
Easting / Northing (Precision):	56 K 0314388 7372084 (+/- 5 m)

Vegetation Community Description

Mangrove shrubland on mudflat along coastline. Canopy is very dense forming impenetrable thicket to 2 – 4 m tall and is dominated by yellow mangrove (*Ceriops tagal*) with patches of long-leaved orange mangrove (*Bruguiera gymnorhiza*), long-styled stilt mangrove (*Rhizophora stylosa*) and eastern white mangrove (*Avicennia marina* ssp. *australasica*) present.

Some stags present. No groundcover. Some rocky outcropping present in association with adjacent metamorphic hills.

Floristic Summary

Botanical Species	Misc	Average Height (m)							Abundance (BA – 1m^2/ha)				
		E1	T1	T2	T3	S1	S2	G	E1	T1	T2	T3	S1
Ceriops tagal	D					3		0.5					
Bruguiera gymnorhiza	A					4							
Avicennia marina ssp. *australasica*	A					3							
Rhizophora stylosa	A					4							
% Rock	0												
% Bare ground	5												
% Leaf litter	0												
% Cryptophytes	0												

Misc: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant, V = collected, + = outside transect

VEGETATION SURVEY

Mangrove Shrubland on Marine Clay Plain (V301)

Topography , Soils and Geology	
Landform Situation:	Plain, tidal flat, salt flat.
Erosional Landform Pattern:	n / a
Slope Type:	Flat; Level (< 1 %)
Altitude:	7 m
Soils:	Observation (reliability low)
Soil Colour:	Brown
Soil Texture:	Clay
Geology:	Inferred (reliability high)
Geology:	Unconsolidated
Geology Formation / Rock Type:	Marine Clays

Community Health and Condition	
Overall Health:	**Very Good**
Weed Species:	none
Weed Cover (%):	0
Disturbance:	debris
Disturbance Cover (%):	< 5

Survey Details	
Project Number:	301001-00752 / 2BV1030
Recorder/s:	Amy Kruger
Field Site Number:	WP075
Sample Level / Type:	Detailed / Rectangular
Sample Detail / Species List:	Tertiary / Woody species
Sample Area:	10 x 50 m
Date / Time:	14 / 04 / 2009 16:34

VEGETATION SURVEY

Mangrove Shrubland on Beach Ridge
(V302)

Regional Ecosystem Profile	
Regional Ecosystem Type:	**RE 12.1.3**
EPBC Status:	**n / a**
VMA Status:	**Not Of Concern**
EPA Status:	**Not Of Concern**
DNRW Mapped as:	12.1.3
Overall Health:	**Very Good**

Site Description	
Bioregion / Locality:	Curtis Island, CE QLD (CQC Bioregion)
KP / Site Description:	Laird Point Project Area, NW
Photo Numbers:	0071 - 0072
Datum:	WGS84
Easting / Northing (Precision):	56 K 0314559 7371803 (+/- 4 m)
Altitude:	4 m

Vegetation Community Description

Mangrove shrubland to 4 – 5 m tall on sand / shell beach berm. Canopy is dominated by yellow mangrove (*Ceriops tagal*) with eastern white mangrove (*Avicennia marina* ssp. *australasica*) and long-leaved orange mangrove (*Bruguiera gymnorhiza*) also present. Stunted forms of rainforest derivatives and weedy species including tuckeroo (*Cupaniopsis anacardioides*) and common prickly pear (*Opuntia stricta*) also present on highest point of berm.

Bushland is generally in very good condition with little evidence of disturbance. Debris present and dieback probably associated with tidal influx also present. No hollow-bearing trees observed. Little leaf litter and some logs present.

Survey Details	
Project Number:	301001-00752 / 2V1030
Recorder/s:	Amy Kruger
Field Site Number:	A13
Sample Level / Type:	Reconnaisance / Random
Sample Detail / Species List:	Quaternary / Dominant species
Sample Area:	50 x 50 m
Date / Time:	08 / 10 / 2009 11:50

VEGETATION SURVEY

Ironbark – Spotted Gum Open Forest on Metamorphic Hill (V303)

Regional Ecosystem Profile	
Regional Ecosystem Type:	**RE 12.11.6**
EPBC Status:	**n / a**
VMA Status:	**Not Of Concern**
EPA Status:	**Not Of Concern**
DNRW Mapped as:	12.11.6
Overall Health:	**Good**

Site Description	
Bioregion / Locality:	Curtis Island, CE QLD (CQC Bioregion)
KP / Site Description:	Laird Point Project Area, NW
Photo Numbers:	1185 - 1186
Datum:	WGS84
Easting / Northing (Precision):	56 K 0314533 7371978 (+/- 5 m)
Altitude:	11 m

Vegetation Community Description

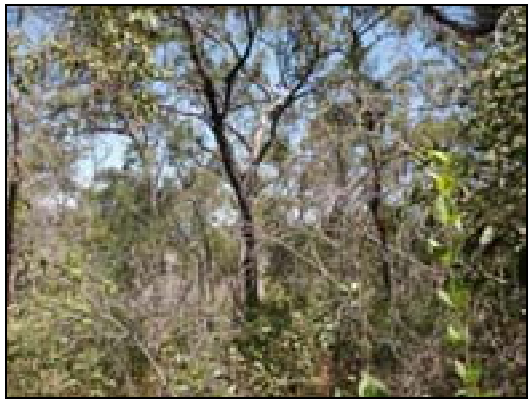
Open forest to 15 – 20 m tall on midslope (steeply sloped). Canopy is open and dominated by narrow-leaved red ironbark (*Eucalyptus crebra*) with lemon-scented/spotted gum (*Corymbia citriodora*), Queensland peppermint (*E. exserta*) and Moreton Bay ash (*C. tessellaris*). Sparse midstorey of canopy recruits to 8 – 12 m tall. Low tree / tall shrub layer to 2 – 4 m tall of Brisbane black wattle (*Acacia leiocalyx*), red ash (*Alphitonia excelsa*), native quinine (*Petalostigma pubescens*), medicine bush (*Pogonolobus reticulatus*) and canopy recruits. Sparse to open grassy groundlayer to 1 m tall of black speargrass (*Heteropogon contortus*), dark wiregrass (*Aristida calycina*), kangaroo grass (*Themeda triandra*), barbed-wire grass (*Cymbopogon refractus*) and conetop nineawn grass (*Enneapogon lindleyanus*).

Bushland is in good condition with some evidence of grazing and historical logging. Erosion present. Major weed infestations are common prickly pear (*Opuntia stricta*), common lantana (*Lantana camara*) and rubber vine (*Cryptostegia grandiflora*) and mostly associated with drainage line and edges of community.

Survey Details	
Project Number:	301001-00752 / 2V1030
Recorder/s:	Amy Kruger
Field Site Number:	WP074
Sample Level / Type:	Reconnaisance / Random
Sample Detail / Species List:	Quaternary / Dominant species
Sample Area:	50 x 50 m
Date / Time:	14 / 04 / 2009 16:25

VEGETATION SURVEY

Spotted Gum – Ironbark - Bloodwood Open Forest on Metamorphic Hill (V304)



Regional Ecosystem Profile	
Regional Ecosystem Type:	**RE 12.11.6**
EPBC Status:	**n / a**
VMA Status:	**Not Of Concern**
EPA Status:	**Not Of Concern**
DNRW Mapped as:	12.11.6
Overall Health:	**Good**

Site Description	
Bioregion / Locality:	Curtis Island, CE QLD (CQC Bioregion)
KP / Site Description:	Laird Point Project Area, NW
Photo Numbers:	0079 - 0080
Datum:	WGS84
Easting / Northing (Precision):	56 K 0314873 7372041 (+/- 3 m)
Altitude:	15 m

Vegetation Community Description

Open forest to 15 – 18 m tall on midslope of metamorphic hill. Rocky outcropping present. Canopy is open and co-dominated by lemon-scented/spotted gum (*Corymbia citriodora*), narrow-leaved red ironbark (*Eucalyptus crebra*) and pink bloodwood (*C. intermedia*). Dense midstorey to 6 – 10 m tall of red ash (*Alphitonia excelsa*), Brisbane black wattle (*Acacia leiocalyx*) and canopy recruits. Dense grassy groundlayer to 1 m tall of black speargrass (*Heteropogon contortus*), sawsedge (*Gahnia aspera*), dark wiregrass (*Aristida calycina*) and guinea grass (*Megathryrus maximus*).

Bushland is in good condition with evidence of historical fire present. Isolated rubber vine (*Cryptostegia grandiflora*) present. Scattered leaf litter and hollow logs present. Occasional stag / hollow-bearing tree present.

Survey Details	
Project Number:	301001-00752 / 2V1030
Recorder/s:	Amy Kruger
Field Site Number:	A14
Sample Level / Type:	Reconnaisance / Random
Sample Detail / Species List:	Quaternary / Dominant species
Sample Area:	50 x 50 m
Date / Time:	08 / 10 / 2009 12:40

VEGETATION SURVEY

Spotted Gum – Ironbark Open Forest on Metamorphic Hill (V305)

Regional Ecosystem Profile	
Regional Ecosystem Type:	**RE 12.11.6**
EPBC Status:	**n / a**
VMA Status:	**Not Of Concern**
EPA Status:	**Not Of Concern**
DNRW Mapped as:	12.11.6
Width of Vegetation:	Not linear
Total Area of Vegetation:	> 50 ha

Site Description	
Bioregion / Locality:	Curtis Island, CE QLD (CQC Bioregion)
KP / Site Description:	Laird Point Project Area, N
Photo Numbers:	1174 - 1175
Datum:	WGS84
Easting / Northing (Precision):	56 K 0315040 7372377 (+/- 5 m)

Vegetation Community Description

Lemon-scented/spotted gum (*Corymbia citriodora*) – narrow-leaved red ironbark (*Eucalyptus crebra*) dominated open forest to 15 – 20 m tall on midslope. Canopy is open and Queensland blue gum (*E. tereticornis*) becoming prominent further downslope. Midstorey is dense to 10 – 15 m tall of eucalypt species. Low tree layer of canopy recruits to 6 – 8 m tall. Very dense shrub layer to 2 – 4 m tall of canopy recruits and pioneer species. Dense grass ground layer to 1 m tall. Rocky outcropping present.

Floristic Summary

Botanical Species	Misc	Average Height (m)							Abundance (BA – 1m^2/ha)				
		E1	T1	T2	T3	S1	S2	G	E1	T1	T2	T3	S1
Eucalyptus tereticornis			18	12		2				4			
Eucalyptus crebra			16	12	5					4			
Eucalyptus exserta				10							1		
Angophora leiocarpa				10	5								
Pogonolobus reticulatus						3							
Acacia leiocalyx						2							
Acacia concurrens						2							
Heteropogon contortus								1					
Megathryrus maximus	#							1					
Passiflora suberosa	#							0.5					
Cymbopogon refractus								0.5					
% Rock	< 5												
% Bare ground	< 5												
% Leaf litter	< 5												
% Cryptophytes	0												

Misc: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant, V = collected, + = outside transect

VEGETATION SURVEY

Spotted Gum – Ironbark Open Forest on Metamorphic Hill (V305)

Topography , Soils and Geology	
Landform Situation:	Hills and tablelands, not specified.
Erosional Landform Pattern:	n / a
Slope Type:	Lower slope; Very Gently Inclined (1 – 3 %)
Altitude:	18 m
Soils:	Observation (reliability low)
Soil Colour:	Brown
Soil Texture:	Loam
Geology:	Inferred (reliability high)
Geology:	Metamorphosed
Geology Formation / Rock Type:	Wandilla Formation – Quartz greywacke

Community Health and Condition	
Overall Health:	**Good**
Weed Species:	*Megathryrus maximus, Passiflora suberosa*
Weed Cover (%):	< 5
Disturbance:	Fire (historical), stock use, vehicle track
Disturbance Cover (%):	< 5

Survey Details	
Project Number:	301001-00752 / 2BV1030
Recorder/s:	Amy Kruger
Field Site Number:	WP069
Sample Level / Type:	Detailed / Rectangular
Sample Detail / Species List:	Tertiary / Woody species
Sample Area:	10 x 50 m
Date / Time:	14 / 04 / 2009 14:18

VEGETATION SURVEY

Spotted Gum – Ironbark Open Forest on Metamorphic Hill (V306)

Regional Ecosystem Profile	
Regional Ecosystem Type:	**RE 12.11.6**
EPBC Status:	**n / a**
VMA Status:	**Not Of Concern**
EPA Status:	**Not Of Concern**
DNRW Mapped as:	12.11.6
Overall Health:	**Very Good**

Site Description	
Bioregion / Locality:	Curtis Island, CE QLD (CQC Bioregion)
KP / Site Description:	Laird Point Project Area, N
Photo Numbers:	0063 - 0064
Datum:	WGS84
Easting / Northing (Precision):	56 K 0315327 7372534 (+/- 5 m)
Altitude:	22 m

Vegetation Community Description

Open forest to 15 – 20 m on midslope of metamorphic hill and adjacent to drainage line. No water present at time of survey. Canopy is open and dominated by lemon-scented/spotted gum (*Corymbia citriodora*) with narrow-leaved red ironbark (*Eucalyptus crebra*). Tall midstorey to 10 – 12 m tall of canopy recruits. Midstorey and low tree layer are open to sparse. Low tree layer dominated by forest she-oak (*Allocasuarina torulosa*) to 6 – 8 m tall. Mid-dense shrub layer to 2 – 3 m tall of Brisbane black wattle (*Acacia leiocalyx*) and saplings. Dense ground layer to 0.5 – 1 m tall of forest grasstree (*Xanthorrhoea johnsonii*), narrow-leaved matrush (*Lomandra confertifolia*), blady grass (*Imperata cylindrica*) and black speargrass (*Heteropogon contortus*).

Bushland is in very good condition with disturbance limited to fire (historical) and limited grazing. Rocky outcropping present. Thick leaf litter and logs present.

Survey Details	
Project Number:	301001-00752 / 2V1030
Recorder/s:	Amy Kruger
Field Site Number:	A12
Sample Level / Type:	Reconnaisance / Random
Sample Detail / Species List:	Quaternary / Dominant species
Sample Area:	50 x 50 m
Date / Time:	08 / 10 / 2009 10:50

VEGETATION SURVEY

Blue Gum – Ironbark Woodland on Metamorphic Hill (V307)

Regional Ecosystem Profile	
Regional Ecosystem Type:	**RE 12.11.14**
EPBC Status:	**n / a**
VMA Status:	**Of Concern**
EPA Status:	**Of Concern**
DNRW Mapped as:	12.11.6 / 12.11.14
Width of Vegetation:	Not linear
Total Area of Vegetation:	> 50 ha

Site Description	
Bioregion / Locality:	Curtis Island, CE QLD (CQC Bioregion)
KP / Site Description:	Laird Point Project Area, N
Photo Numbers:	1177 - 1178
Datum:	WGS84
Easting / Northing (Precision):	56 K 0315270 7372234 (+/- 6 m)

Vegetation Community Description

Queensland blue gum (*Eucalyptus tereticornis*) – narrow-leaved red ironbark (*E. crebra*) dominated woodland to 10 – 15 m tall on lower hillslope. Canopy is open with occasional Queensland peppermint (*E. exserta*) present. Midstorey is dominated by *Acacia* species to 2 – 6 m and is dense. Low shrub layer of canopy recruits to 2 m tall. Dense grass ground layer dominated by black speargrass (*Heteropogon contortus*), dark wiregrass (*Aristida calycina*) and kangaroo grass (*Themeda triandra*) to 1 m tall.

Floristic Summary

Botanical Species	Misc	Average Height (m)							Abundance (BA – 1m^2/ha)				
		E1	T1	T2	T3	S1	S2	G	E1	T1	T2	T3	S1
Eucalyptus tereticornis	D		12							5			
Eucalyptus crebra	S		12							1			
Eucalyptus exserta	A		10										
Lophostemon suaveolens	A		10										
Acacia leiocalyx						4							
Dodonaea lanceolata						3							
Acacia julifera						3							
Heteropogon contortus								1					
Themeda triandra								0.7					
Aristida calycina								0.7					
% Rock	5												
% Bare ground	< 5												
% Leaf litter	5												
% Cryptophytes	0												

Misc: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant, V = collected, + = outside transect

VEGETATION SURVEY

Blue Gum – Ironbark Open Forest on Metamorphic Hill (V307)

Topography , Soils and Geology	
Landform Situation:	Hills and tablelands, not specified.
Erosional Landform Pattern:	n / a
Slope Type:	Lower slope; Very Gently Inclined (1 – 3 %)
Altitude:	10 m
Soils:	Observation (reliability low)
Soil Colour:	Brown
Soil Texture:	Loam
Geology:	Inferred (reliability high)
Geology:	Metamorphosed
Geology Formation / Rock Type:	Wandilla Formation – Quartz greywacke

Community Health and Condition	
Overall Health:	**Good**
Weed Species:	*Passiflora suberosa*
Weed Cover (%):	< 5
Disturbance:	Fire (historical), grazing, vehicle track
Disturbance Cover (%):	< 5

Survey Details	
Project Number:	301001-00752 / 2BV1030
Recorder/s:	Amy Kruger
Field Site Number:	WP070
Sample Level / Type:	Detailed / Rectangular
Sample Detail / Species List:	Tertiary / Woody species
Sample Area:	10 x 50 m
Date / Time:	14 / 04 / 2009 14:40

VEGETATION SURVEY

Saltpan Vegetation on Marine Clay Plain (V308)

Regional Ecosystem Profile	
Regional Ecosystem Type:	**RE 12.1.2**
EPBC Status:	**n / a**
VMA Status:	**Not Of Concern**
EPA Status:	**Not Of Concern**
DNRW Mapped as:	12.1.2
Width of Vegetation:	Not linear
Total Area of Vegetation:	> 50 ha

Site Description	
Bioregion / Locality:	Curtis Island, CE QLD (CQC Bioregion)
KP / Site Description:	Laird Point Project Area, N
Photo Numbers:	1179 - 1180
Datum:	WGS84
Easting / Northing (Precision):	56 K 0315250 7371412 (+/- 4 m)

Vegetation Community Description

Expansive mudflat largely devoid of vegetation on marine clay plain in bay. Saltpan vegetation present along bay edge and dominated by salt couch (*Sporobolus virginicus*) and prickly couch grass (*Zoysia macrantha*). Cracking clays. Water present in central area of saltpan (intermittently flooded). Occasional mangrove lines boundary, becoming more common in central area of saltpan.

Floristic Summary

Botanical Species	Misc	Average Height (m)							Abundance (BA – 1m^2/ha)				
		E1	T1	T2	T3	S1	S2	G	E1	T1	T2	T3	S1
Sporobolus virginicus	D							0.2					
Zoysia macrantha	S							0.2					
Sesuvium portulacastrum	A							0.2					
Ceriops tagal	A					0.5							
% Rock	< 5												
% Bare ground	80 - 90												
% Leaf litter	< 5												
% Cryptophytes	0												

Misc: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant, V = collected, + = outside transect

VEGETATION SURVEY

Saltpan Vegetation on Marine Clay Plain (V308)

Topography , Soils and Geology	
Landform Situation:	Plain, tidal flat, salt flat.
Erosional Landform Pattern:	n / a
Slope Type:	Flat; Level (< 1 %)
Altitude:	11 m
Soils:	Observation (reliability low)
Soil Colour:	Brown
Soil Texture:	Clay
Geology:	Inferred (reliability high)
Geology:	Unconsolidated
Geology Formation / Rock Type:	Marine Clays

Community Health and Condition	
Overall Health:	**Good**
Weed Species:	none
Weed Cover (%):	0
Disturbance:	Grazing, fencing, vehicle tracks, debris
Disturbance Cover (%):	5

Survey Details	
Project Number:	301001-00752 / 2BV1030
Recorder/s:	Amy Kruger
Field Site Number:	A71
Sample Level / Type:	Detailed / Rectangular
Sample Detail / Species List:	Tertiary / Woody species
Sample Area:	10 x 50 m
Date / Time:	14 / 04 / 2009 14:48

VEGETATION SURVEY

Blue Gum – Ironbark Woodland on Metamorphic Hill (V309)

Regional Ecosystem Profile	
Regional Ecosystem Type:	**RE 12.11.14**
EPBC Status:	**n / a**
VMA Status:	**Of Concern**
EPA Status:	**Of Concern**
DNRW Mapped as:	12.11.6 / 12.11.14
Overall Health:	**Good**

Site Description	
Bioregion / Locality:	Curtis Island, CE QLD (CQC Bioregion)
KP / Site Description:	Laird Point Project Area, N
Photo Numbers:	1181 - 1182
Datum:	WGS84
Easting / Northing (Precision):	56 K 0315557 7372277 (+/- 4 m)
Altitude:	10 m

Vegetation Community Description
Queensland blue gum (*Eucalyptus tereticornis*) – narrow-leaved red ironbark (*E. crebra*) dominated woodland to 10 – 15 m tall on lower hillslope. Canopy is open with Queensland peppermint (*E. exserta*) and swamp box (*Lophostemon suaveolens*). Midstorey is open to 8 – 10 m tall of *Acacia* spp., and canopy recruits. Low tree layer of saplings to 4 m tall. Dense low shrub layer of canopy recruits and medicine bush (*Pogonolobus reticulatus*) to 2 m tall. Dense native grass ground layer to 0.5 m tall. Bushland is in good condition. Disturbance includes historical fire scars and grazing. Hollow logs and stags present. Scattered weeds.

Survey Details	
Project Number:	301001-00752 / 2V1030
Recorder/s:	Amy Kruger
Field Site Number:	WP072
Sample Level / Type:	Reconnaisance / Random
Sample Detail / Species List:	Quaternary / Dominant species
Sample Area:	50 x 50 m
Date / Time:	14 / 04 / 2009 15:05

VEGETATION SURVEY

Blue Gum Open Forest on Alluvial Plain
(V310)

Regional Ecosystem Profile	
Regional Ecosystem Type:	**RE 12.3.11**
EPBC Status:	**n / a**
VMA Status:	**Of Concern**
EPA Status:	**Of Concern**
DNRW Mapped as:	12.3.7 / 12.3.11
Overall Health:	**Good**

Site Description	
Bioregion / Locality:	Curtis Island, CE QLD (CQC Bioregion)
KP / Site Description:	Laird Point Project Area, NE
Photo Numbers:	0032 - 0033
Datum:	WGS84
Easting / Northing (Precision):	56 K 0315705 7372558 (+/- 4 m)
Altitude:	4 m

Vegetation Community Description

Queensland blue gum (*Eucalyptus tereticornis*) – pink bloodwood (*Corymbia intermedia*) dominated open forest to 15 – 20 m tall adjacent creekline. Water not present at time of survey. Canopy is open with Queensland peppermint (*E. exserta*), Moreton Bay ash (*C. tessellaris*) and swamp box (*Lophostemon suaveolens*). Open midstorey of canopy recruits to 8 – 10 m tall. Low tree layer to 4 – 6 m tall of red ash (*Alphitonia excelsa*), Brisbane black wattle *Acacia leiocalyx*) and lance-leaved hopbush (*Dodonaea lanceolata*). Scattered patches of dense *Acacia* regrowth. Dense grassy ground layer to 1 m tall of black speargrass (*Heteropogon contortus*) and dark wiregrass (*Aristida calycina*).

Bushland is in good condition with disturbance limited to erosion and grazing. Scattered leaf litter and some logs present.

Survey Details	
Project Number:	301001-00752 / 2V1030
Recorder/s:	Amy Kruger
Field Site Number:	A09
Sample Level / Type:	Reconnaisance / Random
Sample Detail / Species List:	Quaternary / Dominant species
Sample Area:	50 x 50 m
Date / Time:	07 / 10 / 2009 16:13

VEGETATION SURVEY

Spotted Gum – Ironbark Open Forest on Metamorphic Hill (V311)

Regional Ecosystem Profile	
Regional Ecosystem Type:	**RE 12.11.6**
EPBC Status:	**n / a**
VMA Status:	**Not Of Concern**
EPA Status:	**Not Of Concern**
DNRW Mapped as:	12.11.6
Overall Health:	**Good**

Site Description	
Bioregion / Locality:	Curtis Island, CE QLD (CQC Bioregion)
KP / Site Description:	Laird Point Project Area, NE
Photo Numbers:	0028 - 0030
Datum:	WGS84
Easting / Northing (Precision):	56 K 0316222 7372534 (+/- 4 m)
Altitude:	43 m

Vegetation Community Description

Open forest of lemon-scented/spotted gum (*Corymbia citriodora*) and narrow-leaved red ironbark (*Eucalyptus crebra*) to 15 – 20 m tall on mid to upper slope of metamorphic hill (quartz greywacke). Canopy is open. Red pebbly soils with some rocky outcropping. Open midstorey of canopy recruits to 8 – 10 m tall. Very dense shrub layer of canopy recruits and pioneer species (*Acacia* spp.). Open ground layer of native grasses to 0.5 m tall including black speargrass (*Heteropogon contortus*), dark wiregrass (*Aristida calycina*), narrow-leaved matrush (*Lomandra confertifolia*) and sawsedge (*Gahnia aspera*).

Bushland is in good condition with evidence of historical fire and grazing present. Stags and logs present. Scattered leaf litter.

Survey Details	
Project Number:	301001-00752 / 2V1030
Recorder/s:	Amy Kruger
Field Site Number:	A08
Sample Level / Type:	Reconnaisance / Random
Sample Detail / Species List:	Quaternary / Dominant species
Sample Area:	50 x 50 m
Date / Time:	07 / 10 / 2009 15:39

VEGETATION SURVEY

Spotted Gum – Ironbark Open Forest on Metamorphic Hill (V312)

Regional Ecosystem Profile	
Regional Ecosystem Type:	**RE 12.11.6**
EPBC Status:	**n / a**
VMA Status:	**Not Of Concern**
EPA Status:	**Not Of Concern**
DNRW Mapped as:	12.11.6
Overall Health:	**Very Good**

Site Description	
Bioregion / Locality:	Curtis Island, CE QLD (CQC Bioregion)
KP / Site Description:	Laird Point Project Area, NE
Photo Numbers:	1200 - 1201
Datum:	WGS84
Easting / Northing (Precision):	56 K 0315981 7372297 (+/- 5 m)
Altitude:	21 m

Vegetation Community Description

Open forest to 15 – 20 m tall of lemon-scented/spotted gum (*Corymbia citriodora*) and narrow-leaved red ironbark (*Eucalyptus crebra*) with Queensland blue gum (*E. tereticornis*) and Queensland peppermint (*E. exserta*). Canopy is open to mid-dense. Midstorey to 10 – 15 m tall of canopy recruits, pink bloodwood (*C. intermedia*) and forest she-oak (*Allocasuarina torulosa*). Midstorey is sparse to open. Sparse low tree layer to 4 – 6 m tall of canopy recruits. Low dense shrub layer to 1 – 2 m tall of ball honey-myrtle (*Melaleuca nodosa*), medicine bush (*Pogonolobus reticulatus*) and Brisbane black wattle (*A. leiocalyx*). Native grass / sedge ground layer to 0.5 m tall.

Bushland is in very good condition with stag trees and hollow logs present. Leaf litter. Rocky outcropping present. Disturbance is limited to vehicle track. Isolated weedy plants present.

Survey Details	
Project Number:	301001-00752 / 2V1030
Recorder/s:	Amy Kruger
Field Site Number:	WP081
Sample Level / Type:	Reconnaisance / Random
Sample Detail / Species List:	Quaternary / Dominant species
Sample Area:	50 x 50 m
Date / Time:	15 / 04 / 2009 13:01

VEGETATION SURVEY

Blue Gum Open Forest on Alluvial Plain
(V313)

Regional Ecosystem Profile	
Regional Ecosystem Type:	**RE 12.3.11**
EPBC Status:	**n / a**
VMA Status:	**Of Concern**
EPA Status:	**Of Concern**
DNRW Mapped as:	12.3.7 / 12.3.11
Width of Vegetation:	Not linear
Total Area of Vegetation:	> 50 ha

Site Description	
Bioregion / Locality:	Curtis Island, CE QLD (CQC Bioregion)
KP / Site Description:	Laird Point Project Area, C
Photo Numbers:	1183 - 1184
Datum:	WGS84
Easting / Northing (Precision):	56 K 0315824 7371966 (+/- 5 m)

Vegetation Community Description

Queensland blue gum (*Eucalyptus tereticornis*) – narrow-leaved red ironbark (*E. crebra*) – pink bloodwood (*C. intermedia*) open forest to 15 – 20 m tall on lower hillslope adjacent creekline. Midstorey is sparse to open to 8 – 10 m tall. Low tree layer to 4 – 6 m tall. Low dense shrub layer of canopy recruits to 1 – 3 m tall. Dense grassy ground layer to 0.5 m tall.

Floristic Summary

Botanical Species	Misc	Average Height (m)							Abundance (BA – 1m^2/ha)				
		E1	T1	T2	T3	S1	S2	G	E1	T1	T2	T3	S1
Eucalyptus tereticornis	D		18	8	6					4	1		
Corymbia intermedia	S		15	10		1				2			
Eucalyptus crebra	S		18	8						1			
Eucalyptus exserta	A		18										
Acacia leiocalyx				8	4	1							
Acacia concurrens				8	4								
Angophora leiocarpa				8									
Melaleuca sp.					4	1							
Sida cordifolia	#							0.5					
Themeda triandra								0.5					
Aristida calycina								0.5					
% Rock	0												
% Bare ground	10												
% Leaf litter	< 5												
% Cryptophytes	0												

Misc: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant, V = collected, + = outside transect

VEGETATION SURVEY

Blue Gum Open Forest on Alluvial Plain
(V313)

Topography , Soils and Geology	
Landform Situation:	Alluvial plain, floodplain
Erosional Landform Pattern:	n / a
Slope Type:	Lower slope; Very Gently Inclined (1 – 3 %)
Altitude:	11 m
Soils:	Observation (reliability low)
Soil Colour:	Light brown
Soil Texture:	Sandy
Geology:	Inferred (reliability high)
Geology:	Unconsolidated
Geology Formation / Rock Type:	Alluvium

Community Health and Condition	
Overall Health:	**Good**
Weed Species:	*Paspalum dilatatum, Sida cordifolia*
Weed Cover (%):	0
Disturbance:	Fire (historical), vehicle tracks, grazing
Disturbance Cover (%):	5 - 25

Survey Details	
Project Number:	301001-00752 / 2BV1030
Recorder/s:	Amy Kruger
Field Site Number:	WP073
Sample Level / Type:	Detailed / Rectangular
Sample Detail / Species List:	Tertiary / Woody species
Sample Area:	10 x 50 m
Date / Time:	14 / 04 / 2009 15:30

VEGETATION SURVEY

Blue Gum Open Forest on Alluvial Plain
(V314)

Regional Ecosystem Profile	
Regional Ecosystem Type:	**RE 12.3.11**
EPBC Status:	**n / a**
VMA Status:	**Of Concern**
EPA Status:	**Of Concern**
DNRW Mapped as:	12.3.7 / 12.3.11
Overall Health:	**Good**

Site Description	
Bioregion / Locality:	Curtis Island, CE QLD (CQC Bioregion)
KP / Site Description:	Laird Point Project Area, CE
Photo Numbers:	0020 - 0021
Datum:	WGS84
Easting / Northing (Precision):	56 K 0316046 7372070 (+/- 4 m)
Altitude:	18 m

Vegetation Community Description

Queensland blue gum (*Eucalyptus tereticornis*) open forest to 15 – 18 m tall with pink bloodwood (*Corymbia intermedia*) fringing small ephemeral creekline. Water not present at time of survey. Canopy is open. Midstorey of canopy recruits, swamp box (*Lophostemon suaveolens*) and *Acacia* species. Open shrub layer of saplings and forest grasstree (*Xanthorrhoea johnsonii*). Dense grassy groundcover to 0.8 m tall of black speargrass (*Heteropogon contortus*) and dark wiregrass (*Aristida calycina*).

Bushland is in good condition with evidence of historical fire and vehicle tracks. Logs and some leaf litter present.

Survey Details	
Project Number:	301001-00752 / 2V1030
Recorder/s:	Amy Kruger
Field Site Number:	A06
Sample Level / Type:	Reconnaisance / Random
Sample Detail / Species List:	Quaternary / Dominant species
Sample Area:	50 x 50 m
Date / Time:	07 / 10 / 2009 14:00

VEGETATION SURVEY

Spotted Gum Open Forest on Metamorphic Hill (V315)

Regional Ecosystem Profile	
Regional Ecosystem Type:	**RE 12.11.6**
EPBC Status:	**n / a**
VMA Status:	**Not Of Concern**
EPA Status:	**Not Of Concern**
DNRW Mapped as:	12.11.6
Overall Health:	**Very Good**

Site Description	
Bioregion / Locality:	Curtis Island, CE QLD (CQC Bioregion)
KP / Site Description:	Laird Point Project Area, SE
Photo Numbers:	0045 - 0046
Datum:	WGS84
Easting / Northing (Precision):	56 K 0316559 7371649 (+/- 4 m)
Altitude:	34 m

Vegetation Community Description

Lemon-scented/spotted gum (*Corymbia citriodora*) dominated open forest to 15 – 20 m tall on midslope of metamorphic hill. Canopy is open. Head of creekline. Sparse midstorey of canopy recruits to 8 – 12 m tall. Dense shrub layer of *Acacia* species to 4 – 6 m tall. Sparse grassy groundlayer of dark wiregrass (*Aristida calycina*), conetop nineawn grass (*Enneapogon lindleyanus*), black speargrass (*Heteropogon contortus*) and forest grasstree (*Xanthorrhoea johnsonii*).

Bushland is in very good condition with disturbance limited to some grazing and historical fire scars. Hollow-bearing trees, logs and leaf litter present.

Survey Details	
Project Number:	301001-00752 / 2V1030
Recorder/s:	Amy Kruger
Field Site Number:	A11
Sample Level / Type:	Reconnaisance / Random
Sample Detail / Species List:	Quaternary / Dominant species
Sample Area:	50 x 50 m
Date / Time:	08 / 10 / 2009 09:08

VEGETATION SURVEY

Ironbark – Spotted Gum Open Forest on Metamorphic Hill (V316)

Regional Ecosystem Profile	
Regional Ecosystem Type:	**RE 12.11.6**
EPBC Status:	**n / a**
VMA Status:	**Not Of Concern**
EPA Status:	**Not Of Concern**
DNRW Mapped as:	12.11.6
Overall Health:	**Very Good**

Site Description	
Bioregion / Locality:	Curtis Island, CE QLD (CQC Bioregion)
KP / Site Description:	Laird Point Project Area, CE
Photo Numbers:	0024 - 0025
Datum:	WGS84
Easting / Northing (Precision):	56 K 0316175 7371732 (+/- 5 m)
Altitude:	70 m

Vegetation Community Description

Narrow-leaved red ironbark (*Eucalyptus crebra*) woodland to open forest to 10 – 15 m tall on crest of metamorphic hill (quartz greywacke). Extensive rocky outcropping present. Canopy is open with lemon-scented/spotted gum (*Corymbia citriodora*). Sparse midstorey of canopy recruits to 6 – 8 m tall. Open to mid-dense shrub layer of *Acacia* species and red ash (*Alphitonia excelsa*) to 2 – 4 m tall. Open ground layer of dark wiregrass (*Aristida calycina*), black speargrass (*Heteropogon contortus*) and sawsedge (*Gahnia aspera*) to 0.5 m tall.

Bushland is in very good condition with some evidence of historical fires and grazing. Dense leaf litter and hollow logs present.

Survey Details	
Project Number:	301001-00752 / 2V1030
Recorder/s:	Amy Kruger
Field Site Number:	A07
Sample Level / Type:	Reconnaisance / Random
Sample Detail / Species List:	Quaternary / Dominant species
Sample Area:	50 x 50 m
Date / Time:	07 / 10 / 2009 14:36

VEGETATION SURVEY

Blue Gum Woodland on Metamorphic Hill
(V317)

Regional Ecosystem Profile	
Regional Ecosystem Type:	**RE 12.11.14**
EPBC Status:	**n / a**
VMA Status:	**Of Concern**
EPA Status:	**Of Concern**
DNRW Mapped as:	12.11.6 / 12.11.14
Overall Health:	**Good**

Site Description	
Bioregion / Locality:	Curtis Island, CE QLD (CQC Bioregion)
KP / Site Description:	Laird Point Project Area, C
Photo Numbers:	1198 - 1199
Datum:	WGS84
Easting / Northing (Precision):	56 K 0315785 7371667 (+/- 3 m)
Altitude:	14 m

Vegetation Community Description

Queensland blue gum (*Eucalyptus tereticornis*) dominated woodland to 15 – 20 m tall on flat. Open canopy with occasional narrow-leaved red ironbark (*E. crebra*) and pink bloodwood (*Corymbia intermedia*). Midstorey is dense to 8 – 12 m of canopy recruits and pioneer species. Low shrub layer to 2 m tall of saplings. Dense grass ground layer to 0.5 m tall.

Bushland is in good condition with evidence of livestock activity and occasional weeds present.

Survey Details	
Project Number:	301001-00752 / 2V1030
Recorder/s:	Amy Kruger
Field Site Number:	WP080
Sample Level / Type:	Reconnaisance / Random
Sample Detail / Species List:	Quaternary / Dominant species
Sample Area:	50 x 50 m
Date / Time:	15 / 04 / 2009 11:06

VEGETATION SURVEY

Blue Gum Woodland on Metamorphic Hill
(V318)

Regional Ecosystem Profile	
Regional Ecosystem Type:	**RE 12.11.14**
EPBC Status:	**n / a**
VMA Status:	**Of Concern**
EPA Status:	**Of Concern**
DNRW Mapped as:	12.11.6 / 12.11.14
Overall Health:	**Good**

Site Description	
Bioregion / Locality:	Curtis Island, CE QLD (CQC Bioregion)
KP / Site Description:	Laird Point Project Area, C
Photo Numbers:	0081 - 0082
Datum:	WGS84
Easting / Northing (Precision):	56 K 0315482 7371675 (+/- 6 m)
Altitude:	18 m

Vegetation Community Description

Woodland on flat floodplain adjacent saltpan. Canopy is open and dominated by Queensland blue gum (*Eucalyptus tereticornis),* pink bloodwood (*Corymbia intermedia)* and swamp box (*Lophostemon suaveolens*). Sparse midstorey to 8 – 10 m tall of Brisbane black wattle (*Acacia leiocalyx*), red ash (*Alphitonia excelsa*) and canopy recruits. Sparse shrub layer to 4 m of canopy recruits, medicine bush (*Pogonolobus reticulatus*) and lance-leaved hopbush (*Dodonaea lanceolata*). Dense grassy ground layer to 0.8 m tall and dominated by blady grass (*Imperata cylindrica*).

Bushland is in good condition with evidence of recent vehicle track construction and grazing. Scattered clumps of *Sida* spp. Some leaf litter present but lacks hollow-bearing trees and logs on ground.

Survey Details	
Project Number:	301001-00752 / 2V1030
Recorder/s:	Amy Kruger
Field Site Number:	A15
Sample Level / Type:	Reconnaisance / Random
Sample Detail / Species List:	Quaternary / Dominant species
Sample Area:	50 x 50 m
Date / Time:	08 / 10 / 2009 13:44

VEGETATION SURVEY

Blue Gum – Ironbark Woodland on Metamorphic Hill (V319)

Regional Ecosystem Profile	
Regional Ecosystem Type:	**RE 12.11.14**
EPBC Status:	**n / a**
VMA Status:	**Of Concern**
EPA Status:	**Of Concern**
DNRW Mapped as:	12.11.6 / 12.11.14
Overall Health:	**Good**

Site Description	
Bioregion / Locality:	Curtis Island, CE QLD (CQC Bioregion)
KP / Site Description:	Laird Point Project Area, C
Photo Numbers:	1190 - 1191
Datum:	WGS84
Easting / Northing (Precision):	56 K 0315459 7371904 (+/- 4 m)
Altitude:	5 m

Vegetation Community Description

Queensland blue gum (*Eucalyptus tereticornis*) – narrow-leaved red ironbark (*E. crebra*) woodland to 10 – 15 m tall on lower slope. Canopy is open. Midstorey is sparse to 5 – 8 m tall of canopy recruits. Sparse low tree layer of canopy recruits and pioneer species to 2 m tall. Dense grass ground layer to 1 m tall of pitted bluegrass (*Bothriochloa decipiens*), black speargrass (*Heteropogon contortus*) and kangaroo grass (*Themeda triandra*).

Bushland is in good condition with disturbance or weed invasion present. Occasional balloon cotton (*Gomphocarpus physocarpus*) present. Stags and hollow logs present.

Survey Details	
Project Number:	301001-00752 / 2V1030
Recorder/s:	Amy Kruger
Field Site Number:	WP076
Sample Level / Type:	Reconnaisance / Random
Sample Detail / Species List:	Quaternary / Dominant species
Sample Area:	50 x 50 m
Date / Time:	15 / 04 / 2009 09:26

VEGETATION SURVEY

Blue Gum – Paperbark Open Forest on Alluvial Plain (V320)

Regional Ecosystem Profile	
Regional Ecosystem Type:	**RE 12.3.7**
EPBC Status:	**n / a**
VMA Status:	**Of Concern**
EPA Status:	**Of Concern**
DNRW Mapped as:	12.3.7 / 12.3.11
Width of Vegetation:	Not linear
Total Area of Vegetation:	> 50 ha

Site Description	
Bioregion / Locality:	Curtis Island, CE QLD (CQC Bioregion)
KP / Site Description:	Laird Point Project Area, CW
Photo Numbers:	1192 - 1193
Datum:	WGS84
Easting / Northing (Precision):	56 K 0315272 7371686 (+/- 5 m)

Vegetation Community Description

Queensland blue gum (*Eucalyptus tereticornis*) dominated open forest to open woodland to 10 – 15 m tall. Canopy is sparse with occasional pink bloodwood (*Corymbia intermedia*). Dense midstorey of pendulous paperbark (*Melaleuca fluviatilis*) to 8 – 10 m tall and dense low shrub layer of canopy recruits to 2 – 4 m tall. Dense sedge / grass groundlayer to 1 m tall. Pooling water present.

Floristic Summary

Botanical Species	Misc	Average Height (m)							Abundance (BA – 1m²/ha)				
		E1	T1	T2	T3	S1	S2	G	E1	T1	T2	T3	S1
Eucalyptus tereticornis	D		15	6	3					3			
Melaleuca fluviatilis	S		12	6	2					6	1		
Corymbia intermedia	A		10										
Acacia leiocalyx				6									
Alphitonia excelsa					4								
Gomphocarpus physocarpus						1							
Imperata cylindrica								0.5					
Panicum effusum								1					
Cyperus gracilis								0.5					
Philydrum lanuginosum								0.5					
Eleocharis dulcis								0.3					
Fimbristylis sp.								0.2					
% Rock	0												
% Bare ground	< 5												
% Leaf litter	< 5												
% Cryptophytes	0												

Misc: D = dominant, C = Codominant, S = subdominant, A = associate, EVR = significant species, # = weed, ## = declared plant, V = collected, + = outside transect

VEGETATION SURVEY

Blue Gum – Paperbark Open Forest on Alluvial Plain (V320)

Topography , Soils and Geology	
Landform Situation:	Alluvial plain, floodplain
Erosional Landform Pattern:	n / a
Slope Type:	Flat; Level (< 1 %)
Altitude:	3 m
Soils:	Observation (reliability low)
Soil Colour:	Dark brown
Soil Texture:	Sandy
Geology:	Inferred (reliability high)
Geology:	Unconsolidated
Geology Formation / Rock Type:	Alluvium

Community Health and Condition	
Overall Health:	**Good**
Weed Species:	*Gomphocarpus physocarpus, Ageratum houstonianum, Sida cordifolia*
Weed Cover (%):	< 5
Disturbance:	Fire (historical), grazing
Disturbance Cover (%):	< 5

Survey Details	
Project Number:	301001-00752 / 2BV1030
Recorder/s:	Amy Kruger
Field Site Number:	WP077
Sample Level / Type:	Detailed / Rectangular
Sample Detail / Species List:	Tertiary / Woody species
Sample Area:	10 x 50 m
Date / Time:	15 / 04 / 2009 09:45

VEGETATION SURVEY

Paperbark – Blue Gum Open Forest on Alluvial Plain (V321)

Regional Ecosystem Profile	
Regional Ecosystem Type:	**RE 12.3.7**
EPBC Status:	**n / a**
VMA Status:	**Not Of Concern**
EPA Status:	**Not Of Concern**
DNRW Mapped as:	12.3.7 / 12.3.11
Overall Health:	**Good - Average**

Site Description	
Bioregion / Locality:	Curtis Island, CE QLD (CQC Bioregion)
KP / Site Description:	Laird Point Project Area, S
Photo Numbers:	0001 - 0002
Datum:	WGS84
Easting / Northing (Precision):	56 K 0315467 7371485 (+/- 4 m)
Altitude:	10 m

Vegetation Community Description

Pendulous paperbark (*Melaleuca fluviatilis*) dominated open forest to woodland to 10 – 15 m tall in open depression (swamp). No pooling water at time of survey. Canopy is open with Queensland blue gum (*Eucalyptus tereticornis*) present. Sparse midstorey of canopy recruits to 4 – 6 m tall. Very sparse groundcover to 0.5 m tall of blady grass (*Imperata cylindrica*) and sawsedge (*Gahnia aspera*).

Bushland is in good to average condition with extensive evidence of grazing and compaction. Flannel weed (*Sida cordifolia*) becomes more dominant on edges of swamp. No water observed in swamp at time of survey; however, presence of mosses and ferns and broad trunk bases indicates that, at times, the area contains a significant amount of water for a sustained period of time.

Survey Details	
Project Number:	301001-00752 / 2V1030
Recorder/s:	Amy Kruger
Field Site Number:	A01
Sample Level / Type:	Reconnaisance / Random
Sample Detail / Species List:	Quaternary / Dominant species
Sample Area:	50 x 50 m
Date / Time:	07 / 10 / 2009 09:47

VEGETATION SURVEY

Ironbark – Blue Gum Woodland on Metamorphic Hill (V322)

Regional Ecosystem Profile	
Regional Ecosystem Type:	**RE 12.11.14**
EPBC Status:	**n / a**
VMA Status:	**Of Concern**
EPA Status:	**Of Concern**
DNRW Mapped as:	12.11.6 / 12.11.14
Overall Health:	**Good**

Site Description	
Bioregion / Locality:	Curtis Island, CE QLD (CQC Bioregion)
KP / Site Description:	Laird Point Project Area, SE
Photo Numbers:	0017 - 0018
Datum:	WGS84
Easting / Northing (Precision):	56 K 0316036 7371406 (+/- 4 m)
Altitude:	20 m

Vegetation Community Description

Woodland dominated by narrow-leaved red ironbark (*Eucalyptus crebra*) and Queensland blue gum (*E. tereticornis*) to 15 – 20 m tall on lower slope of metamorphic hill in association with drainage line. Canopy is open and includes lemon-scented/spotted gum (*Corymbia citriodora*), pink bloodwood (*C. intermedia*) and swamp box (*Lophostemon suaveolens*). Sparse midstorey layer of canopy recruits to 8 – 12 m tall. Dense shrub layer to 2 – 4 m tall of Brisbane black wattle (*Acacia leiocalyx*), lance-leaved hopbush (*Dodonaea lanceolata*) and canopy recruits. Dense ground layer to 1 m tall of narrow-leaved matrush (*Lomandra confertifolia*), blady grass (*Imperata cylindrica*), lovegrass (*Eragrostis* sp.), dark wiregrass (*Aristida calycina*), black speargrass (*Heteropogon contortus*) and guinea grass (*Megathryrus maximus*).

Bushland is in good condition with evidence of historical fire and some grazing present. Sparse leaf litter. Some logs present. Groundcover weed species present.

Survey Details	
Project Number:	301001-00752 / 2V1030
Recorder/s:	Amy Kruger
Field Site Number:	A05
Sample Level / Type:	Reconnaisance / Random
Sample Detail / Species List:	Quaternary / Dominant species
Sample Area:	50 x 50 m
Date / Time:	07 / 10 / 2009 12:49

VEGETATION SURVEY

Spotted Gum Open Forest on Metamorphic Hill (V323)

Regional Ecosystem Profile	
Regional Ecosystem Type:	**RE 12.11.6**
EPBC Status:	**n / a**
VMA Status:	**Not Of Concern**
EPA Status:	**Not Of Concern**
DNRW Mapped as:	12.11.6
Overall Health:	**Very Good**

Site Description	
Bioregion / Locality:	Curtis Island, CE QLD (CQC Bioregion)
KP / Site Description:	Laird Point Project Area, S
Photo Numbers:	0017 - 0018
Datum:	WGS84
Easting / Northing (Precision):	56 K 0315859 7371301 (+/- 3 m)
Altitude:	33 m

Vegetation Community Description

Lemon-scented/spotted gum (*Corymbia citriodora*) dominated open forest to 15 – 20 m tall on upper slope / crest of metamorphic hill. Canopy is open with narrow-leaved red ironbark (*Eucalyptus crebra*) also present. Tall midstorey layer of canopy recruits to 8 – 12 m tall. Low tree layer / shrub layer of Brisbane black wattle (*Acacia leiocalyx*), catkin wattle (*A. julifera*), forest she-oak (*Allocasuarina torulosa*), medicine bush (*Pogonolobus reticulatus*) and canopy recruits to 2 – 4 m tall. Shrub layer becoming more dense further downslope. Very sparse ground layer of narrow-leaved matrush (*Lomandra confertifolia*), many-flowered matrush (*L. multiflora*) and dark wiregrass (*Aristida calycina*) to 0.5 m tall.

Bushland is in very good condition with dense leaf litter and logs present. Rocky outcropping present.

Survey Details	
Project Number:	301001-00752 / 2V1030
Recorder/s:	Amy Kruger
Field Site Number:	A04
Sample Level / Type:	Reconnaisance / Random
Sample Detail / Species List:	Quaternary / Dominant species
Sample Area:	50 x 50 m
Date / Time:	07 / 10 / 2009 12:33

VEGETATION SURVEY

Spotted Gum Open Forest on Metamorphic Hill (V324)

Regional Ecosystem Profile	
Regional Ecosystem Type:	**RE 12.11.6**
EPBC Status:	**n / a**
VMA Status:	**Not Of Concern**
EPA Status:	**Not Of Concern**
DNRW Mapped as:	12.11.6 / 12.11.14
Overall Health:	**Very Good**

Site Description	
Bioregion / Locality:	Curtis Island, CE QLD (CQC Bioregion)
KP / Site Description:	Laird Point Project Area, SW
Photo Numbers:	0005 - 0006
Datum:	WGS84
Easting / Northing (Precision):	56 K 0315552 7371008 (+/- 4 m)
Altitude:	14 m

Vegetation Community Description

Lemon-scented/spotted gum (*Corymbia citriodora*) open forest to 15 – 20 m tall on lower slope of metamorphic hill. Outcropping present and canopy is open with narrow-leaved red ironbark (*Eucalyptus crebra*), Queensland blue gum (*E. tereticornis*) and pink bloodwood (*C. intermedia*) also present (in association). Midstorey to 8 – 12 m of canopy recruits. Low tree layer of *Acacia* species and canopy recruits to 4 – 6 m tall. Dense shrub layer of saplings to 2 m tall. Sparse ground layer of dark wiregrass (*Aristida calycina*), forest grasstree (*Xanthorrhoea johnsonii*) and narrow-leaved matrush (*Lomandra confertifolia*) to 0.5 – 1 m tall.

Bushland is in very good condition with little evidence of disturbance and no weed species. Dense leaf litter and hollow logs present.

Survey Details	
Project Number:	301001-00752 / 2V1030
Recorder/s:	Amy Kruger
Field Site Number:	A02
Sample Level / Type:	Reconnaisance / Random
Sample Detail / Species List:	Quaternary / Dominant species
Sample Area:	50 x 50 m
Date / Time:	07 / 10 / 2009 11:04

VEGETATION SURVEY

Mangrove Shrubland on Marine Clay Plain (V325)

Regional Ecosystem Profile	
Regional Ecosystem Type:	**RE 12.1.3**
EPBC Status:	**n / a**
VMA Status:	**Not Of Concern**
EPA Status:	**Not Of Concern**
DNRW Mapped as:	12.1.3
Overall Health:	**Very Good**

Site Description	
Bioregion / Locality:	Curtis Island, CE QLD (CQC Bioregion)
KP / Site Description:	Laird Point Project Area, SW
Photo Numbers:	0036 - 0037
Datum:	WGS84
Easting / Northing (Precision):	56 K 0315334 7370834 (+/- 4 m)
Altitude:	2 m

Vegetation Community Description

Dense mangrove shrubland fringing coastline. Deep marine clays soils with some outcropping in association with adjacent rocky hills. Canopy is closed and dominated by yellow mangrove (*Ceriops tagal*) with eastern white mangrove (*Avicennia marina* ssp. *australasica*) and long-leaved orange mangrove (*Bruguiera gymnorhiza*) also present to 2 – 5 m tall. Saplings to 1 m tall on boundary. No groundcover.

Bushland is in very good condition with little evidence of disturbance and no weeds recorded. Some debris present.

Survey Details	
Project Number:	301001-00752 / 2V1030
Recorder/s:	Amy Kruger
Field Site Number:	A10
Sample Level / Type:	Reconnaisance / Random
Sample Detail / Species List:	Quaternary / Dominant species
Sample Area:	50 x 50 m
Date / Time:	08 / 10 / 2009 08:14

VEGETATION SURVEY

Spotted Gum Open Forest on Metamorphic Hill (V326)

Regional Ecosystem Profile	
Regional Ecosystem Type:	**RE 12.11.6**
EPBC Status:	**n / a**
VMA Status:	**Not Of Concern**
EPA Status:	**Not Of Concern**
DNRW Mapped as:	12.11.6 / 12.11.14
Overall Health:	**Very Good**

Site Description	
Bioregion / Locality:	Curtis Island, CE QLD (CQC Bioregion)
KP / Site Description:	Laird Point Project Area, SW
Photo Numbers:	0008 - 0009
Datum:	WGS84
Easting / Northing (Precision):	56 K 0315396 7371029 (+/- 9 m)
Altitude:	19 m

Vegetation Community Description

Open forest to 15 – 20 m tall on midslope of metamorphic hill. Canopy is open to mid-dense and dominated by lemon-scented/spotted gum (*Corymbia citriodora*). Midstorey is open and dominated by lemon-scented/spotted gum to 8 – 10 m tall. Occasional shrub to 2 m tall including canopy recruits, Brisbane black wattle (*Acacia leiocalyx*), catkin wattle (*Acacia julifera*), medicine bush (*Pogonolobus reticulatus*) and lance-leaved hopbush (*Dodonaea lanceolata*). Sparse ground layer to 0.7 m tall of dark wiregrass (*Aristida calycina*), many-headed wiregrass (*A. caput-medulasae*), long-leaved flax lily (*Dianella longifolia*), narrow-leaved matrush (*Lomandra confertifolia*) and purple coral pea (*Hardenbergia violacea*).

Bushland is in very good condition with little evidence of disturbance. Dense leaf litter, hollow logs and some hollow-bearing trees present. Historical fire scars observed on canopy trees.

Survey Details	
Project Number:	301001-00752 / 2V1030
Recorder/s:	Amy Kruger
Field Site Number:	A03
Sample Level / Type:	Reconnaisance / Random
Sample Detail / Species List:	Quaternary / Dominant species
Sample Area:	50 x 50 m
Date / Time:	07 / 10 / 2009 11:20

VEGETATION SURVEY

Spotted Gum Open Forest on Metamorphic Hill (V327)

Regional Ecosystem Profile	
Regional Ecosystem Type:	**RE 12.11.6**
EPBC Status:	**n / a**
VMA Status:	**Not Of Concern**
EPA Status:	**Not Of Concern**
DNRW Mapped as:	12.11.6
Overall Health:	**Good**

Site Description	
Bioregion / Locality:	Curtis Island, CE QLD (CQC Bioregion)
KP / Site Description:	Laird Point Project Area, SW
Photo Numbers:	1194 - 1195
Datum:	WGS84
Easting / Northing (Precision):	56 K 0315120 7371449 (+/- 5 m)
Altitude:	20 m

Vegetation Community Description

Open forest to 15 – 20 m tall of *Corymbia citriodora* on midslope. Canopy is open to mid-dense. Midstorey of lemon-scented/spotted gum (*C. citriodora*), *Acacia* spp., and narrow-leaved red ironbark (*Eucalyptus crebra*) to 8 – 12 m tall. Dense low shrub layer of canopy recruits (regrowth) to 2 – 5 m tall. Groundlayer to 0.5 m tall of black speargrass (*Heteropogon contortus*), corky passion flower (*Passiflora suberosa*), purple coral pea (*Hardenbergia violacea)* and Paspalum (*Paspalum dilatatum*).

Bushland is in good condition with disturbance limited to historical logging. Stags and hollow logs present. Rocky outcropping. Isolated clumps of environmental weeds observed.

Survey Details	
Project Number:	301001-00752 / 2V1030
Recorder/s:	Amy Kruger
Field Site Number:	WP078
Sample Level / Type:	Reconnaisance / Random
Sample Detail / Species List:	Quaternary / Dominant species
Sample Area:	50 x 50 m
Date / Time:	15 / 04 / 2009 10:07

VEGETATION SURVEY

Mangrove Shrubland on Marine Clay Plain (V328)

Regional Ecosystem Profile	
Regional Ecosystem Type:	**RE 12.1.3**
EPBC Status:	**n / a**
VMA Status:	**Not Of Concern**
EPA Status:	**Not Of Concern**
DNRW Mapped as:	12.1.3
Overall Health:	**Very Good**

Site Description	
Bioregion / Locality:	Curtis Island, CE QLD (CQC Bioregion)
KP / Site Description:	Laird Point Project Area, CW
Photo Numbers:	1196 - 1197
Datum:	WGS84
Easting / Northing (Precision):	56 K 0314886 7371484 (+/- 5 m)
Altitude:	9 m

Vegetation Community Description

Mangrove shrubland fringing coastline on mudflat. Canopy is very dense forming impenetrable thicket to 4 m tall. Dominant species include yellow mangrove (*Ceriops tagal*) and long-leaved orange mangrove (*Bruguiera gymnorhiza*). Small beach rise behind shrubland on mudflat. Beach rise dominated by eucalypts with salt couch (*Sporobolus virginicus*) groundcover.

Shrubland is in very good condition with little evidence of disturbance or weed invasion. Isolated clumps of common prickly pear (*Opuntia stricta*) present on beach rise.

Survey Details	
Project Number:	301001-00752 / 2V1030
Recorder/s:	Amy Kruger
Field Site Number:	WP079
Sample Level / Type:	Reconnaisance / Random
Sample Detail / Species List:	Quaternary / Dominant species
Sample Area:	50 x 50 m
Date / Time:	15 / 04 / 2009 10:30

VEGETATION SURVEY

Mangrove Shrubland on Marine Clay Plain (V329)

Regional Ecosystem Profile	
Regional Ecosystem Type:	**RE 12.1.3**
EPBC Status:	**n / a**
VMA Status:	**Not Of Concern**
EPA Status:	**Not Of Concern**
DNRW Mapped as:	12.1.3
Overall Health:	**Excellent**

Site Description	
Bioregion / Locality:	Curtis Island, CE QLD (CQC Bioregion)
KP / Site Description:	Laird Point Project Area, W
Photo Numbers:	0085, 0101 - 0103
Datum:	WGS84
Easting / Northing (Precision):	56 K 0314299 7370755 (+/- 3 m)
Altitude:	2 m

Vegetation Community Description

Mangrove shrubland forming island in centre of main channel. Canopy is closed to 2 – 4 m tall and dominated by long-styled stilt mangrove (*Rhizophora stylosa*) with yellow mangrove (*Ceriops tagal*) and eastern white mangrove (*Avicennia marina* ssp. *australasica*) also present. Stilt roots and mudflats are exposed at low tide.

Bushland is in excellent condition with no evidence of disturbance or weeds recorded. Wader bird species observed on exposed mudflats at low tide and roosting at high tide.

Survey Details	
Project Number:	301001-00752 / 2V1030
Recorder/s:	Amy Kruger
Field Site Number:	A16
Sample Level / Type:	Reconnaisance / Random
Sample Detail / Species List:	Quaternary / Dominant species
Sample Area:	50 x 50 m
Date / Time:	09 / 10 / 2009 10:52

Appendix E Flora species list (desktop and field survey)

Family name	Botanical name (bold type indicates species recorded on site during field surveys)	Common name	Status#				Source^
			Cwlth	Qld	Reg sig	Weed	
Cyperaceae	*Abildgaardia ovata*	flatspike sedge					3
Cyperaceae	*Abildgaardia vaginata*	Brown's sedge					3
Malvaceae	*Abutilon albescens*	coastal lantern-flower					3
Malvaceae	*Abutilon auritum*	Chinese lantern					3
Malvaceae	*Abutilon grandifolium*	hairy Indian mallow				*	3
Malvaceae	*Abutilon leucopetalum*	desert lantern-flower					3
Malvaceae	*Abutilon oxycarpum*						3
Malvaceae	*Abutilon* sp.						3
Mimosaceae	*Acacia amblygona*	fan-leaved wattle					2, 3
Mimosaceae	*Acacia aulacocarpa*	golden-flowered salwood					3
Mimosaceae	***Acacia bidwillii***	corkwood wattle					3, 4
Mimosaceae	***Acacia concurrens***	black wattle					4
Mimosaceae	*Acacia conferta*	crowded-leaf wattle					3
Mimosaceae	*Acacia crassa* ssp. *longicoma*	hairy banana wattle					2, 3
Mimosaceae	*Acacia cretata*	chalk wattle					3
Mimosaceae	***Acacia decora***	pretty wattle					3, 4
Mimosaceae	*Acacia excelsa* ssp. *excelsa*	doodlallie					3
Mimosaceae	*Acacia falcata*	hickory wattle					3
Mimosaceae	*Acacia fasciculifera*	scaly bark					3
Mimosaceae	***Acacia fimbriata***	fringed wattle					3, 4
Mimosaceae	*Acacia flavescens*	yellow wattle					3, 4
Mimosaceae	***Acacia julifera***	catkin wattle					3, 4
Mimosaceae	*Acacia juncifolia*	rush-leaved wattle					3
Mimosaceae	***Acacia leiocalyx***	black wattle					3, 4
Mimosaceae	*Acacia leiocalyx* ssp. *leiocalyx*						2
Mimosaceae	*Acacia leptocarpa*	north coast wattle					2, 3
Mimosaceae	*Acacia maidenii*	Maiden's wattle					3
Mimosaceae	*Acacia penninervis* v. *longiracemosa*	coastal mountain hickory					2, 3
Mimosaceae	*Acacia podalyriifolia*	Queensland silver wattle					3
Mimosaceae	*Acacia salicina*	sally wattle					3
Mimosaceae	*Acacia* sp.						3
Mimosaceae	*Acacia sparsiflora*	currawong					3
Mimosaceae	*Acacia spirorbis* ssp. *solandri*						2
Mimosaceae	*Acacia storyi*	Story's wattle		R	3RC-		3
Euphorbiaceae	*Acalypha australis*	Asian copperleaf				*	3
Euphorbiaceae	*Acalypha eremorum*	soft acalypha					3
Amaranthaceae	***Achyranthes aspera***	chaff flower					3, 4
Orchidaceae	*Acianthus fornicatus*	pixie caps					3
Asteraceae	*Acmella grandiflora* v. *brachyglossa*	acmella					2, 3
Rutaceae	*Acronychia imperforata*	beach acronychia					2, 3
Rutaceae	*Acronychia laevis*	glossy acronychia					3
Rutaceae	*Acronychia pauciflora*	soft acronychia					3
Rutaceae	*Acronychia* sp.						3
Ericaceae	***Acrotriche aggregata***	red cluster heath					3, 4
Phyllanthaceae	*Actephila sessilifolia*	sessile-leaved actephila		R	3R		3
Adiantaceae	***Adiantum aethiopicum***	common maidenhair fern					3, 4
Adiantaceae	*Adiantum atroviride*	green maidenhair fern					3
Adiantaceae	***Adiantum hispidulum***	rough maidenhair fern					3, 4
Adiantaceae	*Adiantum hispidulum* v. *hispidulum*						3
Plumbaginaceae	*Aegialitis annulata*	club mangrove					3
Myrsinaceae	*Aegiceras corniculatum*	river mangrove					3
Fabaceae	***Aeschynomene brevifolia***	short-leaved budda pea					3, 4
Fabaceae	*Aeschynomene micranthos*	small-flowered budda pea					3
Agavaceae	*Agave americana*	American century plant				*	3
Asteraceae	*Ageratum conyzoides* ssp. *conyzoides*	goatweed				*	3

Family name	Botanical name (bold type indicates species recorded on site during field surveys)	Common name	Status#				Source^
			Cwlth	Qld	Reg sig	Weed	
Asteraceae	***Ageratum houstonianum***	blue billygoat weed				*	3, 4
Rubiaceae	*Aidia racemosa*	archer cherry					3
Cornaceae	*Alangium villosum* ssp. *tomentosum*	hairy muskwood					3
Mimosaceae	*Albizia lebbeck*	Indian siris					3
Euphorbiaceae	*Alchornea ilicifolia*	native holly					3
Sapindaceae	*Alectryon connatus*	grey bird's-eye					3
Sapindaceae	*Alectryon diversifolius*	scrub boonaree					3
Sapindaceae	*Alectryon* sp.						3
Sapindaceae	*Alectryon subdentatus*	hard alectryon					3
Sapindaceae	*Alectryon tomentosus*	hairy alectryon					3
Casuarinaceae	*Allocasuarina littoralis*	black she-oak					3
Casuarinaceae	*Allocasuarina luehmannii*	buloke					3
Casuarinaceae	***Allocasuarina torulosa***	forest she-oak					3, 4
Poaceae	*Alloteropsis semialata*	cockatoo grass					2, 3
Rhamnaceae	***Alphitonia excelsa***	red ash					3, 4
Zingiberaceae	*Alpinia caerulea*	wild ginger					3
Apocynaceae	*Alstonia constricta*	bitter bark					3
Amaranthaceae	*Alternanthera nana*	hairy joyweed					3
Amaranthaceae	*Alternanthera nodiflora*	common joyweed					3
Amaranthaceae	*Alternanthera pungens*	khaki weed				*	3
Fabaceae	*Alysicarpus vaginalis*	buffalo clover				*	3
Apocynaceae	*Alyxia magnifolia*	large-leaf chainfruit			3RC-		3
Apocynaceae	*Alyxia ruscifolia*	prickly alyxia					2, 3
Apocynaceae	*Alyxia spicata*	chain fruit vine					3
Amaranthaceae	*Amaranthus* sp.						3
Amaranthaceae	*Amaranthus viridis*	green amaranth				*	3
Loranthaceae	*Amyema miquelii*	box mistletoe					3
Poaceae	*Ancistrachne uncinulata*	hooky grass					3
Commelinaceae	*Aneilema acuminatum*	slug herb					3
Myrtaceae	***Angophora leiocarpa***	smooth-barked apple					4
Lamiaceae	*Anisomeles malabarica*	malabar catmint					3
Polygonaceae	*Antigonon leptopus*	Mexican creeper				*	3
Ulmaceae	*Aphananthe philippinensis*	rough-leaved elm					3
Araucariaceae	*Araucaria cunninghamii*	hoop pine					3
Mimosaceae	*Archidendropsis thozetiana*	southern siris					3
Papaveraceae	*Argemone ochroleuca*	Mexican poppy				*	3
Papaveraceae	*Argemone ochroleuca* ssp. *ochroleuca*					*	3
Poaceae	***Aristida calycina***						3, 4
Poaceae	*Aristida calycina* v. *calycina*						2, 3
Poaceae	***Aristida caput-medusae***	many-headed wiregrass					3, 4
Poaceae	*Aristida contorta*	bunched kerosene grass					3
Poaceae	*Aristida gracilipes*	slender wiregrass					3
Poaceae	*Aristida holathera*	erect kerosene grass					3
Poaceae	***Aristida personata***	purple wiregrass					3, 4
Poaceae	*Aristida Queenslandica*	Queensland wiregrass					3
Poaceae	*Aristida Queenslandica* v. *dissimilis*						3
Poaceae	*Aristida* sp.						3
Poaceae	*Aristida spuria*	white wiregrass					3
Aristolochiaceae	*Aristolochia pubera*	native Dutchman's pipe					3
Nephrolepidaceae	*Arthropteris tenella*	climbing fern					3
Poaceae	*Arundinella nepalensis*	reedgrass					2, 3
Sapindaceae	*Arytera divaricata*	rose tamarind					3
Apocynaceae	***Asclepias curassavica***	red-headed cotton-bush				*	3, 4
Asparagaceae	*Asparagus aethiopicus* cv. *Sprengeri*	asparagus fern				*	3
Asparagaceae	*Asparagus africanus*	African asparagus fern				3	3

Family name	Botanical name (bold type indicates species recorded on site during field surveys)	Common name	Status#				Source^
			Cwlth	Qld	Reg sig	Weed	
Aspleniaceae	*Asplenium australasicum*	crow's nest fern					3
Aspleniaceae	*Asplenium nidus*	bird's nest fern					3
Aspleniaceae	*Asplenium paleaceum*	scaly asplenium					3
Aspleniaceae	*Asplenium pellucidum*	translucent spleenwort	V	V	2VC-+		3
Aspleniaceae	*Asplenium* sp.						3
Asteraceae	*Aster subulatus*	wild aster				*	3
Sapindaceae	*Atalaya multiflora*	broad-leaved whitewood					3
Sapindaceae	*Atalaya rigida*	veiny whitewood			3RC-		3
Sapindaceae	*Atalaya salicifolia*	brush whitewood					2, 3
Pittosporaceae	*Auranticarpa rhombifolia*	hollywood					3
Fabaceae	*Austrosteenisia blackii*	bloodvine					3
Fabaceae	*Austrosteenisia blackii* v. *blackii*						3
Poaceae	*Avena sativa*	common oats					2
Avicenniaceae	*Avicennia marina*	grey mangrove					3
Avicenniaceae	***Avicennia marina* ssp. *australasica***	eastern white mangrove					3, 4
Asteraceae	*Baccharis halimifolia*	groundsel bush				2	3
Myrtaceae	*Backhousia kingii*	King's myrtle					3
Euphorbiaceae	*Baloghia inophylla*	brush bloodwood					3
Caesalpiniaceae	*Barklya syringifolia*	golden shower tree					3
Caesalpiniaceae	*Bauhinia variegata*	mountain ebony				*	3
Cyperaceae	*Baumea articulata*	jointed twig-rush					3
Asteraceae	*Bidens bipinnata*	bipinnate beggar's ticks				*	3
Asteraceae	***Bidens pilosa***	cobbler's pegs				*	3, 4
Blechnaceae	*Blechnum cartilagineum*	gristle water-fern					3
Blechnaceae	*Blechnum orientale*	centipede fern					3
Blechnaceae	*Blechnum patersonii*	strap water-fern					3
Nyctaginaceae	*Boerhavia burbidgeana*						3
Nyctaginaceae	*Boerhavia dominii*	hogweed					3
Nyctaginaceae	*Boerhavia* sp.						3
Rutaceae	*Bosistoa medicinalis*	Eumundi bosistoa			R/PC		3
Rutaceae	*Bosistoa transversa*	three-leaved bosistoa	V		R/PC		1, 2, 3
Fabaceae	*Bossiaea armitii*	flatleaf bossiaea					3
Poaceae	*Bothriochloa bladhii*	caucasian bluestem grass					3
Poaceae	*Bothriochloa bladhii* ssp. *bladhii*	forest bluegrass					3
Poaceae	***Bothriochloa decipiens***	pitted bluegrass					3, 4
Poaceae	*Bothriochloa decipiens* v. *decipiens*	red grass					3
Rhodophyceae	*Botryocladia leptopoda*	red alga					2
Rutaceae	*Bouchardatia neurococca*	onion nut					3
Nyctaginaceae	*Bougainvillea glabra*	paper flower				*	3
Sterculiaceae	*Brachychiton australis*	broad-leaved bottle tree					3
Sterculiaceae	*Brachychiton* sp.						3
Phyllanthaceae	***Breynia oblongifolia***	coffee bush					3, 4
Phyllanthaceae	*Bridelia exaltata*	brush ironbark					3
Phyllanthaceae	*Bridelia leichhardtii*	small-leaved brush ironbark					3
Brigantiaeaceae	*Brigantiaea tricolor*	a lichen					2
Poaceae	*Bromus catharticus*	priarie grass				*	3
Rhizophoraceae	***Bruguiera gymnorhiza***	large-leaved orange mangrove					3, 4
Goodeniaceae	*Brunonia australis*	blue pincushion					3
Acanthaceae	*Brunoniella acaulis* ssp. *ciliata*	hairy blue trumpet					3
Acanthaceae	*Brunoniella australis*	kidney weed					3
Acanthaceae	*Brunoniella* sp.						3
Crassulaceae	*Bryophyllum delagoense*	mother-of-millions				2	3
Orchidaceae	*Bulbophyllum globuliforme*	miniature moss-orchid					
Orchidaceae	*Bulbophyllum minutissimum*	grain-of-wheat orchid					2
Pittosporaceae	*Bursaria incana*	prickly pine					3

Family name	Botanical name (bold type indicates species recorded on site during field surveys)	Common name	Status#				Source^
			Cwlth	Qld	Reg sig	Weed	
Caesalpiniaceae	*Caesalpinia nitens*	shiny prickle-vine					3
Caesalpiniaceae	*Caesalpinia scortechinii*	large prickle vine					3
Caesalpiniaceae	*Caesalpinia* sp.						3
Orchidaceae	*Caladenia carnea*	striped pink fingers					3
Orchidaceae	*Caladenia* sp.						3
Lamiaceae	*Callicarpa pedunculata*	velvet leaf					3
Myrtaceae	***Callistemon viminalis***	weeping bottlebrush			2V		2, 3, 4
Asteraceae	***Calotis cuneifolia***	burr daisy					3, 4
Asteraceae	*Calotis hispidula*	bogan flea					3
Asteraceae	*Calyptocarpus vialis*	creeping cinderella weed				*	3
Fabaceae	*Canavalia rosea*	coastal jack bean					3
Fabaceae	*Canavalia sericea*	silky jack bean					3
Poaceae	*Capillipedium parviflorum*	scented top					2, 3
Poaceae	*Capillipedium spicigerum*	spicytop					3
Capparaceae	*Capparis arborea*	brush caper berry					3
Capparaceae	***Capparis canescens***	grayed canarium					3, 4
Capparaceae	*Capparis loranthifolia*	narrow-leaved bumble					3
Capparaceae	*Capparis ornans*	showy caper					3
Capparaceae	*Capparis sarmentosa*	scrambling caper					3
Capparaceae	*Capparis* sp.						3
Brassicaceae	*Cardamine flexuosa*	wood bittercress				*	3
Asteraceae	*Carduus thoermeri*	nodding thistle				*	3
Caricaceae	*Carica papaya*	pawpaw				*	3
Apocynaceae	***Carissa ovata***	currant bush					3, 4
Aizoaceae	*Carpobrotus glaucescens*	angular pigface					2, 3
Asteraceae	*Carthamus lanatus*	saffron thistle				*	2
Apocynaceae	*Cascabela thevetia*	yellow oleander				*	3
Asteraceae	*Cassinia laevis*	cough bush					3
Asteraceae	*Cassinia quinquefaria*	wild rosemary					3
Lauraceae	*Cassytha filiformis*	dodder laurel					2, 3
Lauraceae	***Cassytha pubescens***	dodder					3, 4
Lauraceae	*Cassytha* sp.						3
Casuarinaceae	*Casuarina cunninghamiana*	river she-oak					3
Casuarinaceae	*Casuarina equisetifolia*	beach she-oak					3
Casuarinaceae	*Casuarina equisetifolia* ssp. *incana*	hoary beach she-oak					2, 3
Casuarinaceae	*Casuarina glauca*	swamp she-oak					3
Apocynaceae	*Catharanthus roseus*	pink periwinkle				*	3
Chlorophyceae	*Caulerpa cupressoides*	green alga					2
Vitaceae	*Cayratia acris*	hairy grape					3
Ulmaceae	*Celtis paniculata*	native celtis					3
Poaceae	*Cenchrus echinatus*	mossman river grass				*	2, 3
Apiaceae	*Centella asiatica*	thick-leaved pennywort					3
Asteraceae	*Centratherum australianum*	bubblegum plant					3
Rhodophyceae	*Ceramium* sp.						2
Rhizophoraceae	***Ceriops tagal***	yellow mangrove					2, 3, 4
Rhodophyceae	*Chamaebotrys boergesenii*	marine alga					2
Caesalpiniaceae	*Chamaecrista absus* v. *absus*	tropical sensitive pea					3
Caesalpiniaceae	*Chamaecrista mimosoides*	tea senna					3
Caesalpiniaceae	*Chamaecrista nomame* v. *nomame*						3
Euphorbiaceae	*Chamaesyce bifida*						2, 3
Euphorbiaceae	*Chamaesyce dallachyana*	mat spurge					3
Euphorbiaceae	*Chamaesyce hirta*	asthma plant				*	3
Euphorbiaceae	*Chamaesyce hyssopifolia*	hyssop-leaved sandmat				*	3
Euphorbiaceae	*Chamaesyce mitchelliana*						3
Euphorbiaceae	*Chamaesyce ophthalmica*	Florida hammock sandmat				*	3

Family name	Botanical name (bold type indicates species recorded on site during field surveys)	Common name	Status#				Source^
			Cwlth	Qld	Reg sig	Weed	
Euphorbiaceae	*Chamaesyce prostrata*	red caustis weed				*	3
Adiantaceae	*Cheilanthes nudiuscula*						3
Adiantaceae	*Cheilanthes sieberi*	mulga fern					3
Adiantaceae	*Cheilanthes* sp.						3
Orchidaceae	*Chiloglottis sylvestris*	bare-tipped wasp-orchid					3
Poaceae	*Chionachne cyathopoda*	cane grass					2
Poaceae	*Chloris divaricata* v. *divaricata*	slender chloris					3
Poaceae	***Chloris gayana***	rhodes grass				*	3, 4
Poaceae	*Chloris inflata*	purpletop rhodes grass				*	2, 3
Poaceae	*Chloris virgata*	feathertop rhodes grass				*	3
Rhodophyceae	*Chondria armata*	red alga					2
Fabaceae	*Chorizema parviflorum*	eastern flame pea					2, 3
Asteraceae	*Chrysocephalum apiculatum*	yellow buttons					3
Poaceae	*Chrysopogon fallax*	golden beard grass					3
Poaceae	*Chrysopogon sylvaticus*	beard grass					3
Asteraceae	*Cirsium vulgare*	spear thistle				*	3
Vitaceae	*Cissus antarctica*	kangaroo vine					3
Vitaceae	*Cissus oblonga*	native grape					3
Cucurbitaceae	*Citrullus lanatus* v. *lanatus*	watermelon				*	3
Euphorbiaceae	*Claoxylon tenerifolium*	Queensland brittlewood					3
Poaceae	*Cleistochloa subjuncea*	sandstone panic					3
Vitaceae	*Clematicissus opaca*	small-leaved grape					3
Ranunculaceae	*Clematis glycinoides*	forest clematis					3
Lamiaceae	*Clerodendrum floribundum*	lolly bush					2, 3
Lamiaceae	*Clerodendrum inerme*	coastal lolly bush					3
Lamiaceae	*Clerodendrum* sp.						3
Fabaceae	*Clitoria ternatea*	butterfly pea				*	3
Commelinaceae	***Commelina diffusa***	climbing dayflower					3, 4
Commelinaceae	*Commelina ensifolia*	scurvy grass					3
Commelinaceae	*Commelina lanceolata*	lance-leaved wandering jew					3
Commelinaceae	*Commelina* sp.						3
Asteraceae	***Conyza bonariensis***	fleabanes				*	3, 4
Asteraceae	*Conyza leucantha*	white-flowered fleabanes					2, 3
Asteraceae	*Conyza sumatrensis*	tall fleabane				*	3
Sparrmanniaceae	*Corchorus* sp.						3
Sparrmanniaceae	*Corchorus trilocularis*	three-locule corchorus					3
Laxmanniaceae	*Cordyline murchisoniae*						2
Asteraceae	*Coronidium boormanii*						3
Asteraceae	*Coronidium glutinosum*						3
Asteraceae	*Coronidium lanuginosum*	woolly everlasting daisy					2, 3
Asteraceae	*Coronidium newcastlianum*	white paper daisy					3
Orchidaceae	*Corybas barbarae*	helmet-orchid					3
Myrtaceae	***Corymbia citriodora***	lemon-scented/spotted gum					3, 4
Myrtaceae	*Corymbia citriodora* ssp. *citriodora*	lemon-scented gum					3
Myrtaceae	***Corymbia clarksoniana***	Clarkson's bloodwood					2, 3, 4
Myrtaceae	*Corymbia erythrophloia*	gum-topped bloodwood					3
Myrtaceae	*Corymbia gummifera*	red bloodwood					3
Myrtaceae	***Corymbia intermedia***	pink bloodwood					3, 4
Myrtaceae	*Corymbia polycarpa*	long-fruited bloodwood					3
Myrtaceae	***Corymbia tessellaris***	Moreton Bay ash					3, 4
Myrtaceae	*Corymbia torelliana*	cadaghi					3
Asteraceae	*Crassocephalum crepidioides*	thickheads				*	3
Crassulaceae	*Crassula sieberiana* ssp. *sieberiana*	Australian crassula					3
Amaryllidaceae	***Crinum pedunculatum***	river lily					3, 4
Amaryllidaceae	*Crinum* sp.						3
Fabaceae	*Crotalaria brevis*	little rattlepod					2, 3

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			Cwlth	Qld	Reg sig	Weed	
Fabaceae	*Crotalaria medicaginea*	trefoil rattlepod					3
Fabaceae	*Crotalaria montana*	mountain rattlepod					3
Fabaceae	*Crotalaria montana* v. *angustifolia*	narrow-leaved mountain rattlepod					2
Fabaceae	***Crotalaria pallida***	smooth rattlepod				*	3, 4
Fabaceae	*Crotalaria* sp.						3
Fabaceae	*Crotalaria zanzibarica*	cusara pea				*	3
Euphorbiaceae	*Croton acronychioides*	thick-leaved croton					3
Euphorbiaceae	*Croton insularis*	silver croton					3
Euphorbiaceae	*Croton phebalioides*	narrow-leaved croton					3
Euphorbiaceae	*Croton stigmatosus*	broad silvery native cascarilla			R/WC		3
Lauraceae	*Cryptocarya* sp.						3
Lauraceae	*Cryptocarya triplinervis*	three-veined laurel					3
Lauraceae	*Cryptocarya triplinervis* v. *pubens*	hairy three-veined laurel					3
Apocynaceae	***Cryptostegia grandiflora***	rubber vine				W, 2	3, 4
Cucurbitaceae	*Cucumis maderaspatanus*	Madras pea pumpkin					3
Sapindaceae	***Cupaniopsis anacardioides***	tuckeroo					3, 4
Sapindaceae	*Cupaniopsis parvifolia*	small-leaved tuckeroo					3
Sapindaceae	*Cupaniopsis shirleyana*	wedge-leaf tuckeroo	V	V	3V		1, 3
Sapindaceae	*Cupaniopsis wadsworthii*	duckfoot tuckeroo					3
Convolvulaceae	*Cuscuta australis*	Australian dodder					3
Convolvulaceae	*Cuscuta* sp.						3
Asteraceae	*Cyanthillium cinereum*	vernonia					3
Cyatheaceae	*Cyathea australis*	common treefern					3
Cycadaceae	*Cycas megacarpa*	large-fruited zamia palm	E	E	3VC-		1
Rubiaceae	*Cyclophyllum coprosmoides*	coastal canthium					3
Rubiaceae	*Cyclophyllum coprosmoides* v. *spathulatum*						3
Thelypteridaceae	*Cyclosorus interruptus*	cyclosorus fern					3
Apiaceae	*Cyclospermum leptophyllum*	marsh parsley				*	3
Orchidaceae	***Cymbidium canaliculatum***	banana orchid					3, 4
Poaceae	*Cymbopogon bombycinus*	silky oilgrass					3
Poaceae	*Cymbopogon Queenslandicus*	Queensland barbed-wire grass					3
Poaceae	***Cymbopogon refractus***	barbed-wire grass					2, 3, 4
Apocynaceae	*Cynanchum bowmanii*	Bowman's milkvine					3
Apocynaceae	*Cynanchum carnosum*	coastal cynanchum					3
Poaceae	*Cynodon dactylon*	couch				*	3
Poaceae	*Cynodon nlemfuensis* v. *nlemfuensis*	stargrass				*	3
Cyperaceae	*Cyperus alopecuroides*						3
Cyperaceae	*Cyperus bifax*	downs flat-sedge					3
Cyperaceae	*Cyperus conicus* v. *conicus*	cone-shaped flat-sedge					3
Cyperaceae	*Cyperus dietrichiae* v. *brevibracteatus*						3
Cyperaceae	*Cyperus dietrichiae* v. *dietrichiae*						2
Cyperaceae	*Cyperus difformis*	rice sedge					3
Cyperaceae	*Cyperus enervis*						2, 3
Cyperaceae	*Cyperus exaltatus*	tall flat-sedge					3
Cyperaceae	*Cyperus fulvus*	sticky flat-sedge					3
Cyperaceae	***Cyperus gracilis***	slender flat-sedge					3, 4
Cyperaceae	*Cyperus haspan*	haspan flat-sedge					3
Cyperaceae	*Cyperus leiocaulon*	common leaf-rush					3
Cyperaceae	*Cyperus papyrus*	papyrus				*	3
Cyperaceae	*Cyperus perangustus*						3
Cyperaceae	*Cyperus polystachyos*	bunchy flat-sedge					3

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Cyperaceae	*Cyperus polystachyos* v. *polystachyos*	bunchy flat-sedge					3
Cyperaceae	*Cyperus scaber*	red nutsedge					3
Cyperaceae	*Cyperus* sp.						3
Cyperaceae	*Cyperus squarrosus*	bearded flat-sedge					3
Cyperaceae	*Cyperus tetracarpus*						3
Poaceae	*Dactyloctenium aegyptium*	coast button grass				*	3
Solanaceae	*Datura stramonium*	common thornapple				*	3
Davalliaceae	*Davallia pyxidata*	hare's foot fern					3
Caesalpiniaceae	*Delonix regia*	poinciana				*	3
Orchidaceae	*Dendrobium discolor*	golden orchid					3
Orchidaceae	*Dendrobium speciosum*	rock orchid					3
Urticaceae	*Dendrocnide photinophylla*	shiny-leaved stinging tree					3
Loranthaceae	*Dendrophthoe glabrescens*						3
Celastraceae	*Denhamia pittosporoides*	veiny denhamia					3
Fabaceae	*Derris involuta*	native derris					3
Fabaceae	*Desmodium brachypodum*	large tick-trefoil					3
Fabaceae	*Desmodium gangeticum*	salpan					3
Fabaceae	*Desmodium gunnii*	southern tick-trefoil					3
Fabaceae	*Desmodium heterocarpon* v. *strigosum*	bristled asian tick-trefoil					2, 3
Fabaceae	*Desmodium rhytidophyllum*	rusty tick-trefoil					3
Fabaceae	*Desmodium* sp.						3
Fabaceae	*Desmodium triflorum*	tick-trefoil				*	3
Fabaceae	*Desmodium varians*	slender tick-trefoil					3
Hemerocallidaceae	*Dianella brevipedunculata*	short-flowered flax-lily					3
Hemerocallidaceae	***Dianella caerulea***	blue flax-lily					3, 4
Hemerocallidaceae	*Dianella caerulea* v. *vannata*						3
Hemerocallidaceae	***Dianella longifolia***	long-leaved flax-lily					3, 4
Hemerocallidaceae	*Dianella rara*	slender flax-lily					3
Hemerocallidaceae	*Dianella revoluta*	blueberry lily					2, 3
Hemerocallidaceae	*Dianella* sp.						3
Poaceae	*Dichanthium sericeum*	Queensland bluegrass					3
Poaceae	*Dichanthium sericeum* ssp. *sericeum*						2, 3
Poaceae	*Dichanthium tenue*	small bluegrass					3
Poaceae	*Digitaria ammophila*	silky umbrella grass					3
Poaceae	*Digitaria breviglumis*	short-glumed umbrella grass					3
Poaceae	*Digitaria ciliaris*	summer grass				*	3
Poaceae	*Digitaria didactyla*	Queensland blue couch				*	3
Poaceae	*Digitaria diffusa*	open summer-grass					3
Poaceae	*Digitaria diminuta*	tiny summary-grass					2
Poaceae	*Digitaria divaricatissima*	spreading umbrella grass					3
Poaceae	*Digitaria leucostachya*	white finger grass					2, 3
Poaceae	*Digitaria longiflora*	long-flowered finger grass					3
Poaceae	*Digitaria minima*	small finger grass					3
Poaceae	*Digitaria parviflora*	small-flowered finger grass					3
Poaceae	*Digitaria ramularis*	branched panic grass					2
Poaceae	*Digitaria* sp.						3
Rutaceae	*Dinosperma melanophloia*	black-barked doughwood			R/PC		3
Dioscoreaceae	*Dioscorea transversa*	native yam					2, 3
Ebenaceae	*Diospyros australis*	black plum					3
Ebenaceae	*Diospyros fasciculosa*	grey ebony					3
Ebenaceae	*Diospyros geminata*	Queensland ebony					3
Ebenaceae	*Diospyros* sp.						3
Cucurbitaceae	*Diplocyclos palmatus*	native bryony					3
Cucurbitaceae	*Diplocyclos palmatus* ssp. *palmatus*	bryony					2, 3
Orchidaceae	*Dipodium* sp.						3

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Picrodendraceae	*Dissiliaria muelleri*	Mueller's redheart			NPT-R		3
Orchidaceae	*Dockrillia bowmanii*	scrub pencil-orchid					3
Orchidaceae	*Dockrillia mortii*	wire orchid					3
Orchidaceae	*Dockrillia schoenina*	pencil orchid					3
Orchidaceae	*Dockrillia teretifolia*	rat's tail orchid					3
Sapindaceae	***Dodonaea lanceolata***	lance-leaved hopbush					3, 4
Sapindaceae	*Dodonaea lanceolata* v. *subsessilifolia*						2, 3
Sapindaceae	*Dodonaea* sp.						3
Sapindaceae	*Dodonaea viscosa*	sticky hopbush					3
Adiantaceae	*Doryopteris concolor*	hand fern					3
Polypodiaceae	*Drynaria rigidula*	basket fern					3
Polypodiaceae	*Drynaria sparsisora*	rock fern					3
Putranjivaceae	*Drypetes deplanchei*	grey boxwood					3
Meliaceae	*Dysoxylum gaudichaudianum*	ivory mahogany					3
Chenopodiaceae	*Dysphania carinata*	keeled goosefoot					2
Chenopodiaceae	*Dysphania glomulifera*						3
Chenopodiaceae	*Dysphania littoralis*	red crumbweed					3
Poaceae	*Echinochloa colona*	awnless barnyard grass				*	3
Poaceae	*Echinochloa crus-galli*	barnyard grass				*	3
Chenopodiaceae	*Einadia nutans* ssp. *linifolia*	narrow-leaved climbing saltbush					3
Elaeocarpaceae	*Elaeocarpus obovatus*	hard quandong					3
Celastraceae	*Elaeodendron melanocarpum*						2, 3
Sapindaceae	*Elattostachys xylocarpa*	white tamarind					3
Cyperaceae	***Eleocharis dulcis***	water chestnut					3, 4
Cyperaceae	*Eleocharis geniculata*	Canadian spikerush					3
Poaceae	*Eleusine indica*	crowsfoot grass				*	2, 3
Myrsinaceae	*Embelia australiana*	embelia					3
Asteraceae	***Emilia sonchifolia***	emilies				*	3, 4
Chenopodiaceae	*Enchylaena tomentosa*	ruby saltbush					2, 3
Poaceae	***Enneapogon lindleyanus***	conetop nineawn grass					3, 4
Poaceae	*Enneapogon nigricans*	blackheads					3
Poaceae	*Enneapogon robustissimus*	nine horn grass					3
Poaceae	*Enteropogon unispiceus*						2
Poaceae	*Entolasia marginata*	bordered panic grass					2, 3
Poaceae	***Entolasia stricta***	wiry panic					2, 3, 4
Asteraceae	*Epaltes australis*	spreading nutheads					3
Poaceae	*Eragrostis brownii*	brown's lovegrass					3
Poaceae	*Eragrostis elongata*	clustered lovegrass					2, 3
Poaceae	*Eragrostis interrupta*						2, 3
Poaceae	*Eragrostis leptocarpa*	drooping lovegrass					3
Poaceae	*Eragrostis leptostachya*	paddock lovegrass					2, 3
Poaceae	*Eragrostis megalosperma*						2
Poaceae	*Eragrostis minor*	smaller stinkgrass				*	3
Poaceae	*Eragrostis parviflora*	weeping lovegrass					2, 3
Poaceae	*Eragrostis pilosa*	soft lovegrass				*	3
Poaceae	*Eragrostis sororia*	woodland lovegrass					2, 3
Poaceae	***Eragrostis* sp.**						3, 4
Poaceae	*Eragrostis spartinoides*						3
Poaceae	*Eragrostis tenuifolia*	elastic grass				*	3
Poaceae	***Eremochloa bimaculata***	poverty grass					2, 3, 4
Myoporaceae	*Eremophila debilis*	winter apple					3
Poaceae	*Eriachne aristidea*	threeawn wanderrie grass					2
Poaceae	*Eriachne pallescens*						3
Poaceae	*Eriachne rara*	wanderrie grass			R/PC		2, 3
Poaceae	*Eriachne* sp.						3

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Poaceae	*Eriachne triseta*	common wanderrie grass					2
Rosaceae	*Eriobotrya japonica*	loquat				*	3
Poaceae	*Eriochloa crebra*	cup grass					3
Poaceae	*Eriochloa procera*	slender cupgrass					2, 3
Fabaceae	*Erythrina vespertilio*	batwing coral tree					3
Erythroxylaceae	*Erythroxylum australe*	cocaine tree					3
Myrtaceae	*Eucalyptus acmenoides*	yellow stringybark					3
Myrtaceae	***Eucalyptus crebra***	narrow-leaved red ironbark					3, 4
Myrtaceae	*Eucalyptus drepanophylla*	narrow-leaved ironbark					3
Myrtaceae	***Eucalyptus exserta***	Queensland peppermint					3, 4
Myrtaceae	*Eucalyptus fibrosa*	broad-leaved red ironbark					3
Myrtaceae	*Eucalyptus fibrosa* ssp. *fibrosa*	broad-leaved red ironbark					3
Myrtaceae	*Eucalyptus melliodora*	yellow box					3
Myrtaceae	*Eucalyptus moluccana*	gum-topped box					3
Myrtaceae	*Eucalyptus platyphylla*	poplar gum					3
Myrtaceae	*Eucalyptus portuensis*	white mahogany					2
Myrtaceae	*Eucalyptus* sp.						3
Myrtaceae	***Eucalyptus tereticornis***	Queensland blue gum					3, 4
Myrtaceae	*Eugenia reinwardtiana*	beach cherry					3
Myrtaceae	*Eugenia uniflora*	Brazilian cherry tree				*	3
Poaceae	*Eulalia aurea*	silky browntop					3
Euphorbiaceae	*Euphorbia cyathophora*	dwarf poinsettia				*	3
Euphorbiaceae	*Euphorbia tannensis* ssp. *eremophila*	desert spurge					2
Laxmanniaceae	***Eustrephus latifolius***	wombat berry					3, 4
Convolvulaceae	*Evolvulus alsinoides*	tropical speedwell					2, 3
Euphorbiaceae	*Excoecaria agallocha*	milky mangrove					3
Euphorbiaceae	*Excoecaria dallachyana*	scrub poison tree					3
Santalaceae	***Exocarpos latifolius***	broad-leaved cherry					3, 4
Moraceae	*Ficus coronata*	creek sandpaper fig					3
Moraceae	*Ficus fraseri*	white sandpaper fig					3
Moraceae	*Ficus obliqua*	small-leaved fig					3
Moraceae	*Ficus opposita*	sandpaper fig					3
Moraceae	*Ficus* sp.						3
Moraceae	*Ficus virens*	white fig					3
Moraceae	*Ficus virens* v. *virens*	white fig					3
Cyperaceae	*Fimbristylis dichotoma*	common fringe-rush					3
Cyperaceae	*Fimbristylis ferruginea*	rusty fringe-rush					3
Cyperaceae	*Fimbristylis microcarya*	small fringe-rush					3
Cyperaceae	*Fimbristylis nutans*						3
Cyperaceae	*Fimbristylis pauciflora*						3
Cyperaceae	*Fimbristylis polytrichoides*	coastal rusty sedge					3
Cyperaceae	***Fimbristylis* sp.**						3, 4
Cyperaceae	*Fimbristylis tristachya*						3
Fabaceae	*Flemingia parviflora*	flemingia					3
Rutaceae	*Flindersia australis*	crow's ash					3
Phyllanthaceae	*Flueggea leucopyrus*	bushweed					2, 3
Cyperaceae	*Fuirena ciliaris*	hairy umbrella-sedge					3
Agavaceae	*Furcraea foetida*	mauritis hemp				*	3
Cyperaceae	***Gahnia aspera***	sawsedge					3, 4
Fabaceae	*Galactia tenuiflora*	snail flower					3
Fabaceae	*Galactia tenuiflora* v. *villosa*	hairy snail flower					2
Rhodophyceae	*Galaxaura* sp.						2
Asteraceae	*Gamochaeta pensylvanica*	Pennsylvania everlasting				*	3
Rhodophyceae	*Ganonema samaense*						2
Asteraceae	*Gazania rigens*	treasure flower				*	3
Rutaceae	*Geijera salicifolia*	brush wilga					2, 3
Hemerocallidaceae	*Geitonoplesium cymosum*	scrambling lily					3
Orchidaceae	*Geodorum densiflorum*	pink nodding orchid					3

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Phyllanthaceae	*Glochidion ferdinandi*	cheese tree					3
Phyllanthaceae	*Glochidion lobocarpum*	pin flower tree					3
Asteraceae	*Glossocardia bidens*	native cobbler's pegs					3
Lamiaceae	*Glossocarya hemiderma*	glossocarya					3
Fabaceae	*Glycine clandestina* v. *clandestina*	twining glycine					3
Fabaceae	*Glycine pescadrensis*	variable glycine					3
Fabaceae	*Glycine* sp.						3
Fabaceae	*Glycine tomentella*	woolly glycine					3
Apocynaceae	***Gomphocarpus physocarpus***	balloon cotton				*	3, 4
Fabaceae	*Gompholobium pinnatum*	poor man's gold					3
Fabaceae	*Gompholobium virgatum*	leafy wedge pea					3
Amaranthaceae	*Gomphrena celosioides*	gomphrena weed				*	2, 3
Goodeniaceae	*Goodenia glabra*	smooth goodenia					2
Myrtaceae	*Gossia acmenoides*	scrub ironwood					3
Myrtaceae	*Gossia bidwillii*	python tree					3
Proteaceae	*Grevillea* sp.						3
Sparrmanniaceae	*Grewia latifolia*	dog bush					3
Sparrmanniaceae	*Grewia retusifolia*	dysentery plant					3
Apocynaceae	*Gymnanthera oblonga*	native rubber vine					3
Araceae	*Gymnostachys anceps*	settler's flax					3
Hernandiaceae	*Gyrocarpus americanus*	gyro damson					3
Hernandiaceae	*Gyrocarpus americanus* ssp. *americanus*	gyro damson					3
Haloragaceae	*Haloragis heterophylla*	variable raspwort					3
Fabaceae	***Hardenbergia violacea***	purple coral pea					3, 4
Acanthaceae	*Harnieria hygrophiloides*	white karambal					3
Sapindaceae	*Harpullia hillii*	blunt-tipped tulipwood					3
Asteraceae	*Helichrysum* sp.						3
Boraginaceae	*Heliotropium pauciflorum*						3
Hernandiaceae	*Hernandia bivalvis*	grease nut		R	3RC-		3
Poaceae	***Heteropogon contortus***	black speargrass					2, 3, 4
Dilleniaceae	*Hibbertia scandens*	climbing guinea flower					2, 3
Dilleniaceae	***Hibbertia stricta***	erect guinea flower					3, 4
Malvaceae	*Hibiscus divaricatus*	yellow native rosella					3
Malvaceae	***Hibiscus heterophyllus***	native rosella					2, 3, 4
Malvaceae	*Hibiscus meraukensis*	merauke hibiscus					3
Malvaceae	*Hibiscus splendens*	pink hibiscus					3
Malvaceae	*Hibiscus tiliaceus*	cotton tree					2, 3
Celastraceae	*Hippocratea barbata*	knotvine					3
Euphorbiaceae	*Homalanthus nutans*	native bleeding heart					3
Flacourtiaceae	*Homalium alnifolium*	homalium					3
Apocynaceae	*Hoya australis*	native hoya					3
Violaceae	***Hybanthus enneaspermus***	orange spadeflower					3, 4
Violaceae	*Hybanthus stellarioides*	star spadeflower					3
Poaceae	*Hyparrhenia rufa*	thatch grass				*	3
Poaceae	*Hyparrhenia rufa* ssp. *rufa*	thatch grass				*	3
Menispermaceae	*Hypserpa decumbens*	twining vine					3
Balsaminaceae	*Impatiens walleriana*	balsam				*	3
Poaceae	***Imperata cylindrica***	blady grass					2, 3, 4
Fabaceae	*Indigofera australis*	australian indigo					2
Fabaceae	*Indigofera baileyi*	Bailey's indigo			3R		2
Fabaceae	*Indigofera hirsuta*	hairy indigo					3
Fabaceae	*Indigofera linifolia*	native indigo					3
Fabaceae	*Indigofera linnaei*	Birdsville indigo					2, 3
Fabaceae	*Indigofera pratensis*	forest indigo					3

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Fabaceae	*Indigofera trifoliata*	threeleaf indigo					3
Fabaceae	*Indigofera tryonii*						3
Convolvulaceae	*Ipomoea pes-caprae* ssp. *brasiliensis*	goatsfoot					3
Poaceae	*Ischaemum triticeum*	swamp grass					3
Fabaceae	*Isotropis filicaulis*						2, 3
Rubiaceae	*Ixora Queenslandica*	Queensland ixora					3
Fabaceae	*Jacksonia scoparia*	dogwood					2, 3
Convolvulaceae	*Jacquemontia paniculata*	jacquemontia vine					3
Sapindaceae	*Jagera pseudorhus*	foambark					3
Oleaceae	*Jasminum didymum*	jasmine					3
Oleaceae	*Jasminum didymum* ssp. *didymum*						3
Oleaceae	*Jasminum didymum* ssp. *racemosum*	native olive					2, 3
Oleaceae	*Jasminum simplicifolium* ssp. *australiense*	stiff jasmine					3
Oleaceae	*Jasminum* sp.						3
Juncaceae	*Juncus polyanthemus*	Australian gray rush					3
Byttneriaceae	*Keraudrenia lanceolata*	Queensland velvet-flower					2, 3
Byttneriaceae	*Keraudrenia* sp.						3
Rubiaceae	*Knoxia sumatrensis*	knoxia					3
Asteraceae	*Lactuca serriola forma serriola*	prickly lettuce				*	3
Asteraceae	*Lagenophora gracilis*	blue bottle-daisy					3
Verbenaceae	***Lantana camara***	lantana				W, 3	3, 4
Verbenaceae	*Lantana montevidensis*	creeping lantana				3	3
Dryopteridaceae	*Lastreopsis tenera*						2
Laxmanniaceae	*Laxmannia gracilis*	slender wire lily					3
Menispermaceae	*Legnephora moorei*	round-leaf vine					3
Brassicaceae	***Lepidium bonariense***	Argentine peppercress				*	2, 3, 4
Brassicaceae	*Lepidium didymum*	pepperweed				*	3
Brassicaceae	*Lepidium virginicum*	Virginian peppercress				*	3
Cyperaceae	***Lepidosperma laterale***	variable sword-sedge					3, 4
Poaceae	*Leptochloa decipiens*	slender canegrass					3
Poaceae	*Leptochloa decipiens* ssp. *decipiens*						2
Poaceae	*Leptochloa fusca*	brown beetle grass					3
Poaceae	*Leptochloa fusca* ssp. *fusca*	brown beetle grass					2, 3
Myrtaceae	***Leptospermum polygalifolium***	wild may					2, 3, 4
Myrtaceae	*Leptospermum* sp.						3
Poaceae	*Lepturus repens*	stalky grass					2, 3
Lamiaceae	*Leucas lavandulifolia*	leucas				*	3
Rhodophyceae	*Liagora ceranoides*	red alga					2
Plumbaginaceae	*Limonium solanderi*	limonium					3
Scrophulariaceae	*Lindernia anagallis*	pimpernel					3
Lindsaeaceae	*Lindsaea ensifolia*	graceful necklace fern					3
Myrtaceae	*Lithomyrtus obtusa*	beach myrtella					2, 3
Lauraceae	*Litsea reticulata*	bollygum					3
Arecaceae	*Livistona australis*	Australian cabbage palm			R/PC		3
Arecaceae	*Livistona decora*	weeping cabbage palm					3
Campanulaceae	***Lobelia purpurascens***	white root					3, 4
Laxmanniaceae	***Lomandra confertifolia***	narrow-leaved mat-rush					3, 4
Laxmanniaceae	*Lomandra confertifolia* ssp. *pallida*	pale narrow-leaved mat-rush					2, 3
Laxmanniaceae	*Lomandra filiformis*	wattle mat-rush					3
Laxmanniaceae	*Lomandra gracilis*	mat-rush					3

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			Cwlth	Qld	Reg sig	Weed	
Laxmanniaceae	***Lomandra longifolia***	long-leaved mat-rush					3, 4
Laxmanniaceae	***Lomandra multiflora***	many-flowered mat-rush					3, 4
Laxmanniaceae	*Lomandra multiflora* ssp. *multiflora*						3
Laxmanniaceae	*Lomandra spicata*	jungle mat-rush					3
Myrtaceae	*Lophostemon confertus*	brush box					3
Myrtaceae	***Lophostemon suaveolens***	swamp box					3, 4
Onagraceae	*Ludwigia octovalvis*	willow primrose					3
Onagraceae	*Ludwigia peploides* ssp. *montevidensis*	yellow primrose					3
Combretaceae	*Lumnitzera racemosa*	white-flowered black mangrove					3
Solanaceae	*Lycianthes shanesii*	soft nightshade					3
Schizaeaceae	*Lygodium microphyllum*	snake fern					3
Loranthaceae	***Lysiana subfalcata***	northern mistletoe					3, 4
Euphorbiaceae	*Macaranga tanarius*	macaranga					3
Moraceae	*Maclura cochinchinensis*	cockspur thorn					3
Fabaceae	***Macroptilium atropurpureum***	siratro				*	3, 4
Fabaceae	*Macroptilium lathyroides*	phasey bean				*	3
Fabaceae	*Macrotyloma axillare* v. *axillare*	archer vine				*	3
Zamiaceae	*Macrozamia miquelii*	Miquel's zamia palm			R/WC		3
Zamiaceae	*Macrozamia* sp.						3
Euphorbiaceae	*Mallotus claoxyloides*	green kamala					3
Euphorbiaceae	*Mallotus discolor*	white kamala					3
Euphorbiaceae	*Mallotus philippensis*	red kamala					3
Euphorbiaceae	*Mallotus* sp.						3
Malvaceae	*Malvastrum americanum* v. *americanum*	spiked malvastrum				*	3
Malvaceae	*Malvastrum coromandelianum* ssp. *coromandelianum*	false mallow				*	3
Anacardiaceae	*Mangifera indica*	mango				*	3
Apocynaceae	*Marsdenia lloydii*	corky milkvine					3
Apocynaceae	*Marsdenia microlepis*	little milkvine					3
Apocynaceae	*Marsdenia rostrata*	common milkvine					3
Apocynaceae	*Marsdenia viridiflora*	native pear					3
Marsileaceae	*Marsilea crenata*	four-leaved clover					3
Marsileaceae	*Marsilea mutica*	variable nardoo					3
Celastraceae	*Maytenus disperma*	orange boxwood					3
Scrophulariaceae	*Mecardonia procumbens*	mecardonia				*	3
Fabaceae	*Medicago polymorpha*	burr medic				*	3
Rutaceae	*Medicosma cunninghamii*	pinkheart					3
Poaceae	***Megathyrsus maximus***	green panic				*	3, 4
Poaceae	*Megathyrsus maximus* v. *pubiglumis*	guinea grass				*	3
Myrtaceae	*Melaleuca citrina*	honey-myrtle					3
Myrtaceae	*Melaleuca dealbata*	silver-leaved paperbark					3
Myrtaceae	*Melaleuca leucadendra*	weeping tea-tree					3
Myrtaceae	*Melaleuca nervosa*	woodland paperbark					3
Myrtaceae	*Melaleuca nervosa* ssp. *nervosa*						2, 3
Myrtaceae	***Melaleuca nodosa***	ball honey-myrtle					3, 4
Myrtaceae	***Melaleuca quinquenervia***	broad-leaved paperbark					3, 4
Myrtaceae	*Melaleuca* sp.						3
Myrtaceae	*Melaleuca viridiflora*	paperbarked tea-tree					3
Pentapetaceae	*Melhania oblongifolia*	velvet hibiscus					3
Pentapetaceae	*Melhania* sp.						3
Meliaceae	*Melia azedarach*	white cedar					3
Poaceae	*Melinis minutiflora*	molasses grass				*	3
Poaceae	***Melinis repens***	red natal grass				*	2, 3, 4

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			Cwlth	Qld	Reg sig	Weed	
Apocynaceae	*Melodinus australis*	southern melodinus					2
Apocynaceae	*Melodinus* sp.						3
Annonaceae	*Melodorum leichhardtii*	zigzag vine					3
Convolvulaceae	*Merremia quinquefolia*	rock rosemary				*	3
Rutaceae	*Micromelum minutum*	tiny heath-myrtle					3
Polypodiaceae	*Microsorum punctatum*	wart fern					2, 3
Asteraceae	*Minuria integerrima*	smooth minuria					3
Fabaceae	*Mirbelia aotoides*	mirbelia					3
Sapindaceae	*Mischocarpus anodontus*	veiny pearfruit					3
Sapindaceae	*Mischocarpus pyriformis*	pear-fruited tamarind					3
Rubiaceae	*Mitracarpus hirtus*	white eye				*	3
Pontederiaceae	*Monochoria cyanea*	bog hyacinth					3
Ericaceae	*Monotoca scoparia*	prickly broom heath					3
Rubiaceae	*Morinda canthoides*	veiny morinda					3
Rubiaceae	*Morinda* sp.						3
Commelinaceae	*Murdannia graminea*	blue murdannia					3
Rutaceae	*Murraya ovatifoliolata*	native murraya					3
Rutaceae	*Murraya paniculata*	mock orange					3
Rutaceae	*Murraya paniculata* cv. *exotica*	mock orange				*	3
Myoporaceae	*Myoporum acuminatum*	coastal boobialla					3
Myoporaceae	*Myoporum boninense* ssp. *australe*	boobialla					2
Myoporaceae	*Myoporum montanum*	water bush					3
Myrsinaceae	*Myrsine variabilis*	variable muttonwood					3
Najadaceae	*Najas tenuifolia*	water nymph					3
Lauraceae	*Neolitsea dealbata*	white bolly gum					3
Nephrolepidaceae	*Nephrolepis cordifolia*	fishbone fern					3
Mimosaceae	*Neptunia gracilis* f. *gracilis*	native sensitive plant					3
Apocynaceae	*Nerium oleander*	oleander				*	3
Oleaceae	*Notelaea microcarpa*	velvet mock-olive					3
Nymphaeaceae	*Nymphaea caerulea*	blue water-lily				*	3
Nymphaeaceae	*Nymphaea violacea*	water-lily					3
Menyanthaceae	*Nymphoides indica*	water snowflake					3
Ochnaceae	*Ochna serrulata*	ochna				*	3
Rubiaceae	*Oldenlandia galioides*	sweet false galium					3
Rubiaceae	*Oldenlandia mitrasacmoides*						3
Rubiaceae	*Oldenlandia mitrasacmoides* ssp. *trachymenoides*						2
Oleaceae	*Olea paniculata*	native olive					3
Asteraceae	*Olearia canescens*	daisy-bush					3
Rubiaceae	*Opercularia diphylla*	thin-leaved stinkweed					2
Poaceae	*Oplismenus aemulus*	creeping shade grass					2, 3
Cactaceae	*Opuntia* sp.						3
Cactaceae	***Opuntia stricta***	prickly pear				2	3, 4
Myrtaceae	*Osbornia octodonta*	myrtle mangrove					3
Hydrocharitaceae	*Ottelia ovalifolia*	swamp lily					3
Poaceae	*Ottochloa nodosa*	slender panic grass					2, 3
Meliaceae	*Owenia acidula*	emu apple					3
Oxalidaceae	***Oxalis corniculata***	creeping oxalis				*	3, 4
Asteraceae	*Ozothamnus cassinioides*						3
Pandanaceae	*Pandanus* sp.						3
Bignoniaceae	***Pandorea pandorana***	wonga vine					3, 4
Poaceae	*Panicum decompositum* v. *decompositum*	native millet					2, 3
Poaceae	*Panicum decompositum* v. *tenuius*	slender native millet					3
Poaceae	***Panicum effusum***	hairy panic					2, 3, 4
Poaceae	*Panicum larcomianum*	Mount Larcom panic					2

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			Cwlth	Qld	Reg sig	Weed	
Poaceae	*Panicum paludosum*	swamp panic					2, 3
Poaceae	*Panicum simile*	two-coloured panic grass					3
Apocynaceae	*Parsonsia eucalyptophylla*	gargaloo					3
Apocynaceae	*Parsonsia lanceolata*	northern silkpod					3
Apocynaceae	*Parsonsia larcomensis*	Mount Larcom monkey rope	V	V	2V		1, 2, 3
Apocynaceae	*Parsonsia leichhardtii*	black silkpod					3
Apocynaceae	*Parsonsia longipetiolata*	green-leaved silkpod					3
Apocynaceae	*Parsonsia paulforsteri*	narrow-leaved silkpod			1K		3
Apocynaceae	*Parsonsia plaesiophylla*	veiny silkpod					3
Apocynaceae	*Parsonsia rotata*	veinless silkpod					3
Apocynaceae	*Parsonsia* sp.						3
Apocynaceae	***Parsonsia straminea***	common silkpod					3, 4
Apocynaceae	*Parsonsia velutina*	hairy silkpod					3
Apocynaceae	*Parsonsia ventricosa*	acuminate silkpod			R/WC		3
Poaceae	*Paspalidium albovillosum*	hairy white grass					2, 3
Poaceae	*Paspalidium distans*	shotgrass					3
Poaceae	*Paspalidium gausum*						2
Poaceae	*Paspalidium gracile*	belah grass					3
Poaceae	*Paspalidium* sp.						3
Poaceae	***Paspalum dilatatum***	paspalum				*	3, 4
Poaceae	*Paspalum distichum*	water grass					3
Poaceae	*Paspalum scrobiculatum*	ditch millet					3
Passifloraceae	*Passiflora aurantia*	blunt-leaved passion flower					3
Passifloraceae	*Passiflora foetida*	stinking passionfruit				*	3
Passifloraceae	***Passiflora suberosa***	corky passion flower				*	3, 4
Passifloraceae	*Passiflora subpeltata*	white passion flower				*	3
Rubiaceae	*Pavetta australiensis*	butterfly bush					3
Rubiaceae	*Pavetta australiensis* v. *australiensis*	Australian butterfly bush					3
Adiantaceae	*Pellaea falcata*	sickle fern					3
Adiantaceae	*Pellaea nana*	dwarf sickle fern					3
Adiantaceae	*Pellaea paradoxa*	heart fern					3
Piperaceae	*Peperomia blanda*	aridland peperomia					3
Piperaceae	*Peperomia blanda* v. *floribunda*	many-flowered peperomia					3
Piperaceae	*Peperomia* sp.						3
Asteraceae	*Peripleura diffusa*	fuzzweed					3
Asteraceae	*Peripleura hispidula*	hairy fuzzweed					3
Asteraceae	*Peripleura hispidula* v. *setosa*	bristly fuzzweed					2, 3
Poaceae	*Perotis rara*	comet grass					2
Polygonaceae	***Persicaria decipiens***	slender knotweed					3, 4
Picrodendraceae	***Petalostigma pubescens***	quinine bush					3, 4
Philydraceae	***Philydrum lanuginosum***	frogsmouth					3, 4
Verbenaceae	*Phyla nodiflora*	carpetweed					3
Phyllanthaceae	*Phyllanthus microcladus*	small-leaved spurge					3
Phyllanthaceae	*Phyllanthus* sp.						3
Phyllanthaceae	*Phyllanthus virgatus*	leaf-flower					3
Solanaceae	*Physalis peruviana*	cape gooseberry				*	3
Thymelaeaceae	***Pimelea linifolia***	slender rice flower					3, 4
Pinaceae	*Pinus elliottii*	slash pine				*	3
Piperaceae	*Piper hederaceum*	pepper vine					3
Pittosporaceae	*Pittosporum revolutum*	yellow pittosporum					3
Pittosporaceae	*Pittosporum* sp.						3
Pittosporaceae	*Pittosporum spinescens*	wallaby apple					3
Pittosporaceae	*Pittosporum venulosum*	veiny pittosporum					3
Lamiaceae	*Pityrodia salviifolia*	pityrodia					2, 3
Sapotaceae	*Planchonella pohlmaniana*	yellow boxwood					3
Sapotaceae	*Planchonella pubescens*	western black plum					3
Lecythidaceae	***Planchonia careya***	cockatoo apple					3, 4

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Plantaginaceae	*Plantago debilis*	shade plantain					3
Polypodiaceae	*Platycerium bifurcatum*	elkhorn fern					3
Lamiaceae	*Plectranthus graveolens*	flea bush					3
Lamiaceae	*Plectranthus parviflorus*	cockspur flower					3
Anacardiaceae	***Pleiogynium timorense***	Burdekin plum					3, 4
Menispermaceae	***Pleogyne australis***	wiry grape					3, 4
Poaceae	*Poa annua*	annual poa				*	3
Asteraceae	*Podolepis longipedata*	tall copper-wire daisy					2, 3
Fabaceae	*Podolobium aciculiferum*	needle shaggy pea					2, 3
Rubiaceae	***Pogonolobus reticulatus***	medicine bush					3, 4
Annonaceae	*Polyalthia nitidissima*	canary beech					3
Polygalaceae	*Polygala linariifolia*	narrow-leaved polygala					3
Araliaceae	*Polyscias elegans*	celerywood					3
Rhodophyceae	*Polysiphonia* sp.						2
Rhamnaceae	*Pomaderris canescens*						3
Rhamnaceae	*Pomaderris* sp.						3
Rubiaceae	*Pomax umbellata*	pomax					3
Portulacaceae	***Portulaca oleracea***	pigweed				*	3, 4
Portulacaceae	*Portulaca pilosa*	pink pigweed				*	3
Potamogetonaceae	*Potamogeton pectinatus*	fennel-leaved pondweed					3
Sapotaceae	*Pouteria Queenslandica*	Queensland coondoo					3
Amaryllidaceae	*Proiphys cunninghamii*	Moreton Bay lily					3
Acanthaceae	*Pseuderanthemum variabile*	pastel flower					3
Rubiaceae	*Psychotria daphnoides*	smooth psychotria					3
Rubiaceae	*Psychotria daphnoides var. pubescens*	soft psychotria					3
Rubiaceae	*Psychotria loniceroides*	hairy psychotria					3
Rubiaceae	*Psydrax odorata*	shiny-leaved canthium					3
Rubiaceae	*Psydrax odorata* f. *buxifolia*	shiny-leaved boxwood					3
Rubiaceae	*Psydrax odorata* ssp. *australiana*	australian boxwood					3
Rubiaceae	*Psydrax* sp.						3
Dennstaedtiaceae	*Pteridium esculentum*	bracken					3
Asteraceae	*Pterocaulon redolens*						2, 3
Asteraceae	*Pterocaulon serrulatum* v. *serrulatum*	ragweed					2
Asteraceae	*Pterocaulon sphacelatum*	applebush					3
Orchidaceae	*Pterostylis revoluta*	autumn greenhood					3
Fabaceae	*Pycnospora lutescens*	pycnospora					2, 3
Polypodiaceae	*Pyrrosia confluens*	horseshoe felt fern					3
Polypodiaceae	*Pyrrosia confluens* v. *confluens*						2, 3
Polypodiaceae	*Pyrrosia rupestris*	rock felt fern					3
Simaroubaceae	*Quassia bidwillii*	quassia	V	V	3VC-		1, 3
Rhizophoraceae	***Rhizophora stylosa***	long-styled stilt mangrove					2, 3, 4
Fabaceae	*Rhynchosia acuminatissima*	pointed trefoil					3
Fabaceae	***Rhynchosia minima***	rhynchosia					2, 3, 4
Cyperaceae	*Rhynchospora heterochaeta*	beak-sedge					3
Sapindaceae	*Rhysotoechia bifoliolata*	twinleaf tuckeroo					3
Sapindaceae	*Rhysotoechia bifoliolata* ssp. *bifoliolata*						3
Rubiaceae	*Richardia brasiliensis*					*	3
Euphorbiaceae	*Ricinocarpos ledifolius*	scrub wedding bush					3
Euphorbiaceae	*Ricinocarpos pinifolius*	wedding bush					3
Ripogonaceae	*Ripogonum album*	white supplejack					3
Petiveriaceae	*Rivina humilis*	coral berry				*	3
Acanthaceae	***Rostellularia adscendens***	pink tongues					3, 4
Rosaceae	*Rubus probus*	Queensland raspberry					3
Ruppiaceae	*Ruppia maritima*	sea tassel					3

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			Cwlth	Qld	Reg sig	Weed	
Chenopodiaceae	*Salsola kali*	soft roly-poly					2, 3
Lamiaceae	*Salvia coccinea*	red salvia				*	3
Lamiaceae	*Salvia plebeia*	common sage					2
Chenopodiaceae	***Sarcocornia quinqueflora* ssp. *quinqueflora***	beaded glasswort					3, 4
Apocynaceae	*Sarcostemma viminale* ssp. *australe*	Australian rapunzel plant					3
Apocynaceae	*Sarcostemma viminale* ssp. *brunonianum*	rapunzel plant					3
Poaceae	*Sarga leiocladum*	wild sorghum					3
Poaceae	*Sarga plumosum*	plume sorghum					2
Phaeophyceae	*Sargassum parvifolium*	brown alga					2
Goodeniaceae	*Scaevola taccada*	Cardwell cabbage					3
Araliaceae	*Schefflera actinophylla*	umbrella tree					3
Anacardiaceae	*Schinus terebinthifolius*	broad-leaved pepper tree				3	3
Poaceae	*Schizachyrium fragile*	firegrass					2, 3
Poaceae	*Schizachyrium pachyarthron*						2
Poaceae	*Schizachyrium pseudeulalia*						2, 3
Schizaeaceae	*Schizaea bifida*	forked comb fern					3
Cyperaceae	*Schoenoplectus erectus*	tall club-rush				*	3
Cyperaceae	*Schoenoplectus lateriflorus*						3
Cyperaceae	*Schoenus brevifolius*	common bog-rush					3
Cyperaceae	*Schoenus falcatus*	sickle bog-rush					3
Cyperaceae	*Schoenus sparteus*	broom bog-rush					3
Rhodophyceae	*Scinaia* sp.						2
Rhodophyceae	*Scinaia tsinglanensis*	red alga					2
Cyperaceae	*Scleria brownii*	brown's nutrush					3
Cyperaceae	*Scleria mackaviensis*	Mackay scleria					3
Cyperaceae	***Scleria* sp.**						3, 4
Chenopodiaceae	*Sclerolaena birchii*	galavanised burr					2
Flacourtiaceae	*Scolopia braunii*	flintwood					3
Scrophulariaceae	*Scoparia dulcis*	scoparia				*	3
Apocynaceae	*Secamone elliptica*	corky milkvine					3
Caesalpiniaceae	*Senna gaudichaudii*	kolomana					3
Caesalpiniaceae	*Senna pendula* v. *glabrata*	easter cassia				*	3
Caesalpiniaceae	*Senna surattensis*	smooth senna					3
Sapotaceae	*Sersalisia sericea*	mongo					3
Aizoaceae	***Sesuvium portulacastrum***	sea purslane					2, 3, 4
Poaceae	*Setaria oplismenoides*	native pigeon grass					2, 3
Poaceae	***Setaria surgens***	annual pigeon grass					3, 4
Malvaceae	***Sida cordifolia***	flannel weed				*	3, 4
Malvaceae	*Sida corrugata*	variable sida					3
Malvaceae	***Sida hackettiana***	spiked sida					3, 4
Malvaceae	*Sida nematopoda*						2
Malvaceae	***Sida rhombifolia***	Paddy's lucerne				*	3, 4
Malvaceae	*Sida rohlenae*	shrub sida					3
Malvaceae	*Sida* sp.						3
Asteraceae	*Sigesbeckia orientalis*	Indian weed					3
Smilacaceae	***Smilax australis***	austral sarsasparilla					3, 4
Smilacaceae	*Smilax glyciphylla*	sweet sarsaparilla					3
Solanaceae	***Solanum nigrum***	black nightshade				*	3, 4
Solanaceae	*Solanum nigrum* ssp. *nigrum*					*	3
Solanaceae	*Solanum nodiflorum*	nightshade				*	3
Solanaceae	*Solanum seaforthianum*	Brazilian nightshade				*	3
Solanaceae	*Solanum stelligerum*	devil's needles					3
Solanaceae	*Solanum torvum*	devil's fig				*	3
Asteraceae	***Sonchus oleraceus***	common sowthistle				*	3, 4
Fabaceae	*Sophora tomentosa* ssp.	Australian silver bush					3

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			Cwlth	Qld	Reg sig	Weed	
	australis						
Poaceae	*Sorghum arundinaceum*	Rhodesian sudan grass				*	2
Poaceae	*Sorghum halepense*	Johnson grass				*	3
Poaceae	*Sorghum nitidum* f. *aristatum*	brown sorghum					3
Rubiaceae	*Spermacoce brachystema*						3
Rubiaceae	*Spermacoce multicaulis*						2, 3
Rubiaceae	*Spermacoce* sp.						3
Rubiaceae	*Spermacoce* sp. (Lorim Point A.Morton AM1237)	Lorim Point spermacoce					2
Asteraceae	*Sphagneticola trilobata*	Singapore daisy				3	3
Poaceae	*Spinifex sericeus*	beach spinifex					3
Araceae	*Spirodela punctata*	thin duckweed					3
Poaceae	*Sporobolus elongatus*	slender rat's tail grass					3
Poaceae	***Sporobolus virginicus***	salt couch					3, 4
Verbenaceae	*Stachytarpheta jamaicensis*	Jamaica snakeweed				*	3
Stackhousiaceae	*Stackhousia monogyna*	creamy candles					3
Menispermaceae	*Stephania japonica*	snake vine					3
Sterculiaceae	*Sterculia quadrifida*	red-fruited kurrajong					3
Gleicheniaceae	*Sticherus flabellatus* v. *flabellatus*	umbrella fern					3
Gleicheniaceae	*Sticherus* sp.						3
Moraceae	*Streblus brunonianus*	whalebone tree					3
Loganiaceae	*Strychnos psilosperma*	threaded boxwood					3
Stylidiaceae	*Stylidium eglandulosum*	woolly-stemmed triggerplant					3
Fabaceae	*Stylosanthes guianensis*	common stylo				*	3
Fabaceae	***Stylosanthes* sp.**						3, 4
Chenopodiaceae	***Suaeda australis***	seablite					3, 4
Fabaceae	*Swainsona phacoides*	lilac darling-pea					3
Fabaceae	*Swainsona* sp.						3
Arecaceae	*Syagrus romanzoffiana*	queen palm				*	3
Araceae	*Syngonium podophyllum*	arrowhead vine				*	3
Myrtaceae	*Syzygium luehmannii*	small-leaved lillypilly					3
Orchidaceae	*Taeniophyllum muelleri*	minute orchid	V				1
Caesalpiniaceae	*Tamarindus indica*	tamarind				*	3
Asteraceae	*Taraxacum officinale*	dandelion				*	3
Chenopodiaceae	*Tecticornia halocnemoides*	shrubby samphire					3
Chenopodiaceae	*Tecticornia indica*	brown-headed samphire					3
Chenopodiaceae	*Tecticornia pergranulata*	blackseed samphire					3
Chenopodiaceae	*Tecticornia pergranulata* ssp. *Queenslandica*	Queensland blackseed samphire					3
Fabaceae	*Tephrosia astragaloides*						3
Fabaceae	*Tephrosia dietrichiae*	Dietrich's pea					3
Fabaceae	*Tephrosia filipes*						3
Fabaceae	*Tephrosia filipes* ssp. *filipes*						2, 3
Fabaceae	*Tephrosia juncea*	rush tephrosia					3
Fabaceae	*Tephrosia rufula*	rusty tephrosia					3
Combretaceae	*Terminalia porphyrocarpa*	brown damson					3
Combretaceae	*Terminalia* sp.						3
Vitaceae	*Tetrastigma nitens*	shining grape					3
Poaceae	*Themeda quadrivalvis*	grader grass				*	3
Poaceae	***Themeda triandra***	kangaroo grass					2, 3, 4
Malvaceae	*Thespesia populnea*	porlia tree					3
Rubiaceae	*Timonius timon* v. *timon*	peach					3
Menispermaceae	*Tinospora smilacina*						3
Euphorbiaceae	*Tragia novae-hollandiae*	stinging vine					3
Ulmaceae	***Trema tomentosa***	poison peach					3, 4
Boraginaceae	*Trichodesma zeylanicum*	cattle bush					3
Johnsoniaceae	*Tricoryne elatior*	yellow autumn lily					3
Asteraceae	*Tridax procumbens*	tridax daisy				*	3

Family name	Botanical name (bold type indicates species recorded on site during field surveys)	Common name	Status#				Source^
			Cwlth	Qld	Reg sig	Weed	
Rubiaceae	*Triflorensia ixoroides*	shiny-leaved tarenna					3
Fabaceae	*Trifolium repens*	white clover				*	3
Fabaceae	*Trifolium repens* v. *repens*	white clover				*	3
Juncaginaceae	*Triglochin procerum*	water-ribbons					3
Poaceae	*Triraphis mollis*	purple plumegrass					3
Sparrmanniaceae	*Triumfetta repens*	creeping burr					3
Sparrmanniaceae	*Triumfetta rhomboidea*	Chinese burr				*	3
Moraceae	*Trophis scandens* ssp. *scandens*	burnie vine					3
Meliaceae	*Turraea pubescens*	native honeysuckle					3
Apocynaceae	*Tylophora grandiflora*	small-leaved tylophora					3
Typhaceae	*Typha domingensis*	bulrush					3
Typhaceae	*Typha orientalis*	broad-leaved cumbungi					3
Araceae	*Typhonium brownii*	black arum lily					3
Fabaceae	*Uraria lagopodioides*	purple clover weed					3
Malvaceae	***Urena lobata***	urena burr				*	3, 4
Poaceae	*Urochloa mosambicensis*	sabi grass				*	2
Poaceae	*Urochloa mutica*	para grass				*	3
Poaceae	*Urochloa subquadripara*	signal grass				*	2, 3
Rhamnaceae	*Ventilago pubiflora*	ventilago vine					3
Verbenaceae	***Verbena bonariensis***	purpletop				*	3, 4
Verbenaceae	*Verbena incompta*	untidy verbena				*	2
Fabaceae	*Vigna lanceolata*	maloga bean					3
Fabaceae	*Vigna vexillata* v. *angustifolia*	wild cow pea					3
Violaceae	*Viola hederacea*	native violet					3
Lamiaceae	*Vitex rotundifolia*	round-leaved vitex					3
Lamiaceae	*Vitex trifolia*	chaste tree					3
Lamiaceae	*Vitex trifolia* v. *subtrisecta*	simpleleaf chaste tree					3
Lamiaceae	*Vitex trifolia* v. *trifolia*						3
Asteraceae	*Vittadinia sulcata*	native daisy					3
Asteraceae	*Wedelia asperrima*	sunflower daisy					2
Asteraceae	*Wedelia spilanthoides*	rock daisy					2, 3
Thymelaeaceae	*Wikstroemia indica*	tie bush					3
Monimiaceae	*Wilkiea macrophylla*	large-leaved wilkiea					3
Asteraceae	*Wollastonia biflora*	beach sunflower					3
Xanthorrhoeaceae	*Xanthorrhoea fulva*	swamp grasstree					3
Xanthorrhoeaceae	***Xanthorrhoea johnsonii***	forest grasstree					3, 4
Xanthorrhoeaceae	*Xanthorrhoea latifolia*	broad-leaved grasstree					3
Xanthorrhoeaceae	*Xanthorrhoea latifolia* ssp. *latifolia*						2, 3
Xanthorrhoeaceae	*Xanthorrhoea pumilio*	dwarf grasstree					2, 3
Xanthorrhoeaceae	*Xanthorrhoea* sp.						3
Asteraceae	*Xerochrysum bracteatum*	golden everlasting daisy					2, 3
Meliaceae	*Xylocarpus moluccensis*	cedar mangrove					3
Flacourtiaceae	*Xylosma terrae-reginae*	Queensland xylosma					3
Rutaceae	*Zanthoxylum brachyacanthum*	thorny yellowwood					3
Rutaceae	*Zieria* sp.						3
Fabaceae	*Zornia dyctiocarpa*	zornia pea					3
Fabaceae	*Zornia dyctiocarpa* v. *filifolia*	fern-leaved zornia pea					3
Fabaceae	*Zornia floribunda*	many-flowered zornia pea					3
Fabaceae	*Zornia muriculata*	spiny zornia pea					3
Fabaceae	*Zornia muriculata* ssp. *angustata*	narrow-leaved zornia pea					2, 3
Fabaceae	*Zornia muriculata* ssp. *muriculata*	spiny zornia pea					3
Zosteraceae	*Zostera muelleri* ssp. *capricorni*	Capricorn Coast seagrass					3
Poaceae	***Zoysia macrantha***	prickly couch					4

Bold type indicates species recorded on site during field surveys undertaken in 2009.

*Status: Cwlth (EPBC Act): E = Endangered, V = Vulnerable. Qld (NCA): E = Endangered, V = Vulnerable, R = Rare. Reg (Regionally Significant) CSIRO ROTAP List: 1 = Type collection, 2 = Geographic range in Australia is less than 100 km, 3 = Geographic range in Australia is more than 100 km, V = Vulnerable, R = Rare, K = Poorly Known, C = Reserved, - = Reserve population size is not accurately known, + = overseas occurrence; SEQN (Biodiversity Planning Assessment): NPT – R = Non-EVR Prioirity Taxa – Regionally Significant; SEQ Vine Forest Plant Atlas: R = Rare, WC = Well Conserved, PC = Poorly Conserved. Weed (Non-

native Species) WONS List: ## = Weed of National Significance; Qld (LP[P&SRM]A): 2 = Class 2 declared plant, 3 = Class 3 declared plant; Qld Plant Census 2007: * = Non-native species.

^Source: 1 = DEWHA EPBC Protected Matters Report, 2 = QLD Herbarium HERBRECS Flora Collection Records, 3 = DERM Wildlife Online Search, 4 = WorleyParsons 2009 Field Survey.

Appendix F Regional ecosystem descriptions

REGIONAL ECOSYSTEMS

RE 12.1.2

Saltpan vegetation including grassland and herbland on marine clay plains

VMA Status (Nov09): **Least concern**
Biodiversity Status: **No concern at present**

Saltpan vegetation comprising salt couch (*Sporobolus virginicus*) grassland and samphire herbland. Grasses including prickly couch (*Zoysia macrantha* ssp. *macrantha*) sometimes present in upper portions of tidal flats.
Includes saline or brackish sedgelands.
Occurs on Quaternary estuarine deposits. Marine plains/tidal flats.

Special Values / Comments:
Habitat for false water-rat (*Xeromys myoides*) in southern part of the bioregion particularly in areas immediately adjacent to mangroves, 12.1.3.

Protected Areas:
Extent in reserves is High. National Parks: Bribie Island, Burrum Coast, Curtis Island, Eurimbula, Great Sandy, Noosa, Poona, Southern Moreton Bay Islands, Wild Cattle Island; Conservation Parks: Barubbra Island, Broadwater, Bullock Creek, Coombabah Lake, Curtis Island, Eudlo Creek, Fleays, Great Sandy, Hays Inlet 1, Hays Inlet 2, Keyser Island, Maroochy River, Maroochy Wetlands, Mon Repos, Mouth of Baffle Creek 1, Mouth of Baffle Creek 2, Mouth of Kolan River, ORegan Creek, Sheep Island, Tallebudgera Creek, Weyba Creek; Forest Reserves: Beerburrum 2.

Wetland:	Estuarine wetlands (e.g. mangroves)
Structure Category:	Very sparse
Subregion:	4, 8, 9, 10
Estimated Extent:	In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.

Fire Management Guidelines:
STRATEGY: Burn in association with surrounding vegetation. Surrounding vegetation should be burnt when swamp is wet to avoid undesirable effects such as peat fire. ISSUES: Some elements of this RE will be flammable. Though not usually deliberately burnt, fire should not be avoided. This RE will often burn in association with surrounding ecosystems. Moist conditions are desirable for any planned burning activities in this ecosystem.

Supplementary Description:
Bean *et al*. (1998), A3.

REGIONAL ECOSYSTEMS

RE 12.1.3

Mangrove shrubland to low closed forest on marine clay plains and estuaries

VMA Status (Nov09): **Least concern**
Biodiversity Status: **No concern at present**

Mangrove shrubland to low closed forest.
Occurs on Quaternary estuarine deposits.

Special Values / Comments:
Habitat for false water-rat (*Xeromys myoides*) in southern part of the bioregion particularly in areas immediately adjacent to saltpans, 12.1.2.

Protected Areas:
Extent in reserves is High. National Parks: Bribie Island, Burrum Coast, Curtis Island, Eurimbula, Great Sandy, Mooloolah River, Moreton Island, Noosa, Poona, Southern Moreton Bay Islands, St Helena Island, Wild Cattle Island; Conservation Parks: Baddow Island, Barubbra Island, Bottle Creek, Broadwater, Buckleys Hole, Bullock Creek, Coombabah Lake, Curtis Island, Eudlo Creek , Fleays, Fleays Wildlife Park, Garden Island, Goat Island (Noosa River), Great Sandy , Hays Inlet 1, Hays Inlet 2, Indooroopilly Island, Keyser Island, King Island, Maroochy River, Maroochy Wetlands, Mon Repos, Mouth of Baffle Creek 1, Mouth of Baffle Creek 2, Mouth of Kolan River, Mud Island, Myora, ORegan Creek, Saltwater Creek, Sheep Island, Tallebudgera Creek, Tinana Island, Tingalpa Creek, Weyba Creek; Forest Reserves: Beerburrum FR 2.

Wetland:	Estuarine wetlands (e.g. mangroves).
Structure Category:	Dense
Subregion:	4, 8, 9, 10
Estimated Extent:	In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.

Fire Management Guidelines:
STRATEGY: Do not burn. ISSUES: Scorching within the supra-littoral margin, particularly when this ecotone merges into flammable vegetation such as woodlands and forests of melaleuca may be a problem.

Supplementary Description:
Bean et al. (1998), A1.

REGIONAL ECOSYSTEMS

RE 12.3.7

Queensland blue gum, weeping bottlebrush, River Sheoak fringing forest

VMA Status (Nov09): **Least concern**
Biodiversity Status: **No concern at present**

Narrow fringing community of Queensland blue gum (*Eucalyptus tereticornis*), weeping bottlebrush (*Callistemon viminalis*), river she-oak (*Casuarina cunninghamiana*) ± large-leaved water gum (*Waterhousea floribunda*). Other species associated with this RE include black tea-tree (*Melaleuca bracteata*), flaxleaf paperbark (*M. trichostachya*) and pendulous paperbark *(M. fluviatilis*) in north of bioregion. Slender mat-rush (*Lomandra hystrix*) often present in stream beds. Occurs on Quaternary alluvial plains along watercourses.
RE 12.3.7a: Riverine wetland or fringing riverine wetland. Black tea-tree open-forest. Occurs in drainage depressions on Quaternary alluvial plains. **RE 12.3.7b**: Riverine wetland or fringing riverine wetland. Naturally occurring waterholes and lagoons,both permanent and intermittent. Includes exposed stream bed and bars. Occurs in the bed of active (may be intermittent) river channels. **RE 12.3.7c**: Palustrine wetland (e.g. vegetated swamp). Billabongs and ox-bow lakes containing either permanent or periodic water bodies. Old river beds now cut off from regular flow. **RE 12.3.7d**: Palustrine wetland (e.g. vegetated swamp). Aquatic vegetation usually fringed with Queensland blue gum. Closed depressions on alluvial plains.

Special Values / Comments:
RE 12.3.7d: Important for water birds and freshwater invertebrates and vertebrates such as tortoises. RE 12.3.7a: Prone to weed invasions. RE 12.3.7b/c/d: Vegetation may occur on infrequently inundated areas. RE 12.3.7a/d: Too small to map at 1:100 000 scale.

Protected Areas:
Extent in reserves is Low. National Parks: Bunya Mountains, Crows Nest, Curtis Island, Dawes, Deer Reserve, Esk, Gatton, Good Night Scrub, Main Range, Mount Barney, Mount Chinghee, Mount Walsh, Ravensbourne, Sarabah, Springbrook, Tamborine; Conservation Parks: Baddow Island, Bullyard, Curtis Island, Dwyers Scrub, Eurimbula, Flagstone Creek, King, Tenthill; Forest Reserves: Bulburin, Conondale 1, Kandanga, Kroombit Tops, Littabella, Lockyer, Maleny 3, Mapleton, Mount Binga, Mount Mee, Nerang, Numinbah, Perseverence Creek, Polmaily 2, Tamborine, Warro, White Mountain, Wongi, Yabba 1, Yabba 2.

Wetland:	Riverine wetland or fringing riverine wetland.
Structure Category:	Mid-dense
Subregion:	2, 3, 5, 6, 7, 10, (8), (1)
Estimated Extent:	In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.

Fire Management Guidelines:
STRATEGY: Avoid intentionally burning this fringe vegetation. Burn surrounding ecosystems in conditions that would minimise fire incursion. ISSUES: Protection relies on broad-scale management of surrounding country. Fire exclusion is not necessary. Swamp she-oak (*Casuarina equisetifolia*) is very sensitive to fire and germination after fire is typically very low or negligible. Triggers unrelated to fire appear to maintain a healthy ecosystem. Issues with weeds may result from fire and other disturbance.

Supplementary Description:
Bean *et al.* (1998), E11, E12.

REGIONAL ECOSYSTEMS

RE 12.3.11

Grey ironbark, Queensland blue gum, pink bloodwood open forest on alluvial plains

VMA Status (Nov09): **Of concern**
Biodiversity Status: **Of concern**

Open-forest to woodland of Queensland blue gum (*Eucalyptus tereticornis*), grey ironbark (*E. siderophloia*) and pink bloodwood (*Corymbia intermedia)*. Moreton Bay ash (*Corymbia tessellaris*), swamp box (*Lophostemon suaveolens*) and broad-leaved paperbark (*Melaleuca quinquenervia*) frequently occur and often form a low tree layer. Other species present in scattered patches or low densities include smooth-barked apple (*Angophora leiocarpa*), Queensland peppermint *(E. exserta*), flooded gum (*E. grandis*), brown bloodwood (*C. trachyphloia*), lemon-scented/spotted gum (*C. citriodora*), broad-leaved white mahogany (*E. latisinensis*), Tindale's stringybark (*E. tindaliae*), scribbly gum (*E. racemosa*), small-leaved paperbark (*Melaleuca sieberi*) and paperbarked tea-tree (*M. viridiflora*). Narrow-leaved red gum (*E. seeana*) may be present south of Landsborough. Occurs on Quaternary alluvial plains and drainage lines along coastal lowlands. Rainfall usually exceeds 1000mm/y.
RE 12.3.11a: Open-forest of grey ironbark with vine forest understorey. Other canopy species include pink bloodwood, hoop pine (*Araucaria cunninghamii)* and smooth-barked kauri (*Agathis robusta*). Frequently occurring understorey species include *Flindersia* spp., swamp box, brush box (*L. confertus*), small-leaved tuckeroo (*Cupaniopsis parvifolia*), *Acronychia* spp., red ash (*Alphitonia excelsa*) and brown salwood (*Acacia disparrima*). Occurs on sub-coastal Quaternary alluvial plains. Rainfall usually exceeds 1000mm/y.

Special Values / Comments:
Habitat for black-breasted button-quail (*Turnix melanogaster*). Coastal and sub-coastal areas south of Bundaberg and a narrow coastal fringe north of Bundaberg. Extensively cleared and modified in populous southern parts of the bioregion. RE 12.3.11a: Understorey is a likely product of long term fire exclusion.

Protected Areas:
Extent in reserves is Low. National Parks: Bingera, Bribie Island, Burrum Coast, Conondale, Curtis Island, Glass House Mountains, Glenbar, Great Sandy, Gympie, Maleny, Mooloolah River, Mount Bauple (S), Mount Walsh, Poona, Tamborine; Conservation Parks: Baddow Island, Beelbi Creek, Buccan, Carbrook Wetlands 1, Curtis Island, Eudlo Creek, Great Sandy, Hays Inlet 2, Indooroopilly Island, King, Police Paddock, Tinana Creek, Vernon; Forest Reserves: Beerburrum 1, Bellthorpe 2, Clagiraba, Conondale 2, Daisy Hill, Gigoomgan, Goomboorian, Grongah, Imbil 1, Kenilworth, Littabella, Mapleton, Marodian, Moggill, Nerang, Numinbah, Tamborine, Wongi; Resource Reserve: Cooloola (Noosa River).

Wetland:	Contains palustrine wetland (e.g. in swales).
Structure Category:	Mid-dense
Subregion:	8, 7, 3, 2, 4, (9)
Estimated Extent:	In December 2006, remnant extent was > 10,000 ha and 10-30% of the pre-clearing area remained

Fire Management Guidelines:
SEASON: Summer to late-autumn. INTENSITY: Low. INTERVAL: 3-6 years. STRATEGY: burn 40-60% of any given area. ISSUES: Control of weeds is a major focus of planned burning. Maintain ground litter/fallen timber habitats by burning when sufficient soil moisture.

Supplementary Description:
Bean *et al.* (1998), E9, D8, C1.

REGIONAL ECOSYSTEMS

RE 12.11.6

Lemon-scented spotted gum, narrow-leaved red ironbark open forest on metamorphics +/- interbedded volcanics

VMA Status (Nov09): **Not of concern**
Biodiversity Status: **No concern at present**

Open-forest to woodland of lemon-scented/spotted gum (*Corymbia citriodora*) generally with narrow-leaved red ironbark (*Eucalyptus crebra*). Other species such as broad-leaved red ironbark (*Eucalyptus fibrosa* ssp. *fibrosa*) Queensland peppermint (*E. exserta)*, Queensland blue gum (*E. tereticornis*), gum-topped ironbox (*E. moluccana*), silver-leaved ironbark (*E. melanophloia*), smooth-leaved apple (*Angophora leiocarpa*) may be present in scattered patches or in low densities. Understorey grassy or shrubby. Occurs on Paleozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. Drier habitats than RE 12.11.5.

Special Values / Comments:
Habitat for rare and threatened flora species including large-fruited zamia palm (*Cycas megacarpa*). This RE has been compiled from individual 1:100 000 map sheets.

Protected Areas:
Extent in reserves is High. National Parks: Calliope, Castle Tower, Curtis Island, DAguilar Range, Dawes, Glenbar, Good Night Scrub, Kroombit Tops, Mount Barney, Mount Colosseum, Mount Walsh, Ravensbourne, Wietalaba, Woowoonga (R); Conservation Parks: Baywulla Creek, Bottle Creek, Boyne Island, Curtis Island, Eurimbula, Garden Island; Forest Reserves: Bania, Boompa 3, Bulburin, Cordalba, DAguilar, Dan Dan, Dawes 1, Dawes 2, Gigoomgan, Kilkivan, Kroombit Tops, Littabella, Lockyer, Marodian, Maxwelton FR, Moggill, Mount Glorious, Nour Nour, Polmaily 2, Warro, White Mountain, Wonbah.

Structure Category:	Mid-dense
Subregion:	7, 10, (3), (5)
Estimated Extent:	In December 2006, remnant extent was > 10,000 ha and >30% of the pre-clearing area remained.

Fire Management Guidelines:
SEASON: Summer to winter. INTENSITY: Low to moderate. INTERVAL: 4-25 years. STRATEGY: Aim for 40-60% mosaic burn. Burn with soil moisture and with a spot ignition strategy so that a patchwork of burnt/unburnt country is achieved. ISSUES: The fire regime should maintain a mosaic of grassy and shrubby understoreys. Control of weeds is a major focus of planned burning in most areas. Careful thought should be given to maintaining ground litter and fallen timber habitats by burning only with sufficient soil moisture. Burning should aim to produce fine scale mosaics of unburnt areas. Variability in season and fire intensity is important, as well as spot ignition in cooler or moister periods to encourage mosaics. Spring burns (traditionally used in SEQ ecosystems) have an associated risk due to changing weather conditions post-burn. The fire interval recommendation provides a guide to burning frequency and should be adjusted according to the 'reading of country' and observed ecosystem health in relation to fire.

Supplementary Description:
Bean *et al.* (1998), H19 (in part).

REGIONAL ECOSYSTEMS

RE 12.11.14

Narrow-leaved red ironbark, Queensland blue gum woodland on metamorphics +/- interbedded volcanics

VMA Status (Nov09): **Of concern**
Biodiversity Status: **Of concern**

Narrow-leaved red Ironbark (*Eucalyptus crebra*), Queensland blue gum (*E. tereticornis*) grassy woodland. Other species including silver-leaved ironbark (*Eucalyptus melanophloia*), Clarkson's bloodwood (*Corymbia clarksoniana*), gum-topped bloodwood (*C. erythrophloia)*, Moreton Bay ash *(C. tessellaris*), *Angophora* spp. may be present in low densities or in patches. Mid-layer generally sparse but can include low trees such as corkwood wattle (*Acacia bidwillii*), *Capparis* spp., large-leaved hopbush (*Dodonaea triquetra*), red ash (*Alphitonia excelsa*) and *Xanthorrhoea* spp. Occurs on mid and lower slopes on Paleozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics.

Special Values / Comments:
None identified.

Protected Areas:
Extent in reserves is Low. National Parks: Calliope, Castle Tower, Cherbourg, Crows Nest, Curtis Island, Glenbar, Mount Walsh, Pidna, Woowoonga; Conservation Parks: Curtis Island, King; Forest Reserves: Boompa 3, Bulburin, Conondale 2, Glastonbury, Imbil 1, Kandanga, Kenilworth, Kilkivan, Marodian, Moggill, Mount Binga, Oakview, Polmaily 2, Warro, Wrattens, Yabba 1, Yabba 2.

Structure Category:	Sparse
Subregion:	3, 5, 6, 7, 10
Estimated Extent:	In December 2006, remnant extent was > 10,000 ha and 10-30% of the pre-clearing area remained

Fire Management Guidelines:
SEASON: Summer to late-autumn. INTENSITY: Low. INTERVAL: 3-6 years. STRATEGY: Aim to burn 40-60% of any given area. Spot ignition in cooler or moister periods encourages mosaics. ISSUES: Control of weeds is a major focus of planned burning in most areas. Maintain ground litter and fallen timber habitats by burning only with sufficient soil moisture. Burning should aim to produce fine scale mosaics of unburnt areas. Spring burns (traditionally used in SEQ ecosystems) have an associated risk due to changing weather conditions post-burn. The fire interval recommendation provides a guide to burning frequency and should be adjusted according to the 'reading of country' and observed ecosystem health in relation to fire.

Supplementary Description:
Bean *et al.* (1998), I13 (in part).

References

Bean, A.R., Sparshott, K.M., McDonald, W.J.F. and Neldner, V.J. 1998. *Forest Ecosystem Mapping and Analysis of South-eastern Queensland Biogeographic Region. A. Vegetation Survey and Mapping.* Report for Queensland CRA/RFA Steering Committee. Queensland Herbarium and Environment Australia, Brisbane.

Appendix G EVR flora species information dossiers

Sessile-leaved actephila (Actephila sessilifolia)

Rare (Queensland)

Shrub or small tree to 6 m tall with slender branches and elliptic to narrowly-ovate, hairless, rough leaves. Leaves are dark green above and pinkish when dry below to 7.5 cm long and 3 m wide. Small, inconspicuous flowers appear in summer and hard, black globular fruits to 12 mm diameter are produced in mid to late autumn (DNR 1999).

This species is restricted to eastern Queensland, from Bowling Green Bay near Townsville, south to Mount Larcom near Gladstone, where it has been recorded in notophyll and microphyll vine forests and vine thickets, in red, talus or granite soils at 30-320 m altitude. It is considered a locally common species and is often recorded in association with brown tulip oak (*Argyrodendron polyandrum*), banyan (*Ficus virens)*, cedar fig (*F. superba* var. *henneana)*, white walnut (*Cryptocarya hypospodia*), red bean (*Dysoxylum mollisissum* ssp. molle); python tree (*Gossia bidwilli)*, blush walnut (*Beilschmiedia obtusifolia)* and trumpet satinash (*Acmenosperma claviflorum*) (DNR 1999).

Sessile-leaved actephila is known to several national parks and state forests including the Eungella and Mount O'Connell National Parks and is considered under threat by the clearing of habitat and weed invasion (DNR 1999).

Eumundi bosistoa (Bosistoa medicinalis)

Rare, Poorly Conserved (Regional)

Eumundi bosistoa is a small tree growing to 15 m tall and is characterised by foliate to trifoliate leaves, white flowers and brown, hairless and transversely ribbed fruit to 20 mm diameter. Leaflets are leathery, hairless and elliptic to oblong-obovate to 12 cm long with numerous, large, conspicuous oil dots and prominent veins (Harden et al 2006; Hartley 1977).

Restricted to the coastal regions of eastern Queensland, from Proserpine to the Blackall Range, this species is found in dry vine thickets and rainforests, often in rocky situations and along creeks, in substrates derived from andesite, granites and granodiorite (Hartley 1997).

Little is known about the total population size and extent of occurrence for this species including its representation in protected reserves.

Heart-leaved bosistoa (Bosistoa transversa)

Vulnerable (Australia)

Small to medium tree to 22 m tall with a dense, dark green canopy and crooked trunk. Leaves are up to 16 cm long with 1-3 paired, broad, leathery, glabrous leaflets to 12.5 cm long and 6 cm wide. They are dark above and paler below with prominent veins and distinct oil dot and heart-shaped bases. Small, white flowers appear in summer in terminal and/or upper axillary spikes to 16 cm long. Hard, ribbed, egg-shaped fruit to 13 mm wide appear thereafter (DEC 2010; DEWHA 2010).

Heart-leaved bosistoa prefers lowland subtropical rainforests to 300 m altitude and is restricted to southern Queensland and north-eastern New South Wales, from Maryborough in the north to Nightcap Range in the south. Little is known about the total population size and extent of occurrence of this species including its representation in protected estates however, threats have been identified as loss of habitat through clearing and fragmentation, habitat

degradation through weed invasion and disturbance, grazing by domestic stock, fire and timber harvesting (DEWHA 2010).

Miniature moss-orchid (Bulbophyllum globuliforme)

Vulnerable (Australia)
Rare (Queensland)

Tiny epiphytic orchid found in sparse to dense clumps and long strands with creeping stems and thickened bulb-like stems (pseudobulbs). Pseudobulbs are small, pale green and globular to egg-shaped to 2 mm long and 2 mm wide with small, thread-like, papery, narrowly-triangular leaves to 2 mm long and 0.3 mm wide arising from the top. Leaves are concave and often shed early. Small, solitary, white to pale yellow flowers are borne in late autumn to late spring, on thread-like stems to 15 mm long that arise from the base of the pseudobulbs (DEWHA 2010; DNR 1999).

This species is restricted to south-eastern Queensland and north-eastern New South Wales from the Kroombit Tops, west of Gladstone in the north to the McPherson Range, south of the border. It is found in dry rainforests including notophyll vine forests and some microphyll vine forests on scaly bark of the branches and upper trunk of mature hoop pine (*Araucaria cunninghamii*) trees at 500-800 m altitude (DEWHA 2010; DNR 1999).

It is not known if this species occurs in any protected estate however threats have been identified as logging of hoop pine host-trees, fire, damage to host trees by roadworks and collection or damage by orchid enthusiasts (DNR 1999)..

White croton (Croton stigmatosus)

Rare, Well Conserved (Regional)

White croton is a small tree to 15 m tall with green, hairy, oblong to lanceolate leaves to 15 cm long and 4 cm wide with fine translucent oil dots and irregularly toothed margins. It has creamy brown flowers held in racemes to 14 cm long and hairy fruit to 6 mm diameter are produced in summer (Botanic Gardens Trust 2010; Forster 2003).

White croton is restricted to dry and subtropical rainforests in north-eastern New South Wales and south-eastern Queensland and is not known to occur in any protected estate (Harden et al 2006).

Wedge-leaf Tuckeroo (Cupaniopsis shirleyana)

Vulnerable (Australia)
Vulnerable (Queensland)
Back on Track Species (High) (Queensland)

Small tree to 10 m tall with compound, alternate and pinnate leaves and greenish to cream flowers that are held on slender axillary or terminal racemes and appear from mid autumn to mid winter. Leaflets are 6-15-paired, stiff, leathery and glossy green above and hairy below with triangular to wedge-shaped bases and toothed or sometimes entire margins. Orange, hairy, spherical to egg-shaped fruit are produced mid winter (DEWHA 2010).

This species is restricted to south-eastern Queensland, from Brisbane to Curtis Island and is found in dry rainforests and scrubby urbanised areas on moderate to very steep slopes, screeslope gullies and rocky stream channels at 60-550 m altitude and in association with white booyong (*Argyrodendron trifoliatum*), hoop pine (*Araucaria cunninghamii*), rough-leaved elm (*Aphananthe philippensis)*, white bean (*Ailanthus triphysa)*, native holly (*Alchornea*

ilicifolia), broad-leaved whitewood (*Atalaya multiflora)*, python tree (*Gossia bidwillii*), thick-leaved croton (*Croton acronychioides)*, black plum (*Diospyros australis)*, hard quandong (*Elaeocarpus obovatus)*, southern fitzalania *(Fitzalania heteropetala),* blush coondoo *(Planchonella laurifolia*), blunt-leaved coondoo (*P. myrsinifolia)*, Burdekin plum *(Pleiogynium timorense*), red-fruited kurrajong (*Sterculia quadrifida)* and strychnine tree (*Strychnos axillaris*) (DEWHA 2010; DNR 1999).

Wedge-leaf tuckeroo is protected at Mount Larcom and in the Sankey Scrub and threats have been identified as clearing and disturbance from activities such as roadworks and other infrastructure works, including associated drainage works, weed infestations (DEWHA 2010).

Large-fruited zamia palm (Cycas megacarpa)

Endangered (International)
Endangered (Australia)
Endangered (Queensland)
Back on Track Species (Critical) (Queensland)

Trunked cycad to 5 m tall and 14 cm diameter with green, densely hairy, orange-brown new growth. Leaves are bright green, highly glossy to semi-glossy, moderately keeled and pinnate to 110 cm long. Leaflets are 120-170-numbered, simple, strongly discolourous and flat to slightly keeled to 200 mm long and 7.5 mm wide with basal leaflets not gradually reducing to spines. Pollen cones (flowers) are ovoid and orange to 18 cm long and 7 cm diameter and seed cones (fruit) are grey to brown to 25 cm long and are produced in early autumn (Botanic Gardens Trust 2010; Queensland Herbarium 2007).

The large-fruited zamia palm is beetle pollinated and restricted to south-eastern Queensland where it is found in woodlands and open woodlands dominated by lemon-scented/spotted gum (*Corymbia citriodora*), narrow-leaved red ironbark (*Eucalyptus crebra*), gum-topped bloodwood (*C. erythrophloia)*, silver-leaved ironbark (*E. melanophloia)* and brush box *(Lophostemon confertus*), on rocky substrates derived from acid volcanics, ironstone and mudstone and rarely alluvium and at 40-680 m altitude (Botanic Gardens Trust 2010; Queensland Herbarium 2007).

Forty-six populations have been recorded across its distribution range totalling 372,964 individuals and including several populations from national parks. Important populations have been identified at Biloela, Kroombit and Wonbah and threats have been identified as include destruction due to land clearing, legal harvesting and commercial salvage, illegal harvesting, loss of genetic variation and insect pollinators, inappropriate fire regimes, timber harvesting and drought. Species is declining (Queensland Herbarium 2007).

Black-barked doughwood (Dinosperma melanophloia)

Non-EVR Priority Taxon (Regional)
Rare, Poorly Conserved (Regional)

Medium-sized tree characterised by 1-foliolate, leathery, hairless, ovate to oblong-elliptic leaves to 15 cm long with numerous, distinct oil dots. Leaves are aromatic (aniseed), dark green and dull above and paler below and are held on stalks to 3 cm long. Flowers are white and fruit capsules are wrinkled, hairy and 1-4-lobed to 4 mm long (Harden et al 2006).

Black-barked doughwood are restricted to north of Mount Nebo in eastern Queensland, in dry and subtropical rainforests and it is not known to occur in any protected estate (Harden et al 2006).

Mueller's redheart (Dissiliaria muelleri)

Non-EVR Priority Taxon (Regional)

Mueller's redheart is a small to medium size tee with often rough, warty branchlets and leathery, hairless, glossy, ovate to circular leaves to 10 cm long. Leaves have shallowly wrinkled to entire margins and prominent veins and are held on stalks to 4 mm long. Flowers are white and fruit capsules are ovoid and 3-lobed to 9 mm diameter (Harden et al 2006).

Mueller's redheart prefers dry rainforests of the Mount Larcom-Gladstone area in central-eastern Queensland. It is not known to occur in any protected reserve (Harden et al 2006).

Wanderrie grass (Eriachne rara)

Rare, Poorly Conserved (Regional)

Tufted, erect grass to 60 cm tall with sparsely downy bases and simple or sparsely branched, rough stems. Leaves are involuted and stiff to 20 cm long and 3 mm wide with rough, thickened margins and ribbed nerves. Inflorescences are loose panicles to 10 cm long and 5 cm wide with membranous, ovate-elliptic, glabrous, beaked glumes to 9 mm long. Flowers and seeds are produced from late summer to late autumn (Botanic Gardens Trust 2010).

Wanderrie grass is restricted to open eucalypt woodlands, wallum and paperbark swamps and seasonal water channels in deep or shallow, sandy, sometimes gritty or stony soils in association with sandstone, laterite and granite, in south-eastern Queensland and north-eastern New South Wales (Lazarides 1995; Sharp and Simon 2002).

This species is not known to occur in any protected estate and total population size and extent of occurrence is unknown.

Grease nut (Hernandia bivalvis)

Rare (Queensland)

Small tree to 12 m tall with ovate to oblong-ovate, dark glossy green (paler and hairless below) leaves to 10 cm long with prominent veins and cream flowers borne in clusters in spring. Red to orange, ovate, edible fruit are produced in late summer to mid autumn (DNR 1999).

Grease nut is restricted to rainforests, vine thickets and microphyll vine forests to 620 m altitude on coastal ranges on rock pavements and outcrops in shallow soils, in south-eastern Queensland and it is not known to occur in any protected reserve (DNR 1999; Harden et al 2006).

Miquel's zamia palm (Macrozamia miquelii)

Lower Risk (Least Concern) (International)
Rare, Well Conserved (Regional)

Ground cycad with stems to 40 cm diameter and deep green, highly glossy and flat leaves to 180 cm long. Leaves are 30-80-numbered in crown and have 80-160 simple, strongly discolourous leaflets to 380 mm long and 11 mm wide and basal leaves are reduced to spines. Pollen cones (flowers) are fusiform to 20 cm long and 5 mm diameter and seed cones (fruit) are narrowly ovoid to 30 cm long and 10 cm diameter (Jones et al 2001).

Miquel's zamia palm is restricted to sclerophyll forests in poor soils in southern Queensland and northern New South Wales and is not known to any protected estate (Jones et al 2001).

Mount Larcom monkey rope (Parsonsia larcomensis)

Vulnerable (Australia)
Vulnerable (Queensland)

The Mount Larcom monkey rope is a semi-woody creeping plant to 5 m long with clear sap and ovate to broadly elliptic leaves to 4.5 cm long and 2.2 cm wide. Leaves are green above and glaucous below with raised veins and slightly recurved margins and are held on stalks to 7 mm long. Flowers are white with red spots in the throat, tubular and hairy to 8 mm long and are borne in clusters of 5-12 from mid summer to late autumn. Brown, hairy, slender, cylindrical to spindle-shaped fruit to 11 cm long and 1.1 mm diameter are produced from late winter to early summer. Plants attach to rocks and soils by adventitious roots (DEWHA 2010; DNR 1999).

This species is restricted to the Rockhampton-Mount Perry region of central-east and south-eastern Queensland where it is found in open heathlands and shrublands at or near the summits of mountain peaks on cliffs or among outcrops of acid volcanic rocks and serpentinite and in shallow, loamy soils in association with broad-leaved red ironbark (*Eucalyptus crebra*), grasstrees (*Xanthorrhoea* spp.) and serpentinite rice flower (*Pimelea leptospermoides*) at 350-750 m altitude (DNR 1999).

Five populations have been recorded in the distribution area although total population size is unknown. This species is not known to occur in any conservation reserve and is considered under threat by habitat degradation by weeds and fragmentation by clearing (DEWHA 2010; DNR 1999).

Narrow-leaved silkpod (Parsonsia paulforsteri)

Poorly Known (Known only from the type collection) (Regional)

Climber with twining, hairless stems (becoming woody and warty with age) and clear sap. Leaves are linear to broadly-lanceolate to 10 cm long and 1.5 cm wide with strongly recurved margins and distinct veins. Leaves are dark green above and paler or whitish below and lack basal glands. Flower are white to 3 mm diameter and are held in compact panicles in the leaf axils or at the ends of branches. Fruit capsules are hairless and fusiform to narrow-ovoid ro 8 cm long (Botanic Gardens Trust 2010; Harden et al 2006).

The narrow-leaved silkpod is restricted to vine thickets and rainforest / gallery forests on river terraces and hillslopes and occasionally in eucalypt / paperbark woodlands, in coastal regions of southern Queensland. This species is not known to any protected reserve (Harden et al 2006).

Acuminate silkpod (Parsonsia ventricosa)

Rare, Well Conserved (Regional)

Climber with twining stems to 6 m tall with watery sap and lanceolate to oblong-lanceolate, glabrous to downy leaves to 15 cm long and 5 cm wide with numerous, prominent tertiary veins below and are held on stalks to 12 mm long. Inflated, globular, hairy flowers to 3.5 mm diameter are borne in short, umbel-like cymes in the leaf axils from summer to autumn and fruit capsules are slender to 14 cm long (Botanic Gardens Trust 2010).

The acuminate silkpod is restricted to dry and subtropical rainforests of southern Queensland and northern New South Wales with a disjunct population recorded in the Gladstone-Eungella

region of central-eastern Queensland (Botanic Gardens Trust 2010). This species is not known to any protected estate.

Quassia (Quassia bidwillii)

Vulnerable (Australia)
Vulnerable (Queensland)

Quassia is a small shrub or tree to 6 m tall with ribbed, hairy young branches and stiff, leathery, narrowly elliptic to narrowly ovate leaves to 12 cm long and 2 cm wide. Leaves are green, glossy and hairless above and paler and hairy below with curled margins and are held on stalks to 7 mm long. Small, red flowers are borne in clusters in the leaf axils from late Spring to early Autumn and red, hairy, egg to elliptic shaped fruit to 1 cm long are produced from late summer to mid winter (DNR 1999).

This species is restricted to Queensland, between Scawfell Island near Mackay and Goomboorian north of Gympie, where it is found in lowland rainforests or rainforest margins and occasionally open forests, woodlands and mangroves in lithosols, skeletal soils, loamy sands, sands, silts and sands with clay subsoils at 1 - 617 m altitude in coastal regions. Quassia occurs in association with lemon-scented/spotted gum (*Corymbia citriodora)*, small-fruited grey gum (*Eucalyptus propinqua)*, yellow stringybark (*E. acmenoides*), Queensland blue gum (*E. tereticornis*), pink bloodwood *(C. intermedia*), grey ironbark (*E. siderophloia),* gum-topped ironbox *(E. moluccana)*, Gympie messmate (*E. cloeziana*) and broad-leaved red ironbark (*E. fibrosa s*pp. *fibrosa)* (DEWHA 2010,; DNR 1999).

Forty populations have been recorded in the distribution range including in the Scawfell Island National Park. Threats to this species include habitat clearing and soil erosion resulting from agriculture, forestry, urban development and recreational activities, inappropriate fire regimes and weed infestation (DNR 1999).

Minute orchid (Taeniophyllum muelleri)

Vulnerable (Australia)

Epiphytic terrestrial orchid with leaves reduced to scale-like bracts and soon shed. Green-yellow, tubular flowers are produced from mid winter to late spring and species reproduces by vegetative growth.

The minute orchid is restricted to coasts and coastal ranges of eastern Australia, north of Bellinger River in New South Wales and at 0-250 m altitude, where it is found on the outer branches and branchlets of rainforest trees in littoral and subtropical rainforests, wet sclerophyll forests and riparian areas. This species is not known to any protected reserve and threats have been identified as habitat clearing and removal of host trees.

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Appendix H Significant weed factsheets

Significant weed profiles

Rubber vine (Cryptostegia grandiflora)

Rubber vine can grow as a shrub to 3 m (unsupported) or as a woody climber to 30 m (supported) tall and is characterised by whip-like, smooth, warty stems and dark green and glossy, oval-shaped leaves to 10 cm long and 5 cm wide. Leaves are held in pairs on short purplish stems and have prominent thick midribs. Large, showy, funnel-shaped, pink to purple flowers appear in spring and summer and hard, light green fruit pods to 15 cm long and 4 cm wide are produced in summer through to autumn (Biosecurity Queensland 2007a; Parsons and Cuthbertson 2001).

Native to south-western Madagascar, rubber vine found in open grasslands and in canopy gaps along streams, in all soil types in eastern Queensland where it smothers native vegetation and restricts access to waterways. Rubber vine is considered a weed of national significance and is spread by seed in water and by wind.

Lantana (Lantana camara)

Lantana is a branching, spreading, thicket-forming shrub to 3 m tall with brown, woody, brittle stems to 5 m long and 4 mm diameter. Stems are square in cross-section and have small, recurved prickles. Aromatic, oval-shaped leaves are held in pairs along stems. They are roughly hairy, yellow-green above and paler below and have prominent veins and variable toothed margins. Flowers are borne in clusters at the ends of branches year round and vary from yellow to purple and are shortly followed by glossy, purple-black clusters of fruit to 8 mm diameter (Parsons and Cuthbertson 2001).

Native to central America, lantana is found in all vegetation types from exposed dry hillsides to wet heavily shaded gullies and predominantly in disturbed areas, in a variety of soils in coastal and sub-coastal regions of eastern Australia. Introduced as an ornamental garden plant, lantana forms dense impenetrable thickets which restrict plant growth and animal and vehicle movement whilst increasing the fire fuel load of vegetation. Spread by seed through birds and possibly also though suckers, lantana is also known to increase soil fertility which facilitates the introduction and spread of other weedy species and is thought to be poisonous to stock (Parsons and Cuthbertson 2001.

***Prickly pear (Opuntia stricta*)**

This erect, succulent shrub grows to 2 m tall and is native to the Caribbean region. It is characterised by dull green to bluish-green, fleshy, segmented stems to 30 cm long and 15 cm wide and 2 cm thick with tufted areoles containing finely barbed bristles and 1-2 stout, yellow spines to 4 cm long. Found in exposed and shady sites, in semi-arid savannahs and grassy woodlands of warm-temperate, subtropical and tropical regions of Australia, with highest concentrations in central and southern Queensland, the leaves of the prickly pear are reduced to small scales beneath the areoles and are quickly shed on maturity. In late spring to summer, sessile, lemon-yellow flowers with green or pink markings and fleshy bases to 8 cm diameter are produced in the margins of stems and soon replaced by reddish purple, pear-shaped fruit to 6 cm long (Biosecurity Queensland 2007b; Parsons and Cuthbertson 2001).

Introduced as a garden ornamental species, the prickly pear is drought tolerant and highly invasive forms large thickets and are not palatable to stock. Their thorns may injure humans and livestock and can also contaminate wool (Parsons and Cuthbertson 2001).

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Appendix I Fauna species recorded during survey

Species Recorded During Field Survey

Scientific Name	Common Name
Frogs	
Rhinella marina	cane toad
Reptiles	
Carlia munda	shaded-litter rainbow-skink
Cryptoblepharus pulcher	elegant snake-eyed skink
Dendrelaphis punctulata	common tree snake
Gehyra dubia	tree dtella
Heteronotia binoei	Bynoe's gecko
Varanus tristis	freckled monitor
Birds	
Butorides striata	striated heron
Calyptorhynchus banksii	red-tailed black-cockatoo
Centropus phasianinus	pheasant coucal
Charadrius ruficapillus	red-capped plover
Coracina novaehollandiae	black-faced cuckoo-shrike
Corvus orru	Torresian crow
Cracticus nigrogularis	pied butcherbird
Dacelo novaeguineae	laughing kookaburra
Dicrurus bracteatus	spangled drongo
Egretta garzetta	little egret
Egretta novaehollandiae	white-faced heron
Egretta sacra	eastern reef egret
Esacus magnirostris	beach stone-curlew
Geopelia humeralis	bar-shouldered dove
Grallina cyanoleuca	magpie-lark
Gymnorhina tibicen	Australian magpie
Haematopus longirostris	pied oystercatcher
Haliaeetus leucogaster	white-bellied sea-eagle
Haliastur indus	brahminy kite
Hirundo neoxena	welcome swallow
Hirundo nigricans	tree martin
Chroicocephalus novaehollandiae	silver gull
Melithreptus albogularis	white-throated honeyeater
Merops ornatus	rainbow bee-eater
Ninox connivens	barking owl
Numenius madagascariensis	eastern curlew
Numenius phaeopus	whimbrel
Microcarbo melanoleucos	little pied cormorant
Philemon corniculatus	noisy friarbird
Pluvialis fulva	Pacific golden plover
Podargus strigoides	tawny frogmouth
Rhipidura leucophrys	willie wagtail
Thalasseus bergii	crested tern
Hydoprogne caspia	Caspian tern
Strepera graculina	pied currawong
Todiramphus macleayii	forest kingfisher
Trichoglossus haematodus	rainbow lorikeet
Vanellus miles	masked lapwing
Mammals	

Scientific Name	Common Name
Bos taurus	European cattle
Equus caballus	horse
Macropus giganteus	eastern grey kangaroo

Appendix J Migratory/marine bird species

Scientific name^ Common name (Family name)	EPBC status*	Preferred habitat	Likelihood of occurrence** in project area
Accipiter fasciatus [6] brown goshawk (Accipitridae)	Ma	Found in forest, woodlands dry scrublands and farms (Morcombe 2003). Identified within the wider study area through recent studies on Curtis Island.	**Likely**
Anseranas semipalmata [1,4] magpie goose (Anseranatidae)	Ma	Open wetlands, swamps, farmlands and major watercourses (Morcombe 2003).	**Possible**
Anthus novaeseelandiae [2,4,6] Australasian pipit (Motacillidae)	Ma	Grasslands, grassy woodlands, forest clearings, grassy roadsides. Feeds, roosts and nests on the ground (Morcombe 2003).	**Likely**
Ardea intermedia [2,4,6] intermediate egret (Ardeidae)	Ma	Floodwater, rivers, shallows of wetlands, intertidal mudflats (Morcombe 2003).	**Likely**
Cacomantis flabelliformis [4,6] fan-tailed cuckoo (Cuculidae)	Ma	Wet eucalypt forests, rainforest edges and open forests including river gum forests, in southern and eastern Australia (Morcombe 2003).	**Likely**
Charadrius ruficapillus [1,2,4,5,6] red-capped plover (Charadriidae)	Ma	Estuaries, salt marsh, lagoons, inland waterways, salt lakes, brackish lagoons. Sedentary or nomadic (Geering et al. 2007). DEWHA report indicates roosting known to occur in the wider study area.	**Known**
Coracina novaehollandiae [2,4,5,6] black-faced cuckoo-shrike (Campephagidae)	Ma	Rainforests, eucalypt forests and woodlands, tree-lined watercourses of the interior, farmland, gardens (Morcombe 2003).	**Known**
Coracina papuensis [4,6] white-bellied cuckoo-shrike (Campephagidae)	Ma	Eucalypt forests and woodlands, mangroves, riparian forests, gallery forests (Morcombe 2003).	**Likely**

Scientific name^ Common name (Family name)	**EPBC status***	**Preferred habitat**	**Likelihood of occurrence** in project area**
Coracina tenuirostris [4,6] cicadabird (Campephagidae)	Ma	Rainforests, eucalypt forests, woodlands, paperbark swamps and mangroves (Morcombe 2003).	**Likely**
Dendrocygna arcuata [4] wandering whistling-duck (Anatidae)	Ma	Wetlands with permanent water and aquatic vegetation in northern and north eastern Australia, such as billabongs, dams, lagoons, swamps, tidal creeks (Morcombe 2003).	Unlikely
Dicrurus bracteatus [4,5,6] spangled drongo (Dicruridae)	Ma	Woodlands, rainforest margins, mangroves and paperbark swamps, riverside thickets, gardens (Morcombe 2003).	**Known**
Egretta garzetta [4,5,6] little egret (Ardeidae)	Ma	Fresh and saltwater wetlands - swamps, billabongs, floodplains, mangroves, mudflats (Morcombe 2003).	**Known**
Eudynamys orientalis [2,4,6] eastern koel (Cuculidae)	Ma	Generally found in rainforest, and dense wet eucalypt forest particularly along thickly vegetated waterways (Morcombe 2003). Identified within the wider study area through recent studies on Curtis Island.	**Likely**
Eurostopodus mystacalis [4,6] white-throated nightjar (Caprimulgidae)	Ma	Forests, woodlands and heathland, often among rocks, leaves and fallen timber (Morcombe 2003).	**Likely**
Eurystomus orientalis [4,6] dollarbird (Coraciidae)	Ma	Woodlands, forest edges, inland watercourse trees, farmlands (Morcombe 2003).	**Likely**
Falco cenchroides [2,4] Australian kestrel (Falconidae)	Ma	Open woodlands, grasslands, farmland and heathlands (Morcombe 2003).	**Possible**

Scientific name^ Common name (Family name)	**EPBC status***	**Preferred habitat**	**Likelihood of occurrence** in project area**
Grallina cyanoleuca [2,4,5] magpie-lark (Monarchidae)	Ma	Varied habitat, almost anywhere with trees and water, coastal to semi-arid (Morcombe 2003).	**Known**
Haliastur indus [2,4,5,6] brahminy kite (Accipitridae)	Ma	Tropical and subtropical Australian coasts, estuaries, mudflats, travel inland along rivers (Morcombe 2003).	**Known**
Haliastur sphenurus [2,4,6] whistling kite (Accipitridae)	Ma	Open woodlands, scrublands, farmlands, wetlands (Morcombe 2003).	**Likely**
Himantopus himantopus [1,2,4] black-winged stilt (Recurvirostridae)	Ma	Shallow freshwater wetlands, swamps, dams, lakes, estuaries, mudflats (Geering et al. 2007). DEWHA report indicates roosting known to occur in the wider study area.	**Likely**
Hirundo neoxena [2,4,5,6] welcome swallow (Hirundinidae)	Ma	Diverse, most habitats except densest forests and most arid deserts (Morcombe 2003).	**Known**
Petrochelidon nigricans [4,5,6] tree martin (Hirundinidae)	Ma	Open woodlands and farmlands near lakes and rivers (Morcombe 2003).	**Known**
Ninox novaeseelandiae [4,6] southern boobook (Strigidae)	Ma	Almost anywhere with trees - forests, open forests and woodlands, farmland with scattered trees, parks and gardens (Morcombe 2003).	**Likely**
Nycticorax caledonicus [4] nankeen night-heron (Ardeidae)	Ma	Shallow margins of swamps, lakes, mangroves and rivers. Roosts in dense vegetation (Morcombe 2003).	**Possible**

Scientific name^ Common name (Family name)	EPBC status*	Preferred habitat	Likelihood of occurrence** in project area
Pelecanus conspicillatus [2,4,6] Australian pelican (Pelecanidae)	Ma	Large shallow waters coastal and inland, islands, mudflats, arid temporary lakes (Morcombe 2003).	**Likely**
Porphyrio porphyrio [2,4] purple swamphen (Rallidae)	Ma	Margins of swamps, lakes and shallow rivers with cover of rushes or reeds (Morcombe 2003).	Unlikely
Recurvirostra novaehollandiae [1,4] red-necked avocet (Recurvirostridae)	Ma	Salt and freshwater wetlands, salt lakes, freshwater swamps and lakes, floodwaters, claypans, dams (Geering et al. 2007). DEWHA report indicates roosting known to occur in the wider study area.	**Likely**
Scythrops novaehollandiae [4,6] channel-billed cuckoo (Cuculidae)	Ma	Rainforest, open forest, woodland, swamp woodland (Morcombe 2003).	**Likely**
Sterna bergii [2,4,5,6] crested tern (Laridae)	Ma	Found in coastal environments around Australia such as open beaches, estuaries and bays, islands and extending into deeper pelagic waters (Morcombe 2003).	**Known**
Gelochelidon nilotica [2,4,6] gull-billed tern (Laridae)	Ma	Distributed throughout the mainland, only rarely found over the ocean. Found in freshwater swamps, brackish and salt lakes, beaches and estuarine mudflats (Morcombe 2003).	**Likely**
Stiltia Isabella [1] Australian pratincole (Glareolidae)	Ma	Found in treeless and sparsely wooded plains or grasslands and areas of sparse vegetation. Generally found on inland plains (Geering et al. 2007).	Unlikely
Thinornis rubricollis [1] hooded plover (Charadriidae)	Ma	Australian endemic species. Distribution: around the southern half of Australia, found mainly on sandy ocean beaches (Geering et al. 2007).	Unlikely

Scientific name^ Common name (Family name)	**EPBC status***	**Preferred habitat**	**Likelihood of occurrence** in project area**
Threskiornis molucca [2,4,6] Australian white ibis (Threskiornithidae)	Ma	Shallow fresh and tidal wetlands, pastures, parks and gardens, rubbish tips (Morcombe 2003).	**Likely**
Threskiornis spinicollis [2,4] straw-necked ibis (Threskiornithidae)	Ma	Swamps, irrigated pastures, wet or dry grasslands (Morcombe 2003).	**Possible**
Todiramphus macleayii [4,5,6] forest kingfisher (Alcedinidae)	Ma	Open forests, woodlands, margins of rivers, swamps and billabongs, mangroves, farmlands (Morcombe 2003).	**Known**
Todiramphus sanctus [4,6] sacred kingfisher (Alcedinidae)	Ma	Open forests, woodlands, semi-arid scrublands, mangroves (Morcombe 2003).	**Likely**
Zosterops lateralis [4,6] silvereye (Timaliidae)	Ma	Found in a range of habitats such as woodlands and forests, heath, mallee, mangroves, farmland, gardens (Morcombe 2003).	**Likely**
Ardea ibis [1,2] cattle egret (Ardeidae)	Mi	Found in pasture and the shallows of freshwater wetlands (Morcombe 2003).	**Possible**
Actitis hypoleucos [1,4] common sandpiper (Scolopacidae)	Mi/Ma	Distribution around Australia however it is considered more common in northern Australia. Prefers rocky creeks and mangrove-lined inlets, rarely seen in intertidal mudflats (Geering et al. 2007). DEWHA report indicates roosting known to occur in the wider study area.	**Possible**
Apus pacificus [1] fork-tailed swift (Apodidae)	Mi/Ma	Varied; airspace over habitat ranging from rainforest to semi-desert (Morcombe 2003).	**Likely**

Scientific name^ Common name (Family name)	**EPBC status***	**Preferred habitat**	**Likelihood of occurrence** in project area**
Ardea modesta [1,6] eastern great egret (Ardeidae)	Mi/Ma	Floodwater, rivers, shallows of wetlands, intertidal mudflats (Morcombe 2003).	**Likely**
Arenaria interpres [1] ruddy turnstone (Scolopacidae)	Mi/Ma	Found around the coastline on beaches, coasts with exposed rock, stony or shell beaches, mudflats or reefs (Geering et al. 2007). DEWHA report indicates roosting known to occur in the wider study area.	**Likely**
Calidris acuminata [1,2,4] sharp-tailed sandpiper (Scolopacidae)	Mi/Ma	Widespread distribution, found in flooded fields, mudflats, mangroves, rocky shores and beaches. Occurs on both coastal and inland wetlands but prefers non-tidal fresh or brackish wetlands (Geering et al. 2007). DEWHA report indicates roosting known to occur in the wider study area.	**Possible**
Calidris alba [1,4] sanderling (Scolopacidae)	Mi/Ma	Found around the coastline on open sandy beaches (Geering et al. 2007).	Unlikely
Calidris canutus [1,4] red knot (Scolopacidae)	Mi/Ma	Distributed around the coastline on sheltered areas such as mud flats, sandbars in estuaries and lagoons (Geering et al. 2007). DEWHA report indicates roosting known to occur in the wider study area.	**Likely**
Calidris ferruginea [1,2,4] curlew sandpiper (Scolopacidae)	Mi/Ma	Found on intertidal mudflats of estuaries, lagoons, mangroves, as well as beaches, rocky shores, floodwaters and flooded saltbush surrounds of inland lakes (Geering et al. 2007). DEWHA report indicates roosting known to occur in the wider study area.	**Likely**
Calidris melanotos [1] pectoral sandpiper (Scolopacidae)	Mi/Ma	Relatively low numbers of individuals regularly migrate to Australia. Usually solitary and found on freshwater wetlands (Geering et al. 2007).	Unlikely
Calidris ruficollis [1,4,6]	Mi/Ma	Wide distribution, in sheltered inlets, bays, lagoons, estuaries, intertidal and inland mudflats	**Likely**

Scientific name^ Common name (Family name)	**EPBC status***	**Preferred habitat**	**Likelihood of occurrence** in project area**
red-necked stint (Scolopacidae)		and protected sandy or coralline shores (Geering et al. 2007). DEWHA report indicates roosting known to occur in the wider study area.	
Calidris subminuta [1] long-toed stint (Scolopacidae)	Mi/Ma	Preference for shallow freshwater swamps and brackish swamps rather than open mudflats (Morcombe 2003), Feeds in shallow water with low vegetation which provides cover while feeding (Geering et al. 2007).	Unlikely
Calidris tenuirostris [1,2] great knot (Scolopacidae)	Mi/Ma	Found in sheltered areas such as mudflats of estuaries, inlets, harbours, lagoons and mangrove swamps (Geering et al. 2007). DEWHA report indicates roosting known to occur in the wider study area.	**Likely**
Charadrius bicinctus [1] double-banded plover (Charadriidae)	Mi/Ma	Distributed around the southern and east coast of Australia on tidal flats and coastal beaches. Occasionally freshwater wetlands and inland salt lakes (Geering et al. 2007). DEWHA report indicates roosting known to occur in the wider study area.	**Likely**
Charadrius dubius [1] little ringed plover (Charadriidae)	Mi/Ma	Relatively low number of individuals regularly visit Australia. Found on the muddy edges of freshwater wetlands (Geering et al. 2007).	Unlikely
Charadrius leschenaultia [1] greater sand plover (Charadriidae)	Mi/Ma	Occurring mainly on sheltered sandy, shelly or muddy beaches or estuaries with large intertidal mudflats or sandbanks (Geering et al. 2007). DEWHA report indicates roosting known to occur in the wider study area.	**Likely**
Charadrius mongolus [1] lesser sand plover (Charadriidae)	Mi/Ma	Found in sheltered bays, harbours and estuaries with large intertidal sand flats or mudflats (Geering et al. 2007). DEWHA report indicates roosting known to occur in the wider study area.	**Likely**
Cuculus saturatus [4] oriental cuckoo (Cuculidae)	Mi/Ma	Typically found in dense vegetation with a closed canopy such as, rainforest margins, monsoon forest, vine thicket, dense eucalypt forest, paperbark swamp and mangroves	**Possible**

Scientific name^ Common name (Family name)	EPBC status*	Preferred habitat	Likelihood of occurrence** in project area
		(Morcombe 2003).	
Egretta sacra [2,4,5,6] eastern reef egret (Ardeidae)	Mi/Ma	Found on beaches, rocky shores, tidal rivers and inlets, mangroves, and exposed coral reefs (Morcombe 2003).	**Known**
Gallinago hardwickii [1,2] Latham's snipe (Scolopacidae)	Mi/Ma	Low rank vegetation around shallows of wetlands, reeds, sedges, salt marsh (Morcombe 2003).	**Possible**
Gallinago megala [1] Swinhoe's snipe (Scolopacidae)	Mi/Ma	Distribution along coastal northern Australia. Found on a variety of freshwater wetlands such as billabongs, swamps, flooded grasslands and claypans (Geering et al. 2007).	Unlikely
Gallinago stenura [1] pin-tailed snipe (Scolopacidae)	Mi/Ma	Uncommon in Australia with most recorded sightings in the north west of Australia. Sightings have been in coastal freshwater wetlands (Geering et al. 2007).	Unlikely
Glareola maldivarum [1] oriental pratincole (Glareolidae)	Mi/Ma	Found in areas where there is an accumulation of insects generally in northern Australia but can be seen elsewhere. Typical areas include wetlands, tidal flats, open areas or beaches (Geering et al. 2007).	**Possible**
Haliaeetus leucogaster [1,2,4,5,6] white-bellied sea-eagle (Accipitridae)	Mi/Ma	Coastal seas, islands, estuaries and inlets. Follows major rivers and wetlands far inland. Huge nests of sticks, usually in tall trees (Morcombe 2003).	**Known**
Heteroscelus brevipes [1,2,4,6] grey-tailed tattler (Scolopacidae)	Mi/Ma	Found in coastal habitats foraging in intertidal pools, mudflats, sand beaches, rock ledges and reefs (Geering et al. 2007). DEWHA report indicates roosting known to occur in the wider study area.	**Likely**
Heteroscelus incanus [1] wandering tattler	Mi/Ma	Distribution along the east coast of Australia. Generally found on rocky coasts and off shore	Unlikely

Scientific name^ Common name (Family name)	**EPBC status***	**Preferred habitat**	**Likelihood of occurrence** in project area**
(Scolopacidae)		islands, this species tends to avoid mud flats (Geering et al. 2007).	
Hirundapus caudacutus [1,2,6] white-throated needletail (Apodidae)	Mi/Ma	Variety of habitats. Aerial forager (Morcombe 2003).	**Likely**
Hirundo rustica [1] barn swallow (Hirundinidae)	Mi/Ma	Found in a wide variety of habitats with the exception of the more heavily forested regions and drier inland areas. Often near water (Morcombe 2003).	**Possible**
Limicola falcinellus [1] broad-billed sandpiper (Scolopacidae)	Mi/Ma	Generally uncommon, found in sheltered coastal estuaries and lagoons with intertidal mudflats, and on muddy coastal creeks and swamps (Geering et al. 2007). DEWHA report indicates roosting known to occur within the wider study area.	**Likely**
Limnodromus semipalmatus [1] Asian dowitcher (Scolopacidae)	Mi/Ma	Found along on coastal beaches, mudflats and salt fields. Considered to be rare or vagrant to the east coast (Geering et al. 2007).	**Possible**
Limosa lapponica [2,4,6] bar-tailed godwit (Scolopacidae)	Mi/Ma	Coastal tidal mudflats and sandbars of estuaries and lagoons (Geering et al. 2007).	**Likely**
Limosa limosa [1] black-tailed godwit (Scolopacidae)	Mi/Ma	Found in fresh and brackish waters and intertidal mudflats (Geering et al. 2007). DEWHA report indicates roosting known to occur in the wider study area.	**Likely**
Merops ornatus [1,2,4,5,6] rainbow bee-eater (Meropidae)	Mi/Ma	Open country, most vegetation types, sand dunes, banks (Morcombe 2003).	**Known**
Monarcha melanopsis [1,2,4,6] black-faced monarch	Mi/Ma	Distributed along the east coast, found in rainforests, mangroves, eucalypt woodlands, coastal scrub and damp gullies (Morcombe 2003).	**Likely**

Scientific name^ Common name (Family name)	**EPBC status***	**Preferred habitat**	**Likelihood of occurrence** in project area**
(Monarchidae)			
Symposiarchus trivirgatus [1,2,4,6] spectacled monarch (Monarchidae)	Mi/Ma	Mainly found in coastal rainforest but also found in mangroves and gullies of dense wet eucalypt forest (Morcombe 2003).	**Likely**
Myiagra cyanoleuca [1,4,6] satin flycatcher (Monarchidae)	Mi/Ma	Distributed along the east coast of Australia from far northern Queensland to Tasmania. Found in forests, woodlands, mangroves and coastal heath but avoids rainforest (Morcombe 2003).	**Likely**
Numenius minutus [1] little curlew (Scolopacidae)	Mi/Ma	Widespread in the north of Australia and scattered elsewhere. Found on coastal and inland grasslands, often artificially grassed areas or on the grassed edges of freshwater wetlands (Geering et al. 2007).	Unlikely
Numenius phaeopus [1,2,4,5,6] whimbrel (Scolopacidae)	Mi/Ma	Common across northern Australia and uncommon to rare further south. Found mainly on the coast, on tidal and estuarine mudflats and lagoons, especially near mangroves (Geering et al. 2007). DEWHA report indicates roosting known to occur in the wider study area.	**Known**
Pandion cristatus [2,4,6] eastern osprey (Accipitridae)	Mi/Ma	Found around coastal waters, beaches, reefs and estuaries (Morcombe 2003).	**Likely**
Phalaropus lobatus [1] red-necked phalarope (Scolopacidae)	Mi/Ma	Considered a rare but regular migrant to the NW of Australia and irregular in the remainder of Australia. Mostly pelagic during the non breeding period (Geering et al. 2007).	Unlikely
Philomachus pugnax [1] ruff (Scolopacidae)	Mi/Ma	Considered a rare but recurrent visitor to the coastlines of Australia. Prefers muddy substrates around fresh and brackish wetlands (Geering et al. 2007).	Unlikely
Pluvialis fulva [1,2,4,5]	Mi/Ma	Widespread along the coastline. Found on muddy, rocky and sandy wetlands, shores,	**Known**

Scientific name^ Common name (Family name)	**EPBC status***	**Preferred habitat**	**Likelihood of occurrence** in project area**
Pacific golden plover (Charadriidae)		paddocks, salt marsh, estuaries and lagoons (Geering et al. 2007). DEWHA report indicates roosting known to occur in the wider study area.	
Pluvialis squatarola [1,4] grey plover (Charadriidae)	Mi/Ma	Generally found on intertidal flats, particularly in estuaries and bays (Geering et al. 2007). DEWHA report indicates roosting known to occur in the wider study area.	**Likely**
Rhipidura rufifrons [1,4,6] rufous fantail (Rhipiduridae)	Mi/Ma	Rainforest, dense wet eucalypt forest, paperbark and mangrove swamps, riparian vegetation (Morcombe 2003).	**Likely**
Hydroprogne caspia [2,4,5,6] Caspian tern (Rhipiduridae)	Mi/Ma	Distributed around the Australian coastline, prefers shelters estuaries, inlets and bays. Distribution extends inland to fresh and saline wetlands and floodwaters (Morcombe 2003).	**Known**
Sterna hirundo [6] common tern (Rhipiduridae)	Mi/Ma	Found around the Australia coastline and in offshore waters. Typically well offshore but also seen along ocean beaches, estuaries and large lakes (Morcombe 2003).	**Likely**
Sula leucogaster [4] brown booby (Sulidae)	Mi/Ma	Mainly tropical marine habitats including deep waters and inshore shallows (Morcombe 2003).	**Possible**
Tringa glareola [1] wood sandpiper (Scolopacidae)	Mi/Ma	More common in the northern half of Australia. Preference for shallow freshwater wetlands and pools with emergent reeds and grass (Geering et al. 2007).	Unlikely
Tringa nebularia [1,2,4,6] common greenshank (Scolopacidae)	Mi/Ma	Distribution around Australia occurring on intertidal mudflats and a variety of coastal and inland wetlands (Geering et al. 2007). DEWHA report indicates roosting known to occur in the wider study area.	**Likely**
Tringa stagnatilis [1,2,4]	Mi/Ma	Wide spread distribution across Australia on a variety of fresh and salt water wetland.	**Possible**

Scientific name^ Common name (Family name)	**EPBC status***	**Preferred habitat**	**Likelihood of occurrence** in project area**
marsh sandpiper (Scolopacidae)		Generally avoids intertidal mudflats unless well sheltered (Geering et al. 2007). DEWHA report indicates roosting known to occur in the wider study area.	
Tringa totanus [1] common redshank (Scolopacidae)	Mi/Ma	Considered an uncommon but regular migrate to the coastlines in the north of Australia and a vagrant elsewhere. Found in sheltered coastal habitats (Geering et al. 2007).	Unlikely
Xenus cinereus [1,4] terek sandpiper (Scolopacidae)	Mi/Ma	Found in coastal bays and estuaries on tidal mudflats fringed by mangroves and on exposed sea-grass beds (Geering et al. 2007). DEWHA report indicates roosting known to occur in the wider study area.	**Likely**

^Source: 1 = EPBC Protected Matters Search Tool, 2 = Birds Australia, 3 = QLD Museum Fauna Collection Records, 4 = EPA Wildlife Online, 5 = WorleyParsons this study, 6 = Other Studies within the wider study area. *Status: EPBC: Mi = Migratory, Ma = Marine **Likelihood of Occurrence: Known: species has been previously recorded within Project area; Likely: species is known from the wider study area and preferred habitat is present on site; Possible: species is known from the wider study area and suboptimal habitat is present on site; Unlikely; species is known from the wider study area however, suitable habitat is not present on site.

References

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Appendix K EVR fauna species descriptions

EVR species profiles

Grey goshawk (*Accipiter novaehollandiae*)

The grey goshawk is found across northern Australia and down the east coast into Tasmania. The preferred habitat of the grey goshawk is heavily timbered areas in coastal and sub-coastal regions. Once a home territory is established, the grey goshawk is sedentary. Breeding pairs seem to be permanent, occupying the same home range and building on the same nesting structure in consecutive years. In the northern parts of its range, nesting occurs from January to May (Schodde and Tidemann 1990).

The habitat within the project area is not consistent with the described optimal habitat for this species. The eucalypt woodland within the project area may however, be utilised within the foraging range of the grey goshawk. The grey goshawk is a high mobility taxon (EPA 2006b) and the wider study area may contain habitat that is preferred by this species. If this species was present within the wider study area, it is likely to avoid any disturbance created during the construction of this facility. As such given the suitability of the habitat within the project area, the high mobility of the species and the extent of similar habitat within the wider study area; it is unlikely that proposed development at this location will significantly impact this species.

Glossy black-cockatoo (*Calyptorhynchus lathami*)

The glossy black-cockatoo is distributed from South Australia up the east coast to the central Queensland coast. It has been recognised that the sub species *Calyptorhynchus lathami erebus* is an outlying population of this species on the central Queensland coast. The glossy black-cockatoo is a highly specialised feeder, reliant on *casuarina* seeds. Breeding occurs in the hollows of living eucalypt trees. A major threatening process for this species is the loss of habitat including the loss of tree hollows suitable for breeding and the loss of feed trees (Mooney and Pedler 2005).

There are no large stands of *casuarina* species within the project area. Several smaller clusters of *casuarina* trees (4-8 individuals) occur within the project area however, there were no glossy black cockatoo feeding signs observed. It is unlikely that the project area contains significant food resources for this species. The glossy black-cockatoo has been observed in the Curtis Island industrial precinct by recent surveys (URS 2009). The glossy black-cockatoo is a high mobility taxon (EPA 2006b). Given the suitability of the habitat within the project area, the high mobility of this species and similar habitat within the wider study area, it is unlikely that proposed development at this location will significantly impact this species.

Black-necked stork (*Ephippiorhynchus asiaticus*)

The black-necked stork is considered widespread and common in the north of its range but scarce in the southeast of it range (Garnett and Crowley 2000). It is listed as endangered in New South Wales and rare in Queensland. The black-necked stork is found in freshwater wetlands including billabongs, lakes, swamps, freshwater pools, floodplains and occasionally mangroves. During breeding, this species constructs a large nest in trees or large bushes, often over swamps. This species is considered relatively resilient to habitat modification. However, threatening processes include the loss of wetland habitat, the degradation of these habitats and the modification of natural wetlands through changes to the natural flow regimes. Identified actions for the improvement of the outlook for the black-necked stork are habitat protection for foraging and nesting sites, habitat management through the exclusion of stock, the control of weed species, the reduction of nutrients and the avoidance of herbicides and

pesticides around known habitat wetlands. The identification of priority breeding and feeding wetlands has been identified as a priority action in New South Wales (DECCW NSW 2005).

The black-necked stork has been observed within the wider study area, however no records of this species are within the Curtis Island industrial precinct. The black-necked stork is a high mobility taxon (EPA 2006b). The mangroves and melaleuca wetlands within the study area are considered potential foraging areas that may occasionally be utilised by the black-necked stork. However, the habitat available within the project area is not considered optimal habitat for the black-necked stork and as such it is unlikely to be utilised as a breeding area. Given the high mobility of this species and similar habitat within the wider study area, it is unlikely that proposed development at this location will significantly impact this species.

Yellow chat 'Dawson' (*Epthianura crocea macgregori*)

The Dawson yellow chat is known to occur at three localities – Curtis Island, Torilla Plain and the Fitzroy Delta. Critical habitat for this species is wetlands and associated grassland on seasonally inundated marine plains. These wetlands have shallow braided channels and depressions with a mosaic of dense sedge-beds, grasslands, tall samphire and areas of mud and/or shallow water (Houston and Melzer 2008). Threatening process for this species include modifications to hydrological regimes and high densities of feral pigs or cattle, which trample suitable habitat areas (Houston and Melzer 2008).

Within the project area, the southern side of the saltpan has the potential to provide some habitat values required by the yellow chat. Heavy grazing by feral cattle and horses within this area however, significantly reduces the suitability of this site for the yellow chat. Given the known habitat requirements of the yellow chat, the limited extent of the potential habitat within the project area and the grazing of this area by feral cattle and horses; it is unlikely that this location would be utilised by the yellow chat.

Red goshawk (*Erythrotriorchis radiatus*)

The red goshawk is sparsely distributed across northern of Australia and down the east coast of Queensland (Barrett et al. 2003). Individuals of this species require very large territories and occur in areas of high biodiversity. Their preferred habitat is woodland and forests with a mosaic of vegetation types, favouring areas with permanent water and large bird populations. They generally avoid very dense and very open habitats. Nests are constructed in large trees within one kilometre of permanent water. The nesting site or a location close to the existing nesting site is used in successive breeding years. The main threatening process for this species is the removal of habitat, particularly lowland riverine forest. Recovery actions include the identification and conservation of existing red goshawk habitat and nesting sites and efforts to increase the awareness and understanding of the species (NSW NPWS 2002).

Freshwater within the project area appears to be available seasonally. Given that there is no permanent freshwater within the project area it is unlikely that this site would be utilised for breeding by the red goshawk. There are no records of individuals or nests from recent surveys in the Curtis Island industrial precinct. There are no records of this species within the wider study area. However, the red goshawk is a high mobility taxa (EPA 2006b). They occupy very large home ranges and often hunt at least three kilometres from their nest site (Scodde and Tidemann 1990). There is potential for habitat within the project area to be utilised within a foraging range of the red goshawk. As such, given the home range of this species it may be impacted by loss of habitat within its foraging range.

Beach stone-curlew (*Esacus magnirostris*)

The beach stone-curlew is found around the north and east coast of Australia on undisturbed beaches. This species is primarily nocturnal in activity, although this is affected by the tide (Geering et al. 2007). The beach stone-curlew forages in the intertidal zone for crabs and other invertebrates. Nesting occurs on sandbanks, sand spits, among mangroves or in sand surrounded by short grass and scattered casuarinas. This species is considered sensitive to habitat disturbance. Threatening processes for this species are: loss of habitat due to industrial and residential development, predation of the eggs and chicks by feral animals and off road vehicles or beach combing activities. Recovery actions include the protection of important habitat areas from urban and industrial development, and pollution; restricting or controlling assess to beaches where these birds are resident, particularly during the breeding season and implementing control measures for feral animals (DERM 2007a).

The beach stone-curlew is a high mobility taxon (EPA 2006b). During both field surveys, the beach stone-curlew was regularly seen on the beach at Laird Point. One sighting was within the project area on the edge of the saltpan. Recent surveys within the Curtis Island industrial precinct have also recorded the beach stone-curlew. Given the preference for undisturbed beaches and estuaries and the threatening process for this species, it is likely that the proposed development at this location will impact this species through loss of habitat, increased disturbance and potential increases in predation by feral animals. Given the high mobility of this species; it is likely that this species will move away from the proposed development area and seek isolated beach habitat.

Squatter pigeon 'southern' (*Geophaps scripta scripta*)

The squatter pigeon (southern subspecies) is patchily distributed from the Burdekin-Lynd divide west of Townsville, south to the Queensland border and inland to Longreach and Charleville. It occurs mainly in grassy woodlands and open forests dominated by eucalypts, usually with access to water (Garnett and Crowley 2000). This species is rare in the south of its range, with no confirmed sightings in NSW since the 1970s. It forages on the ground for seeds from a range of grasses, legumes and other herbs and will eat insects and ticks. Nests are scraped into the ground beneath a tussock of grass and sparsely lined with grass. There is no specific location identified where nesting is likely to occur. The main threatening processes for the squatter pigeon (southern) are the degradation of habitat through grazing pressure and predation particularly, from cats and foxes (DEWHA 2009a).

The squatter pigeon is a high mobility taxon (EPA 2006b). This mobility provides a degree of resilience to habitat modification. The species will utilise habitat when the resources are available. The open woodland habitat of the ridges within the project area provides suitable habitat for the Squatter Pigeon. The lack of permanent fresh water within the project area reduces the suitability of this habitat. There is potential for the habitat within the study area to be utilised when water is seasonally available. However, given the high mobility of this species and proximity of similar habitat in the wider study area; it is unlikely that the proposed development at this location will have a significant impact on this species.

Sooty oystercatcher (*Haematopus fuliginosus*)

The sooty oystercatcher is found along the shoreline around the coastline of Australia. They favour rocky headlands, rocky shelves, exposed reefs, beaches and estuaries. Eggs are laid in a scrape in the sand or among pebbles (Garnett and Crowley 2000). Threatening processes include the disturbance of coastal nesting, feeding and roosting areas and predation of the eggs and chicks (DECCW NSW 2005).

The sooty oystercatcher is a high mobility taxon (EPA 2006b). The sooty oystercatcher has been identified within the wider study area, through recent surveys on Curtis Island (BAMM 2009). The shoreline within the project area provides limited suitable habitat for the sooty oystercatcher. The direct impact of the proposed development on this habitat will be associated with the construction of the wharf facilities. The indirect impact of the development will be the increased human activity and potential increase in feral species (such as cats and rodents). Considering these potential indirect impacts and the species sensitivity to this disturbance, it is likely that this species will not utilise this habitat post the proposed development. As such, the sooty oystercatcher is likely to be impacted through loss of habitat.

Powerful owl (*Ninox strenua*)

The powerful owl is found along the east coast of Australia from the central Queensland coast to south-western Victoria. They are found in open eucalypt, *casuarina* or *callitris* pine forests and woodlands (Garnett and Crowley 2000). The preferred habit is eucalypt forests, preferring tall wet forests with home ranges where the territories centre on densely vegetated gullies. The powerful owl is an opportunistic, nocturnal hunter that preys mainly on arboreal and semi arboreal marsupials such as gliders and possums. Nests are constructed in tree hollows. It is estimated that suitable tree hollows for powerful owls do not form until *eucalyptus* trees are at least 150-200 years old. Tree hollows are also required for the primary prey species (medium to large arboreal mammals such as possums and gliders). Powerful owls are sedentary with home ranges varying in size from 400 - 1500 hectares. The primary threatening process is the removal of habitat, particularly suitable hollow bearing trees for both the powerful owls' nesting requirements and for the requirements of the primary prey species. Conservation actions include the identification and conservation of habitat areas and the associated areas of significant hollow bearing trees (Webster et. al. 2004).

The powerful owl is a high mobility taxon (EPA 2006b). There is a known population of powerful owl at Mount Larcom west of Gladstone. The powerful owl has been identified within habitat adjacent to the study area through recent surveys on Curtis Island (Sandpiper 2008). There are hollow bearing trees scattered throughout the eucalypt woodland within the project area. Although the hollows sighted during the field trip would not be large enough for breeding hollows for the powerful owl, they would be suitable for their prey species. Given the size of the home range requirement of the powerful owl and the proximity the recent powerful owl record adjacent to the study area, it is likely that the project area is within the foraging range of the powerful owl. As such, this species is likely to be impacted by loss of habitat within its foraging range and a reduction in prey.

Eastern curlew (*Numenius madagascariensis*)

The eastern curlew is a migratory species arriving in Australia around August from breeding grounds in Russia and north eastern China. Southeast Queensland hosts one quarter of the world population of this species during the non-breeding season, specifically Moreton Bay and the Great Sandy Strait. Foraging occurs on intertidal mudflats particularly on exposed seagrass beds or mudflats for burrowing crabs or shrimps (Geering et al. 2007). Disturbance has been identified as a significant threatening process for migratory wader birds as this prevents the birds from foraging effectively (Bamford el.at 2008). Buffer zones of 150 – 200m around identified important habitat have been determined as a requirement to minimise disturbance to shorebird species (Paton et.al 2000). Major shorebird feeing areas and major shorebird roosting sites have been identified in the greater study area (EPA 2003) (see Figure 8). The mudflats and shoreline in the project area have not been identified as either major

shorebird feeding areas or as major shorebird feeding sites. During the field survey, the eastern curlew was observed utilising the intertidal mudflats and claypan within the project area. This species has also been observed during the initial wader bird surveys in the study area (BAMM 2009).

Given the proximity of known feeding and roosting grounds within the greater project area there is potential for disturbance from the construction and operation of this facility to result in significant impact on this species. However, given the majority of individuals are present in Australia from November to March, some of the potential disturbance can be managed through the timing of construction activities. The establishment of a 200m restricted access buffer around the identified major feeding and roosting sites, would limit disturbance to birds utilising these areas. There is likely to be loss of some foraging area associated with the construction of the wharf facilities. However, provided the shoreline habitats outside the development footprint are not significantly altered, as a result of construction (e.g. by dredging) and these habitats remain relatively undisturbed post construction; there is potential for habitat outside the development footprint to remain a suitable foraging area for the eastern curlew.

Little tern (*Sternula albifrons*)

The little tern is found in coastal environments around Australia, except for southern Western Australia. Little terns are almost exclusively coastal, occurring on beaches, sheltered inlets, estuaries and bays, particularly where there are sand banks and spits. They feed on fish, foraging over inshore waters and estuaries. Nesting occurs between the high tide mark and shore vegetation on undisturbed beaches (Garnett and Crowley 2000). Breeding colonies are unobtrusive and easily overlooked with the eggs laid directly on the sand. The primary threatening processes for this species is the disturbance or loss of nesting areas. This includes the disturbance of nesting areas by human recreational activities, predation while nesting by foxes, dogs, cats, rats and silver gulls and the loss of suitable habitat due to development or recreational activities (DERM 2006).

Foraging is likely to occur in the shallow waters within the project area. Provided the shoreline habitats outside the development footprint are not significantly altered as a result of construction (for example, by dredging); the proposed development at this location is unlikely to alter the foraging potential of this area. The sand beach at Laird Point and the sand bar across the front of the claypan provide potential nesting habitat for this species. However, these beaches are heavily disturbed by feral horses and cattle. Considering the current level of disturbance on these beach areas by feral animals, it is unlikely the little tern would nest there. Given the critical habitat for this species is nesting areas, it is unlikely the proposed development at this location will significantly impact on this species.

Square-tailed kite (*Lophoictinia isura*)

The square-tailed kite inhabits coastal forests and woodlands around Australia, primarily within 250km of the coastline. The preferred habitat is areas that are structurally diverse and communities that are rich in passerines. This species is a specialised hunter of passerines, particularly honeyeaters, and insects in the tree canopy (Garnett and Crowley 2000). Nests are usually located along or near watercourses. Threatening processes include the loss of habitat, particularly along watercourses for inland areas, disturbance of nest trees and inappropriate fire or grazing regimes, which result in reduced nesting and feeding resources. Conservation actions include the protection and maintenance of nesting habitat and the

alteration of burning and grazing regimes to maintain or enhance floristic and structural diversity (NSW NPWS 1999).

There are no permanent watercourses in the study area. As such, the project area does not contain optimal breeding habitat for this species. The square-tailed kite is a high mobility taxon (EPA 2006b). There is potential for habitat within the project area to be utilised within a foraging range of the square-tailed kite. However, there have been no observations of square-tailed kites or their nests within the Curtis Island industrial precinct during recent studies. Given the high mobility of this species and the proximity of similar suitable habitat within the greater study area, it is unlikely that the proposed development at this location would have a significant impact of this species.

Black-chinned honeyeater (*Melithreptus gularis*)

The black-chinned honeyeater inhabits forests and woodlands of eastern and northern Australia. Its preferred habitat is open eucalypt woodland with an annual rainfall between 400-700mm (Garnett and Crowley 2000). Foraging occurs over large ranges of at least five hectares. Threatening processes include the clearing of open forest and woodland habitat, poor regeneration of these habitats due to intense grazing and competition by more aggressive species such as the noisy miner (*Manorina flavigula*) in smaller remnants. Conservation actions proposed for this species include the conservation of habitat and the increased connectivity of open woodland habitats through revegetation programs (DECCW NSW 2005).

The woodland within the project area provides potentially suitable habitat for this species. There have been no observations of this species during recent surveys of the Curtis Island industrial precinct. The black-chinned honeyeater is a high mobility taxon (EPA 2006b). Given the high mobility and the proximity of large areas of similar habitat within the wider study area; it is unlikely that the proposed development at this location would have a significant impact on this species.

Large-eared pied bat (*Chalinolobus dwyeri*)

The large-eared pied bat is distributed from Rockhampton in Queensland to the New South Wales central coast. This microbat roosts in caves, crevices in cliffs, old mines and in the disused mud nests of the fairy martin (*Petrochelidon ariel*). They are found in areas with suitable roosting sites and well timbered habitat with gullies close to the roost. It is currently understood that this species preys on flying insects and shows a reduced level of activity through the coolest months. Threatening processes include the clearing of forest and woodland near roosting sites, the loss of foraging habitat near the roosting sites due to the frequency of fire, the disruption of roosting sites and the use of pesticides. Conservation actions include the identification and protection of roosting sites, the protection of foraging habitat around the roosting sites and the reduction of pesticide use (DEWHA 2009c).

There are no areas of extensive cliffs or caves within the project area. No roosting sites have been identified in the wider study area. It is possible that woodland within this study area is within the foraging range of a roost community outside of this study area. However, given the proximity of similar suitable habitat within the greater study area and the lack of suitable roosting sites near the study area; it is unlikely that the proposed development at this location will significantly impact on this species.

Little pied bat (*Chalinolobus picatus*)

The little pied bat is distributed through central and western Queensland, across western New South Wales to north eastern South Australia. It is recorded most commonly in dry open woodland communities but is also found in mulga, open dry forest and riverine open forest in south east Queensland. This species is known to roost in caves, mineshafts and tree hollows (Churchill 2008).

There are no known caves or mine shafts within the wider study area on Curtis Island. There are however, hollow bearing trees scattered throughout the eucalypt woodland within the project area. These hollows provide potential roosting sites for this species. This species has been identified within the wider study area. Given the lack of identified caves within the wider study area, tree hollows are potentially important roosts for the local population. As such, this species may be impacted through the loss of tree hollows associated with the development. This is likely to be limited to the eucalypt woodland within the development footprint.

Northern quoll (*Dasyurus hallucatus*)

The northern quoll is distributed from southeast Queensland across the north of Australia to Broome Western Australia. They utilise a variety of dens including rock crevices, tree hollows, logs, termite mounds, and goanna burrows. Northern quolls are omnivorous feeding on a wide range of insects, small mammals, reptiles, eggs and fruits. Males of this species die after one year, thought to be due to the stresses of mating. The highest threatening process for this species is the arrival of cane toads, with local populations in the Northern Territory usually extinct within a year of the arrival of cane toads. Other threatening processes include the removal of ground cover by fire leading to increased mortality, feral predators and mortality due to pesticide poisoning (Van Dyck and Strahan 2008). The survival of northern quoll populations in Queensland where cane toads are present, is more likely to occur in areas with steeper slopes, shallower soils, more rock and with fewer disturbances by fire (Woinarski et al 2008).

The habitat within the study area is suitable for the northern quoll. Cane toads were observed during the field studies. The presence of cane toads reduces the probability of northern quolls utilising the study area, however this does not preclude the presence of the northern quolls on Curtis Island. Observations of northern quoll populations persisting where cane toads are present alludes to the possibility of northern quolls persisting on Curtis Island. Northern quolls are usually solitary, occupying large home ranges of over 100 ha for males and approximately 35 ha for females (Woinarski et al 2008). The wider study area on Curtis Island contains areas consistent with the described habitat for persisting populations of northern quoll. Taking the precautionary approach assumes that there is a persisting population of northern quolls on Curtis Island. As such, there is potential for loss of habitat for this species. This is likely to be limited to the development footprint.

Yellow-bellied glider 'southern subspecies' (*Petaurus australis australis*)

The yellow-bellied glider occurs in mature tall eucalypt forest, typically in areas of high rainfall. The preferred habitat is mixed sclerophyll forest. In coastal environments, the preferred habitat consists of moist gullies and creek habitats in mature coastal forest. The yellow-bellied glider diet consist primarily of plant exudes and insects, the majority of this diet consists of nectar and tree sap. A mosaic of tree species is required to provide a variety of flowering times with a continuous year round food supply. Yellow-bellied gliders occur in naturally low densities within the landscape. They live in family groups of up to six individuals occupying a home range of 20-85 hectares. These family groups require large tree hollows for dens and may utilise up to 13 dens within their home range. These larger hollows

generally occur in trees that are at least 220 years old. The key threatening process for this species is the clearing of native vegetation and the removal of suitable hollow bearing trees (NSW NPWS 2003).

Yellow-bellied gliders were observed on the mainland west of the study area during recent surveys (Sandpiper 2008). The study area contains suitable habitat with hollow bearing trees. However, the hollows observed during survey of the study area were not large and it is unlikely they would meet the size requirements of a yellow-bellied glider den. The home range of this species is sufficiently large for a family group utilising a series of dens within the wider study area to forage within habitat in the study area. If there is a population of yellow-bellied glider on Curtis Island then there is potential for loss of habitat for this species. This is likely to be limited to the development footprint.

Koala (*Phascolarctos cinereus*)

The koala is restricted in its distribution to the eucalypt forests and woodlands of eastern Australia (Menkhorst and Knight 2004). Koalas generally inhabit open eucalypt forests with sparse ground cover and tend to avoid thick forests and steep slopes. The koala is solitary, with individuals showing distinct home ranges that vary according to population density and the abundance of mature food trees. Male koalas are territorial and commonly protect an area of up to eight hectares. Koalas can travel distances of up to two kilometres in an evening. The major threats to the koala, particularly in lowland areas of southeast Queensland, are land clearing, traffic, and predation from domestic dogs. Koala populations are declining or becoming locally extinct in many areas of southeast Queensland, mainly because of habitat loss (EPA 2006a).

Recent studies conducted within the Curtis Island industrial precinct have not indicated any records of koalas or any observations indicating the presence of koalas. However, these surveys do not cover all potential habitat within the wider study area. The DERM Essential Habitat Mapping indicates areas of essential habitat for koalas on Curtis Island with essential habitat mapped inside the study area shown in Figure 7. Taking the precautionary approach, the assumption is made that there is a population of koalas in the wider study area. The eucalypt woodland within the project area is suitable habitat for koalas and it is possible that habitat within the development footprint is utilised by koalas. As such, if this species is present within the wider study area, then it may be impacted by loss of habitat. This is likely to be limited to the development footprint.

Grey-headed flying-fox (*Pteropus poliocephalus*)

The grey-headed flying-fox is distributed along the coastal lowlands of south eastern Australia from Gladstone in Queensland south to Melbourne (DECCW NSW 2009). The species is highly mobile, moving up and down the coast in search of flowering trees (primarily eucalypts) for nectar and various fruit on which it feeds. It occurs in rainforest, open and closed forest communities, and open woodland and urban areas. Communal roost sites are usually in riparian communities. They move over long distances seasonally in response to the availability of food resources, and individuals travel up to 50 kilometres from their camp to forage. Threatening processes include: habitat destruction, culling, habitat fragmentation and hybridisation with the black flying-fox. Conservation actions include the identification and protection of camp and foraging areas and the development of crop protection methods which are not harmful to the grey-headed flying-fox (DEWHA 2009b).

Gladstone is recognised as the northern extent of the grey-headed flying-fox range with a known roost located to the south of Gladstone (DECCW NSW 2009). There are black flying-

fox roost sites within the greater Gladstone region (EPA 2008) and these species are known to share roost sites. There are no identified flying-fox roosting sites within the project area. It is not likely that the proposed development in this area will affect any known flying-fox roosting sites. Given the proximity of the known grey-headed flying-fox roosting site, it is likely that the project area is part of the foraging range of this species. As such, it may be impacted through loss of habitat. However, given there are no known roosting sites within the project area and the proximity of similar suitable foraging habitat within the wider study area; it is unlikely that the proposed development at this location will significantly impact on this species.

Coastal sheathtail bat (*Taphozous australis*)

The coastal sheathtail bat is distributed along the east coast and coastal islands off Queensland from Shoalwater Bay to Cape York Peninsula. Rarely found more than a few kilometres inland, it roosts in caves, rock crevices, boulder piles and occasionally buildings. The coastal sheathtail bat is an insectivorous species foraging above the canopy over a range of habitats (Churchill 2008). Threatening processes included the alteration of the foraging environment through development and mining activities and the disturbance of roost sites. Recommendations to protect this species include the protection of roosts and determination of foraging preferences (Duncan et al. 1999).

The project area does not contain any significant rock formations that would provide the cave and rock crevice roosting site requirements for this species. There are significant rock formations in the greater Gladstone area, which may provide the roosting requirements for the coastal sheathtail bat. The study area contains habitat suitable for the foraging requirements of this species. DERM Wildlife Online lists four records of coastal sheathtail bat in the wider study area. Given the presence of this species in the wider study area, it is possible the project area is within the foraging range of this species. However, given the proximity of suitable roosting sites to the project area and extent of similar habitat suitable for the foraging requirements of the coastal sheathtail bat; it is unlikely that the proposed development at this location will significantly impact on this species.

False water-rat (*Xeromys myoides*)

The false water-rat is found in disjunct populations along the Northern Territory and Queensland coast. This specialised rodent inhabits intertidal wetlands and adjacent habitats. It is an active predator of invertebrates, particularly grapsid crabs (Ball 2004). Threatening processes include habitat loss, degradation and fragmentation as a result of urban developments, mining activities, chemical pollution and the exposure of acid sulphate soils. Conservation actions include the identification and protection of current habitat, increasing the knowledge base about this species and community education (DERM 2009).

Studies undertaken by Ball (2004) indicated the mangrove habitat was preferred over areas of marine couch but areas of marine couch habitat may be utilised in association with suitable mangrove habitat (Ball 2004). The mangroves with associated mudflats, sand bar and grassland at the front of the saltpan provide potential habitat for the false water-rat within the project area. The site plan illustrates that some of this area is inside the development footprint. As such there will be the potential loss of habitat. The remaining potential habitat area may also be potentially impacted through edge effects and fragmentation of the mangrove habitat. As such, if this species is present within the wider study area, then it may be impacted through loss of habitat and degradation of habitat. Potential edge effects of the

development that may affect this species or its prey include altered hydrological regime, sediment or pollutants and the potential for competition from introduced rodents.

Black flying-fox (*Pteropus alecto*)

The black flying-fox is found across tropical and sub tropical Australia extending down the east coast into New South Wales. Daytime camps, consisting of up to 30,000 individuals, are generally located in riparian habitat. These camps are shared with other flying-fox species. Camps are located close to food resources with night foraging occurring within 20km of the campsite. Preferred native foods include a range of fruits and nectar from eucalypts, melaleucas, turpentines, grevilleas and bottlebrushes. This species however, utilises a range of similar food resources available in urban gardens. The mating season along the east coast is from March to April, with a single young born in October to November. Initially the young are carried with the mother during foraging. After the first month, these young remain in nursery roosts until three months of age, after which they begin to forage independently (Van Dyck and Strahan 2008). The threatening processes for this species include loss of foraging habitat, particularly identified is foraging habitat that is productive during winter and spring (DECC NSW 2005).

Black flying-foxes have been recorded within the wider study area. Flying-fox roost sites have been identified within the greater Gladstone region. There are no known roosts identified within the study area with the closest known flying-fox roost being north of the site along Graham's Creek (DERM 2008). Given the habitat within the study area, it is likely the proposed development will result in a loss of suitable foraging habitat for the black flying-fox. This loss of foraging habitat is likely to be restricted to the development footprint.

Ornamental snake (*Denisonia maculata*)

The ornamental snake is restricted to the Dawson and Fitzroy River drainage of Central Queensland and is sparsely distributed throughout its range. This species inhabits low lying areas with deep cracking clay soils and adjacent slightly elevated ground. It shelters under fallen timber bark and in deep soil cracks. The diet is almost exclusively frogs (Richardson 2006).

Database searches and a review of current studies did not identify any field records of this species within the wider study area. The Queensland Brigalow Belt Reptile Recovery Plan has not identified any records of this species with the Calliope Shire (Richardson 2006). This may however, be a result of survey effort within the region. The project area does not contain deep cracking clay soils. The melaleuca wetland however, may provide some limited habitat values for this species but it is isolated and not considered optimal habitat for this species. This species is unlikely to be present and it is unlikely that the proposed development at this location will significantly impact on this species.

Yakka skink (*Egernia rugosa*)

The yakka skink is distributed throughout the Brigalow Belt and north to Cape York. It is usually found in open dry sclerophyll forest or woodland where it shelters among dense ground vegetation, large hollow logs, beneath rocks and in warrens or cavities in the soil. The primary threat to this species is habitat loss and degradation. Conservation objectives include the maintenance of large connected patches of suitable habitat, retention of ground cover and debris, avoiding disturbance to known colonies and the control of fox and cat populations (DEHWA 2009d).

The Brigalow Belt Reptile Recovery Plan (Richardson 2006) indicates there have been no sightings of yakka skink within the Calliope Shire. Data base searches and review of recent survey effort have not indicated any field records of this species within the wider study area. These results, however, may be due to a lack of general survey effort within the region and the difficulty of observing this species in the field. The habitat within the study area is suitable for this species. A precautionary approach assumes a population within the study area. As such, if this species is present within the study area, then it may be impacted through loss of habitat and potential unearthing during construction. The potential for significant impact on this species is likely to be limited to the development footprint.

Brigalow scaly-foot (*Paradelma orientalis*)

The Brigalow Scaly-foot is distributed throughout the Brigalow Belt. It is a nocturnal species found in a wide variety of dry open forest and woodland habitats. A population at Lilly Hills on Boyne Island, 15 kilometres south of Gladstone, has been observed to be semi-arboreal, feeding on the sap of *Acacia falciformis*. It is understood that feeding also includes plant material and a variety of invertebrates (Tremul 2000).

The habitat present within the study area is suitable for the Brigalow Scaly-foot. The nocturnal habitats of this species can make observation in the field difficult. Given the proximity of the known population at Lilly Hills and the suitability of the habitat within the study area, there is potential for this species to occur on Curtis Island. A precautionary approach would be recommended in this case and the assumption made that that this species occurs on Curtis Island. If this species occurs within the project area then it is likely to be impacted through potential unearthing during construction and loss of habitat. This is likely to be limited to the development footprint.

Rusty monitor (*Varanus semiremex*)

The rusty monitor is distributed along the Queensland coast from Gladstone to Cape York Peninsula. It is found in coastal and estuarine mangroves and paperbark forests and in the associated rivers, creeks and lakes up to 70 km inland. This is a tree dwelling lizard which shelters in hollows. Their diet includes other lizards, fish, crabs and invertebrates. Threatening processes for this species include the clearing or fragmentation of habitat, the loss of hollow-bearing trees and poisoning from cane toads (Fitzgerald 1997).

A data base search of DERM Wildlife Online indicates one record of the rusty monitor within the wider study area. Suitable habitat is present within the study area. A precautionary approach would be recommended in this case and the assumption made that this species occurs within the study area. The development footprints indicate likely impacts on the melaleuca community and sections of mangrove habitat, associated with the construction of a wharf. As such, if this species occurs within the project area then it is likely to be impacted through loss of habitat and potentially directly impacted during construction. Potential edge effects of the development that may affect this species or its prey include altered hydrological regime and the potential increase in sediment or pollutants.

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