



# GLNG LNG Facility Supplementary Ecological Assessment Report

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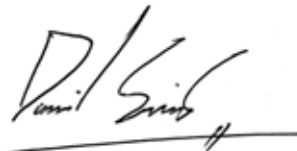
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## Abbreviations

Abbreviation	Description
<b>CSG</b>	Coal Seam Gas
<b>EIS</b>	Environmental Impact Statement
<b>EPBC Act</b>	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
<b>FPC</b>	Foliage Projection Cover
<b>LNG</b>	Liquefied Natural Gas
<b>NC Act</b>	<i>Queensland Nature Conservation Act 1992</i>
<b>RE</b>	Regional Ecosystems
<b>VM Act</b>	<i>Queensland Vegetation Management Act 1999</i>
<b>WONS</b>	Weeds of National Significance

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## Executive Summary

This report details the findings of the ecological assessment of changes to the site boundary and development footprint for the GLNG LNG facility on Curtis Island. Appendix N-3 of the GLNG EIS detailed the findings of an assessment based on studies undertaken for the original LNG facility layout. Subsequent boundary refinements have resulted in minor adjustments to the footprint and thus amendments to areas of vegetation communities impacted.

Analysis of the vegetation mapping has resulted in the identification of potential areas of remnant vegetation to be impacted. In addition, significant regional ecosystems have been identified and mapped. An analysis of the proposed clearing for the footprints utilised in the GLNG EIS and the current footprint (Figure 1) shows that areas of potential disturbance to REs 12.1.2, 12.1.3, 12.2.2 and 12.3.3 have been reduced and that REs 12.11.6 and 12.11.4 will be increased - primarily as a result of the inclusion of the road corridor linking the facility to Hamilton Point.

Of significance is the exclusion of any disturbance to RE 12.2.2 (Microphyll/notophyll vine forest on beach ridges) from the revised footprint. RE 12.2.2 is listed as 'Endangered' under the *VM Act* and 'Critically Endangered' under the *EPBC Act* and so reduction of impacts to this community is of benefit to the biodiversity of the bioregion. In addition, the area of disturbance to the 'Endangered' RE 12.3.3 has been reduced by 5.7 ha as a result of footprint redesign.

The potential impacts and mitigation measures section has been updated to incorporate innovative approaches to management of potential impacts to flora and fauna.

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## Introduction

### 1.1 Background

The GLNG EIS described the environmental values, potential impacts and mitigation measures for the various components of the GLNG project. The engineering design for the LNG facility has developed since the release of the EIS resulting in a modification of the LNG facility footprint (Figure 1). This modification of the footprint however has only slightly changed the site boundary. For the purposes of this report the LNG facility footprint extends beyond the site boundary to include the proposed haul road (connecting the MOF with the LNG facility).

This report details the modified site footprint, environmental values and potential impacts and mitigation measures for the LNG facility.

Information presented in Appendix N-3 of the GLNG EIS of continued application to the modified LNG facility footprint shown in Figure 1 has not been replicated in full within this report. This includes the following sections from Appendix N-3:

- Review of Existing Information (Section 2.2 Fauna Report; Section 1.4 Flora Report);
- Target Species (Section 2.3.1 Fauna Report);
- Legislative context (Section 2.3 Fauna Report; Section 1.3 Flora Report);
- Survey Limitations (Section 2.4.1 Fauna Report; Section 1.6.1 Flora Report);
- Nomenclature (Section 2.4.2 Fauna Report; Section 1.6 Flora Report);
- Regional Context (Section 3.1 Fauna Report; Section 2.1 Flora Report); and
- Survey Results (Section 3.4 Fauna Report; Section 2.2 Flora Report).

For the full content of these sections, refer to the individual Fauna and Flora Reports within Appendix N-3 of the GLNG EIS.

### 1.2 Study Aims and Objectives

The aims of the investigation were to review the mapping of vegetation communities with respect to the updated LNG facility site footprint. In meeting these aims, the objectives of the study were to:

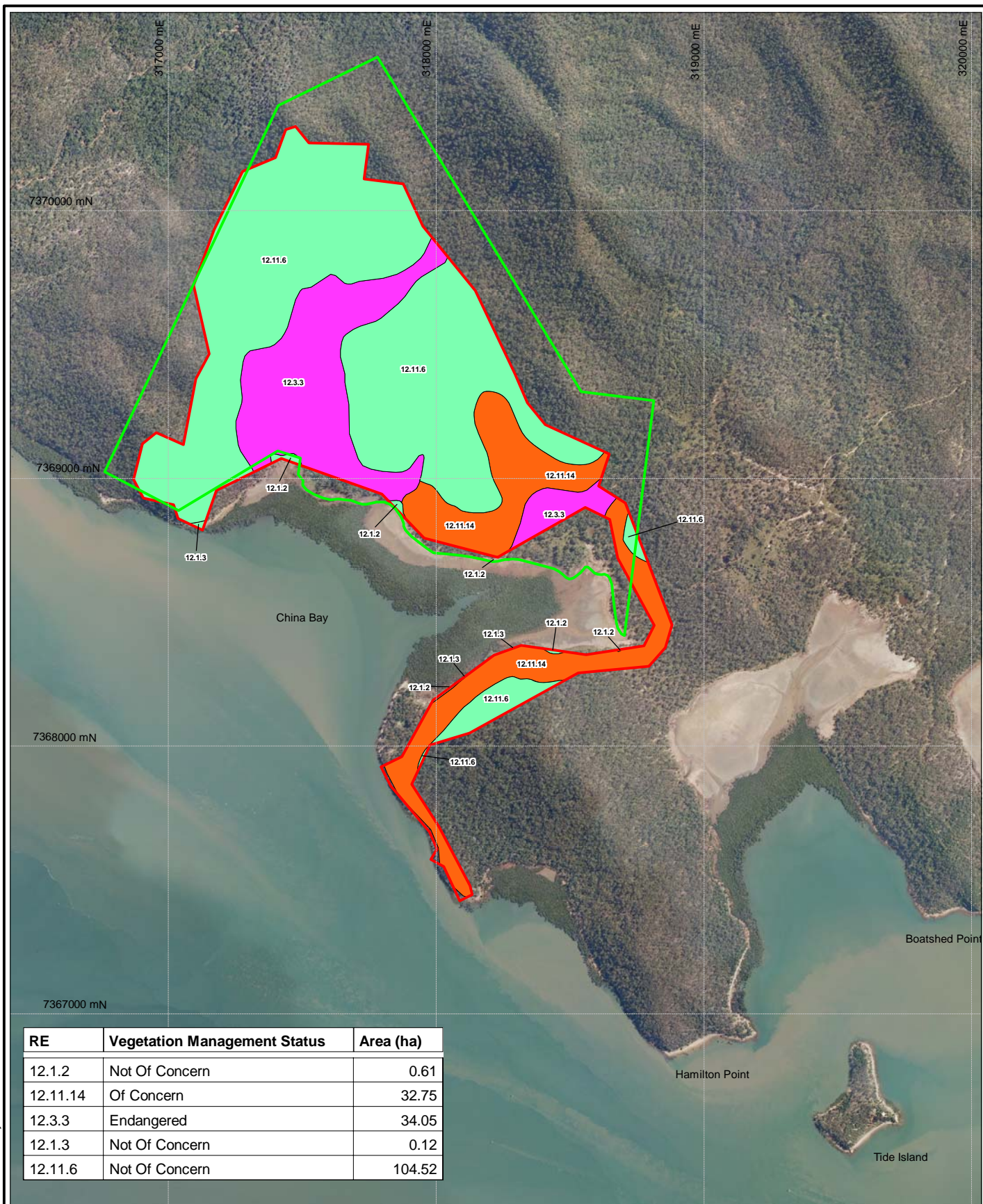
- Review existing terrestrial ecological data for the local area;
- Map the Regional Ecosystems occurring in the study area; and
- Determine the impacts of the proposed LNG facility on the surrounding vegetation and develop appropriate management strategies.

### 1.3 Study Approach

A field assessment and consequent vegetation mapping was undertaken as part of the original assessment of the LNG facility for the EIS. Additional fieldwork has not been undertaken for the modified LNG facility footprint as this lies within the area of original fieldwork. Therefore, descriptions within this report are based on analyses and results from the previous study.

Vegetation mapping was undertaken using the existing 1:100 000 Regional Ecosystems (RE) coverage Version 5.0 for the region (EPA, 2009) in conjunction with vegetation mapping undertaken for the GLNG EIS (EIS Flora Report Section 2.2, Figure 1 and Figure 2). Comprehensive flora and fauna field surveys of the LNG facility were conducted over an eight day period between 2 and 9 April 2008. Full methodology for previous surveys is detailed in the GLNG EIS Appendix N-3, Fauna Report Section 2.4 and Flora Report Section 1.5.





RE	Vegetation Management Status	Area (ha)
12.1.2	Not Of Concern	0.61
12.11.14	Of Concern	32.75
12.3.3	Endangered	34.05
12.1.3	Not Of Concern	0.12
12.11.6	Not Of Concern	104.52



0 250m 500m  
Scale 1:20,000(A4)  
Datum: GDA94

- LNG Facility Footprint
- LNG Facility Indicative Site Boundary

- Endangered dominant RE
- Of concern dominant RE
- Not of concern RE

Source: This map may contain data which is sourced and Copyright. Refer to Section 18.2 of the EIS for Ownership and Copyright.

<p>Client</p>  	<p>Project</p> <p><b>GLADSTONE LNG PROJECT ENVIRONMENTAL IMPACT STATEMENT SUPPLEMENT NATURE CONSERVATION</b></p>	<p>Title</p> <p><b>VEGETATION MANAGEMENT STATUS LNG FACILITY DISTURBANCE FOOTPRINT</b></p>
<p>Drawn: CA    Approved: JB    Date: 27-11-2009</p>		<p>Figure: 1</p>
<p>Job No: 4262 6440/6220    File No: 42626440-g-2029.wor</p>		
		<p>Rev: B</p> <p><b>A4</b></p>

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## Environmental Values

### 2.1 Site Description

A full description of the regional and local characteristics is detailed in Section 2.1 of the LNG facility flora report.

#### 2.1.1 Vegetation Communities

The geology of the study area predominantly features metamorphic substrates which form low rising hills and support two distinct vegetation communities. The hill top and mid-slope areas support open forest dominated by *Corymbia citriodora* subsp. *citriodora* (lemon-scented gum) (RE 12.11.6); whereas the lower slopes and flatter coastal areas support grassy woodlands dominated by *Eucalyptus tereticornis* (forest red gum) and *Eucalyptus crebra* (narrow-leaved ironbark) (RE 12.11.14). The ground layer of RE 12.11.6 was found to be relatively sparse due to the rocky substrate and shallow soils exhibited on the slopes and hilly areas on the site. Weed invasion also appeared to be more prevalent in this community.

Three alluvial plains associated with distinct drainage lines occur within the LNG facility study area. These plains support *Eucalyptus tereticornis* (forest red gum) open woodlands (RE 12.3.3) with a mid-storey of *Lophostemon suaveolens* (swamp box) and a grassy understorey. The ground layer of this community was generally the most disturbed by grazing adjacent to ephemeral streams; nonetheless, the ground layer was generally in good condition and supported a diversity of native grass species including *Themeda triandra* (kangaroo grass), *Cymbopogon refractus* (barbwire grass) and *Heteropogon contortus* (spear grass).

The majority of the vegetation associations have been disturbed or modified to some degree by grazing, selective logging, clearing for agriculture or weed invasion. Regeneration has occurred across most of the study area and now supports open forest or woodland.

#### 2.1.2 Fauna Habitat Values

A full description of the fauna values for the LNG facility is presented in Section 3 of the Fauna Report within Appendix N-3 of the GLNG EIS.

The study area primarily supports *Eucalyptus* or *Corymbia* dominated woodlands. Overall habitat values throughout the LNG facility study area have been reduced through a history of grazing and farming activities. Occasional mature habitat trees provide nesting and roosting resources for arboreal mammals, bats and birds. The grassy woodlands on alluvium were found to exhibit a relatively high abundance of weed species in the ground layer, while areas upslope of alluvial plains dominated by *Corymbia citriodora* (spotted gum) had only a thin layer of topsoil in the 'A' horizon, therefore contained a lower abundance of weeds in the ground layer. The majority of woodland communities were found to feature a large amount of fallen timber and surface rock suitable for ground dwelling fauna. Four broad habitat types were determined from the study site including riparian and alluvial woodland, spotted gum and ironbark woodland, saltpan and mangrove communities and waterbodies and aquatic habitat. Specific details regarding the fauna at the site of the proposed LNG facility can be found in Appendix N-3 of the GLNG EIS.

## 2 Potential Impacts and Mitigation Measures

### Potential Impacts and Mitigation Measures

#### 3.1 Vegetation Disturbance

Site preparation works for the construction of the proposed LNG facility and Hamilton Point access road will involve the clearing of vegetation. The total area of each community potentially impacted and the percentage of each vegetation community within the sub-region (as defined by RE types within the Burnett-Curtis Hills and Ranges sub-region) are presented below in Table 2-1, based on the modified footprint for the LNG facility. As the current footprint differs from that presented in the GLNG EIS, a comparison between the two potential clearing regimes has also been undertaken. This is presented in Table 2-2.

**Table 2-1 Proposed area of vegetation communities to be removed at the proposed LNG facility**

Regional Ecosystem (RE)	Community Description	VM Status <sup>1</sup>	Biodiversity Status <sup>2</sup>	EPBC Status <sup>3</sup>	Potential Disturbance	
					Ha	Sub region <sup>4</sup> %
12.1.2	Saltpan vegetation comprising <i>Sporobolus virginicus</i> grassland and samphire herbland on Quaternary estuarine deposits	Not of Concern	No Concern at Present	Not Listed	0.6	0.004
12.1.3	Mangrove shrubland to low closed forest on Quaternary estuarine deposits	Not of Concern	No Concern at Present	Not Listed	0.1	0.0006
12.3.3	<i>Eucalyptus tereticornis</i> open forest to woodland on Cainozoic alluvial plains	Endangered	Endangered	Not Listed	34.1	0.13
12.11.6	<i>Corymbia citriodora</i> and <i>Eucalyptus crebra</i> open forest to woodland on Mesozoic to Proterozoic moderately to strongly deformed and metamorphosed sediments and interbedded volcanics	Not of Concern	No Concern at Present	Not Listed	104.5	0.006
12.11.14	<i>Eucalyptus crebra</i> , <i>E. tereticornis</i> grassy woodland on Mesozoic to Proterozoic moderately to strongly deformed and metamorphosed sediments and interbedded volcanics	Of Concern	Of Concern	Not Listed	32.8	0.71
<b>Total</b>		-	-	-	172.1	-

<sup>1</sup> Refers to conservation status under the *Vegetation Management Act, 1999*

<sup>2</sup> Refers to Biodiversity status as recognised by the EPA

<sup>3</sup> Refers to conservation status under the *Environment Protection and Biodiversity Conservation Act, 1999*

<sup>4</sup> Indicates disturbed % of vegetation community within the Burnett-Curtis Hills and Ranges province of the South-east Qld Bioregion as per Accad *et. al.* (2006)

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## 2 Potential Impacts and Mitigation Measures

The vegetation community of *Corymbia citriodora*, *Eucalyptus crebra* open forest on metamorphics ± interbedded volcanics ('Not of Concern' RE 12.11.6) is to be subjected to the majority of proposed disturbance (104.5 ha). This represents 0.006 % of this community within the sub-region. This vegetation community has no current formal conservation significance under State or Commonwealth legislation.

The intertidal communities of Mangrove shrubland to low closed forest on Quaternary estuarine deposits (RE 12.1.3) and Saltpan vegetation comprising *Sporobolus virginicus* grassland and samphire herbland on Quaternary estuarine deposits (RE 12.1.2) are subject to the least disturbance in terms of area (0.1 and 0.6 ha respectively) and sub-regional context (0.0006 % and 0.004 % respectively). These communities have no current formal conservation significance under State or Commonwealth legislation.

### 3.1.1 Comparison between 2008 and 2009 footprints

An analysis has been undertaken of proposed clearing for the footprints utilised in the GLNG EIS (2008 footprint) and the current footprint (2009 footprint) (Table 2-2) (Figure 1). As shown, areas of potential disturbance to REs 12.1.2, 12.1.3, 12.2.2 and 12.3.3 have been reduced. For RE 12.2.2, this is due to the community being avoided under the modified footprint. REs 12.11.6 and 12.11.4 will be subjected to a greater area of disturbance, primarily as a result of the inclusion of the haul road corridor linking the facility to the MOF on Hamilton Point which was not included in the LNG facility component of the GLNG EIS.

Of significance is the exclusion of any disturbance to RE 12.2.2 (Microphyll/notophyll vine forest on beach ridges) from the modified footprint. RE 12.2.2 is listed as 'Endangered' under the *VM Act* and 'Critically Endangered' under the *EPBC Act* and so reduction of impacts to this community is of benefit to the biodiversity of the bio-region.

## 2 Potential Impacts and Mitigation Measures

**Table 2-2 Comparison between 2008 and 2009 clearing impacts**

Regional Ecosystem (RE)	Community Description	Potential Disturbance 2008 Footprint (ha)	Potential Disturbance 2009 Footprint (ha)	Difference (ha) <sup>1</sup>
12.1.2	Saltpan vegetation comprising <i>Sporobolus virginicus</i> grassland and samphire herbland on Quaternary estuarine deposits	2.8	0.6	-2.2
12.1.3	Mangrove shrubland to low closed forest on Quaternary estuarine deposits	0.5	0.1	-0.4
12.2.2	Microphyll/notophyll vine forest on beach ridges	0.4	0.0	-0.4
12.3.3	<i>Eucalyptus tereticornis</i> open forest to woodland on Cainozoic alluvial plains	39.8	34.1	-5.7
12.11.6	<i>Corymbia citriodora</i> and <i>Eucalyptus crebra</i> open forest to woodland on Mesozoic to Proterozoic moderately to strongly deformed and metamorphosed sediments and interbedded volcanics	63.6	104.5	+40.9
12.11.14	<i>Eucalyptus crebra</i> , <i>E. tereticornis</i> grassy woodland on Mesozoic to Proterozoic moderately to strongly deformed and metamorphosed sediments and interbedded volcanics	19.5	32.8	+13.30
Totals		126.6	172.1	+44.8

<sup>1</sup> A '-' sign indicates a reduction in area cleared; a '+' sign indicates an increase in area cleared.

### 3.1.2 Significant Communities

The vegetation community of Microphyll / notophyll vine forest on beach ridges (RE 12.2.2), listed as 'Endangered' under state legislation and 'Critically Endangered' under commonwealth legislation was impacted under the original footprint. This community will now be avoided completely.

The community subjected to the second highest area of clearing is *Eucalyptus tereticornis* open forest to woodland on Cainozoic alluvial plains ('Endangered' RE 12.3.3). This community is listed as 'Endangered' under state legislation. Occurring within the three alluvial plains found on site, approximately 34.1 ha of this community will potentially be cleared. This disturbance represents 0.13 % of this community found within the sub-region. However the modified footprint has reduced overall disturbance to this community by 5.7 ha.

The vegetation community of *Eucalyptus crebra*, *E. tereticornis* grassy woodland on Mesozoic to Proterozoic moderately to strongly deformed and metamorphosed sediments and interbedded volcanics (RE 12.11.14) is listed as 'Of Concern' under state legislation. This community occurs throughout the site on lower coastal slopes of the site and an area of 32.8 ha is proposed to be disturbed. This potential clearing represents 0.71 % of this community within the sub-region. This is an increase of 13.3 ha from the original footprint due primarily to the inclusion of the Hamilton Point road corridor in the current design.

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## 2 Potential Impacts and Mitigation Measures

### 3.1.3 Ecological Integrity of Impacted Communities

Vegetation within the LNG facility study area has a long history of disturbance including grazing, thinning and exotic weed invasion. The site supports remnant vegetation, modified woodlands and non-remnant shrubby regrowth. The majority of vegetation in the LNG facility study area is currently grazed and exhibits some degradation of ground-cover and mid-strata. Virtually all areas of remnant vegetation have undergone some past thinning or clearing. Despite the relatively high degree of past disturbance, the ecological integrity of remnant communities within the study area was found to be moderate, with integral ecological processes intact. Furthermore, the exclusion of the vegetation community of microphyll/notophyll vine thicket on beach ridges (RE 12.2.2) from the modified footprint removes the overall edge effect and fragmentation of this community. For further detail regarding the potential impacts of fragmentation on ecological communities refer to EIS Appendix N3.

### 3.1.4 Impacts to Fauna

As the changes to the footprint are not significant, impacts will not be appreciably different to those presented in the GLNG EIS. For details, refer to Section 4.1 of the Fauna Report in Appendix N-3 of the GLNG EIS. Fragmentation of fauna habitat within the vegetation communities present still exists although this has been reduced by 5.7 ha within koala preferred habitat of RE 12.3.3 (*Eucalyptus tereticornis* open forest to woodland on Cainozoic alluvial plains).

The proposed haul road linking the LNG facility with Hamilton Point will traverse RE 12.11.6 and RE 12.11.14. There may be minor impacts to the edges of some limited extents RE 12.1.2 and RE 12.1.3. Previous field studies on Curtis Island for the GLNG EIS component (EIS Appendix N3) have determined that the communities listed above only serve as limited habitat for a low diversity of fauna for the locality on west Curtis Island south of Graham Creek. This is due to a range of historical impacts such as selective clearing and grazing and ongoing impacts from feral predators including dogs, cats, pigs and cane toads.

It is considered that impacts from individual components of the GLNG project will not significantly impact on the faunal assemblage. However, the cumulative impacts from all proposed development on the south-west coast of Curtis Island may have a greater impact on fauna than the individual components alone. Section 3.1.5 below describes the potential cumulative impacts of development.

### 3.1.5 Cumulative Impacts

The construction of the LNG facility and its components will result in the disturbance of approximately 172 ha of remnant vegetation. This area of disturbance is approximately 45 ha greater than the original footprint although this modified footprint no longer directly impacts the vegetation community of Microphyll/notophyll vine forest on beach ridges (RE 12.2.2) which is listed as 'Critically Endangered' under the *EPBC Act*. Nonetheless, the cumulative impacts of all proposed development in this area of Curtis Island may have an impact on fauna and flora.

Overall impacts will include increased fragmentation of habitats and communities, dislocation of fauna movement corridors, edge effects, increased use of and competition for adjacent habitat areas, possible mortality of common fauna species from clearing activities, and the conversion of the area from a natural environment to an industrial complex. This is an expected and normal consequence of the designation of the area as the Curtis Island Industry Precinct in the GSDA Development Scheme. Cumulative impacts to fauna will be low, given the relatively low diversity of terrestrial fauna

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## 2 Potential Impacts and Mitigation Measures

determined from previous fauna surveys, historical disturbance of the area and sub-optimal conditions. The majority of conservation significant fauna species are birds and therefore their mobility allows them to move away from the zone of impact. Cumulative impacts have been further addressed in Appendix N-3 and Attachment J, Section 5.3.1 of the GLNG EIS.

### 3.2 Mitigation Measures

#### 3.2.1 Mitigation Measures Previously Documented for the LNG Facility

Appendix N-3 of the GLNG EIS covers potential impacts and mitigation measures from the following sources:

- Dust (Section 4.1.4 Flora Report);
- Vegetation Clearing (Section 3.2.1 Flora Report, Section 4.2.1 Fauna Report);
- Noise and Vibration (Section 4.2.2 Fauna Report);
- Light (Section 4.2.3 Fauna Report);
- Pests (Section 4.2.4 Fauna Report);
- Weeds (Section 3.2.2 Flora Report); and
- Rehabilitation of Disturbed Areas (Section 3.2.3 Flora Report).

These impacts and associated mitigation and management measures continue to be applicable to the modified LNG facility footprint addressed in the study. Additional strategies to reduce impacts are summarised below.

#### 3.2.2 Vegetation Clearing

- The use of tape, pegs or other markers will be employed to clearly delineate areas to be cleared prior to commencement;
- Particular attention will be paid when delineating clearing areas in proximity to 'Endangered' and 'Of Concern' REs;
- A qualified ecologist will be required to identify potential fauna habitat and mark the boundary of areas in proximity to 'Endangered' and 'Of Concern' REs areas that are proposed to be cleared;
- A qualified spotter-catcher will be present during clearing operations in areas identified as potential fauna habitat;
- Any clearing involving the removal of expansive stands of woodland vegetation should be undertaken in stages to retain opportunities for fauna dispersal; and
- Large scale burning of cleared vegetation should be avoided.

All vegetation clearance will be undertaken in accordance with Santos EHS Management System Standard – EHS01 Land Disturbance and Section 13.16.1.1 (Clearing and Grading) of the GLNG LNG facility EMP.

#### 3.2.3 Management of Impacts to Fauna

Mitigation measures to reduce impacts to fauna were outlined in the GLNG EIS. Additional strategies include making arrangements with wildlife carers to receive injured or displaced fauna in the unlikely event this is necessary.

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## 2 Potential Impacts and Mitigation Measures

### 3.2.4 Weed Control

Weed control has been specified previously within the GLNG EIS and LNG facility EMP (Section 13.16.1.2). Appropriate weed management strategies will be implemented for controlling the spread of weeds, including continued weed monitoring as per section 13.16.1.2 (Flora Management) of the LNG facility EMP. Management strategies include:

- Effective management strategies to control the spread of declared weed species in keeping with Santos Standards (including Santos EHS09 Weeds and Pest Animal Control), regional management practice or DNR&W pest control fact sheets;
- Ongoing monitoring of the project site to identify any new incidence of weed infestation;
- Provision of information for project staff on the identification of declared weeds and their dispersal methods; and
- Wash down protocols for any vehicles or machinery entering and leaving site.

### 3.2.5 Environmental Offsetting

Appendix N-3 of the GLNG EIS outlines legislative and corporate requirements for environmental offsetting.

An environmental offsets package is being developed by Santos in conjunction with Ecofund Queensland (a Queensland government advisory service) as an Environmental Offset Management Plan to address the objectives of both the current State and Commonwealth legislative environmental offsetting requirements. An analysis has been undertaken to identify the offset requirements for proposed impacts for the CSG field, Gas Transmission Pipeline and LNG facility components of the GLNG Project. Analysis requirements being undertaken for offsets include:

- Extent and size of offsets required to be secured for the LNG facility;
- Ecological values required to be offset;
- Options available for pooling or consolidation of offset requirements;
- Options for securing offsets; and
- Offset assessment and analysis includes the co-ordination of multiple offset requirements and is being carried out under the following policies:
  - Vegetation management offsets under the *Vegetation Management Act, 1999* (Qld);
  - Fish habitat offsets under the *Fisheries Act, 1992*;
  - Protected plants offsets under the *Nature Conservation Act, 1992*;
  - Biodiversity offsets under the Draft Policy for Biodiversity Offsets 2008 (Qld); and
  - Environmental offsets under the *Environmental Protection & Biodiversity Conservation Act, 1999* (Cwth).

Further steps to be undertaken within a suitable timeframe as part of the process include:

- Identification of suitable offset options;
- Assessment of properties;
- Landholder liaison and negotiation to secure required offsets;
- Offset validation and preparation of specific Biodiversity Offset Management Plan(s); and
- Liaison to finalise contractual arrangements and covenants.

In addition to the objectives outlined above and those previously stated within the GLNG EIS (Section's 6.4, 7.4, 8.4 and Appendices N1, N2 and N3), the Environmental Offset Management Plan will be implemented over an appropriate time frame to accomplish the following specific aims:



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## 2 Potential Impacts and Mitigation Measures

- Identification of suitable potential offset areas with ecological values analogous to impacted ecological communities;
- Assessment of the ecological value and equivalence of offsets to ensure suitable offset extent, species assemblage, floristic structure and ecological integrity utilising an appropriate biometric field methodology;
- Development of appropriate management prescriptions to ensure long term viability of offsets (such as pest control, livestock management, access exclusion, ameliorative plantings and fire regime management);
- Placement of appropriate covenants for future conservation and management of offsets; and
- Development of appropriate monitoring and maintenance activities and performance review processes to ensure long term viability of the offsets.

The process of developing a suitable Environmental Offset Management Plan is an iterative process with State and Commonwealth regulatory bodies and the outcome will be coordinated with the other GLNG components.

## Glossary

**Biodiversity** Describes the number and variety of organisms found within a specified geographic region or within a given ecosystem.

**Bioregion** is a landscape pattern that reflects changes in geology and climate, as well as major changes in floral and faunal assemblages at a broad scale.

**Burnett-Curtis Hills and Ranges province** is a province in the far north of the South-east Qld Bioregion abutting the Brigalow Belt Bioregion.

**Ecosystem** is an interdependent system of interacting plants, animals and other organisms together with the non-living (physical and chemical) components of their surroundings.

**Ecology** is the scientific study of abundance, distribution and interactions between organisms and their natural environment.

**Habitat** The area or natural environment in which an organism or population normally lives. A habitat is made up of physical factors such as soil, moisture, range of temperature, and availability of light as well as biotic factors such as the availability of food resources and the presence of predators.

**Nomenclature** The procedure of assigning names to groups of organisms listed in a taxonomic classification.

**Quaternary sample plots** - is a standardised flora study to collect data to verify regional ecosystem and vegetation mapping. Data from these sites are generally collected throughout the field survey and entered on spreadsheets or databases. Quaternary sites may be collected at regular intervals along a traverse, and/or made where REs/vegetation communities change.

**Regional Ecosystem (RE)** - Describes the relationships between major floral species and the environment at the regional scale. They are mostly derived from linking vegetation mapping units based on dominant canopy species, recognised at a scale of 1:100,000 to land zones that represent major environmental variables, in particular geology, rainfall and landform. Under the VM Act REs are assigned a conservation status based on an assessment of the pre-clearing and remnant extent of a RE.

**Remnant Vegetation** - Vegetation is identified as 'remnant' under the VM Act where the predominant canopy of the vegetation: covers more than 50 % of the equivalent undisturbed canopy; averages more than 70 % of the vegetations undisturbed height and is composed of species characteristic of the vegetations undisturbed predominant canopy.

**Secondary sample plots** Secondary sample plots are standardised transects used for classification and detailed descriptions of REs and vegetation communities. Data collected include all location, environmental and overall floristic and structural information as well as a list of all species present and basal area, percentage cover and stem density measures of abundance.

**South-east Qld Bioregion** covers approximately 6.6 million hectares and extends from the NSW border west to Toowoomba and the Bunya Mountains and north to Gladstone.

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### 3 Glossary

**Threatened species/Conservation significant species** - a generic term for a plant or animal species listed as critically endangered, endangered, vulnerable or rare under either state or commonwealth threatened species legislation. The terms 'threatened' and 'conservation significant' are interchangeable in this context.

**Volplane** – the act of gliding as undertaken by gliders

**Weeds** are plant species that invade native ecosystems and can adversely affect the survival of indigenous flora and fauna, often competing with indigenous plants for resources such as nutrients, moisture and light. They can prevent natural regeneration, reduce wildlife habitat, alter water flows, increase soil erosion, introduce poisons into the soil or poison animals, change fire behaviour and may introduce foreign genes into local plant populations. Weed species are not necessarily exotic non-indigenous species, but can also be non-endemic natives that are naturalised to areas outside of their natural distribution.

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