

## Environmental Protocol for Constraints Planning and Field Development – GFD

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### Abbreviations and Units

| Acronym           | Description  |
|-------------------|--|
| CG                | Coordinator-General  |
| CSG               | Coal Seam Gas  |
| DNPRSR            | Department of National Parks, Recreation, Sport and Racing   |
| EA                | Environmental Authority  |
| EHSMS             | Environment, Health and Safety Management System   |
| EIS               | Environmental Impact Statement   |
| EP Act            | Environmental Protection Act 1994  |
| EPBC Act          | Environmental Protection and Biodiversity Conservation Act 1999  |
| ESA               | Environmentally Sensitive Area   |
| GFD Project       | Gas Field Development Project  |
| GIS               | Geographic Information System  |
| GLNG              | Gladstone Liquefied Natural Gas  |
| GQAL              | Good Quality Agricultural Land   |
| IA                | Indigenous Affairs   |
| LNG               | Liquefied Natural Gas  |
| MNES              | Matters of National Environmental Significance   |
| MSES              | Matters of State Environmental Significance (including ESAs)   |
| NC Act            | Nature Conservation Act 1992   |
| PAA               | Priority Agricultural Area   |
| PALU              | Priority Agricultural Land Use   |
| PLA               | Priority Living Area   |
| PM                | Project Manager  |
| PoO               | Plan of Operations   |
| RE                | Regional Ecosystem   |
| RMP               | Rehabilitation Monitoring Plan   |
| SCL               | Strategic Cropping Land  |
| SSMP              | Significant Species Management Plan  |
| TEC               | Threatened Ecological Community  |
| The GFDP Protocol | The GLNG Gas Field Development Project Environmental Protocol for Constraints Planning and Field Development |
| US                | Upstream   |

## 1.0 Introduction

The Santos GLNG Gas Field Development Project (the GFD Project) is an expansion of the existing approved Santos GLNG Project involving the construction, operation, decommissioning and rehabilitation of additional production wells, and associated supporting infrastructure that will provide additional gas over a project life exceeding 30 years. These areas combined are referred to as the Santos GLNG Upstream Project Area. A map of the Santos GLNG Upstream Project Area is included in Figure 1.

The planning and development of gas field infrastructure is an iterative process. The Santos GLNG Upstream Project Area will be progressively developed as the gas resource is realised. The *Environmental Protocol for Constraints Planning and Field Development – GFD* (the GFD Protocol) enables Santos GLNG to systematically identify and assess environmental values and then avoid and manage potential environmental impacts in accordance with approval EPBC 2012/6615.

### 1.1 Scope of the Protocol

The GFD Protocol provides a method for assessing environmental constraints during the planning and field development process. The purpose of the GFD Protocol is to set out the framework for identifying and assessing Matters of National Environmental Significance (MNES) and avoiding or minimising potential environmental impacts associated with development of the Santos GLNG Upstream Project Area. The Protocol must comply with requirements of the GFD EPBC Act approval (2012/6615). Specifically, Condition 4 and Condition 7:

*Condition 4. 'The approval holder must undertake pre-disturbance surveys of proposed disturbance areas, unless the approval holder has an alternative methodology to identify EPBC threatened species, EPBC communities and migratory species or habitat for an EPBC threatened species or EPBC migratory species approved by the Minister in writing'.*

*Condition 7. 'The approval holder must submit an Environmental Protocol for Constraints Planning and Field Development (Constraints Protocol) for the Minister's written approval. The Constraints Protocol must:*

- a. *detail the constraints which will apply to project activities with regard to their impact on EPBC threatened species, EPBC migratory species and their habitat, and to EPBC communities.*
- b. *be based on levels of constraints, including, but not limited to:*
  - i. *the listing status of an EPBC threatened species and EPBC community;*
  - ii. *the quality of the EPBC community and habitat for an EPBC threatened species and EPBC migratory species;*
  - iii. *the number of different EPBC threatened species, EPBC migratory species and EPBC communities impacted by a project activity; and*
  - iv. *the value of the EPBC community and habitat for an EPBC threatened species and EPBC migratory species in a regional context.'*

### 1.2 Land Disturbance Approach

Santos GLNG will adopt a hierarchy of management principles when planning for petroleum activities that will result in land disturbance within the Santos GLNG Upstream Project Area. These management principles are:

1. Avoidance – Avoiding direct and indirect adverse environmental impacts where reasonable and practicably possible;
2. Minimise – Minimise direct and indirect adverse environmental impacts where impacts cannot be avoided;
3. Mitigate – Implement mitigation and management measures to minimise direct, indirect and cumulative adverse environmental impacts;
4. Remediation and Rehabilitation – Actively remediate and rehabilitate impacted areas to promote and maintain long-term recovery; and
5. Provide Offsets – Where required, offsets will be provided for activities that result in an unavoidable significant residual adverse impact to MNES in accordance with approval EPBC 2012/6615.

This Protocol does not supersede the management requirements or legal obligations provided by all government approvals. Other constraints relevant to the Project that are outside the scope of this Protocol include landholder constraints, cultural heritage (Indigenous and non-indigenous) as well as land use and tenure constraints. These additional constraints are discussed in more detail in Section 2.3.



## 2.0 Constraints Planning

Santos GLNG utilises a *Geographic Information System* (GIS) for constraints planning and field development. The Santos GIS contains a number of mapping layers including environmental and social constraints as well as multiple infrastructure types. The GIS is used to identify mapped constraints and locate infrastructure to avoid particular environmental values. The development of the constraints layers is an iterative process. As new data becomes available, it is updated in the Santos GIS through a process of data acquisition, cleansing and verification.

### 2.1 MNES Constraint Basis Ranking

Condition 7b of the Santos GLNG GFD Project approval (EPBC 2012/6615) requires the level of constraints applied to MNES species and communities to consider the following factors:

- the relevant listing status;
- the quality of the patch;
- the number of different species and communities to be impacted; and
- the value of the patch in a regional context.

In order to apply different levels of constraint on MNES using the factors listed above, each patch must be ranked. To do this the following MNES constraint basis ranking will be applied. A score will be assigned in relation to each of the four factors listed in Condition 7b. The four scores will be added together to determine the final MNES constraints basis rank.

The final rank will be utilised as an additional constraints planning tool in Santos GLNG's GIS as follows. Where practicable given other constraints discussed in Section 2.3, patches with a higher MNES constraint basis ranking will be avoided in preference to areas with a lower MNES constraint basis ranking. The input scores for the four factors listed in Condition 7b and the final constraint ranking are detailed below.

#### 2.1.1.1 Listing status score

Under the EPBC Act, Threatened Ecological Communities are listed as either Critically Endangered or Endangered. Threatened flora and fauna species are listed as either Extinct, Extinct in the Wild, Critically Endangered, Endangered or Vulnerable. Species with a listing status of Extinct or Extinct in the wild will not occur within the GFD Project area. These listing statuses have been excluded from this assessment. The constraint score for the EPBC Act listing status is shown in Table 1 below.

**Table 1: Constraint Score for the EPBC Act Listing Status**

| EPBC Act Listing Status | Constraint Score |
|-------------------------|------------------|
| Vulnerable              | 1                |
| Endangered              | 2                |
| Critically Endangered   | 3                |



### 2.1.1.2 Patch quality score

Larger patches are more likely to sustain viable populations of native flora and fauna (McIntyre *et al.* 2000; Lindenmayer *et al.* 1999). Larger patches in the landscape are naturally buffered and therefore less susceptible to ecological edge effects such as invasion by Buffel grass which is the dominant pasture species over much of the GFD Project area (Eyre *et al.* 2009). For this reason, patch size can be used as a surrogate for quality.

The size of a particular patch and the related quality of that patch varies according to the key species for which a patch is considered habitat. Large mobile fauna species generally require large habitat patches while smaller sedentary species require smaller habitat patches. To account for relevance of patch size to the particular species, the constraint scores for quality (patch size) have been split into three categories based on the size and mobility of the relevant fauna species. The constraint score for how patch size will determine patch quality is shown in Table 2 below.

**Table 2: Constraint Score for the Patch Quality**

| Constraint Score | Patch size class for All mammals and all birds except BBBQ <sup>1</sup> | Patch size class for all terrestrial reptiles | Patch size class for all Invertebrates, Aquatic fauna and BBBQ <sup>1</sup> |
|------------------|---|---|---|
| 1                | <10 ha  | <1 ha   | -   |
| 2                | 10 ha - 100 ha  | 1 ha - 5 ha                                   | -   |
| 3                | >100 ha   | >5 ha   | All habitat   |

<sup>1</sup> BBBQ = Black-breasted button-quail (*Turnix melanogaster*).

### 2.1.1.3 Number of different species and communities impacted score

Typically, a patch will contain more than one matter to be impacted. To account for the different number of species and communities within a patch the constraint score has been divided into three separate constraint score categories. These constraint score categories are shown in Table 3.

**Table 3: Constraint Score for the Number of Different Species and Communities Impacted**

| Number of different species and communities impacted | Constraint Score |
|--|------------------|
| <4 different matters                                 | 1                |
| Between 4 and 8 different matters                    | 2                |
| >8 different matters                                 | 3                |

### 2.1.1.4 The value of the patch in a regional context score

The value of the patch in a regional context is scored using the Biodiversity Assessment and Mapping Methodology (BAMM) GIS data. The Biodiversity Assessment and Mapping Methodology (BAMM) was developed to provide a consistent approach for assessing biodiversity values at the landscape scale in Queensland. Importantly BAMM provides eleven diagnostic criteria that combine to provide information on a particular areas relative biodiversity significance. Two of the eleven BAMM criteria, Criteria J (Corridors) and Criteria G (Context and Connection), will be used to provide the score for the value of the patch in a regional context. A description of these two criteria is provided below.

**Context and Connection (Criteria G)** – this criterion represents the extent to which a Remnant Unit incorporates, borders or buffers areas such as significant wetlands, endangered ecosystems, and the degree to which a Remnant Unit is connected to other vegetation.

**Corridors (Criteria J)** - Areas identified under this criterion qualify either because they are existing vegetated corridors important for contiguity including regrowth, or cleared areas that could serve this purpose if revegetated. Some examples of corridors include riparian habitats, transport corridors and "stepping stones".

Table 4 shows how the BPA data will be used to determine a score for the value of a patch in a regional context. It should be noted that where the data for Criteria G and Criteria J result in two different constraint scores the higher constraint score will apply.

**Table 4: The Value of the Patch in a Regional Context Score**

| BPA data Corridors (Criteria J) and Context and Connection (Criteria G) for the patch | Constraint Score |
|---|------------------|
| G Rating of No data and a J Rating of No data"  | 1                |
| G Rating of "Low" or a J Rating of "LOCAL"  | 2                |
| G Rating of "MEDIUM" or a J Rating of "REGIONAL"                                      | 3                |
| G Rating of "HIGH" or a J Rating of "STATE"   | 4                |
| G Rating of "VERY HIGH"   | 5                |

### 2.1.1.5 Final MNES constraints ranking

The scores for each of the four factors will be summed to provide the final MNES constraints basis ranking. Areas that contain a higher constraint basis ranking score will be considered to be in better condition and be preferentially avoided relative to areas with a lower constraint basis ranking. The final MNES constraints rankings are shown below in Table 5.

**Table 5: Final MNES Constraints Basis Ranking**

| Final MNES Constraint Ranking | Ranking score |
|-------------------------------|---------------|
| Constraint basis ranking 1    | 0 – 4         |
| Constraint basis ranking 2    | 5 – 9         |
| Constraint basis ranking 3    | 10 – 14       |

The final MNES constraint raking will then be used to categorise the MNES constraint ranking within the overall GFD Project Constraint Categories discussed below.

## 2.2 Constraints Categories

The broader environmental constraints for the GFD Project will be derived from a range of sources depending on the constraint type. The constraints GIS datasets considered for the GFD Project will be sourced from Government datasets and Santos GIS datasets. In addition to the constraints datasets, all current survey data, aerial photography, maps and other information relevant to the Santos GLNG Upstream Project Area will be utilised during the constraints planning and field development process. The constraints categories as detailed in the Santos GIS layers represent requirements for constraints planning and field development for the GFD Project. However, the groups of constraints that make up the GIS layers will be revised if new constraints are identified, or if existing Santos GFD Project approval conditions are varied.

A full list of constraints, constraint categories and the relevant development restrictions that that will apply are detailed in Table 6. A high level summary of what activities are permitted in each of the constraint categories is detailed in Table 7.

**Table 6: GFD Project Constraint Categories**

| Constraint Categories    | Development Permitted  | Constraint   |
|--------------------------|--|--|
| No-go area               | <ul style="list-style-type: none"> <li>No petroleum activities</li> </ul>  | <ul style="list-style-type: none"> <li>National parks<sup>1</sup></li> <li>Conservation parks</li> <li>Forest reserves</li> </ul>  |
|                          |  | <ul style="list-style-type: none"> <li>Spring vents and/or spring complexes protected under the EPBC Act (i.e. spring where the listed TEC <i>The community of native species dependent on natural discharge of groundwater from the Great Artisan Basin</i> has been identified and/ or springs that support other EPBC listed threatened species)</li> </ul> |
|                          |  | <ul style="list-style-type: none"> <li>'Wetlands of High Ecological significance' also known as 'High conservation value wetlands' as detailed in the Map of Referrable Wetlands dataset (QLD)</li> <li>Wetlands of International Importance (Ramsar)</li> </ul>   |
| High constraint area     | <ul style="list-style-type: none"> <li>Low impact petroleum activities<sup>1</sup></li> <li>Linear infrastructure<sup>1</sup></li> </ul> | <ul style="list-style-type: none"> <li>Watercourses</li> </ul>   |
|                          |  | <ul style="list-style-type: none"> <li>'General ecologically significant wetlands' or 'Wetlands of other environmental value' as detailed in the Map of Referrable Wetlands dataset</li> </ul>   |
|                          |  | <ul style="list-style-type: none"> <li>All other spring vents / spring complexes (not protected under the EPBC Act)</li> </ul>   |
|                          |  | <ul style="list-style-type: none"> <li>Habitat for a species listed as critically endangered under the EPBC Act at the time of referral<sup>3</sup></li> </ul>   |
| Moderate constraint area | <ul style="list-style-type: none"> <li>All petroleum activities<sup>2</sup></li> </ul>   | <ul style="list-style-type: none"> <li>Constraints Basis Ranking 3 - MNES identified under the EPBC Act with a constraint basis ranking score between 10-14</li> </ul>   |
|                          |  | <ul style="list-style-type: none"> <li>Constraints Basis Ranking 2 - MNES identified under the EPBC Act with a constraint basis ranking score between 5-9</li> </ul>   |
|                          |  | <ul style="list-style-type: none"> <li>Constraints Basis Ranking 1 - MNES identified under the EPBC Act with a constraint basis ranking score between 0-4</li> </ul>   |
| Low constraint area      | <ul style="list-style-type: none"> <li>All petroleum activities</li> </ul>   | <ul style="list-style-type: none"> <li>'No Concern at Present' REs</li> </ul>  |
|                          |  | <ul style="list-style-type: none"> <li>Non-remnant vegetation</li> </ul>   |
|                          |  | <ul style="list-style-type: none"> <li>Existing Santos infrastructure</li> </ul>   |
|                          |  | <ul style="list-style-type: none"> <li>Existing roads, rail, pipeline and other infrastructure that would have to be considered during field development</li> </ul>  |

<sup>1</sup> Definitions for these activities are provided in Section 6.0.

<sup>2</sup> All petroleum activities will be permitted within the moderate constraint area, however, disturbance will be avoided in accordance with the relevant MNES constraints ranking whereby patches with a higher MNES constraint basis ranking will be preferentially avoided over areas with a lower MNES constraint basis ranking.

<sup>3</sup> Habitat for species listed as critically endangered under the EPBC Act at the time of referral will be treated as a high constraint area irrespective of the constraints basis ranking. Infrastructure developments in these areas will be restricted to Low impact petroleum activities and linear infrastructure.

**Table 7: Summary of Activities Permitted in each Constraint Category for the GFD Project**

| Constraint Category      | Low impact petroleum activities | Linear Infrastructure | Wells & related petroleum activities | Petroleum activities |
|--------------------------|---------------------------------|-----------------------|--------------------------------------|----------------------|
| No Go area               | No                              | No                    | No                                   | No                   |
| High constraint area     | Yes                             | Yes                   | No                                   | No                   |
| Moderate constraint area | Yes <sup>1</sup>                | Yes <sup>1</sup>      | Yes <sup>1</sup>                     | Yes <sup>1</sup>     |
| Low constraint area      | Yes                             | Yes                   | Yes                                  | Yes                  |

<sup>1</sup> All petroleum activities will be permitted within the moderate constraint area, however, disturbances will be avoided in accordance with the relevant MNES constraints ranking whereby patches with a higher MNES constraint basis ranking will be preferentially avoided over areas with a lower MNES constraint basis ranking.

### 2.3 Additional Constraints

In addition to MNES constraints described above, there are also a number of other constraints relevant to the Project that fall outside the scope of this Protocol that must be considered when planning field development activities. These constraints include considerations such as landholder agreements, presence of sensitive receptors and constructability restrictions as well as those prescribed through other legislative mechanisms including cultural heritage (indigenous and non-indigenous) requirements, land use and tenure based constraints. These constraints influence development differently, from outright exclusion to preferential avoidance. Ultimately, Santos GLNG will balance development needs against all constraints (including MNES), ensuring firstly, that activities will be compliant with any legal obligations and then avoiding and/or minimising impacts to identified constraints as far as practicable.

### 3.0 Pre-Disturbance Requirements

As a program of works progresses through the various stages of development, the extent of land disturbance required by the program of works will vary. The GFD Protocol will be predominantly applied during the preliminary phases that determine the location of significant land disturbances (i.e. project planning, infrastructure design and construction phases). However, all disturbances to land must comply with the GFD Protocol and the internal approval process (Section 3.1).

#### 3.1 Internal Approval Process

Santos GLNG will implement an internal assessment and approval process to ensure new land disturbance accounts for existing constraints. Figure 2 shows the application of the of the internal approval process. The process will be applied so as to ensure that the planning, design and decision making processes for all new field development and land disturbance activities implement the constraints determined in accordance with Section 2.0 and consists of the five steps described below.

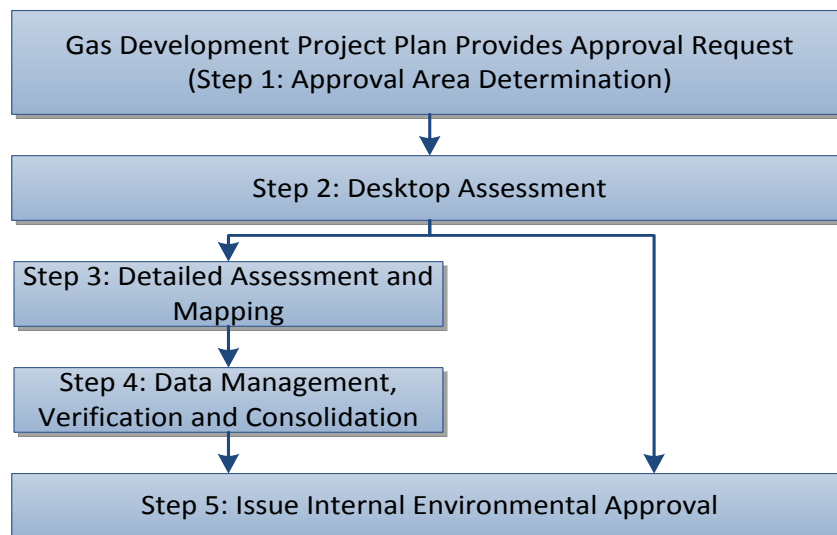


Figure 2: The Internal Approval Process

##### 3.1.1 Step 1: Approval Area Determination

Santos GLNG's disturbance initiation process starts with the determination of the area subject to the approval. The approval area determination can be for a large area project scale internal approval allowing certain infrastructure types within certain areas or smaller discrete programs of works where the proposed geographic location of the infrastructure requiring the disturbance (GIS location data) is known. During this stage of development, the project related details such as the type of approval, name of the project and the proposed infrastructure subject to the approval will be documented.

##### 3.1.2 Step 2: Desktop Assessment

The desktop assessment to be undertaken will consist of the following:

- Identifying additional external environmental and regulatory permits and approvals required to be in place prior to the commencement of disturbance.

- Assessment of the mapped constraints using Santos' GIS constraints data. The assessment will involve a review of Santos GLNG's high resolution aerial photography and determination of the accuracy of existing constraints data in the Santos WebGIS;
- Identifying areas that require a detailed environmental assessment. A detailed environmental assessment will be undertaken in areas that satisfy the following two conditions:
  1. Have low accuracy constraints data. Whether ecological assessment and mapping data is suitable and can be relied upon for constraints planning and internal approval process will be assessed by a suitably qualified person. Factors to be considered by the suitably qualified person include:
    - Results of the previous survey when compared to current high resolution aerial photography;
    - Ecological values assessed and the survey methodology employed;
    - Proximity of any existing survey data in relation to the assessment area;
    - Time period from when the field survey was last conducted;
    - Data quality including any confidence scores assigned to the data by a suitably qualified person.

Should the suitably qualified person consider that the ecological assessment and mapping methodology broadly aligns with the methodology attached in Appendix A and the temporal scale of the assessment in respect to the values assessed is such that a new detailed environmental assessment is unlikely to change the results of the assessment then the existing environmental assessment will be considered reliable.

2. Are likely to contain one or more of the following environmental constraints:
  - Threatened fauna species habitats;
  - Threatened flora species and habitats;
  - Vegetation Communities specifically REs and TECs;
  - Wetlands; or
  - Springs;

A desktop assessment will be adequate to inform the final internal environmental approval (avoiding Step 3) in the following two circumstances:

1. The desktop assessment has determined that the approval area has been accurately assessed and mapped in the past and the constraints data derived from the assessment is accurate and mapping can be relied upon.
2. Assessment of the mapped constraints data and high resolution aerial photography in the Santos GLNG's GIS indicates that the approval area is unlikely to contain any of the environmental constraints listed above. This would apply to predominantly cleared areas with little or no structured woodland / forest vegetation.

If either of the above two circumstances have been met then the process will be continued at Step 5. If the desktop assessment has determined detailed environmental assessment is required then the process continues at Step 3.

### 3.1.3 Step 3: Detailed Assessment and Mapping

Where required by the desktop assessment, a detailed environmental assessment will be conducted to quantify the environmental values present. The detailed environmental assessment methodology is provided in Appendix A.

The scope of the detailed environmental assessment will vary depending on the location of the approval area and the environmental constraints being assessed. The detailed environmental assessment will be conducted by suitably qualified person.

The objective of the detailed environmental assessment is to:

- Identify and target specific constraints and assess them in accordance with the appropriate Santos GLNG procedures. Targeted specific constraints will include, but are not limited to, the following:
  - Threatened fauna species habitats;
  - Threatened flora species and habitats;
  - Wetlands;
  - Watercourses ;
  - Springs;
  - Vegetation Communities specifically REs and TECs; and
  - Pests and weeds
- Map the environmental constraints present within the approval area; and
- Determine whether the area requires re-classification in accordance with the constraint basis ranking and the constraint categories listed in Table 6 and update Santos GLNG's internal constraints mapping.

Field assessment surveys will inform future options assessments relating to potential field development impacts on environmental constraints including MNES and provide recommendations to inform Santos GLNG's decision to manage the risk of adverse impact to such values.

### 3.1.4 Step 4: Data Management, Verification and Consolidation

Field validated values and alterations to mapping will be uploaded to Santos GLNG's GIS and made available to the business for further optimisation of future developments within the gas fields. The iterative process of frequent and constant data updates following the detailed environmental assessment increases the accuracy of the Santos GLNG Desktop Environmental Assessment (Step 2) over time.

### 3.1.5 Step 5: Issue and Acceptance of Internal Environmental Approval Conditions

Subject to the environmental constraints present, an internal approval will be issued authorising certain petroleum activities to proceed. Once the internal approval has been granted, development activities can proceed subject to requirements of the internal approval and other internal Santos GLNG processes. If a project owner does not accept the environmental approval or cannot locate infrastructure in accordance with the approval requirements, the project owner will provide a program of works or infrastructure specific internal environmental approval request. In effect, this request will form Step 1 of a new internal environmental approval.

The assessment of the actual extent of disturbance to environmentally sensitive areas, including MNES, will also be considered at this stage, along with the cumulative extent of disturbance relative to the disturbance limits.

## 4.0 Post-Disturbance Requirements

### 4.1 Recording and Tracking Disturbances

Where disturbance to MNES constraints is permitted, the following details will be recorded:

- The location and extent of the disturbance and the type of infrastructure or activity responsible for the disturbance;
- The related pre-construction environmental assessment documents identifying the environmental constraint;
- The reasons for the decision including justification for the action taken, description of the efforts taken to avoid impact, and an explanation why, given the coexisting constraints, the decision was justified;
- The environmental constraints disturbed; and
- The extent of the disturbance and the relevant effect on the disturbance limits set out in the approval documents.

The information will be recorded and maintained so that it can be audited. Disturbances will be frequently updated in Santos GLNG's GIS so that predicted disturbances can be analysed with actual disturbances and records updated to accurately reflect cumulative disturbances levels.

### 4.2 Data Collection and Storage

Santos GLNG will maintain accurate records, survey information, photographs, field data or any material associated with the field validation requirements to demonstrate that surveys and environmental assessments were conducted in a manner consistent with this protocol. This material will be provided to the Department upon request.

The results of the detailed environmental assessment will be documented and records maintained. Santos GLNG will report on gas field activities as required in approval EPBC (2012/6615).



### 5.0 Approval and Review of the Protocol

In accordance with Condition 41 of the approval (EPBC 2012/6615), this Protocol will be published on the Santos GLNG website within one month of being approved by the Minister. This Protocol will be revised to reflect the any relevant changes to approval conditions. Examples of changes that may require review and amendment of the Protocol include:

- Changes to the geographic extent of the project;
- Changes in the listing status of flora and fauna species relevant to the project;
- Changes in the listing status of Threatened Ecological Communities relevant to the project;
- Revisions to databases and datasets;
- Amendments to EAs;
- Amendments to legislation;
- At the request of the Commonwealth Government; and
- Following periodic review of the Protocol.

Amendments to the Protocol will be made in accordance with approval EPBC (2012/6615).

## 6.0 Definitions

| Term                                 | Definition  |
|--------------------------------------|---|
| Conditions                           | The conditions attached to the approval of the action   |
| Environmental Impact Statement (EIS) | A formal process used to predict the environmental, social and health effects of development activities and to address the mitigation of identified potential impacts.  |
| Gas field development                | All activities associated with the development of the gas fields including (but not limited to) site clearance and site preparation; development of exploration and production wells; development of water and gas transmission pipelines; infrastructure access road construction; construction of workers accommodation and office facilities; construction of gas compression stations; construction of pumping stations; construction of water treatment facilities; and construction of water storage dams.  |
| GLNG                                 | Gladstone Liquefied Natural Gas - Together, Santos, PETRONAS, KOGAS and Total, being the joint proponents of the Santos GLNG Project.   |
| Linear infrastructure                | Infrastructure including (but not limited to) gas and water gathering lines, low and high pressure gas and water pipelines, roads and tracks, power lines and other service lines.  |
| Listed                               | Those species, ecological communities or other identified matters of environmental significance listed for protection under Queensland and Australian legislation.  |
| Low impact petroleum activities      | <p>Low impact petroleum activities means petroleum activities which do not result in the clearing of native vegetation, earthworks or excavation work that cause either, a significant disruption to the soil profile or permanent damage to vegetation that cannot be easily rehabilitated immediately after the activity is completed.</p> <p>Examples of such activities include but are not necessarily limited to:</p> <ul style="list-style-type: none"> <li>• chipholes</li> <li>• coreholes</li> <li>• geophysical surveys</li> <li>• seismic surveys</li> <li>• soil surveys</li> <li>• topographic surveys</li> <li>• cadastral surveys</li> <li>• ecological surveys</li> <li>• installation of environmental monitoring equipment (including surface water).</li> </ul> |
| Minister                             | The Minister responsible for Part 4 of the EPBC Act, and may include a delegate of the Minister under s.133 of the EPBC Act.  |
| MNES                                 | Matters of national environmental significance, being the relevant matters protected under Part 3 of the EPBC Act.  |
| Non-linear infrastructure            | Infrastructure including (but not limited to) exploration and production wells, compressor stations, regulated dams, reverse osmosis plants, brine encapsulation facilities, workers camps, and maintenance facilities.   |
| Patch                                | An area of land that meets the condition thresholds for an EPBC listed threatened ecological community and / or an area of habitat for an EPBC listed species.  |
| Plan                                 | Includes a report, study, protocol or strategy (however described).   |

| Term                              | Definition  |
|-----------------------------------|---|
| Proponent                         | The holder of the approval to which these conditions relate, and includes any person acting on behalf of the proponent.   |
| Regulatory agency                 | Agencies administering the EPBC Act and the EP Act (Qld).   |
| Relevant Authority                | A person or body authorised in writing to exercise powers under government environmental Regulations or Acts.   |
| Santos GLNG Upstream Project Area | CSG fields operated by Santos on behalf of the Santos GLNG joint venture (Santos, PETRONAS, KOGAS and Total) and proposed to supply CSG to the LNG facility on Curtis Island for export as part of the Santos GLNG Project, being the tenements comprising the Reasonable Field Development Area (RFDA).                |
| Suitably Qualified Person         | A person who has professional qualifications, training, skills and experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis to performance relative to the subject matter using the relevant protocols, standards, methods or literature (2010 Model Conditions). |

## 7.0 References

- Cropper, S. (1993) *Management of endangered plants*, CSIRO Publications, Melbourne.
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- Neldner, V.J., Wilson, B.A., Thompson, E.J. and Dillewaard, H.A. (2012) *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland*. Version 3.2. Updated August 2012. Queensland Herbarium, Queensland Department of Science, Information Technology, Innovation and the Arts, Brisbane. 124 pp.

## Appendix A: Detailed Assessment Methodology

## Detailed Assessment Methodology

Detailed site assessments will:

- take into account and reference previous ecological surveys undertaken in the area and relevant new information on the likely presence or absence of MNES;
- Be undertaken by a suitably qualified ecologist;
- Document the survey methodology, results and significant findings in relation to MNES;
- Field data is to be collected in the Santos GIS database or where data is not directly collected into the Santos GIS database the information should be supplied to Santos GIS department with relevant survey detail maintain the layer integrity.
- Detailed ecological site assessments should include the following flora and fauna survey methodologies where applicable.

### Vegetation Community Assessment

The vegetation community assessment is based on the Queensland Herbarium's *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland* (Neldner et al., 2012). Features to be assessed within assessment sites include the following:

- Notes on presence or absence of native vegetation;
- Photographic evidence (multiple photos);
- Quaternary level notes on dominant species (e.g. *Corymbia citriodora*, *Eucalyptus crebra* woodlands on sandy soils, mostly native understory *Aristida* spp.);
- Land Zone, landscape topography and soil type;
- Height of the Ecological Dominant Layer
- Estimate of patch size;
- Native ground cover species richness;
- Total percent ground cover;
- Per cent species richness of declared plant pest species;
- Organic litter cover ;
- Estimate of shrub density;
- Total density of coarse woody material;
- Presence and dominance of key flora species within all structural layers; and
- Incidental observations (including presence of weed species / populations).

In accordance with the Neldner Methodology, the attribute accuracy of the groundtruthed vegetation data in the Santos GIS is classified using the following confidence ratings:

- A = high confidence in accuracy of polygon attributes
- B = moderate confidence in accuracy of polygon attributes
- C = low confidence in accuracy of polygon attributes

### EVNT Flora Species Assessment

The EVNT Flora Species Assessment is based on the timed meander survey method discussed in Section 4.1 of the *Queensland Department of Environment and Heritage Protection's Flora Survey Guidelines - Protected Plants - Nature Conservation Act 1992*. The guidelines can be found here:

<https://www.ehp.qld.gov.au/licences-permits/plants-animals/documents/flora-survey-guidelines.pdf> and the relevant section state:

*The timed meander survey method is the preferred approach to identify and locate EVNT plants potentially impacted by a project. Timed meander surveys are to be led by a person suitably qualified to achieve the required outcomes. It is expected that the majority of vascular plant species encountered will be identified during these searches.*

*The meander method described herein is based on techniques described by Cropper (1993) and Goff et al. (1982), and will be suitable for a diversity of target species, habitats and project areas.*

*To achieve the highest rate of success, the meander technique relies on a comprehensive preliminary desktop assessment having been undertaken in order to target appropriate habitats for EVNT species likely to occur in the area.*

*It should be noted that areas other than those known to be habitat must also be sample surveyed as the preferred habitat of all EVNT species is not known. These should be categorised via desktop analysis and represent a cross section of all the vegetation communities present.*

*Where an EVNT plant is found in an area not thought to be habitat, that habitat type is to then be treated as a known habitat type and searched comprehensively as outlined below'.*

### **Preferred timed meander method**

1. Choose a starting point within the particular habitat of interest and record the time. The choice of starting point is determined by the suitably qualified person based on their experience.
2. Record the identities of the EVNT plant species observed, and collect specimens for any unknown species.
3. Traverse the particular habitat in a random manner so as to maximise the coverage of habitat and the encounter rate of different species.
4. Record the time every 2 to 5 minutes. If the survey needs to be interrupted, do not include this time in the results.
5. Continue searching until no new species have been recorded for 30 minutes or when the entire area of habitat type is surveyed, whichever happens sooner.

Where multiple habitat types or vegetation communities are present within a clearing impact area, a timed meander assessment is to be undertaken within each of these.

Where certain preferred habitat types or vegetation communities may be extensively represented within a site, multiple meanders per habitat type should be undertaken across the clearing impact area to increase the probability of detecting an EVNT species.

For the purposes of MNES flora species, Santos' surveys are conducted in areas where suitable habitat is present and the species is considered likely to occur. To accommodate this additional survey effort, the rate per area of habitat is adjusted on a case by case basis.

Where suspected EVNT species are encountered, the extent and density of the population should be determined (refer Section 4.3 'EVNT population survey' of the method) and a more comprehensive assessment of the vegetation community and habitat should be undertaken. A specimen of the EVNT species should be collected and submitted to the Queensland Herbarium together with the name of the collector, date and locality.

## Fauna Species Habitat Assessment

Where the desktop assessment reveals the potential for fauna habitat to exist within the Assessment Area, further desktop and field based assessment will be undertaken. As with the field based vegetation community assessment, field surveys will be undertaken in representative habitat patches. The field assessment will be undertaken using the Habitat Mapping Assessment Tool (HMAT). Preliminary assessments of the following factors are to be undertaken (at a desktop level) and recorded on the HMAT:

- (1) Tenement in which the Habitat Zone is located (Part A of HMAT);
- (2) Biodiversity Planning Assessment (BPA) Mapping (Part B of HMAT);
- (3) Proximity to water (Part C of HMAT);
- (4) Underlying vegetation type (Part D of HMAT); and,
- (5) Specimen backed records (Part E of HMAT).

In addition, a review of fauna databases, reports and mapping may also be conducted to gain an understanding of the species and the species' preferred microhabitat features likely to occur in the area.

The field assessment involves the completion of the HMAT. This will be carried out by a suitably qualified ecologist. The field assessment involves two steps:

- (1) Review and confirm the results of the desktop assessment (Part A - E); and
- (2) Complete the microhabitat features assessment (Part F).

Once the data entry stage of the HMAT is complete, the HMAT will predict habitat classes of Unlikely, General, Essential or Core habitat for each of the significant species in the HMAT.

The suitably qualified ecologist must then verify the results of the HMAT. The ecologist must either:

- (1) Agree and confirm the output of the HMAT; or
- (2) Disagree with output of the HMAT.

Where the ecologist disagrees with the HMAT an explanation is required within the "Results" tab of the HMAT.

In addition to completing the above assessment process using HMAT, incidental observations of fauna species that are observed while completing the field based elements of HMAT must be recorded as part of this assessment.