

**Guidelines for Preparation  
of an  
Environmental Impact Statement**

**CLARENCE STRAIT TIDAL ENERGY PROJECT**

**TENAX ENERGY PTY LTD**

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# 1 Introduction

Tenax Energy Pty Ltd (the Proponent) proposes to install up to 456 marine turbines on the seafloor in Clarence Strait, 50km north of Darwin. Preliminary engineering designs proposed 15 metre rotors spinning under the power of ocean currents and tides, to generate electricity for approximately 70% of tidal cycles.

The Project would include tidal energy generators and associated submarine cables, switching gear, transformer and substation at Glyde Point to provide a connection to the Darwin/Katherine grid. Designs may evolve with time, but designs presented in the Notice of Intent (NOI) proposed marine turbines placed on gravity base structures within a lease area of approximately 1691 hectares. A 2.3 hectare area is proposed for the submarine cables (approximate length 23km). The total amount of potential energy able to be generated from this Project is estimated at 1 036 000 MWh/year. To manage the increased capacity on the Darwin/Katherine electricity grid, and to refine designs, the Project site would be developed in several phases, including a pilot stage.

The Clarence Strait Tidal Energy Project (the Project) has offshore and onshore components. The offshore component is located in Clarence Strait, between Gunn Peninsula and Melville Island, Tiwi Islands. The onshore part of the Project is a linear alignment located between a point north west of Glyde Point and the northern most extent of the proposed infrastructure corridor associated with the deferred Glyde Point development site.

On the 18 December 2008 the Proponent submitted a Notice of Intent for the Project for assessment under the Northern Territory (NT) *Environmental Assessment Act* 1982 (EA Act). On 12 September 2009 the Northern Territory Minister for Natural Resources, Environment and Heritage (the Minister) determined that the Project required formal assessment under the EA Act at the level of an Environmental Impact Statement (EIS). Issues of concern contributing to this decision included:

- The technology is relatively new and environmental impacts are largely unknown or potentially significant;
- Potential impacts to marine species including coral reef communities;
- A number of rare and threatened species and listed migratory species and communities occur in the proposal's impact area;
- The area provides important feeding grounds for sea turtles and dugong and consequently may be important to the traditional owners of the region;
- Disturbance of seabed impacting the erosion, transportation and deposition of sediments;
- Potential impacts to recreational and tourism activities in the area;
- Potential impacts to local and international shipping needs in the area;
- Potential disturbance to maritime heritage and Aboriginal cultural heritage; and

- Potential impacts to water quality from material inputs such as anti-fouling treatments.

The Proponent referred this proposal to the Australian Government under the *Environment Protection and Biodiversity Conservation (EPBC) Act*. On 28 January 2009, the Project was deemed to be a *controlled action* requiring assessment and approval under the EPBC Act before it can proceed. The controlling provisions are:

- Listed threatened species and communities (sections 18 and 18A);
- Listed migratory species (sections 20 and 20A); and
- Commonwealth marine areas (section 23 & 24A).

The Project will be assessed under a bilateral agreement between the NT and Australian Governments or an accredited assessment process. The assessment approach will be decided jointly by both governments, to streamline the process while satisfying requirements of the EPBC Act and EA Act.

These Guidelines are to assist the Proponent in preparing an EIS for the Clarence Strait Tidal Energy Project, in accordance with Clause 8 of the NT Environmental Assessment Administrative Procedures of the EA Act, and Part 8 of the EPBC Act. The NT Environment Protection Authority (NT EPA) will assess and report on the prepared EIS for the Project, after consultation with the public, advisory agencies and the Australian Government. The Project will then require approval from the responsible NT (consent) Minister(s), and from the Australian Minister under the EPBC Act before it can proceed.

Information about the Project and its relevant impacts, as outlined in this document, is to be provided in the EIS. This information should be sufficient to allow:

- The NT EPA to make informed recommendations to the Minister and the Australian Government in accordance with the EA Act; and
- The Australian Government Minister to make an informed decision on whether or not to approve, under Part 9 of the EPBC Act, the taking of the action for the purposes of each controlling provision.

**Note:**

The Guidelines were issued to the Proponent on 8 July 2009, valid for a period of two years. On 4 July 2011 the Proponent applied for an extension to the period allowed for submission of the EIS. A two-year extension was granted by the NT Minister to the period in which the EIS is to be prepared and submitted by the Proponent for the Clarence Strait Tidal Energy Project.

On 14 June 2013 the Proponent submitted further request to the NT EPA for extension of the period open for submission of the draft EIS. A further two year period has subsequently been granted.

## 2 General advice on guidelines

### General content

The EIS should be a stand-alone document. It should contain sufficient information to avoid searching out previous or additional, unattached reports.

The EIS should enable interested stakeholders and the NT EPA to understand the environmental consequences of the proposed Project. Information in the EIS should be objective, clear, succinct and be supported by maps, plans, diagrams or other descriptive detail. The EIS is to be written in a clear and concise style that is easily understood by the general reader. Technical jargon should be avoided wherever possible. Cross-referencing should be used to avoid unnecessary duplication of text.

Detailed technical information, studies or investigations necessary to support the main text should be included as appendices to the EIS. The Proponent should make the EIS available on the Internet.

If any information is of a confidential nature, the Proponent should consult with the NT EPA on the preferred presentation of that material, before it is submitted for approval to publish.

The level of analysis and detail in the EIS should reflect the level of significance of potential impacts on the environment determined through technical studies. Any and all unknown variables or assumptions made in the assessment must be clearly stated and discussed. The extent to which the limitation of available information may influence the conclusions of the environmental assessment must also be discussed, and assessed in relation to risk and international best-practice.

The Proponent must ensure that the EIS addresses the matters stated in Schedule 4 of the *Environment Protection and Biodiversity Conservation Regulations 2000 - Matters that must be addressed in a PER/EIS* at Attachment 1.

### Format and style

The EIS should comprise three elements, namely:

- The executive summary;
- The main text of the document; and
- Appendices containing detailed technical information and other information that can be made publicly available.

The structure of these Guidelines may be adopted as the format for the EIS. This format need not be followed if the required information can be presented alternatively for better effect. However, each of the elements in these Guidelines must be addressed to meet NT Government regulatory requirements.

The Executive Summary must include a brief outline of the Project and each chapter of the draft EIS, allowing the reader to obtain a clear understanding of the proposed Project, its environmental implications and management objectives. It should be written as a stand-alone document and able to be reproduced on request by interested parties who may not wish to read the draft EIS as a whole.

The main text of the EIS should include a list of abbreviations, a glossary of terms to define technical terms, acronyms and abbreviations, and colloquialisms.

The appendices should include:

- A copy of these Guidelines;
- A list of persons and agencies consulted during the EIS;
- Contact details for the Proponent;
- The names of, and work done by, the persons involved in preparing the EIS; and
- The expertise of the people contributing work to the EIS.

The EIS should be written so that any conclusions reached can be independently assessed. To this end, all sources must be appropriately referenced using the Harvard Standard. The reference list should include the address of any Internet “web” pages used as data sources.

The EIS should be produced on A4 size paper capable of being photocopied, with any maps and diagrams on A4 or A3 size and in colour where possible. The Proponent should consider the format and style of the document appropriate for publication on the Internet (document sizes approximately 2MB or under). The capacity of the website to store data and display the material may have some bearing on how the document is constructed.

Data collected on species listed under the EPBC Act must be provided in electronic format to the Australian Government Department of the Environment (DotE) (refer Attachment 2 *Guidelines for Biological Survey and Mapped Data, 2006*). Prior consultation with DotE is recommended to determine current survey requirements. The provision of this information will help facilitate decision-making under the EPBC Act and assist in the protection and recovery of species and communities.

## Administration

Approximately ten hard bound copies of the draft EIS and Appendices should be submitted to the NT EPA for distribution to NT Government advisory bodies. NT EPA should be consulted prior to printing, to determine the exact number of copies required.

The EIS should be provided on CD/DVD in ADOBE \*.pdf format for placement on the NT EPA internet site (Chapters and Appendices separate). This should be done at least four days before newspaper publication. Additionally, two Microsoft Word copies should be provided to facilitate production of the Assessment Report and Recommendations.

The EIS is to be advertised for review and comment in the *NT News* and *The Australian*.

The EIS should be made available for public comment for a minimum period of 6 weeks at:

- Northern Territory Environment Protection Authority (NT EPA), 2nd Floor, Darwin Plaza, 41 Smith Street Mall, Darwin;
- Development Assessment Services / Department of Lands, Planning and the Environment, Ground Floor, Arnhemica House, 16 Parap Rd Parap; phone: 8999 6046 .
- Northern Territory Library (NTL), Parliament House, Darwin;
- Casuarina Public Library (e-mail [citylibrary@darwin.nt.gov.au](mailto:citylibrary@darwin.nt.gov.au), phone: 89300230);
- Palmerston City Library, Goyder Square, Palmerston (phone 8935 9993);
- Charles Darwin University Library, CDU Casuarina Campus;
- The Environment Centre (Unit 3, 98 Woods St, Darwin);
- Northern Land Council, Head Office, 45 Mitchell St, Darwin;
- The Tiwi Islands Local Government (Jampalampi Community Council)
- The Tiwi Land Council (Darwin office)
- Larrakia Development Corporation Pty Ltd – 3/41 Sadgroves Crescent, access via Hickman St. Winnellie, or P.O. Box 37207 Winnellie NT 0821 or phone: 8947 3455;
- Australian Government, Department of Sustainability, Environment, Water, Population and Communities Library, John Gorton Building, Parkes, Canberra.

The action officer is Michael Browne from the NT EPA. Contact phone number is (08) 8924 4149, email: [eia.ntepa@nt.gov.au](mailto:eia.ntepa@nt.gov.au) or fax (08) 8924 4053.

### **3 General information**

This should provide the background and context of the Project including:

- The title of the Project;
- The full name and postal address of the designated proponent;
- A description of the Project's location;
- A clear outline of the objective of the Project;
- Legislative background for the proposal, including:
  - Requirements of the EPBC Act, including under Part 3 and any other requirements and approvals needed under the EPBC Act; and
  - The Northern Territory Government's approval and regulatory requirements.
- The background to the development of the Project;
- How the Project relates to any other proposals or actions (of which the Proponent should reasonably be aware) that have been or are being taken, or that have been approved in the region affected by the action;
- The current status of the Project; and
- The consequences of not proceeding with the Project.

### **4 Description of the Project**

#### **Project description details**

This section must describe the Project to allow a detailed understanding of infrastructure design and engineering. All construction (including site preparation), operation and management elements of the Project must be described in detail. Where applicable, these details should be described separately under the appropriate headings.

Details should include the precise location and alignment of all works to be undertaken, date or time period over which construction, operation and management will take place, structures to be built, and elements of the Project that may have impacts on identified environmental factors including the future use of the Clarence Strait waters and Glyde Point, and matters protected by the EPBC Act.

This information must also include details on:

- proposed staging of the Project;
- how the works are to be undertaken (including stages of development, deployment);
- the deployment and management of the chosen technology in a tropical marine environment given that the technology has been developed in the Northern Hemisphere in a different environmental context;



- an outline of depth of water at proposed sites, and estimated depth of clear, unobstructed water above the structures at lowest astronomical tide (LAT);
- details of disturbance associated with all construction activity, such as temporary access tracks and dredging;
- design parameters for those structural aspects of the Project that have impact potential. For example, design specifications to ensure structural stability of the units in situ (given expected variable oceanographic conditions); and,
- A description of the horizontal drilling process and location.

The following headings should be included in this section:

### **Objectives, benefits and justification**

The EIS should contain an explanation of the objectives, benefits and justification for the Project. Discuss the net benefits of the projects in terms of actual greenhouse gas emission savings.

### **Project location**

Describe the proposals location in its regional context including appropriately detailed maps showing sites of ecological, cultural, recreational or economic (eg transport routes) significance. The Proponent must explain how the siting of the Project components has accounted for different constraints and values and include justification of how and why the location was chosen.

### **Timeframes and schedules**

Provide an anticipated timetable for all stages of the construction, operation and management of the Project. Seasonal sensitivities should be summarised and timing of activities should be considered within overall mitigation and management plans.

Provide details and outline goals and data requirements of each major Project stage.

Outline any potential for expansion or additional development and possible timeframes.

### **Local planning context**

Describe the relevant NT and Local Government planning schemes, local laws and any other local policies applicable to the proposal.

Identify and explain current land use, land tenure, and local and regional zoning.

Outline land requirements, acquisition requirements, and the tenures under which the Project would be held including relevant legislative processes required to grant proposed tenure.

Identify any development approvals or infrastructure proposals likely to be required or affected by the proposal.

### **Relationship to other projects**

Describe how the action relates to any other actions that have been or are being taken, or that have been approved, in the region affected by the action.

Discuss the compatibility of the Project with future potential uses of the marine waters in the region.

### **Project components and supporting infrastructure**

The following Project components should be discussed:

#### **Turbines**

- Size of the footprint area for turbine structure including the gravity base structure;
- Testing schedule;
- Device structure and operation – suitability of the device for local environmental and weather conditions;
- Gravity Base Structure description;
- Installation requirements (including methods of transportation and installation);
- Power requirements;
- Materials – Inputs and Outputs including:
  - The type, source, volume and/or quantity of materials to be used;
  - Photographs/sketches of the components;
  - Transport of raw materials from source to site;
  - Storage location and requirements of materials;
  - Chemical requirements/treatments, including anti-fouling agents (names, function and quantity in litres);
  - Any other anticipated inputs for the Project;
  - The type, source, volume and/or quantity of predicted waste, products and by-products generated; and
  - The proposed storage, handling and disposal of any waste, products and by-products.
- Hydraulic systems;
- Corrosion and antifouling protection;
- Power conversion system;
- Noise and vibration levels;
- Device marking;

- anticipated exclusion zones required for the Project and gravity base structure placements; and
- navigational/sea user interference.

### **Shore-based infrastructure**

- Shore connections and facilities (including linkages with existing electricity infrastructure);
- Energy storage;
- Supporting infrastructure and ancillary activities, such as storage areas and access roads;
- Traffic and access issues and requirements;
- Any relevant site plans and layouts for each component; and
- Size of the footprint area for each component or associated work area.

### **Maintenance**

Identify and describe the responsible party for maintenance of the development in the long term and maintenance programs to be developed.

### **Infrastructure / services**

Provide a description of existing and required services and infrastructure, and any limitations on services and infrastructure such as seasonal accessibility.

### **Employment**

Provide an estimate of the workforce numbers expected during the construction, operation and maintenance phases.

### **Decommissioning**

This section should outline the planned decommissioning of the Project and establish decommissioning objectives and goals.

It should detail recovery/removal activities and include:

- Procedures for decommissioning and removal of all structures and equipment;
- Anchoring requirements of vessels;
- Cutting/removal techniques for any embedded structures;
- Potential for generation of onsite waste;
- Debris survey details, recovery and disposal methods;
- The environmental, economic and social viability of options for removal or otherwise of turbines, gravity base structures and cables;
- Rehabilitation;
- Proposed timeframes including Project lifespan; and  
The planned final environment.

## 5 Alternatives

Alternative proposals must be discussed, including detailed reasons for the selection and rejection of particular options. The selection criteria should be discussed, and the advantages and disadvantages of preferred options and alternatives detailed. The short, medium and long-term potential beneficial and adverse impacts of each of the options should be considered and associated risks detailed and analysed.

Alternatives to be discussed should include:

- Not proceeding with the proposal;
- Site selection within the region;
- Alternative generator designs;
- Alternative locations for various components of the proposal including opportunities to connecting to the Darwin/Katherine grid at an alternative node to Glyde Point;
- Alternative project scales (e.g. the viability of establishing a smaller scale operation);
- A comparative description of the impacts of each alternative on the matters of National Environmental Significance protected by Part 3 of the EPBC Act; and
- Alternative environmental management techniques for moderate or higher risk impacts.

## 6 Risk Assessment

### Risk Assessment Approach

This EIS should be undertaken with specific emphasis on identification, analysis and treatment of risks through a whole-of-project risk assessment. Through this process, the EIS will:

- Acknowledge and discuss the full range of risks presented by proposed actions including those of special concern to the public;
- Quantify (where possible) and rank risks so that the reasons for proposed management responses are clear;
- Acknowledge levels of uncertainty about estimates of risk and the effectiveness of risk controls;
- Extend risk assessment to problems in realising benefits; and
- Explicitly identify those members of the community expected to accept residual risks and their consequences, providing better understanding of equity issues.

Statements about levels of uncertainty should accompany all aspects of the risk assessment. Steps taken to reduce uncertainty or precautions taken to

compensate for uncertainty should also be identified and their effect/s demonstrated.

Information provided should permit the reader to understand the likelihood of the risk, its potential severity, and any uncertainty about the effectiveness of controls. If levels of uncertainty do not permit robust quantification of risk, then this should be clearly acknowledged.

Processes for risk management are formalised in Standards Australia / Standards New Zealand (eg. AS/NZS ISO 31000:2009; HB 436:2004; HB 158:2006).

### **Hazards and Risks to Humans and Facilities**

The EIS should include an assessment of the risks to people, the environment and nearby facilities associated with the construction, operation and maintenance of the various components of the Project. The aim of this assessment is to demonstrate that:

- The Proponent is fully aware of the risks to human health and safety associated with all aspects of the development;
- The prevention and mitigation of risks to human health and safety are properly addressed in the design specifications for the facility; and
- The risks can and will be managed effectively during the construction, commissioning, operation, and decommissioning of the development.

The hazard and risk analysis will identify the critical areas that need to be addressed in management plans, monitoring programs, contingency and emergency plans.

## **7 Existing Environment, Potential Impacts and Management**

These Guidelines detail the information requirements with respect to the environmental issues and factors identified for the Project. A description of the existing environment, relevant impacts, potential issues and proposed mitigation measures must be provided for the Project and also for surrounding areas that may be affected by the proposal.

The EIS should demonstrate that the Proponent has identified all risks associated with the relevant factors and issues raised, undertaken comprehensive assessment of those risks (including quantification where practicable) and identified effective controls, particularly for significant risks.

Studies to describe the existing environment should be of a scope and standard sufficient to serve as a benchmark against which the impacts of the Project may be assessed and monitored over an extended period. Control areas not impacted by the Project should be included in proposed studies, and long-term monitoring locations in predicted impact and control areas should be established.

All potential relevant impacts must be described, including those within the proposal site and its surrounds, as they relate to the matters protected under the EPBC Act and other environmental factors in general, during construction, operation and decommissioning phases of the proposal. This must also include an assessment of the level of significance of the impact, at the local, regional and global levels (e.g. global and national implications on impacts to threatened marine species and the localised impact of onshore cable route).

Cumulative impacts should also be discussed particularly with respect to acoustic noise, pollution of the marine environment and obstruction of marine biota throughout the Project area. The reliability and validity of forecasts and predictions, confidence limits and margins of error should be indicated as appropriate.

Mitigation measures must also be discussed with particular focus on matters protected under the EPBC Act and other matters determined to be at moderate or greater risk of impact. Specific and detailed measures must be provided and substantiated, based on best available practices. An assessment of the expected or predicted effectiveness of the mitigation measures must be provided. The cost of mitigation measures must be outlined.

Table 1 includes issues and potential impacts that must be discussed; however, the EIS must also assess any other relevant impacts and issues that emerge throughout the process of preparing the EIS. Tidal energy generation is a relatively new technology and as there are no previous examples of such a Project in the proposed area, consideration will need to be given to site and species-specific monitoring programs for the identification and management of actual and potential environmental impacts. In addition, relevant technical data from environmental impact assessment studies for related technologies should be provided to assist in the assessment of impacts.

**Table 1: Existing Environment, Potential Impacts & Environmental Management**

<b>Factor</b>	<b>Baseline (Existing Environment)</b>	<b>Potential Impacts</b>	<b>Safeguards, Management &amp; Monitoring</b>
<p><b>Physical Environment:</b></p> <ul style="list-style-type: none"> <li>• <b>Bathymetry</b></li> <li>• <b>Suspended sediment</b></li> <li>• <b>Water Quality</b></li> </ul>	<ul style="list-style-type: none"> <li>• Bathymetry &amp; Seabed features</li> <li>• Provide maps and interpret the bathymetry of the turbine project area and along the cable route to identify any seabed features of significance;</li> <li>• Provide results and interpretation of any geotechnical investigations undertaken to assess the Tidal Energy Generation turbine locations and cable shore crossing location;</li> <li>• Detail the oceanic processes within Clarence Strait region such as local &amp; regional tides, current velocities and direction through the water; and column, and wave magnitudes;</li> <li>• Describe water quality of marine waters including temporal and spatial variations;</li> <li>• Discuss the soil/sediment types and land units within the onshore Project footprint including actual and potential acid sulphate soils and existing levels of erosion and other disturbances.</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Discuss the potential impacts of the Project components / activities on all aspects of the oceanographic environment during construction, operation and decommissioning of the Project and the suitability of those components in the local environment and climate conditions;</li> <li>• Discuss the impact of structures to hydrodynamics and sediment transport, both near-field and far-field, including: <ul style="list-style-type: none"> <li>– Sediment mobilisation (erosion, transportation and deposition) at the proposed site;</li> <li>– Smothering of sea bed habitats and species (turbidity);</li> <li>– Seabed scour associated with the gravity base structures and cable route</li> <li>– Provide robust quantitative modelling, applicable in a tropical marine environment, of the sediment effects of placing project components in the area, taking into account the type of gravity base and the amount of cabling</li> </ul> </li> <li>• Describe the visual impact of project components on the physical environment;</li> <li>• Describe the potential impacts to water quality that may occur as a result of the Project including fuel and oil leakage from vessels in the water during construction, maintenance and decommissioning activities; leaching and toxicity of material used in project structures, sediment erosion and deposition; and the use</li> </ul>	<ul style="list-style-type: none"> <li>• Detail measures to avoid/minimise identified impacts and monitoring required to ensure those safeguards are met;</li> <li>• Detail suitability of the turbine and gravity base system for local environment conditions (warm tropical environment with distinct wet seasons, cyclone events etc) to minimise scour and sediment mobilisation and reduce damage to benthic habitats.</li> <li>• Ensure quantitative modelling conducted on sediment plumes has taken into account local, tropical environment conditions;</li> <li>• Conduct a coastal erosion risk assessment of the shore crossing and any on-shore infrastructure;</li> <li>• Detail choice of siting the turbines and cable to minimise impacts to sensitive habitats (including shoreline habitats) and species on the seabed; and</li> <li>• Develop hazard management plans to reduce environmental impact in the event of a significant leakage and spill.</li> <li>• Detail use of responsible antifoulant compounds, or other antifoulant methods such as smooth surface or regular removal/cleaning of devices.</li> <li>• Detail use of non-leaching material in the construction of project components</li> </ul>

<b>Factor</b>	<b>Baseline (Existing Environment)</b>	<b>Potential Impacts</b>	<b>Safeguards, Management &amp; Monitoring</b>
		<p>of anti-foulant and anti-corrosion measures.</p> <ul style="list-style-type: none"> <li>• Describe the waste and hazardous substances including anti-foulant and anti-corrosion compounds required for the Project and the potential impacts of these substances on water quality;</li> <li>• Describe the implications of water quality impacts to the food chain, particularly species gathered by Indigenous community and fishers.</li> </ul>	
<b>Marine Ecology</b>	<ul style="list-style-type: none"> <li>• Describe floral &amp; faunal species (including exotic/pest species) and biological communities including those of local, regional and national significance<sup>1</sup> and listed migratory species that are found within and around the Project area (including the wider area of Tiwi Islands, Shoal Bay and Van Dieman Gulf). Include baseline data on listed threatened and migratory species that may be present in the vicinity of the proposal including regional status, population size, levels of use of, and distribution within the Project site and adjacent habitat that may be impacted by the Project. Please include mapping of regional distributions;</li> <li>• Describe in detail, species' important habitats (including for breeding,</li> </ul>	<ul style="list-style-type: none"> <li>• Describe impacts on marine species due to: <ul style="list-style-type: none"> <li>– Light and vibration;</li> <li>– Emission of electromagnetic fields; and</li> <li>– Collision/avoidance, entanglement and entrapment with the marine turbines.</li> </ul> </li> <li>• Describe the potential levels and duration of underwater noise during construction, operation, maintenance and decommissioning stages, the sound attenuation expected in the area and the impacts on marine species;</li> <li>• Where there is likely to be noise impacts from the proposal, a noise modelling study should be undertaken to determine the levels and extent of impacts from the proposal;</li> <li>• Describe the potential for the development</li> </ul>	<ul style="list-style-type: none"> <li>• Discuss measures to minimise identified impacts on species, communities and habitats;</li> <li>• Discuss monitoring and reporting techniques to determine impacts on marine species during all stages of the Project;</li> <li>• Discuss methods to manage/minimise exotic fauna species introduction and spread;</li> <li>• Explain how proposed safeguards will work and the monitoring required to maintain those safeguards;</li> <li>• Provide management plans to address the potential environmental impacts;</li> <li>• Detail ecological monitoring before, during operation and after decommissioning of the marine</li> </ul>

<sup>1</sup> Significant vegetation includes:

- ⇒ rare, threatened, endangered and regionally restricted species, vegetation types or habitats;
- ⇒ communities that are particularly good examples of their type;
- ⇒ vegetation types which are outside their normal distribution or have other biogeographical significance;
- ⇒ ecologically outstanding areas which have importance beyond the immediate site, eg. Coral reefs, mangroves, riparian forests, etc; and
- ⇒ vegetation which is the habitat of rare and threatened fauna or has outstanding diversity.



Factor	Baseline (Existing Environment)	Potential Impacts	Safeguards, Management & Monitoring
	<p>foraging and migration paths), including maps of regional distribution of suitable habitat, and of habitat within the proposed development area that clearly identifies areas to be disturbed from development infrastructure;</p> <ul style="list-style-type: none"> <li>• Identify reef and macro benthic communities in the vicinity of the turbine and cable areas;</li> <li>• Describe any marine species endemic to the local area;</li> <li>• Describe the extent and behaviour of vertebrate marine species in and around the Project in particular sea turtles, dugongs, bird species, fish species (e.g. Narrow-barred Spanish mackerel, <i>Scomberomorus commerson</i>, sharks and rays) and cetaceans (e.g. Indo-Pacific humpback dolphins <i>Sousa chinensis</i>, Australian snubfin <i>Oraella heinsohn</i>);</li> <li>• Describe the extent of seagrasses in the proposed project area;</li> <li>• Describe background underwater noise levels;</li> <li>• Identify marine species which may be affected by underwater noise</li> <li>• Survey methodologies must: <ul style="list-style-type: none"> <li>– Follow best practice &amp; advice from relevant agencies;</li> <li>– Account for seasonality, potential for occurrence of significant species &amp; sensitivity of species to</li> </ul> </li> </ul>	<p>to adversely disrupt the life cycle and spatial distribution of listed marine migratory species;</p> <ul style="list-style-type: none"> <li>• Include an analysis of the significance of the relevant impacts on EPBC Act protected matters. The analysis must conform to relevant EPBC Act policy statements;</li> <li>• Describe whether there may be unknown, unpredictable or irreversible impacts to marine species;</li> <li>• Identify the potential for introduction and/or spread of pest species;</li> <li>• Discuss the impacts of installation, operation and decommissioning on seabed communities;</li> <li>• Describe the potential of the marine turbine foundations introducing new habitats for benthic and fish communities.</li> <li>• Include any technical data and other information used or needed to make a detailed assessment of the relevant impacts, including evidence of environmental assessments/environmental impact studies conducted for related technologies.</li> </ul>	<p>turbines; and</p> <ul style="list-style-type: none"> <li>• Discuss how monitoring information gained from the proposed stages of development would be used to improve management during latter stages and/or address potential changes in Project scale.</li> </ul>

<b>Factor</b>	<b>Baseline (Existing Environment)</b>	<b>Potential Impacts</b>	<b>Safeguards, Management &amp; Monitoring</b>
	<p>disturbance;</p> <ul style="list-style-type: none"> <li>- Identify rare, threatened, endangered species against relevant NT &amp; Commonwealth legislation. Particular reference should be made to species and ecological communities listed as threatened under the EPBC Act that (through analysis) may potentially be disturbed by the Project;</li> <li>- Consider migratory species, and species with conservation and biodiversity values in the Project area;</li> <li>- Consider species which were listed after the making of these draft EIS Guidelines;</li> <li>- Consider species with economic value;</li> <li>- Consider species with indigenous conservation values.</li> </ul> <ul style="list-style-type: none"> <li>• Survey work must be conducted by suitably qualified personnel.</li> <li>• Include survey methodologies and results in appendices.</li> <li>• Provide detailed mapping and description of benthic habitat types in all potentially affected marine areas. Mapping and descriptions must be provided for the development footprint and any other areas that may be impacted upon. Detailed mapping must include: <ul style="list-style-type: none"> <li>- Details of the sea floor (fine</li> </ul> </li> </ul>		

<b>Factor</b>	<b>Baseline (Existing Environment)</b>	<b>Potential Impacts</b>	<b>Safeguards, Management &amp; Monitoring</b>
	<p>detail geomorphology) at a regional level;</p> <ul style="list-style-type: none"> <li>– Sedimentology; and</li> <li>– Any benthic ecology (corals, seagrass, sessile marine organisms).</li> </ul>		
<b>Terrestrial Ecology</b>	<ul style="list-style-type: none"> <li>• Describe and map native terrestrial and inter-tidal flora and fauna for the proposed onshore cable route and infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>• Impact to intertidal/shoreline habitats</li> <li>• Specify the extent of clearing required in the Project footprint<sup>2</sup>.</li> <li>• Describe impacts on species/communities/habitats and food webs, including those of local/regional/national significance from land clearing</li> </ul>	<ul style="list-style-type: none"> <li>• Discuss measures to minimise identified impacts on species, communities and habitats</li> <li>• Explain how proposed safeguards will work and the monitoring required to maintain those safeguards;</li> <li>• Provide management plans to address the potential environmental impacts</li> <li>• Detail cable route chosen with consideration to vulnerable shoreline habitats;</li> <li>• Detail rehabilitation, monitoring and reporting strategies for the onshore component of the Project</li> </ul>
<b>Marine Transport</b>	<ul style="list-style-type: none"> <li>• Describe the existing and projected maritime traffic use of the proposed Project area. Consideration should be given to the potential for future growth in the area;</li> <li>• Describe the location of shipping channels in relation to the proposal area and types of vessels navigating the area;</li> </ul>	<ul style="list-style-type: none"> <li>• Describe the impacts of the Project on local maritime and international shipping needs and other sea users;</li> <li>• Describe impacts, and benefits of the Project on potential future land uses and use of marine areas;</li> <li>• Describe the impacts of increase of boat traffic during construction, maintenance and decommissioning activities; and</li> </ul>	<ul style="list-style-type: none"> <li>• Describe measures to minimise the impacts on local and international shipping users;</li> <li>• Detail timing of construction, maintenance and decommissioning activities to minimise navigational risks and restriction of passage;</li> <li>• Discuss lighting plans and measures that would be employed to avoid interference with safe navigation of</li> </ul>

<sup>2</sup> Statutory obligations under NT legislation (e.g. *Planning Act & Pastoral Land Act*) for vegetation clearing must be met if there is an intention to build infrastructure on areas zoned other than development.

<b>Factor</b>	<b>Baseline (Existing Environment)</b>	<b>Potential Impacts</b>	<b>Safeguards, Management &amp; Monitoring</b>
	<ul style="list-style-type: none"> <li>• Describe the isolated danger or safety zones required to adequately mark and protect marine turbines and cable routes in the Project area <i>Note: Consult with the Marine Safety Branch to determine device marking requirements</i></li> </ul>	<ul style="list-style-type: none"> <li>• Describe the impacts of interference with normal shipping communications</li> </ul>	<p>Glyde Point/Howard Channel area;</p> <ul style="list-style-type: none"> <li>• Discuss safety zones around turbines and cables relevant to all users;</li> <li>• Describe the management of impacts to sea users after decommissioning of the Project and if materials are left on the seabed with surface marker buoys removed; and</li> <li>• Describe procedures for accidental/emergency situations.</li> </ul>
<b>Land Use</b>	<ul style="list-style-type: none"> <li>• Identify zoning, uses and features within the Project locality including: <ul style="list-style-type: none"> <li>– Urban and rural residential;</li> <li>– Agricultural, pastoral, fisheries and shipping;</li> <li>– Conservation, wilderness, and scenic areas;</li> <li>– Indigenous land use;</li> <li>– Recreational land use, and areas of research, educational and scientific value;</li> <li>– Road reserves and pipeline easements;</li> <li>– Military reserves or exercise areas;</li> <li>– Land/Sea titles and rights e.g. those granted under <i>Native Title Act 1993</i>.</li> </ul> </li> <li>• Include Map/s showing jurisdictions and responsible authorities for the areas described above and a description of the regulatory</li> </ul>	<ul style="list-style-type: none"> <li>• Describe, including timeframes, the anticipated and potential site specific and cumulative impacts on existing and potential uses and developments during the construction and operation phases;</li> <li>• Discuss the likely impacts on the land use status and ownership of the land crossed by various components of the Project in terms of land acquisition and compensation. This discussion should include any Indigenous ownership, native title claimants and holders, and land use.</li> <li>• Discuss potential impacts to access for recreation including dive sites; and</li> <li>• Discuss potential impacts to access for fishing activities.</li> </ul>	<ul style="list-style-type: none"> <li>• Outline measures to minimise the impacts to current and future uses of land and water in the Project area; and</li> <li>• Outline consultation processes to be undertaken with key stakeholders (local and commercial fishermen, recreational boat users, indigenous community, local environment groups etc).</li> </ul>

Factor	Baseline (Existing Environment)	Potential Impacts	Safeguards, Management & Monitoring
<b>Historic &amp; Cultural Heritage Values</b>	<p>regime applying to each area.</p> <ul style="list-style-type: none"> <li>• Conduct a detailed, physical maritime survey (eg remote sensing and ground truthing) to capture anything that may be located within the proposed marine Project area and the importance and vulnerability of features identified;</li> <li>• Conduct an archaeological/heritage survey in the onshore area of the Project.</li> <li>• Identify all Indigenous/non-Indigenous places of historic or contemporary cultural heritage significance including<sup>3</sup>: <ul style="list-style-type: none"> <li>– areas nominated for listing or listed on the Register of the National Estate or the Northern Territory Heritage Register, or Interim listing on either of these Registers;</li> <li>– areas nominated for listing or listed on Commonwealth and Territory Heritage registers and Commonwealth and Territory registers of indigenous cultural heritage;</li> <li>– sacred sites - provide evidence of an Authority Certificate under the <i>Northern Territory</i></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Describe potential impacts to the features identified in baseline studies including lifestyles, traditional hunting/fishing practices, heritage places, indigenous/non-indigenous culture generally and the impact of increased visitation;</li> <li>• Provide details on any natural and historic heritage values within the Territory marine environment affected by the proposal;</li> <li>• Discuss the implications of the identified impacts on the Indigenous and non-indigenous access to and use of flora and fauna.</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Detail measures to mitigate impacts to any features at risk from the Project.</li> <li>• A management plan should be developed to include: <ul style="list-style-type: none"> <li>– Procedures to avoid significant areas;</li> <li>– Protection of key sites during construction and decommissioning work</li> <li>– Ongoing protection measures; and</li> <li>– Procedures for the discovery of surface or sub-surface materials during the course of the Project.</li> </ul> </li> </ul>

<sup>3</sup> This should be done through community consultation, historic research and field survey. No information of a confidential nature (particularly that related to anthropological matters) relevant to indigenous people or groups is to be disclosed in the EIS. However, the EIS must describe the arrangements that have been negotiated with relevant indigenous groups in relation to anthropological and archaeological surveys. Advice and permits on the conduct of these studies should be sought from the responsible authorities.

<b>Factor</b>	<b>Baseline (Existing Environment)</b>	<b>Potential Impacts</b>	<b>Safeguards, Management &amp; Monitoring</b>
	<p><i>Aboriginal Sacred Sites Act 1989</i> and compliance with protection of sites under both the <i>Aboriginal Land Rights (Northern Territory) Act 1976</i> and the <i>Northern Territory Aboriginal Sacred Sites Act 1989</i>;</p> <ul style="list-style-type: none"> <li>– Traditional and historic Aboriginal and Torres Strait Islander (ATSI) archaeological and heritage places and objects protected under relevant Territory and/or Commonwealth legislation;</li> <li>– Any historic shipwrecks that may be encountered and are protected under the <i>Historic Shipwrecks Act 1976</i>;</li> <li>– Areas with special values to indigenous and non-indigenous people (e.g. traditional land use, landscape, visual environment, recreational, commercial, tourism, fisheries, scientific, educational and marine archaeological sites); and</li> <li>– European and Macassan historic sites</li> </ul>		
<b>Social Values</b>	<ul style="list-style-type: none"> <li>• Describe the impacts on boat based recreation such as fishing and tourism activities including scuba diving, boating and sailing and tourist charter fishing tours;</li> <li>• Describe the impacts on commercial and fishing vessels;</li> <li>• Identify key stakeholders,</li> </ul>	<ul style="list-style-type: none"> <li>• Identify opportunities for training and employment during construction of the Project and how this would be structured, managed and implemented;</li> <li>• Identify opportunities for local industry and indigenous/non-indigenous workforce participation in the construction and operation of the Project;</li> <li>• Outline possible future benefits for the</li> </ul>	<ul style="list-style-type: none"> <li>• Identify measures to reduce negative impacts and maximise benefits.</li> </ul>

<b>Factor</b>	<b>Baseline (Existing Environment)</b>	<b>Potential Impacts</b>	<b>Safeguards, Management &amp; Monitoring</b>
	<p>regional community structures and community vitality (including demography, health, education and social well-being, access to services and housing, etc); and</p> <ul style="list-style-type: none"> <li>Estimate local employment including a breakdown of skills/trades required and specific opportunities for skills development.</li> </ul>	<p>community following construction;</p> <ul style="list-style-type: none"> <li>Outline the accommodation requirements and arrangements for construction and maintenance activities and any associated infrastructure and services required; and</li> <li>Discuss the potential negative social impacts that could arise from the Project including the impacts of the construction/operation and workforce/maintenance teams on affected landowners and communities, recreational users, local health services;</li> <li>Outline any increased pressure on roads and other public infrastructure particularly during construction phase of the Project.</li> </ul>	
<b>Waste &amp; hazardous materials Management</b>	<ul style="list-style-type: none"> <li>Identify and describe (amount and characteristics) all wastes and their sources, including hazardous wastes, associated with construction, operation and decommissioning of all Project components.</li> <li>Detail all chemicals, including fuels, to be stored and/or used on the Project site. Outline the proposed methods for transportation, storage and use of these substances.</li> <li>Detail other possible hazardous materials that may be derived from construction and operation of the Project</li> </ul>	<ul style="list-style-type: none"> <li>Discuss the potential impacts associated with identified wastes and loss/spills of hazardous materials.</li> <li>Identify and discuss activities likely to give rise to an environmental nuisance as defined under the <i>Waste Management and Pollution Control Act</i>.</li> </ul>	<ul style="list-style-type: none"> <li>Discuss waste management strategies including avoidance, reduction, reuse, recycling, storage, transport and disposal of waste</li> <li>Outline all government approvals and agreements required and obtained for all waste disposal and management matters;</li> <li>Discuss hazardous material management;</li> <li>Environment and Safety management programs should include: <ul style="list-style-type: none"> <li>Contingency/response plans;</li> <li>Spills and containment; and</li> <li>Hazardous material data and storage.</li> </ul> </li> </ul>
<b>Economics</b>	<ul style="list-style-type: none"> <li>Discuss the current local, regional, state and national economic viability (including</li> </ul>	<ul style="list-style-type: none"> <li>Present a summary of the Project's impact on the regional/territory/national economies in terms of direct/indirect</li> </ul>	<ul style="list-style-type: none"> <li>Detail measures to minimise potential adverse impacts identified and maximise the beneficial impacts.</li> </ul>

<b>Factor</b>	<b>Baseline (Existing Environment)</b>	<b>Potential Impacts</b>	<b>Safeguards, Management &amp; Monitoring</b>
	<p>economic base and economic activity, future economic opportunities and contribution to the Northern Territory economy);</p> <ul style="list-style-type: none"> <li>• Consider the costs and potential benefits of connecting to the Darwin/Katherine grid at an alternative node to Glyde Point.</li> <li>•</li> </ul>	<p>effects on employment, income and production including the broader development benefits of the Project.</p> <ul style="list-style-type: none"> <li>• Consider the effects of disturbance to existing land use or threat to the surrounding environment such as Clarence Strait, coastline and mangroves that may impact on current and future commercial activities.</li> <li>• Describe opportunities available to regional centres/communities based on the activity generated by the Project.</li> </ul>	
<b>Greenhouse Gas Emissions</b>	<ul style="list-style-type: none"> <li>• Discuss the benefits of the Project in actual greenhouse gas emission savings at the various proposed stages in the Project's development. Discuss the greenhouse gas implications of the proposed staged development of the Project.</li> </ul>		



## 8 Project Environmental Management

Specific safeguards and controls, which would be employed to minimise or remedy environmental impacts, are to be outlined. These are to be covered in detail in the Environmental Management Plan (EMP). Attachment 3 provides guidance on the draft EMP and it should be strategic, describing a framework for environmental management for construction, operational and decommissioning phases of the Project (prior consultation with DotE is recommended to determine current EMP requirements). As much detail as is practicable should be provided to enable adequate assessment during the public exhibition phase. Where possible, specific management policies, practices and procedures should be included in the draft EMP. The EMP would be finalised at the conclusion of the assessment, taking into consideration comments on the EIS and incorporating the Assessment Report recommendations and conclusions.

The draft EMP should:

- Define the management structure of both the construction and operational phases and its relationship to the environmental management of the site;
- Describe the proposed measures to minimise adverse impacts (including those mentioned in Section 7) and the effectiveness of these safeguards;
- Provide performance indicators by which all anticipated and potential impacts can be measured;
- Include identification of responsibilities;
- Describe how employees and visitors will be made aware of environmental responsibilities and safeguards (including an induction process);
- Describe how adaptive management frameworks will incorporate progressively acquired baseline and performance data, and identification of risks, to maintain ongoing protection of environmental values;
- Describe monitoring programs to allow early detection of adverse impacts;
- Describe how monitoring will be able to determine the differences between predicted and actual impacts;
- Describe remedial actions for any impacts that were not originally predicted;
- Include a summary table listing the undertakings and commitments made in the EIS, including clear timelines for key commitments and performance indicators, with cross-references to the text of the report; and
- Provide for the periodic review of the management plan itself.

Reference should be made to relevant legislation, guidelines and standards, and proposed arrangements for necessary approvals and permits should be noted. The agencies responsible for implementing and overseeing the management plan should be identified. Proposed reporting procedures on the implementation of the management plan, independent auditing or self-auditing and reporting of accidents and incidents should also be described.

## **9 Public Involvement and Consultation**

The EIS has an important role in informing the public about this proposal. It is essential that the Proponent demonstrate how public concerns were identified, and will influence the design and delivery of the Project. Public involvement and the role of government organisations should be clearly identified. The outcomes of surveys, public meetings and liaison with interested groups should be discussed and any resulting changes made to the proposal clearly identified. Details of any ongoing liaison should also be discussed. An outline of negotiations and discussions with local government, the Northern Territory Government and the Australian Government should be provided.

A stakeholder communication plan is recommended to facilitate consultation, information sharing and involvement with Government and the local community during the planning, construction, operation and decommissioning of the Project. The plan should place emphasis on two-way communication and open dialogue rather than the Proponent discussing the final Project stages and outcomes.

## **Attachment 1 –**

### **Matters that must be addressed in a PER/EIS (Schedule 4 of the EPBC Act Regulations 2000)**

(also available at:

[http://www.austlii.edu.au/au/legis/cth/consol\\_reg/epabcr2000697/sch4.html](http://www.austlii.edu.au/au/legis/cth/consol_reg/epabcr2000697/sch4.html))

#### **1 General information**

1.01 The background of the action including:

- (a) the title of the action;
- (b) the full name and postal address of the designated proponent;
- (c) a clear outline of the objective of the action;
- (d) the location of the action;
- (e) the background to the development of the action;
- (f) how the action relates to any other actions (of which the Proponent should reasonably be aware) that have been, or are being, taken or that have been approved in the region affected by the action;
- (g) the current status of the action;
- (h) the consequences of not proceeding with the action.

#### **2 Description**

2.01 A description of the action, including:

- (a) all the components of the action;
- (b) the precise location of any works to be undertaken, structures to be built or elements of the action that may have relevant impacts;
- (c) how the works are to be undertaken and design parameters for those aspects of the structures or elements of the action that may have relevant impacts;
- (d) relevant impacts of the action;
- (e) proposed safeguards and mitigation measures to deal with relevant impacts of the action;
- (f) any other requirements for approval or conditions that apply, or that the Proponent reasonably believes are likely to apply, to the proposed action;
- (g) to the extent reasonably practicable, any feasible alternatives to the action, including:
  - (i) if relevant, the alternative of taking no action;

- (ii) a comparative description of the impacts of each alternative on the matters protected by the controlling provisions for the action;
  - (iii) sufficient detail to make clear why any alternative is preferred to another;
- (h) any consultation about the action, including:
- (i) any consultation that has already taken place;
  - (ii) proposed consultation about relevant impacts of the action;
  - (iii) if there has been consultation about the proposed action — any documented response to, or result of, the consultation;
- (i) identification of affected parties, including a statement mentioning any communities that may be affected and describing their views.

### **3 Relevant impacts**

3.01 Information given under paragraph 2.01 (d) must include:

- (a) a description of the relevant impacts of the action;
- (b) a detailed assessment of the nature and extent of the likely short term and long term relevant impacts;
- (c) a statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible;
- (d) analysis of the significance of the relevant impacts;
- (e) any technical data and other information used or needed to make a detailed assessment of the relevant impacts.

### **4 Proposed safeguards and mitigation measures**

4.01 Information given under paragraph 2.01 (e) must include:

- (a) a description, and an assessment of the expected or predicted effectiveness of, the mitigation measures;
- (b) any statutory or policy basis for the mitigation measures;
- (c) the cost of the mitigation measures;
- (d) an outline of an environmental management plan that sets out the framework for continuing management, mitigation and monitoring programs for the relevant impacts of the action, including any provisions for independent environmental auditing;
- (e) the name of the agency responsible for endorsing or approving each mitigation measure or monitoring program;
- (f) a consolidated list of mitigation measures proposed to be undertaken to prevent, minimise or compensate for the relevant impacts of the action,

including mitigation measures proposed to be taken by State governments, local governments or the Proponent.

## **5 Other approvals and conditions**

5.01 Information given under paragraph 2.01 (f) must include:

- (a) details of any local or State government planning scheme, or plan or policy under any local or State/Territory government planning system that deals with the proposed action, including:
  - (i) what environmental assessment of the proposed action has been, or is being, carried out under the scheme, plan or policy;
  - (ii) how the scheme provides for the prevention, minimisation and management of any relevant impacts;
- (b) a description of any approval that has been obtained from a State, Territory or Commonwealth agency or authority (other than an approval under the Act), including any conditions that apply to the action;
- (c) a statement identifying any additional approval that is required;
- (d) a description of the monitoring, enforcement and review procedures that apply, or are proposed to apply, to the action.

## **6 Environmental record of person proposing to take the action**

6.01 Details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against:

- (a) the person proposing to take the action; and
- (b) for an action for which a person has applied for a permit, the person making the application.

6.02 If the person proposing to take the action is a corporation — details of the corporation's environmental policy and planning framework.

## **7 Information sources**

7.01 For information given in a draft public environment report or environmental impact statement, the draft must state:

- (a) the source of the information; and
- (b) how recent the information is; and
- (c) how the reliability of the information was tested; and
- (d) what uncertainties (if any) are in the information.

**Attachment 2 –  
Guidelines for Biological Survey and Mapped Data –  
Australian Government, (*from previous*)  
Department of Environment and Water Resources**

The Guidelines are available at both of the following locations:

<http://www.environment.gov.au/resource/guidelines-biological-survey-and-mapped-data>

[http://www.ntepa.nt.gov.au/\\_data/assets/pdf\\_file/0004/14638/attachment2.pdf](http://www.ntepa.nt.gov.au/_data/assets/pdf_file/0004/14638/attachment2.pdf)

**Attachment 3 -  
Guidelines for Development of an Environmental  
Management Plan**

(available at:

[http://www.ntepa.nt.gov.au/\\_data/assets/pdf\\_file/0005/14639/attachment4.pdf](http://www.ntepa.nt.gov.au/_data/assets/pdf_file/0005/14639/attachment4.pdf))

**Guidelines for the development of an Environmental  
Management Plan**

**Clarence Strait Tidal Energy Project, NT**

**(EPBC 2008/4660)**

**Prepared by:  
Commonwealth and Territories Section  
Environment Assessment Branch  
Approvals and Wildlife Division  
Department of Environment, Water, Heritage and the Arts  
June 2009**

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# 1 General Comments

This framework has been developed to assist Tenax Energy Pty Ltd to prepare an environmental management plan/s (EMP) to form part of the environmental impact statement for the Clarence Strait Tidal Energy Project, Northern Territory (EPBC 2008/4660). It should be used as a guide only.

## 1.1 *Presentation and cross-referencing*

Ensure that the format of the EMP is consistent and easy to follow. Where it refers to material in previously submitted documents, such as the referral information, include clear cross-references (e.g. 'See environmental impact statement, Section 2.9, pages 25–27.'). Use tables, diagrams and maps where inclusion would provide a better understanding and implementation of the EMP. Link all tables, diagrams and maps into the text through cross-referencing.

## 1.2 *Definitive Commitments*

To ensure readability, write clearly and avoid long sentences with complex clauses. Use the term 'will' rather than 'should' for commitments to carry out management actions. Avoid ambiguities such as 'where possible', 'as required', 'to the greatest extent possible' and the use of jargon. Clearly explain any technical terms or acronyms that need to be used, or define them in a glossary. All commitments must be written in a manner that is clearly auditable.

It is also important that there are no conflicting strategies or statements within the EMP. Carefully read the management commitments that are being made in the plan before submitting it.

# 2 Overall Management Framework

The approach to preparation of the management plan detailed in the following sections is presented in a prescriptive format that provides for the setting of clear actions, specific performance targets and monitoring procedures. It is recognised, however, that management of certain matters of national environmental significance (NES) is not fully predictable. Accordingly, management actions to be taken may need to be flexible and sufficiently adaptable in recognition of issues such as weather perturbations, limited or absence of suitable baseline data, a lack of existing scientific knowledge of the issue at hand, uncertainties over the influence of other external impacts not associated with the project, or particular characteristics or peculiarities of the matter requiring management. The proponent may need, in many circumstances, to implement an innovative and adaptive approach to the preparation of a management plan that, particularly in the early period of a management and monitoring program, may not be able to be clearly defined within a prescriptive plan. For example, it may be appropriate to establish an expert management committee approach with an aim to enable a flexible on-going review process to management and ensure rapid

response to external factors. However, should such an approach be proposed, it will need to be fully transparent and auditable with performance indicators and corrective actions. An example of management measures from an adaptive management plan can be viewed in Section 3 of these guidelines.

## **3 Content of the Management Plan:**

### **3.1 Introduction**

The management plan should include the following:

- brief project description
- brief description of existing environment and relevant matter(s) of NES
- brief description of potential impacts on protected matters
- management strategies
- management actions
  - management measures
  - monitoring requirements
  - performance indicators
  - corrective actions
  - responsibilities
  - timing
- auditing/verification requirements and reporting
- EMP review

### **3.2 Description of Proposal**

This section should only be a paragraph describing the whole project, specifically mentioning the part of the project that impacts on the relevant matter/s of NES. Maps should be used to show the location of the proposal in relation to the surrounding areas. Reference can be given to the EIS if it provides a more thorough description of the proposal.

### **3.3 Existing Environment**

This section should just be a summary of relevant information concerning the NES matters. If there are uncertainties in describing the existing environment, these must be stated. Reference can be given to the EIS if it provides a more thorough description of the proposal.

### **3.4 Potential Impacts**

This section of the plan should focus on identifying the potential impacts of the project on the applicable matters of NES. It should be brief, succinct and should cover:

- the relevant impacts of the proposal,
- the nature and extent of the potential short-term and long-term effect, and
- any uncertainties regarding the predictions.

Impacts from relevant stages of the action (possibly including predictions related to future development of the site) should be incorporated into this section. It may be necessary to divide the potential impacts into subsections, such as a subsection for the Commonwealth marine environment and listed threatened and migratory species.

### 3.5 Management Strategies

Environmental management strategies should be developed to target each of the potential impacts identified. Strategies are required to provide overall guidance on the intent of the management plan and to define the desired outcomes of the management plan and establish an overall benchmark and performance goals. Strategies must be developed for each of the impacts.

### 3.6 Management Actions

Each management strategy forms the basis for a specific management action. These actions are best presented in table format, as shown in the example below. The terms in the table are explained in the sections that follow. Management actions should incorporate the following elements: management measures, monitoring requirements, performance indicators and corrective actions.

#### Example 1: Management actions table

<b>Strategy:</b> Where direct impact is unavoidable, reduce impact on threatened species (Gouldian Finch) during construction of the pipeline.			
		<b>Timing</b>	<b>Responsibility</b>
<b>Management measures</b>	In priority habitat:		Company Environment Officer
	<ul style="list-style-type: none"> <li>• Align the corridor to avoid physical disturbance to confirmed breeding trees/sites especially hollow bearing trees.</li> </ul>	Prior to construction	
	<ul style="list-style-type: none"> <li>• Establish a 100m 'no-go' zone around breeding sites to discourage inadvertent or deliberate disturbance to nesting sites.</li> </ul>	Prior to construction	
	<ul style="list-style-type: none"> <li>• Conduct supplementary seeding in Area A in accordance with advice from relevant experts.</li> </ul>	Post construction	
	In priority and marginal habitat:		
<ul style="list-style-type: none"> <li>• No drawing water from dams/impoundments will be permitted.</li> </ul>	During construction		
<ul style="list-style-type: none"> <li>• Rehabilitate the easement with native seeding grasses that are preferred by the Gouldian Finch, as advised by relevant experts.</li> </ul>	Post construction		
<b>Monitoring requirements</b>	<ul style="list-style-type: none"> <li>• Mapping of suitable habitat for the Gouldian Finch in the northern end of the pipeline and provide to DEWHA</li> </ul>	6 months prior to construction. Annually after construction.	Company Environment Officer

<b>Strategy:</b> Where direct impact is unavoidable, reduce impact on threatened species (Gouldian Finch) during construction of the pipeline.			
		<b>Timing</b>	<b>Responsibility</b>
	<ul style="list-style-type: none"> <li>Observations to ensure current tree hollows are retained, and supply of hollows is sufficient for population.</li> </ul>	Weekly during construction. Monthly during first six months of operation. Annually after first 6 months of operation.	
<b>Performance indicators</b>	<ul style="list-style-type: none"> <li>No impact to areas of preferred habitat.</li> <li>No loss of tree hollows.</li> </ul>		Company Environment Officer
<b>Corrective actions</b>	<ul style="list-style-type: none"> <li>Refine alignment where outside proposed corridor.</li> </ul>	Within 6 months of identifying that performance indicators have not been met and before construction	Company Environment Officer
	<ul style="list-style-type: none"> <li>Artificial tree hollows to be affixed to trees in areas of limited supply.</li> </ul>	Within one month of identifying loss of tree hollow.	

**NB:** The measures and actions described above are indicative only and have not been endorsed as necessarily suitable for minimising or mitigating impacts on the Gouldian Finch or other listed threatened species.

### **3.6.1 Management measures**

Management measures should be designed for each of the strategies. These are the actions that need to be undertaken to prevent or mitigate impacts. A number of management measures may be required to achieve one strategy.

### **3.6.2 Monitoring requirements**

A monitoring program should be developed for management actions. This will establish whether there have been any impacts from the proposed activities, or for determining the effectiveness of mitigation measures. It will also determine whether the environmental strategies are being complied with, and whether any environmental incidents occur. Conditions of approval often include monitoring, and specify its timing and frequency.

Monitoring should be designed to provide ongoing feedback for the management of the proposal's environmental impacts, and the results should feed back into the management plan review process.

### **3.6.3 Performance indicators**

Performance indicators should be used to verify the efficacy of a management plan and will indicate the success or otherwise of particular management measures. The indicators need to be clear and concise, and must specify the outcome to be achieved.

### **3.6.4 Corrective actions**

Corrective actions need to be outlined to demonstrate that appropriate methods will be implemented if there is a deviation from a management measure, or if a management strategy or performance indicator is not achieved. The corrective action must be designed to prevent or mitigate any further impacts and should ensure that management strategies are achieved.

### **3.6.5 Responsibilities**

There should be a clear statement nominating the person(s)/agency(s) responsible for funding the particular management actions, ensuring that particular management actions are undertaken and that the strategies are achieved. This includes identification of the person's position within the relevant company or authority, or their status as separate contract personnel. Ultimate responsibility, if there is a failure in management, should be defined within the management measures.

Official agreement must be obtained where the proponent proposes that a third party (e.g. state government) will take responsibility for management actions.

### **3.6.6 Timing**

Timing needs to be specified for each of the management measures, and monitoring and reporting requirements

### **3.6.7 Training**

Staff and contractors should undergo environmental awareness training to familiarise themselves with their responsibilities for implementing the management plan. Details of this training should be mentioned in the plan.

### **3.6.8 Adaptive Management Example**

As an alternative to the prescriptive form of management plan demonstrated above, adaptive management plans may use a system of triggers and actions. An example of adaptive management is demonstrated in the following table.

### Example 2: Adaptive management triggers and actions table

<b>Strategy:</b> Establish criteria that will trigger a requirement for further mitigation measures to maintain suitable habitat for the Green and Gold Bell Frog				
Values	Triggers	Actions	Responsibility	Timing
<b>Green and Gold Bell Frog</b>	<b>Alert Triggers</b> 1. No record of breeding activity during an annual monitoring program Or 2. Any clearly unusual results observed during the course of a summer monitoring program, such as markedly low numbers of frogs at a site where they previously had not been found.	a. Consult with recognised Green and Gold Bell Frog experts to ascertain likely reasons for this. b. Incorporate relevant management recommendations into the Green and Gold Bell Frog Management Plan.	Environmental Manager	Yearly
	<b>Action Triggers</b> 1. A decline of $\geq 10\%$ in the number of individuals recorded during summer surveys at the project site over three successive years. Or 2. An overall decline of $>25\%$ in annual average number of individuals recorded during summer surveys at the project site over a three year period. Or 3. No record of breeding activity over three successive years.	a. Review and revise the Green and Gold Bell Frog Management Plan and submit for DEWHA approval. b. Select a minimum of two suitable non-operational ponds, plus drains, and manage these specifically for the Green and Gold Bell Frog.	Environmental Manager	Every three years

**NB:** The measures and actions described above are indicative only and have not been endorsed as necessarily suitable for minimising or mitigating impacts on the Green and Gold Bell Frog or other listed threatened species.

### 3.7 Auditing/verification requirements and reporting

Auditing or some other form of verification, and reporting of results, will ensure that the objectives of the management plan are being achieved. Plans should include a reporting and reviewing mechanism as well as documentation standards to demonstrate compliance. Approval conditions may include the provision of reports or mandatory audits of conditions, including the plans required by conditions.

When reporting or auditing is mandatory, the management plan must specify this and outline how and when this will be undertaken. When auditing is required on a regular basis, timing and responsibility for audits must be clearly set out in the management plan. While audits may take place internally, in some cases, appropriately accredited external auditors may be required.

The management plan should provide a clear summary of all reporting and review requirements and the timing for submission. Note, the conditions of approval may also require the submission of an annual certificate stating compliance with the approval conditions.

### **3.8 Contingency arrangements**

Although the management measures may cover most potential impacts, contingency arrangements are required in the event that management measures fail to mitigate or minimise impacts on matters of NES. This may result from human-induced (e.g. fire, oil spill) or natural extreme events (e.g. cyclone).

Contingency arrangements should not be confused with corrective actions, which are implemented when monitoring finds that current management measures are not effective in mitigating impacts during daily operations, or when there has been non-conformance with the strategies of the management plan.

### **3.9 Management plan review**

The management plan must be reviewed periodically to determine its effectiveness in protecting the matter(s) of NES. This will also allow revision of the plan to reflect knowledge gained during the life of the project. A timeline for reviewing the management plan must be established. Reviewed or revised management plans must be approved by the decision maker prior to being implemented.

## **4 Bibliography**

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