



Australia Pacific LNG Project

Volume 1: Overview

Chapter 3: Sustainability

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3. Sustainability

3.1 Introduction

An early objective of Australia Pacific LNG was to seek to develop the Australia Pacific LNG Project (the Project) in a sustainable manner – identifying potential impacts on the natural and socio-economic environment, assessing impacts using sound methodologies and identifying those actions that would assist to advance sustainability goals. This approach reflects the existing practices of both Australia Pacific LNG's joint venture partners, Origin Energy (Origin) and ConocoPhillips, to strive towards environmentally, socially and culturally acceptable project development.

The environmental impact statement (EIS) terms of reference (TOR) asks the proponent to consider sustainability in the following terms:

The EIS should provide a comparative analysis of how the project conforms to the objectives for 'sustainable development'.¹

This analysis should consider the cumulative impacts (both beneficial and adverse) of the project from a life-of-project perspective, taking into consideration the scale, intensity, duration and frequency of the impacts to demonstrate a balance between environmental integrity, social development and economic development.

This information is required to demonstrate that sustainable development aspects have been considered and incorporated during the scoping and planning of the project.

Through the EIS process, sustainability has been taken beyond the comparative analysis assessment required by the TOR by considering sustainability as a key focus of the project assessment. This chapter provides an overview of actions being taken to develop the Project consistently with sustainability principles (see Section 3.3) and address the requirements of the National Strategy for Ecologically Sustainable Development (NSED) (see Section 3.5).

3.1.1 Shared commitment to sustainability

The project proponent, Australia Pacific LNG, has a strong commitment to sustainability, evident from the degree to which sustainability has been integrated into each company's culture and management systems and the actions taken towards achieving more sustainable outcomes.

There is considerable commonality and alignment between Origin and ConocoPhillips in their sustainability focus. Their shared commitment is demonstrated through the conduct of the Australia Pacific LNG partnership, expressed through the Project's sustainability principles (see Section 3.3) and reflected throughout the EIS.

Origin's commitment

Origin is Australia's leading integrated energy company. Listed in the ASX Top 20, Origin is one of the largest producers of gas in eastern Australia and the country's largest owner and developer of gas-fired electricity generation.

¹ National Strategy for Ecologically Sustainable Development (1992), available from the Australian Government Publishing Service

As a leading wholesaler and retailer of energy and Australia's largest green energy retailer, Origin serves more than three million electricity, natural gas and LPG customers across Australia and the Pacific.

Purpose

Origin seeks to advance sustainable practices as a function of company purpose:

We will be the leading, most trusted and admired energy provider in Australia and New Zealand. We will find opportunities across the energy supply chain. We will create more value through realising the benefits of integration. We will be at the forefront of sustainable practices, contributing to a positive future for our customers, our communities, our investors and ourselves. Together we can make a difference.™

Origin's commitments, principles and values seek to advance this purpose. Origin expresses its commitments to key stakeholders as embracing the delivery of market leading performance across the energy supply chain, delivering value to customers, creating and maintaining a rewarding workplace and respecting the rights and interests of the communities in which its operates, being attentive to environmental and social impacts.

Origin implements these commitments through numerous strategies and activities. For example, the Spring Gully (central Queensland) reverse osmosis water treatment facility, launched in May 2008, turns what was wastewater into a new surface water resource for beneficial use, such as the establishment of a plantation of Pongamia trees to be used in a biodiesel trial in partnership with the University of Queensland.

In 2009, Origin finalised what is understood to be the largest bio-sequestration project in Australia to date. This project provides for the planting of six million Mallee eucalypt trees in the wheat belt regions of Australia over just the first three years of what is intended to be a 15-year project. Over its growing life, the Mallee eucalypt will 'sequester' or store carbon from the atmosphere, creating carbon sinks that offset the effects of greenhouse gas emissions. The fully realised project would potentially provide for the plantation of more than 30 million Mallee eucalypt trees and sequester approximately six million tons of carbon dioxide equivalent.

Origin was named Sustainable Company of the Year 2007 by Ethical Investor Magazine. The company also won the Australian Petroleum Production and Exploration Association Environment Award for the reverse osmosis facility at Spring Gully in Queensland, and was the recipient for the fourth time of the Green Electricity Watch accolade for the best green energy product.

ConocoPhillips' commitment

ConocoPhillips is a leading supplier of energy to world markets, is the third largest integrated energy company in the US and the fifth largest oil refiner in the world. In the Australasia region, ConocoPhillips operates the Bayu-Undan offshore platform, 500km sub-sea pipeline and the Darwin LNG facility.

Purpose

The ConocoPhillips company purpose is to:

Use our pioneering spirit to responsibly deliver energy to the world.

ConocoPhillips uses the acronym SPIRIT – Safety, People, Integrity, Responsibility, Innovation and Teamwork – to express the commitment to being adaptive and responsive, to provide creative solutions and to responsible energy supply.

For ConocoPhillips, the commitments made to sustainability are expressed within five key position statements – sustainable development, climate change, renewable energy, water sustainability and biodiversity. As part of implementing its approach to sustainable development, ConocoPhillips commits to clearly and completely integrating economic, social and environmental considerations into project development and decision-making. The ConocoPhillips sustainable development scorecard summarises the degree to which a project is aligned with company sustainable development goals. More information about ConocoPhillips' commitment to sustainability, including key position statements and the scorecard, can be found at www.conocophillips.com/EN/susdev/policies.

ConocoPhillips is addressing the environmental, technological and economic impact of greenhouse gases and other emissions associated with its own operations. For example, since beginning production in the Australasia region in 2004, the Darwin LNG facility has established new design benchmarks in the LNG industry for greenhouse gas emissions. Greenhouse gas savings were achieved through thermal efficiency, waste heat recovery, and vapour recovery solutions. Bayu-Undan has achieved an 84% reduction in flaring in 2006 as compared with 2004.

In the Northern Territory, ConocoPhillips is involved in an innovative program, West Arnhem Fire Management Agreement, which aims to reduce greenhouse gas emissions while preserving cultural traditions of Indigenous landholders. In 2007, the environmental credentials of Darwin LNG were recognised by the Northern Territory Minerals Council Resource Awards of Excellence in the area of Environmental Management.

3.2 Sustainability in policy and legislative frameworks

3.2.1 National Strategy for Ecologically Sustainable Development

In 1992, the Australian Government developed the National Strategy for Ecologically Sustainable Development (NSES D) to provide broad strategic directions and a framework for governments to direct policy and decision-making with respect sustainable development issues. The NSES D was endorsed by the Council of Australian Governments (COAG) and adopted across all levels of the Australian Government.

The key elements of the NSES D are:

- “Goal:
 - Development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends
- Core Objectives:
 - To enhance individual and community wellbeing and welfare by following a path of economic development that safeguards the welfare of future generations
 - To provide for equity within and between generations
 - To protect biological diversity and maintain essential ecological processes and life-support systems
- Principles:

-
- Decision making processes should effectively integrate both long and short-term economic, environmental, social and equity considerations
 - Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation
 - The global dimension of environmental impacts of actions and policies should be recognised and considered
 - The need to develop a strong, growing and diversified economy which can enhance the capacity for environmental protection should be recognised
 - The need to maintain and enhance international competitiveness in an environmentally sound manner should be recognised
 - Cost effective and flexible policy instruments should be adopted, such as improved valuation, pricing and incentive mechanisms
 - Decisions and actions should provide for broad community involvement on issues which affect them

These guiding principles and core objectives need to be considered as a package. No objective or principle should predominate over the others. A balanced approach is required that takes into account all these objectives and principles to pursue the goal of ecologically sustainable development (ESD)” (Ecologically Sustainable Development Steering Committee 1992).

3.2.2 Legislative frameworks

The principles of the NSESD find expression in a number of Commonwealth and state laws, including the:

- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, directed to the protection of matters of national environmental significance
- Queensland *Environmental Protection Act 1994* concerned with the protection of Queensland's environment
- Queensland *Nature Conservation Act 1992* enshrining principles to conserve biological diversity, ecologically sustainable use of wildlife and ecologically sustainable development
- Queensland *Coastal Protection and Management Act 1995* to recognise the diverse range of coastal resources and values in the coastal zone
- Queensland *Sustainable Planning Act 2009* which supersedes the *Integrated Planning Act 1997* and provides a framework for government consideration of community, economic and environmental factors in planning and development.

In targeting actions to achieve more sustainable outcomes, considerations will be derived from policy and legislative frameworks, and also incorporate voluntary commitments. The approach adopted in this EIS draws on all these elements.

3.3 Australia Pacific LNG approach

The commitment to sustainable development drives Australia Pacific LNG to identify impacts on people and on the environment, to find ways to minimise risks and to contribute lasting benefits to society.

Australia Pacific LNG implements this commitment through systems and processes to ensure consideration of social, environmental and economic impacts, risks and benefits are incorporated into business decision-making.

3.3.1 Developing sustainability principles

Origin and ConocoPhillips each have policies pertaining to the range of themes that come under the umbrella of 'sustainability'. Sustainability principles were developed specifically for application as part of developing the Project using the following process. The respective policies of both Origin and ConocoPhillips were consolidated and organised into theme areas and alignment between the policies of the two organisations were mapped. Key external standards were referenced, including the NSESD and International Finance Corporation performance standards (International Finance Corporation 2007). Building on this base, through a series of project workshops, a set of sustainability principles were developed to guide the progress of the Project and provide common guidelines for consideration with respect to all elements of the Project – the gas fields, gas pipeline and LNG facility.

Project purpose

The overarching commitment to sustainable practices is contained in the project purpose. Australia Pacific LNG's project purpose is:

We will create value for our stakeholders by delivering environmentally, socially and economically responsible energy from Australia Pacific LNG's substantial coal seam gas resources in Queensland. We will achieve this through teamwork, innovation, integrity and the application of safe and sustainable practices.

The following sustainability principles underpin the project purpose.

Project sustainability principles

The Australia Pacific LNG Project aspires to be at the forefront of sustainable practices, contributing to a positive future for customers, communities, investors and employees.

Australia Pacific LNG will contribute to sustainable development by:

- Adhering to an overriding duty to safety, ensuring operations are carried out in a safe manner and empowering employees and contractors to place safety considerations above all other priorities
- Fostering the health and well-being of its workforce
- Creating and maintaining a rewarding workplace for employees and contractors by encouraging personal development, recognising good performance, valuing teamwork and fostering equality of opportunity and inclusivity
- Minimising adverse environmental impacts and enhancing environmental benefits associated with its activities, products or services; conserving, protecting, and enhancing where the opportunity exists, the biodiversity values and water resources in its operational areas

- Reducing the greenhouse gas intensity through the development of an energy source less carbon intensive than the world average for the majority of fuel providers for power generation; and implementing a greenhouse gas mitigation strategy for its operations to continuously seek opportunities to further reduce greenhouse gas emissions
- Using resources efficiently, reducing the intensity of materials used and implementing programs for the reduction and reuse of waste
- Respecting the rights, interests and diverse cultures of the communities in which it operates
- Engaging regularly, openly and transparently with people and communities affected by its activities, considering their views in its decision-making and striving for positive social outcomes
- Working cooperatively with communities, governments and other stakeholders to achieve positive social and environmental outcomes, seeking partnership approaches where appropriate
- Upholding exemplary ethical behaviour in all aspects of its business
- Identifying, assessing, managing, monitoring and reviewing risks to its workforce, its property, the environment and the communities affected by its activities
- Ensuring that all employees and contractors work consistently with its sustainability principles, commitments, values and systems.

Australia Pacific LNG will ensure that sustainable practices are an integral element of the way it does business, and will develop and maintain systems to drive continuous improvement.

3.3.2 Application of sustainability principles

The sustainability principles have been used as a key reference point for:

- Identifying and analysing potential impacts of the Project on the natural and socio-economic environment
- Identification and assessment of risks associated with impact; to assist with decision making about project planning and development options
- Consideration of opportunities
- Aiding in the formulation of project commitments and mitigation strategies.

The process for integrating sustainability analysis and commitments into the Project's lifecycle will be adherence to the 'Plan, Do, Check, Act' continuous improvement cycle.

3.4 Consideration of sustainability theme areas

A qualitative assessment has been undertaken, detailing how effectively the Project's EIS process has addressed sustainability aspects. This responds to the TOR requirement:

...to demonstrate that sustainable development aspects have been considered and incorporated during the scoping and planning of the project.

This qualitative assessment has been undertaken having regard to the NSESD. This is discussed in Section 3.5, including how the Project aligns NSESD goals, core objectives and principles.

In addition, a qualitative assessment against the sustainability principles themselves has been undertaken. Some of the sustainability principles relate to themes that are not included in the EIS TOR. Only those principles directly relevant to the TOR are referenced.

To assist in a systematic assessment against the sustainability principles across all project aspects of the EIS, the sustainability principles were grouped into the theme areas of:

- Stakeholders and community
- Climate change and energy
- Biodiversity
- Land and amenity
- Water
- Health and safety.

The sustainability principles were considered consistently with the steps described in Section 3.3.2.

In the remainder of this section, a summary of sustainability considerations are provided for each of these key theme areas.

3.4.1 Stakeholders and community

Stakeholders and community

Communities, landowners, government and many other stakeholders have a close interest the development of the coal seam gas (CSG) to liquefied natural gas (LNG) business in regional Queensland. The gas fields, located in the Bowen Basin and Surat Basin, cover an area extending from Wallumbilla to Millmerran on the Darling Downs.

The gas pipeline will start from the northern Walloons area near Miles and track some 450km north to Curtis Island. The expansive coverage of the Project means Australia Pacific LNG is interacting with many communities and stakeholders over extensive regions.

In applying sustainability principles of respecting the rights, interest and cultures of communities, engaging openly and transparently, and working cooperatively to achieve positive outcomes, extensive work has been undertaken to gain an understanding of stakeholder views of the Project and how it may affect people in the communities spanning the gas fields, gas pipeline corridor and downstream facilities. Through the existing gas fields projects in Talinga, Spring Gully and Peat, Origin has had the opportunity to work with landowners and local communities over a 10-year period; the ongoing consultations with stakeholders in the gas fields, and the consultations that have been initiated with Gladstone and communities along the gas pipeline corridor as the Project has progressed, have provided feedback on the wider community views and interests.

The further methods used to identify, understand and assess social impacts around the Project have been social research and benchmarking and risk and impact analysis. Positive or beneficial social and economic impacts have also been considered in the assessment process. The information obtained through these methods has been the basis for assessing interests and potential impacts and identifying project approaches. Extensive stakeholder consultation, social research and impact monitoring will continue as the Project develops, and an approach will be adopted of working to deliver enduring and sustainable benefits into the regions over the long-term.

Employment and training and development

The skill profile of the workforce for the Project will vary, and encompass unskilled, semi-skilled, trade and professional requirements. The workforce will peak during the construction period. As the Project moves from construction to operation, labour numbers will decline and then plateau according to ongoing operational needs. The Project will seek to maximise employment opportunities for local and regional residents while seeking to mitigate disruptive impacts of project workforce requirements on the existing local and regional labour pool. A 'local first' policy will be applied, where possible, seeking to employ locally in the first instance and where practical, while recognising the need for specialist industry skills. Readily accessible information and advice will be provided to assist those seeking employment within the Project through shop-front, open days and workshops.

Community investment programs will support goals to assist people from project area communities to maximise opportunities to gain employment; for instance, through the provision of scholarships to support a mix of apprenticeships and vocational training opportunities in partnership with tertiary institutions and local training providers where appropriate.

Business opportunities

In keeping with the Project's desire to work with and through communities to build capacity, a local content strategy will be developed whereby Australia Pacific LNG will participate in or establish programs which assist qualified local and regional businesses with the opportunity to tender for provision of goods and services to the Project.

Indigenous stakeholders

Through an Indigenous engagement strategy, education, training, employment and business development will be similarly targeted. Access to education and training will be provided through secondary school and tertiary scholarships and a school-based traineeship program.

Indigenous business development and contracting opportunities will be fostered by implementing a sponsorship program supporting Indigenous business development.

Wider social impacts

The social impact assessment chapters of this EIS address wider social impacts including community, and are available in Volume 2 Chapter 20, Volume 3 Chapter 20 and Volume 4 Chapter 20.

Stakeholder and community interests in the wider region include opportunities to benefit from the Project through employment and business opportunities, potential impacts on local services and facilities and housing demand.

To better understand the social effects, the Project will collaborate with government, industry and community partners on research programs to understand the social impacts and opportunities created by the development in the community. Through community investment programs, sustainable community development will be supported by the Project. Australia Pacific LNG will also work with government, the community and industry to plan for potential cumulative impacts.

To address possible housing impacts, during construction Australia Pacific LNG will provide housing for non-local construction staff and contractors in temporary accommodation facilities. Australia Pacific LNG commits to consulting with stakeholders, including local councils, as part of the site selection process for these facilities.

To further mitigate the pressure on housing during operations for the gas fields and gas pipeline, the non local operations workforce will transition from temporary accommodation facilities to live in the community as housing becomes available. For the LNG facility, the operations workforce will live within the local community in the general housing pool.

To further address possible housing impacts, Australia Pacific LNG will work through committees established under the Sustainable Resource Communities Policy to identify housing market issues, forecasts and possible responses. Community programs will include working with government and agencies that provide support to people in distress.

3.4.2 Climate change and energy

There is strong global demand for energy, but this occurs at the same time we are challenged with demands for resource conservation, the need to reduce global greenhouse gas emissions and tackle climate change; a time of significant population growth and the rapid expansion of under-developed economies. The global population, for instance, continues to rise and is anticipated to reach between 8 billion and 10.5 billion people by 2050 (United Nations 2008).

The International Energy Agency (IEA) notes that between 2006 and 2030, global energy demand is expected to rise by between 32% and 45% (IEA 2008) depending on the degree of energy efficiency improvements that are implemented. The largest growth is expected to be in developing and emerging economies, in particular, China and India. Even at the lower end of the scale, this illustrates the huge growth in demand created by rising populations and technological development.

The Intergovernmental Panel on Climate Change (IPCC) states that evidence shows that many natural systems are being affected by regional climate changes (IPCC 2007). The predicted effects of climate change can be largely detrimental to people and the environment and include increases in the frequency and intensity of extreme weather events and consequent impacts on natural and human systems.

Energy production and consumption, principally of fossil fuel origin, accounts for 65% of the world's greenhouse gas emissions (IEA 2009). Efforts to tackle climate change, therefore, must necessarily involve changes in the energy sector, through transition to less greenhouse gas intensive energy sources and continuing reductions in greenhouse gas emissions in the production of that energy source, including an energy efficient delivery chain.

The Australian Government is committed to reduce carbon pollution, create jobs for a carbon-constrained future and secure Australia's future prosperity. The commitments are underpinned by the three-pillar strategy of global solution (to help shape a collective response), mitigation and adaptation.

The three-pillar strategy is the basis of many government initiatives, including the proposed Carbon Pollution Reduction Scheme, Renewable Energy Target, Climate Change Adaptation Program, and various bilateral climate change partnership programs. The Australia Pacific LNG approach aligns with the Government's three-pillar strategy.

Global solution - market demand and energy

The Project aligns with the 'global solution' dimension of the Australian Government's three-pillar strategy through the development of a low-pollution energy source that, in particular, addresses global electricity generation needs.

Natural gas and coal seam gas are very similar once extracted as both consist principally of methane gas. Such gas is energy rich, abundant, and is the least polluting of fossil fuels. The extraction and

processing of natural gas is well established; and natural gas is an economical, efficient and responsive (i.e. low lag-time) source to fuel electricity generation. It is therefore an ideal transitional fuel source in the medium term, while technologies to harness renewable fuel sources are being developed. Owing to the inherent fluctuations in the availability of renewable energy sources, natural gas is also an ideal provider of base load energy to renewable fuel sources in the long term.

Traditionally, the widespread use of natural gas in electricity generation has been limited by difficulties in transporting it over a large distance. This issue has been addressed by the advent of natural gas liquefaction technology allowing gas to be transported at 1/600th its otherwise ambient volume. A prime example of this technology is ConocoPhillips' Optimized Cascade® Process which will be employed on the Project.

With insufficient gas supplies in several Asian economies (Japan, China, South Korea and Taiwan) to meet domestic demand, there is considerable LNG export potential for countries like Australia which have extensive gas supplies. LNG is often used to replace coal or other fossil fuels for power generation in these countries.

The Project will supply a source of low carbon energy to the world, which will assist in efforts to transition to a low carbon economy, a goal embodied in the Project's purpose of *'delivering environmentally, socially and economically responsible energy'* This supply is relatively abundant and long-term with substantial proven CSG reserves and will operate for at least thirty years. In developing this energy supply, the Project contributes to the goal of delivering a global solution aimed at combating climate change.

Australia Pacific LNG has considered both mitigation and adaptation aspects of energy and climate change. A core goal is to operate efficiently and reduce project-related greenhouse gas emissions through energy efficiency measures and other initiatives in addition to continuously seeking opportunities to further reduce greenhouse gas emissions.

Mitigation

Specific measures for the gas fields include minimising the amount of operational flaring and venting, development of a leak detection and repair program; producing a strategy to minimise plant shutdowns; and installation of automated well control to allow field well turn down capability. For the LNG plant, mitigation actions will include installation of waste heat recovery units on gas turbine exhaust stacks to meet process heat duty requirements; recovery of vapours generated during LNG ship loading; and using high efficiency (e.g. aero-derivative) drivers for the LNG plant's refrigerant compressors.

The Project also aims to assess and incorporate renewable energy sources into the gas fields and gas pipeline project design and delivery. For example, renewable energy options are being investigated in project design, including design of wellheads, remote areas and temporary accommodation facilities.

Adaptation

In addition to operational mitigation, climate change adaptation risks have also been investigated through a risk assessment process using accepted climate change scenarios. Risks identified include sea level rise, coastal erosion, extreme weather events, flooding, more variable rainfall and elevated temperatures. A risk register has been developed and risk mitigation solutions are being incorporated into the design of the facilities. Climate change adaptations have been fed into the Project's front-end engineering design to ensure that mitigation of risks is accounted for in the design of facilities.

3.4.3 Biodiversity

This section outlines how Australia Pacific LNG has sought to integrate sustainability into the biodiversity assessment and management strategy of the Project. Based on a biodiversity assessment, the key impact on biodiversity from the Project has been identified as the clearing of remnant vegetation and the potential degradation of habitats through edge effects and fragmentation.

The biodiversity assessment characterised the Project area as a highly modified landscape, within which some large remnant tracts of vegetation persist. These remnants are primarily on less fertile lands at higher altitudes. The more fertile, lower altitude lands are intensively grazed, and generally have only small, more isolated patches of remnant vegetation.

With a view to minimising the biodiversity impacts of the Project, Australia Pacific LNG will maintain conservation and biodiversity values and manage environmental aspects responsibly in accordance with statements of principle. A process of identification, mitigation, rehabilitation and offsetting of impacts has been applied and will continue to be developed. A risk and opportunity analysis which considers strengths, weaknesses, opportunities and threats, has allowed us to identify strategies that align with these goals. This analysis was subsequently informed and developed through the application of further risk assessment.

Footprint minimisation is a key consideration in gas field development. Planning and construction of any site will occur in a manner that minimises the area of disturbance. Land disturbance will be minimised by using existing infrastructure such as roads, tracks and other disturbed areas wherever possible. Where practicable, activities will be located away from significant vegetation, and 'endangered' and 'of concern' regional ecosystems. Appropriate buffers will also be established. In general the area of disturbance at any site will be kept to the minimum required to safely conduct the activity. Where clearing is necessary, offsets will be developed for areas of conservation significance to counter impacts.

Mitigation

Biodiversity value will be protected by restricting disturbance. The Project area has been classified in accordance with the associated biodiversity values. For the gas fields, management measures associated with each of these areas have been developed. These range from avoidance, including appropriate buffer distances, to implementation of management measures to mitigate impacts during disturbance activities. These are included in greater detail later in the EIS.

For the gas pipeline, important ecological areas will be protected by alignment changes within the selected corridor. Construction methods will be designed to minimise impacts to flora and fauna including restricting corridor width and minimising lengths of open trench, and progressively carrying out rehabilitation.

For the LNG facility, the potential area affected is of a lower scale than for the gas fields and gas pipeline components of the Project. However, a number of management measures to mitigate impacts during disturbance activities on the LNG facility site and for the management of retained vegetated areas will be implemented.

Rehabilitation

In the gas fields, rehabilitation will be undertaken progressively during field development. This will largely be done by reducing footprints following construction activities to the minimum practicable operational area and encouraging natural regeneration. Further rehabilitation will be undertaken following decommissioning. This will include a suitable maintenance period following rehabilitation.

For the gas pipeline, rehabilitation will be undertaken by reducing corridor width following construction and promoting revegetation, recognising operational access requirements. Further rehabilitation will be undertaken following gas pipeline decommissioning to restore areas to pre-disturbed standard.

For the LNG facility, disturbance will be restricted to areas required for development and retained vegetation areas on the site will be managed to avoid further impacts.

Offsetting

The Project impacts on biodiversity in the region will be countered with offsets.

State and regional biodiversity corridors traverse a number of the gas field tenements. The corridors are not intact due to historical clearing. The Australia Pacific LNG offset package will focus on enhancing the biodiversity corridors within the Project tenement boundaries, subject to landholder agreement and the availability of land. The offset package may include protection and enhancement of regrowth vegetation, replanting and re-establishing pre-clearing regional ecosystems within currently cleared areas of the corridors, where practicable, and rehabilitating infrastructure locations following decommissioning.

Reconnecting currently fragmented habitat within these corridor areas over the life of the Project is predicted to result in a significant, long term positive impact on regional biodiversity compared to the 'no project' case. The Project seeks to reduce the amount of fragmentation that currently exists, pre-development.

3.4.4 Marine and coastal

The location for the LNG facility is adjacent to Laird Point, on the western side of Curtis Island in the Curtis Island Industry Precinct, adjacent to Gladstone. Port Curtis has areas that are largely un-impacted by human activity as well as areas that are highly modified by port developments and various industries. Laird Point is at the start of The Narrows, the passage that separates Curtis Island from the mainland. The Project's LNG facility location is within Gladstone Port limits, but also within the Great Barrier Reef World Heritage Area.

The proposed development site is surrounded by vegetated habitat, which includes seagrass meadows, mangrove and saltmarsh areas that in turn provide habitat for various invertebrates, fish, aquatic reptiles and mammals.

In applying sustainability principles with respect to the marine and coastal environment, the process of identification, mitigation, rehabilitation and offsetting of impacts will be applied. Impacts have been identified through specialist studies of geology, air, water, flora and fauna. Commercial and recreational uses of the harbour have also been reviewed. A risk assessment has been undertaken to analyse potential impacts and identify mitigation strategies and measures.

Throughout the study and assessment period, extensive consultations have also taken place with stakeholders in the Gladstone and Curtis Island region, which have informed the understanding of interests and concerns regards the Project's development.

Mitigation

Stakeholders have demonstrated a close interest in the use of the Western Basin of Gladstone Harbour and The Narrows and how the Project may affect recreational uses of the harbour. The Project will investigate horizontal directional drilling for The Narrows gas pipeline crossing as the preferred option, which would reduce the degree of marine trenching.

Australia Pacific LNG will continue with extensive consultations with stakeholders and communities as Gladstone Ports Corporation continues to consider the proposed project for dredging and development in the Western basin.

Australia Pacific LNG will seek to work collaboratively with government and stakeholders to address impacts on boating and fishing access.

Similarly, Australia Pacific LNG will work with the Gladstone Ports Corporation and other port users to develop an industry-wide approach to minimise injury to marine mammals and turtles from boats. A sensitive lighting approach on the LNG facility will be used to reduce light spill impact on marine fauna.

Rehabilitation

For the LNG facility, land rehabilitation will be undertaken following the facility's decommissioning. Any areas temporarily disturbed during construction will be stabilised and landscaped for the operational phase.

Offsetting

Australia Pacific LNG has consulted widely with local stakeholders on offset options and has identified a preference for offsets at the local/regional levels. Australia Pacific LNG will work collaboratively with other Western Basin projects to offset the loss of protected marine habitat as continuing research and investigation is pursued to identify options.

3.4.5 Land and amenity

Australia's agricultural and rural land is under pressure from mining, transport, manufacture, urbanisation and energy production. Land management in the rural landscape plays an important role in the security of water systems, protection of biodiversity, as well as absorption of wastes (e.g. CO₂) and nutrients. Consequently, developments need to be sensitive to the competing land uses, with the aim of reducing impacts of both current projects and those anticipated in the future.

In this section, the term 'land' also covers visual amenity and noise, as they all have the potential to impact on the local land character, as well as affecting localised sensitive receivers.

The most significant potential impacts of the Project to land will occur in the gas fields due to the intensity of activities in these locations. The scale and duration of the impacts is significant, and so the gas fields component of the Project, together with other proposed CSG developments throughout the region, are likely to result in some transformation of the existing agricultural community to a shared land use of agriculture and CSG production.

The Project is underpinned by the planning principles of respecting the rights and interests of landholders; minimising direct and indirect impacts (e.g. noise, sedimentation/erosion, visual amenity, lighting and waste discharges); and consulting to acceptable outcomes through agreement on management procedures, offsets and/or compensation.

Australia Pacific LNG continues to engage with the community to develop sustainable regional land use strategies that seek an enduring balance between the Project, agricultural interests and biodiversity. The aim will be to enhance land use potential over the life of the Project and to promote beneficial land uses both during and after the Project. In particular, opportunities to provide associated water for sustainable beneficial uses, including agriculture, will be actively sought (see Section 3.4.6). The Project will also provide a future legacy of improved infrastructure such as roads, power and telecommunications.

Weed management will be undertaken proactively. Weed wash-down facilities will be constructed near Miles to support gas field construction and operations, and at a location in the Banana Shire to support gas pipeline construction and operations. This will be done in conjunction with regional councils.

Land disturbed by the Project will be rehabilitated to subsequently achieve outcomes of pre-disturbed standard (or better) progressively over the course of the Project. Aboveground infrastructure will be removed and the land rehabilitated following facility decommissioning at end-of-project life.

For the LNG facilities, aboveground onshore infrastructure will also be removed and the land rehabilitated as appropriate for future intended use following facility decommissioning.

Project infrastructure will be designed and sited to maintain both visual amenity and local and regional character where practicable. For example, the site selection and design of infrastructure has been conducted partly so that the most visually evident elements will be located away from public viewpoints such as main roads and tourist vistas. Where possible, infrastructure will be screened (such as with the ground flares) and coloured appropriately (as with some buildings) to blend in with the natural landscape.

Noise and light will be controlled to minimise environmental harm or loss of amenity. Impacts will be minimised through a combination of infrastructure positioning, selection of design criteria and treatments, as well as other abatement technologies.

Throughout the project life, including site preparation, construction, operation, decommissioning and rehabilitation, the Project will produce a variety of waste streams and products. In the assessment of potential impacts, wastes relating to these project phases were categorised into general waste, recyclable and regulated waste. Australia Pacific LNG will develop a detailed waste management plan and will seek to leverage the application of these principles through the supply chain, such as establishing contracts with companies encouraging sustainable waste management practices.

Australia Pacific LNG will seek to control air emissions from project activities to ensure ambient air quality is not degraded such that there is no potential for adverse health effects or environmental harm. For the gas fields and the gas pipeline, measures will include designing all plants to use lean-burn low nitrogen oxide emission engines and turbines wherever these are practical, investigating alternative low emission technologies as appropriate and minimising dust emissions through the implementation of environmental management plans that includes measures to, as far as practicable, minimise land disturbance activities, suppress dust and rehabilitate disturbed land. For the LNG facility, examples of technologies to be used that will assist in meeting air quality objectives include use of power generators equipped with dry low nitrogen oxide technology and the use of waste heat recovery to supply process heat, which will assist to reduce CO₂ emissions.

3.4.6 Water

Overview

Water is fundamental to the extraction of CSG, both in terms of the management of water unavoidably extracted during the production process, and as a resource during CSG exploration, construction and operation activities.

For the extraction of CSG, the pressure within the coal seam is reduced with the releasing of water to the surface. The water is known as 'associated water'. It is anticipated that to meet peak gas production, substantial volumes will be extracted from the Walloons coal seams. The associated water produced during the CSG extraction typically contains concentrations of salts, boron, fluoride and sodium and elevated pH compared with potable water.

Prior to production of CSG, extensive development and construction infrastructure is proposed to allow for gas processing and transmission. This, and other infrastructure associated with a project of this magnitude, will require water for compaction, dust suppression, hydrotesting, workforce health and hygiene and a number of other CSG activities.

Regional context

The Project area is situated in the Surat Basin, some 280,000km² in area, located in the eastern-most corner of the Great Artesian Basin which underlies a large portion of the arid and semi-arid inland of Australia. Artesian and sub-artesian groundwater within the Great Artesian Basin supports a range of nationally important socio-economic, natural and cultural values.

Many townships in the Surat Basin, Dalby, Miles and Chinchilla among them, are experiencing water availability and quality challenges, and are examining alternative measures for the provision of water as a consequence. The local region around Miles through to Dalby is fast evolving as an energy hub for Queensland. New developments requiring significant amounts of water are likely to proceed as part of the Surat Basin development.

Approach

Australia Pacific LNG has invested substantial time and resources investigating the Project's impact on water and in seeking to understand community and stakeholder views about water options. It is recognised that water supply in the region and the protection of existing water resources is of great concern to community and regulatory stakeholders.

An intensive consultation was undertaken with external stakeholders in 2008 to formulate an exhaustive list of water management options. A community engagement program was also undertaken in 2008 to invite submissions and ideas for water use from the community. Community responses were primarily in support of agricultural uses.

Numerous technical studies have also been undertaken. The following are recent studies specifically commissioned to examine aspects of the potential impact of the Project on water:

- Agricultural demand study
- Condamine flow and aquatic biology investigations
- Saline water management study
- Groundwater modelling study – regional and Surat Basin
- Aquifer injection pre-feasibility investigation
- Commercial demand study – focusing on mining, energy and water grid opportunities.

External and internal analyses of water options has been undertaken using strengths, weaknesses, opportunities, threats (SWOT) analysis and risk and opportunity assessment methodologies.

Drawing on findings of studies, external stakeholder views and extensive analysis, Australia Pacific LNG has developed an approach to water management founded on three key elements:

Adaptive management

Australia Pacific LNG has developed an adaptive associated water management plan to assist with the long-term and eminent management of associated water. The plan will establish a framework, promoting active response to regulatory change and stakeholder engagement. Management practices

are to emulate the framework, adopting a continuous improvement cycle of plan, develop, evaluate, implement and monitor.

Sustainable operations

Management of water is to be undertaken by applying a holistic approach, considering environmental, social and economic dimensions of water aspects. Consistent with NSESD strategies, water solutions are required to be economically viable whilst being in the interests of all stakeholders now and in the future.

Flowing from our sustainability principles to minimise adverse environmental impacts, enhance benefits associated with Australia Pacific LNG activities and use resources efficiently, day to day operations will seek to adopt sustainable approaches to water management. For example, treated, recycled or reused water will be used wherever feasible, including for uses such as dust suppression and hydro-testing of pipes and tanks. Over the long term, where practicable, it is intended that the Project will be self sufficient with respect to water use.

Develop and monitor

Australia Pacific LNG aims to continually improve its understanding regarding effects of associated water extraction, treatment, storage and handling through ongoing studies and adaptive management. Australia Pacific LNG commits to a continuing programme of review of beneficial water use.

To complement the implementation of long-term groundwater monitoring, it is proposed that local community groups will be consulted and where possible involved in the implementation of local monitoring programs. Hydrogeologic databases and modelling will also be regularly reviewed to contribute to Australia Pacific LNG's understanding of the subsurface water environment.

3.4.7 Health and safety

Australia Pacific LNG's approach to health, safety and the environment (HSE) has several key elements, including identifying and managing hazards, communication, education and training, as well as emergency preparedness and response. In order to minimise impacts of the potential risks, the operators of the respective portions of the Project will operate the Project under their respective HSE management systems for each of the gas fields, gas pipeline and LNG facility. The HSE management systems will include safety policies, definition of roles and responsibilities, risk management procedures, training protocols, emergency response and preparedness and defined communication systems.

Health and safety risks to the local community have also been assessed as part of the hazard and risk assessment process. Matters of community health and safety will be communicated regularly through channels including Australia Pacific LNG's community shopfront and consultation sessions. Australia Pacific LNG will also maintain an up-to-date traffic management plan, with considerations for, amongst other things, driver fatigue monitoring, ongoing education and training of drivers and pedestrians in road hazards and journey planning. The Project will initiate and participate in ongoing campaigns to reduce the likelihood and consequence of vehicle accidents.

3.5 Comparative analysis against national sustainability standards

This section provides a comparative analysis of how the Project conforms to the national ecologically sustainable development objectives (Ecologically Sustainable Development Steering Committee 1992). This analysis considers the cumulative impacts of all elements of the Project (gas fields, gas

pipeline and LNG facility) across the entire project lifecycle, from design and construction to operation and decommissioning.

The information presented here has been prepared in response to the TOR:

The EIS should provide a comparative analysis of how the project conforms to the objectives for 'sustainable development'.²

This analysis should consider the cumulative impacts (both beneficial and adverse) of the project from a life-of-project perspective, taking into consideration the scale, intensity, duration and frequency of the impacts to demonstrate a balance between environmental integrity, social development and economic development.

The elements of the ESD framework consist of the statement of a goal, core objectives and guiding principles. These are addressed in turn.

3.5.1 Alignment with the NSESD goal

The NSESD goal is:

Development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends.

The Australia Pacific LNG Project purpose aligns with this goal:

We will create value for our stakeholders by delivering environmentally, socially and economically responsible energy from Australia Pacific LNG's substantial coal seam gas resources in Queensland. We will achieve this through teamwork, innovation, integrity and the application of safe and sustainable practices.

The NSESD goal is separated into the components: 'improving the quality of life'; and 'maintaining ecological processes' to allow further comparative analysis.

Improving quality of life

Contributions to an improved quality of life will be made directly by the Project, and indirectly through payment of taxes to the government, then distributed more widely in society. The Project seeks to deliver enduring direct benefits to a broad range of stakeholders over the long term.

The opportunities for project employment and long-term career pathways are extensive. Shareholders will gain dividends and potential for capital growth. Customers will be provided with secure, long-term, low carbon energy. Communities will obtain social investment, and contributions to improved infrastructure, education and training, employment and business opportunities.

Indirectly, taxes will be returned to government, benefiting Queenslanders and Australians in general. Finally, all society benefits through reduced greenhouse gas emissions as LNG replaces coal in customers' power stations. For more information, refer to the following EIS chapters:

- Social assessment – Volume 2 Chapter 20, Volume 3 Chapter 20 and Volume 4 Chapter 20
- Economic assessment – Volume 2 Chapter 21, Volume 3 Chapter 21 and Volume 4 Chapter 21
- Stakeholder engagement – Volume 2 Chapter 2, Volume 3 Chapter 2 and Volume 4 Chapter 2

² National Strategy for Ecologically Sustainable Development (1992), available from the Australian Government Publishing Service

- Indigenous cultural heritage – Volume 2 Chapter 18, Volume 3 Chapter 18 and Volume 4 Chapter 18
- Shared cultural heritage – Volume 2 Chapter 19, Volume 3 Chapter 19 and Volume 4 Chapter 19
- Climate and climate change adaptation – Volume 2 Chapter 4, Volume 3 Chapter 4 and Volume 4 Chapter 4.

Maintaining ecological processes

The Project will adhere to sustainable practices and contribute direct benefits to the natural environment by avoiding areas of high ecological value, minimising impacts to biodiversity, rehabilitation and offsetting unavoidable impacts in accordance with the framework described in Section 3.4.3.

The Project will strive for overall enhancement in biodiversity in the broad project region and over the long-term where those opportunities arise.

Further information is available in the following EIS chapters:

- Terrestrial ecology – Volume 2 Chapter 8, Volume 3 Chapter 8, and Volume 4 Chapter 8
- Aquatic ecology – Volume 2 Chapter 9, Volume 3 Chapter 9, and Volume 4 Chapter 9
- Marine ecology – Volume 3 Chapter 10 and Volume 4 Chapter 10.

3.5.2 Alignment with the NSESD core objectives

The NSESD core objectives are:

- To enhance individual and community wellbeing and welfare by following a path of economic development that safeguards the welfare of future generations
- To provide for equity within and between generations
- To protect biological diversity and maintain essential ecological processes and life-support systems.

The Project sustainability principles are in alignment with these core objectives, as discussed in Section 3.3.

The NSESD core objectives can be separated into the components: 'wellbeing and welfare', 'inter-generational equity', 'intra-generational equity' and 'biological diversity' to allow further comparative analysis as follows.

Wellbeing and welfare

Individual and community wellbeing and welfare will be enhanced through employment opportunities, community investment programs, improved infrastructure and services, education and training, business opportunities and economic flow through effects.

Further information is available in the following EIS chapters:

- Social assessment – Volume 2 Chapter 20, Volume 3 Chapter 20, and Volume 4 Chapter 20
- Economic assessment – Volume 2 Chapter 21, Volume 3 Chapter 21, and Volume 4 Chapter 21.

Inter-generational equity

Inter-generational equity is addressed by focusing strategies on the long term and the intent to deliver sustainable benefits over time. Through the Project's stakeholder engagement process Australia Pacific LNG has sought to develop long-term relationships with communities. Origin and ConocoPhillips recognise the need to develop long-term relationships and that successful relationships can only come from earning community trust.

With this in mind, Australia Pacific LNG has committed extensive people and physical resources in the region to engage with and seek the views and opinions of communities and other stakeholders and to strive towards becoming an integral and valued part of the community. The opportunities created by the Project will have a long-term focus by seeking collaborations with community and government so that capacity is grown during the course of the Project and beyond.

Further information is available in the following EIS chapters:

- Social assessment – Volume 2 Chapter 20, Volume 3 Chapter 20, and Volume 4 Chapter 20
- Economic assessment – Volume 2 Chapter 21, Volume 3 Chapter 21, and Volume 4 Chapter 21
- Stakeholder engagement – Volume 2 Chapter 2, Volume 3 Chapter 2, and Volume 4 Chapter 2.

Intra-generational equity

The Project will provide for equity within generations by implementing programs specifically targeting under-represented groups to ensure project benefits are distributed widely. For example, Australia Pacific LNG will have Indigenous school and tertiary scholarships, a school-based traineeship program, an Indigenous employment policy and strategy, and Indigenous contracting guidelines and tendering criteria.

Further information is available in the following EIS chapters:

- Social assessment – Volume 2 Chapter 20, Volume 3 Chapter 20, and Volume 4 Chapter 20
- Indigenous cultural heritage – Volume 2 Chapter 18, Volume 3 Chapter 18, and Volume 4 Chapter 18.

Biological diversity

Australia Pacific LNG will strive to protect biological diversity and maintain essential ecological processes and life-support systems by adopting sustainable practices including:

- Avoiding areas of high ecological value
- Minimising impacts to biodiversity in general
- Progressively rehabilitating disturbed ecosystems
- Offsetting unavoidable impacts.

Further information is available in the following EIS chapters:

- Terrestrial ecology – Volume 2 Chapter 8, Volume 3 Chapter 8, and Volume 4 Chapter 8
- Aquatic ecology – Volume 2 Chapter 9, Volume 3 Chapter 9, and Volume 4 Chapter 9
- Marine ecology – Volume 3 Chapter 10 and Volume 4 Chapter 10.

3.5.3 Alignment with NSESD principles

The NSESD guiding principles state:

- Decision making processes should effectively integrate both long and short-term economic, environmental, social and equity considerations
- Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation
- The global dimension of environmental impacts of actions and policies should be recognised and considered
- The need to develop a strong, growing and diversified economy which can enhance the capacity for environmental protection should be recognised
- The need to maintain and enhance international competitiveness in an environmentally sound manner should be recognised
- Cost effective and flexible policy instruments should be adopted, such as improved valuation, pricing and incentive mechanisms
- Decisions and actions should provide for broad community involvement on issues which affect them.

Decision-making considers environmental, social and equity considerations

Refer to Section 3.3.1, which describes how the sustainability principles inform decision-making processes for the Project.

Precautionary principle

To address the precautionary principle, a risk and opportunity assessment process was applied to identify risks of serious or irreversible environmental damage. Where these were identified, detailed technical studies were undertaken to understand the potential impacts better and to assemble information that may assist to reduce scientific uncertainty. These studies were conducted by teams of specialists and included gathering baseline environmental data, rigorous impact assessment, feeding back information to design teams so that project changes could be made to reduce impacts, reviewing the impact assessment based on project changes, and identifying and agreeing appropriate mitigation measures (see Volume 1 Chapter 1 for information about the EIS process).

Where technical studies found impacts to be likely or even uncertain, mitigation measures were identified to minimise the risk of environmental harm. These mitigation measures were built into the environmental management plans included in the EIS and will be used during the Project as a basis for developing detailed construction and operational environmental management plans.

Global dimension

While the Project is situated in one state of Australia, its size and breadth is significant on a global scale. Some impact areas that have been considered on a global scale include:

- Greenhouse gas emissions and climate change (this is a global issue with local impacts)
- Shipping of LNG to customers

- Supply of materials and equipment from overseas suppliers particularly during the construction phase
- Trade and economic flows between suppliers, the Project and customers
- Migratory species.

Strong economy and international competitiveness

The Project will provide considerable economic benefits and help to grow the Queensland and Australian economy. It also adds diversity to Australia's export profile reducing our reliance on coal as our dominant export product. These economic benefits will support the Project, the community and government to have capacity to implement environmental protection measures both during and beyond the life of the Project. The Project's economic assessment is discussed in Volume 2 Chapter 21, Volume 3 Chapter 21 and Volume 4 Chapter 21.

LNG from Australia Pacific LNG's rich CSG resource can be extracted, processed and shipped economically thus growing an internationally competitive industry which, up until recently, has been largely west coast based. Natural gas is a key transition fuel to a low carbon economy, an attraction to overseas markets, especially as countries move to put a price on carbon.

In the economic assessment for this EIS, efforts have been made to include environmental values (costs and benefits) and provide a picture of overall project costs and benefits.

Community involvement

Early and extensive engagement with communities and stakeholder has been pursued. The purpose of the engagement has been to inform stakeholders about the Project generally, and on issues of concern or interest to specific communities or groups, and to seek their feedback on Australia Pacific LNG's direction.

Australia Pacific LNG has sought to incorporate feedback from stakeholders in project planning and in the identifying appropriate strategies and commitments. A wide range of methods, forums, meetings and modes of communication have been used in an effort to ensure broad consultation.

3.5.4 Summary

In Section 3.4, sustainability theme areas within the sustainability principles were described. To illustrate coverage, the same theme areas are mapped against the NSESD objectives in Table 3.1 and Table 3.2. References are included for sustainability theme areas where appropriate, as well as the relevant EIS chapter(s).

Table 3.1 Sectoral issues – Energy use, energy production and transport

NSESD	Sustainability theme	EIS chapter reference
Objectives 8.1 to 8.4	Climate change and energy	<p>Climate and climate change adaptation – Volume 2 Chapter 4, Volume 3 Chapter 4, and Volume 4 Chapter 4</p> <p>Greenhouse gases – Volume 2 Chapter 14, Volume 3 Chapter 14, and Volume 4 Chapter 14</p>

Table 3.2 Inter-sectoral issues

NSES	Sustainability theme	EIS chapter reference
Biological diversity Objectives 9.1 to 12.1	Biodiversity	<p>Terrestrial ecology – Volume 2 Chapter 8, Volume 3 Chapter 8, and Volume 4 Chapter 8</p> <p>Aquatic ecology – Volume 2 Chapter 9, Volume 3 Chapter 9, and Volume 4 Chapter 9</p> <p>Marine ecology – Volume 3 Chapter 10, and Volume 4 Chapter 10</p> <p>Coastal environment – Volume 3 Chapter 12, and Volume 4 Chapter 12</p> <p>Matters of environmental significance – Volume 2 Chapter 23, Volume 3 Chapter 23, and Volume 4 Chapter 23</p>
Land use planning and decision-making Objectives 13.1 to 13.2	Land and amenity	<p>Geomorphology, geology, soils and land contamination – Volume 2 Chapter 5, Volume 3 Chapter 5, and Volume 4 Chapter 5</p> <p>Land use and planning – Volume 2 Chapter 6, Volume 3 Chapter 6, and Volume 4 Chapter 6</p> <p>Landscape and visual amenity – Volume 2 Chapter 7, Volume 3 Chapter 7 and Volume 4 Chapter 7</p> <p>Noise and vibration – Volume 2 Chapter 15, Volume 3 Chapter 15, and Volume 4 Chapter 15</p>
Water resource management Objectives 18.1 to 18.2	Water	<p>Groundwater – Volume 2 Chapter 10</p> <p>Surface water and watercourses – Volume 2 Chapter 11</p> <p>Associated water – Volume 2 Chapter 12</p> <p>Water resources – Volume 3 Chapter 11, and Volume 4 Chapter 11</p>
Waste minimisation and management Objectives 19.1 to 19.2	Land and amenity	<p>Waste – Volume 2 Chapter 16, Volume 3 Chapter 16, and Volume 4 Chapter 16</p>
Aboriginal and Torres Strait Islander Peoples Objectives 22.1 to 22.2	Stakeholders and community	<p>Indigenous cultural heritage – Volume 2 Chapter 18, Volume 3 Chapter 18, and Volume 4 Chapter 18</p> <p>Shared cultural heritage – Volume 2 Chapter 19, Volume 3 Chapter 19, and Volume 4 Chapter 19</p>

NSESD	Sustainability theme	EIS chapter reference
Gender issues Objectives 23.1 to 23.2	Stakeholders and community	Social assessment – Volume 2 Chapter 20, Volume 3 Chapter 20, and Volume 4 Chapter 20 Economic assessment – Volume 2 Chapter 21, Volume 3 Chapter 21, and Volume 4 Chapter 21
Education and training Objectives 26.1 to 26.2	Stakeholders and community	Social assessment – Volume 2 Chapter 20, Volume 3 Chapter 20, and Volume 4 Chapter 20 Economic assessment – Volume 2 Chapter 21, Volume 3 Chapter 21 and Volume 4 Chapter 21
Employment and adjustment Objective 27.1	Stakeholders and community	Economic assessment – Volume 2 Chapter 21, Volume 3 Chapter 21, and Volume 4 Chapter 21
Conflict management Objective 31.1 to 31.2	Stakeholders and community	Stakeholder engagement – Volume 2 Chapter 2, Volume 3 Chapter 2, and Volume 4 Chapter 2 Social assessment – Volume 2 Chapter 20, Volume 3 Chapter 20, and Volume 4 Chapter 20
Community awareness, education and participation Objective 32.1 to 32.3	Stakeholders and community	Stakeholder engagement – Volume 2 Chapter 2, Volume 3 Chapter 2 and Volume 4 Chapter 2 Social assessment – Volume 2 Chapter 20, Volume 3 Chapter 20, and Volume 4 Chapter 20

3.6 Conclusions

The Australia Pacific LNG has developed an approach which establishes a strong foundation for the sustainable development of the Project. Central to this has been the development and application of specific sustainability principles for the Project and Australia Pacific LNG. These principles, and the commitments and strategies identified when applying them to the impact areas, will be built on progressively as the Project develops.

Specifically, this chapter meets the TOR requirements as follows:

- It clearly demonstrates how the Project conforms to the National Strategy for Ecologically Sustainable Development objectives (Section 3.5). This analysis has taken a life-of-project perspective and demonstrated that the Project has strived to achieve a balance between environmental, social and economic development
- The commitment of Australia Pacific LNG to sustainability (Section 3.1.1) is clearly demonstrated. This sustainability commitment applies to the EIS and the life of the Project
- Section 3.3 explains how sustainability has been integrated into the Project and EIS through the development and application of sustainability principles. This approach will be carried through for the project lifecycle, with sustainability considerations incorporated into management systems and plans and subject to continuous improvement.

Overall, this EIS demonstrates the sound sustainable basis for the Project in that it:

-
- Provides a low carbon transition fuel into world markets where it will substitute for more greenhouse intensive fuels and therefore contribute to global greenhouse gas reductions
 - Provides sustainable economic returns for Australia Pacific LNG and its owners
 - Provides sustainable social and economic benefits to stakeholders including the local and regional communities
 - Minimises environmental impacts and continue to develop an offset strategy to address residual impacts
 - Has applied a sustainability approach to guide planning, design, construction, operation and decommissioning of the Project.

References

Ecologically Sustainable Development Steering Committee 1992, *National Strategy for Ecologically Sustainable Development*, Australian Government Publishing Service, Canberra.

International Energy Agency (IEA) 2008, *World Energy Outlook*, International Energy Agency, Paris, France.

International Energy Agency (IEA) 2009, *World Energy Outlook – Climate Change Excerpt*, International Energy Agency, Paris, France.

Intergovernmental Panel on Climate Change (IPCC) 2007, *Fourth Assessment Report: Synthesis Report*, Cambridge University Press.

International Finance Corporation 2007, *Guidance Notes: Performance Standards on Social & Environmental Sustainability*, International Finance Corporation – World Bank Group, Washington DC.

United Nations 2008, *World Population Prospects*, United Nations, New York.