



A7

VOLUME A: BACKGROUND AND NEED

Sustainability Assessment

CONTENTS

7.1 Sustainability and Australia	279
7.2 Sustainability and Queensland	280
7.3 BAC NPR Sustainability Assessment Using SPeAR®	281
7.3.1 Purpose and Scope	281
7.3.2 Background to SPeAR®	281
7.3.3 Methodology	282
7.3.4 Sustainability Assessment	284

FIGURES AND TABLES**Figures**

Figure 7.3a: The Four Quadrants of the SPeAR® Diagram

Figure 7.3b: A Yellow Median Line is Used to Represent Best Practice

Figure 7.3c: BAC NPR SPeAR® Diagram

Tables

Table 7.3a: SPeAR® Considers the Following Sustainability Indicators Within the Four Parameters of Sustainability

Table 7.3b: The Principles of Ecologically Sustainable Development and How They Are Addressed Through the SPeAR® Indicators

7.1 Sustainability and Australia

Following the delivery of Agenda 21 via the National Strategy for Ecologically Sustainable Development (NSES D) in Australia, the Australian Government passed additional legislation to address the concept of Ecologically Sustainable Development (ESD).

The goal of the NSES D 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 core objectives of the NSES D are:

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

The Guiding Principles of the NSES D are:

- 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; and
- 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 ESD.

The NSES D contains two objectives for Environmental Impact Assessment (EIA), they are:

- To ensure the guiding principles of ESD are incorporated into EIA, with emphasis on clarity of application and process, community access and post approval accountability; and to increase the level of consistency and certainty, and avoid unnecessary duplication, of the EIA process across the nation; and,
- To increase the sensitivity of the EIA process, its planning and policy context and consequent decision making, to cumulative and regional impacts.

Many jurisdictions ensure that EIA guidelines incorporate ESD principles and some have instituted reviews (such as the Australian Government) to seek the views of stakeholders generally to the integration of environmental, social, economic and health assessments, to encompass regional and cumulative impacts, and to consolidate the efforts of governments to improve the reliability and effectiveness of EIA processes.

7.2 Sustainability and Queensland

In 1994, the *Environmental Protection Act* (EP Act) was introduced to protect Queensland's environment while allowing for development that improves the total quality of life, now and in the future, in a way that maintains ecological processes on which life depends. The EP Act is underpinned by the concept of ESD and aims to address specific aspects of the environment including air, noise, water and waste that are covered in separate environmental protection policies¹. The Queensland Government has also included the concept of ESD in other introduced legislation such as the *Nature Conservation Act 1992* and the *Coastal Protection and Management Act 1995*.

In 1997, the Queensland Government introduced the concept of ESD into planning and development legislation in Queensland through the enactment of the *Integrated Planning Act 1997*, commonly referred to as IPA. The purpose of IPA is to balance community well-being, economic development and the protection of the natural environment by providing a framework for managing growth and change within Queensland. The Act includes various planning schemes and policies at a state, regional and local level, and an integrated development assessment system, IDAS².

South East Queensland is one of the most sought after places to live in Australia and subsequently, the fastest growing region in Australia in terms of urban development. For many years, the South East Queensland region's planning requirements have been determined through state and local government legislation. However, recently, the need for a regional approach to planning and policy issues has been identified as a necessity for managing the rapid growth in Queensland's south-east corner.

In order to manage this growth, in April 2004 the Queensland Government established the Office of Urban Management (OUM) to prepare and implement key regional planning strategies in South East Queensland. In June 2005 the OUM released the South East Queensland Regional Plan document which guides growth and development in South East Queensland over the next two decades.

As stated on page two of the Plan:

The Regional Plan is the pre-eminent plan for the South East Queensland region and takes precedence over all other planning instruments. Under the Integrated Planning Act (IPA), the Regional Plan prevails where there is any inconsistency with any other plan, policy or code, including any other planning instrument made under state legislation, that have effect within the South East Queensland region. The Regional Plan, however, has been prepared to complement, rather than to override other relevant state planning instruments.

The document establishes a range of desired regional outcomes, principles and policies to guide the development of South East Queensland through to 2026. Of the twelve regional policies outlined in the plan, one focuses solely on sustainability. It outlines principles for sustainability in Queensland and the characteristics of a sustainable community in South East Queensland. In addition, the policy details 27 'State of the Region' sustainability indicators to monitor, review and report on how South East Queensland is performing against the goals and objectives of sustainable development.

¹ See http://www.epa.qld.gov.au/about_the_epa/legislation/environmental_protection

² See <http://www.ipa.qld.gov.au/overview/default.asp>

7.3 BAC NPR Sustainability Assessment Using SPeAR®

7.3.1 Purpose and Scope

The purpose of the following sections is to assess the sustainability performance of the New Parallel Runway (NPR) project at Brisbane Airport at the impact assessment stage. The sustainability assessment draws on the detailed studies undertaken for the Draft EIS/MDP for the project, the results of which are detailed in the other Volumes of this Draft EIS/MDP. As the assessment is undertaken at a point in time it is intended to provide a ‘snapshot’ of the sustainability issues relevant to the project now and does not reflect possible changes to the project over time.

The assessment considers all aspects of the project associated with Airport and Surrounds, Middle Banks and Airspace but does not generally include an assessment of Brisbane Airport Corporation’s (BAC) policies and operations unrelated to the NPR. The scope of the assessment includes planning, design, construction and operational issues.

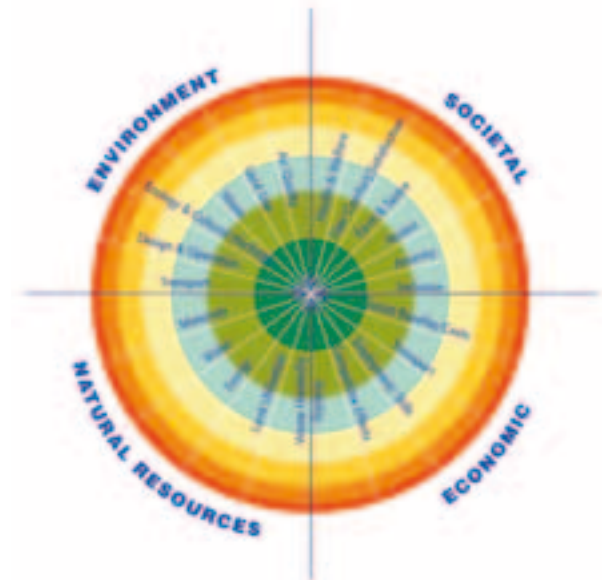
ARUP’s SPeAR® tool has been used for this assessment.

7.3.2 Background to SPeAR®

SPeAR® (Sustainable Project Appraisal Routine) is a tool that is used to qualitatively assess the sustainability performance of projects, plans or developments. It can be used to compare scenarios, provide a snapshot of sustainability performance at a point in time, or demonstrate continual performance improvement through the life of a project. Central to SPeAR® is a graphical output (a ‘SPeAR® diagram’) that summarises the diverse range of issues assessed.

The SPeAR® assessment provides scores against a range of sustainability indicators defined in the four key areas of environment, social, economics and natural resources (the four quadrants of the SPeAR® diagram), as shown in the **Figure 7.3a**. There are over 100 indicators in the base SPeAR® tool.

Figure 7.3a: The Four Quadrants of the SPeAR® Diagram.

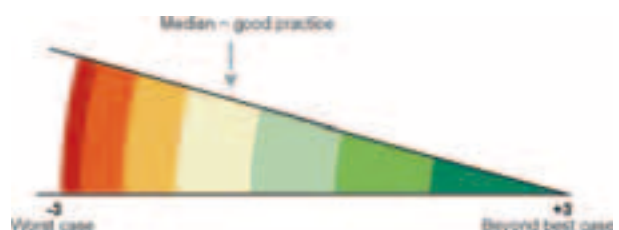


Information shown on the SPeAR® diagram is based on the information available at the time of data collection, which is used to complete the assessment. The nature of some of the indicators assessed means that the appraisal consists of both quantitative and qualitative values.

The four sectors of SPeAR® and their accompanying indicators are not weighted, and the outcome of the SPeAR® appraisal therefore reflects the utilisation of an un-weighted indicator set.

A yellow median line on the diagram is used to represent best practice. Positive elements of the project are represented by green tones from the median line towards the centre of the diagram, and negative elements by orange to red tones from the median line towards the circumference.

Figure 7.3b: A Yellow Median Line is Used to Represent Best Practice



7.3.3 Methodology

The information used for this SPeAR® assessment has been obtained from the detailed studies undertaken during the Draft EIS/MDP phase of the project.

The steps undertaken in the assessment are outlined below:

- A review of other airports’ sustainability initiatives for similar projects to gain an understanding of the benchmark for airport projects worldwide;
- A review of the base SPeAR® indicators to ensure their relevance to the project;
- Addition or removal of indicators relevant to the NPR project;

- An assessment of the project against the SPeAR® indicators using the information from the multi-disciplinary studies undertaken for the Draft EIS/MDP;
- Generation of the SPeAR® diagram; and
- Reporting of the results of the analysis against SPeAR® indicators.

While base SPeAR® indicators were initially based on the UK Government’s indicators, they have been checked against EU and UN indicators, to ensure their applicability globally. **Table 7.3b** identifies how the indicators in SPeAR® relate to the principles in the NSESD.

Table 7.3a: SPeAR® considers the following sustainability indicators within the four parameters of sustainability.

Quadrant	Environment	Societal	Natural Resources	Economic
Headline Indicators	Air Quality	Social Responsibility	Materials	Viability
	Land Use	Amenity	Water Use	Competition Effects
	Water Quality	Access	Energy	Employment/Skills Base
	Natural and Cultural Heritage	Stakeholder Satisfaction	Waste Hierarchy	Transport
	Design and Operation	Health and Wellbeing		
	Transport			

Table 7.3b: The Principles of Ecologically Sustainable Development and How They Are Addressed Through the SPeAR® Indicators.

Relevant SPeAR® Indicators						
	Guiding Principles	Environment	Natural Resource	Social	Economic	Consistency with Principle
1	Decision making processes should effectively integrate both long and short term economic, environmental, social and equity considerations.	Air Quality Land Use Water Quality Natural and Cultural Heritage Design and Operation Transport	Materials Water Use Energy Waste Hierarchy	Social Responsibility Amenity Access Stakeholder Satisfaction Health and Well Being	Viability Competition Effects Employment and Skills Transport	<ul style="list-style-type: none"> The SPeAR® environmental indicators assess the impact of the project on the environment from planning through to operation. Natural resource indicators consider the project's use of materials, water and energy and to what extent efficiency, reuse and recycling are integrated at all project stages. Social indicators deal with impacts to the community and project stakeholders and whether the project promotes community well being. Economic indicators assess the economic viability of the project, its contribution to local and regional economy and any negative impacts to local businesses.
2	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.	Air Quality Land Use Water Quality Natural and Cultural Heritage Design and Operation Transport	Materials Water Use Energy Waste Hierarchy			<ul style="list-style-type: none"> Environment indicators assess the extent to which environmental degradation is avoided or mitigated. The indicators also consider whether best available practical techniques/design/assessment methods are employed to reduce impacts at all stages of the project. Natural resource indicators consider the project's use of materials, water and energy and to what extent efficiency, reuse and recycling are integrated at all project stages to prevent environmental degradation.
3	The global dimension of environmental impacts of actions and policies should be recognised and considered.	Natural and Cultural Heritage				<ul style="list-style-type: none"> Natural and cultural heritage indicators require consideration of the impact on designated sites (local, national or international).
4	The need to develop a strong, growing and diversified economy which can enhance the capacity for environmental protection should be recognised.				Viability Competition Effects Employment and Skills	<ul style="list-style-type: none"> Viability indicators take into account the need for financial viability of the project but also that expenditure on improving environmental and social performance measures associated with the project go beyond best practice. Competition Effects indicators considers the extent to which the project promotes ethical competition and brings vitality to the local economy. Diversity of employment and consumer choice as well as supply chain issues are also considered.
5	The need to maintain and enhance international competitiveness in an environmentally sound manner should be recognised.				Viability Competition Effects	<ul style="list-style-type: none"> Viability indicators take into account the need for financial viability of the project but also that expenditure on improving environmental and social performance measures associated with the project go beyond best practice. Competition Effects indicators considers the extent to which the project promotes ethical competition and brings vitality to the local economy.
6	Cost effective and flexible policy instruments should be adopted, such as improved valuation, pricing and incentive mechanisms.					<ul style="list-style-type: none"> Not applicable to NPR project.
7	Decisions and actions should provide for broad community involvement on issues which affect them.			Social Responsibility Amenity Access Stakeholder Satisfaction Health and Well Being		<ul style="list-style-type: none"> Community involvement during the project is assessed through the social indicators which consider whether research and consultation are undertaken during the project so decisions are made in partnership with community and other stakeholders.

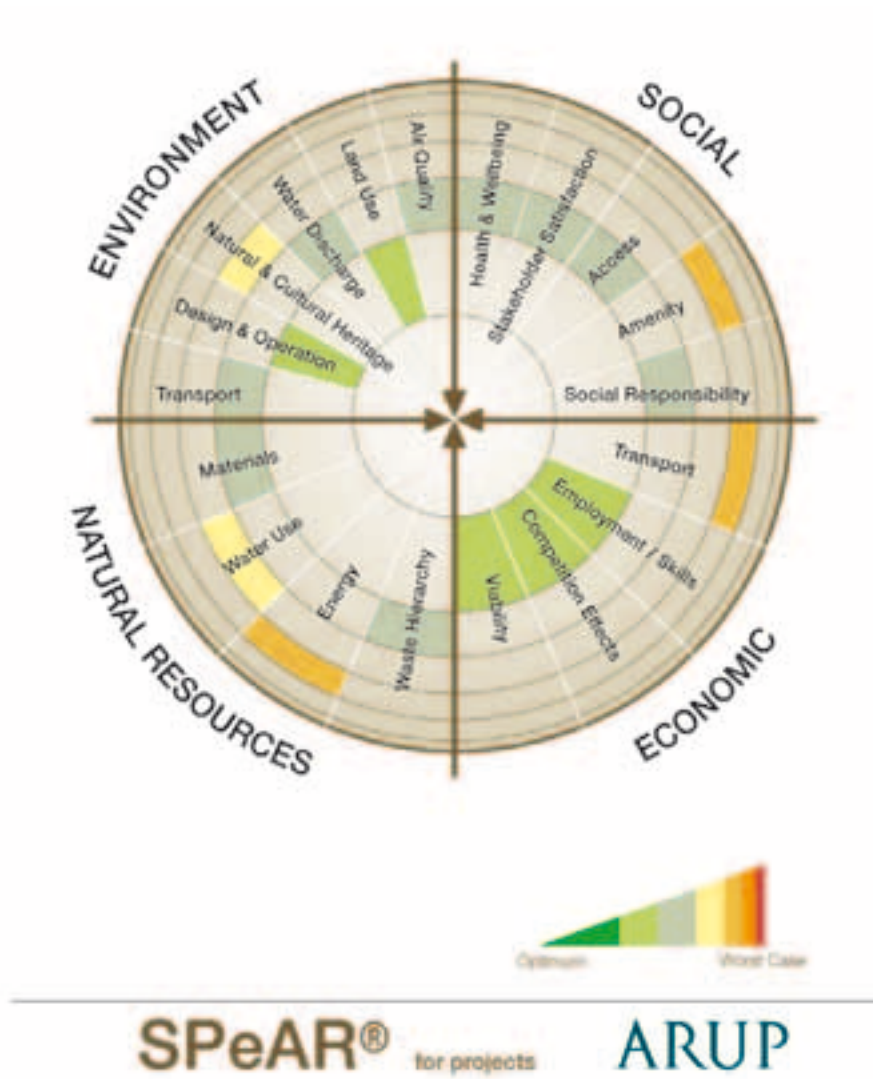
7.3.4 Sustainability Assessment

The sustainability issues discussed in this Chapter are referenced with their relevant quadrant and segment (e.g. ENVIRONMENT – Water), so that they can be easily read and aligned with the SPeAR® diagram. A description of each segment is provided so that the context of the comments is clear and the description is marked with the colour allocated in the assessment to indicate its performance.

The link between the segments and the topic areas of the Draft EIS/MDP is also highlighted. A detailed SPeAR® diagram indicating the sustainability performance of all SPeAR® indicators is provided in **Figure 7.3c**.

The assessment is described in order of the four quadrants and then headline indicators as per **Table 7.3b**.

Figure 7.3c: BAC NPR SPeAR® Diagram.



7.3.4.1 Environment Quadrant

Environment – Air Quality: Air emissions indicators address direct and indirect emissions resulting from the project including dust and particulate matter, and take into account the baseline environment. Indirect emissions sources that have been considered for the NPR project include dredging and construction equipment and associated surface transport. Emissions from the increase in air traffic as a result of the operation of the new runway are also considered as direct emissions.

Relevant Chapters of the Draft EIS/MDP:

Chapter B12 Construction and Traffic
Air Emissions;
Chapter D6 Air Emissions;
Chapter B14 Environmental Management
Framework.

Baseline pollutant levels surrounding the airport site are set by the Queensland EPA through the Environmental Protection (Air) Policy 1997; National Environment Protection Measures (NEPM) (national air quality goals) set by the National Environment Protection Council of Australia (NEPC); and Airports (Environment Protection) Regulations 1997 set by the Australian Government. Baseline levels are within air quality goals except for the occasional exceedence caused by events such as off-airport bush fires and dust storms.

The total greenhouse emissions from the construction phase (including land clearing) were estimated to be approximately 317,770 tonnes CO₂-e. No allowance was made for the fact that the existing mangroves may be a net source of greenhouse emissions particularly methane and nitrous oxide. The use of cleaner fuels for surface transport and machinery has not been considered for the project.

Dispersion modelling was used to assess the impacts in changes to traffic on surface roads as a result of construction of the NPR. The roadside dispersion modelling suggested that future roadside concentrations were generally lower than existing concentrations. Differences between with and without NPR would be small on all modelled road sections. Existing and future roadside concentrations at distances representing nearest residences are anticipated to be below relevant air quality criteria.

The air quality impacts arising from dust and particulate matter generation during construction activities were modeled and assessed as being low and would comply with relevant air quality goals at nearest residential locations. There will be a high level of control (mitigation) during construction through adherence to the activities outlined in the Environmental Management Framework (EMF) for the project. These mitigation measures are considered best practice dust control.

Off-site pollutant concentrations due to aircraft operations for future scenarios are predicted to be higher than for existing operations, with or without the NPR. However, there is likely to be improvements to aircraft technology and emissions that will contribute to offsetting any increased impacts. Recent technology improvements in new Boeing and Airbus aircraft (e.g. B787 and A380) have emission reductions of 20 percent to 30 percent. In designing new flight paths for the NPR, track miles have been considered in respect of reduced fuel use by airlines and thus lower emissions.

A mitigating factor in terms of overall air emissions for the project is the sourcing of sand from Middle Banks and transportation by dredge then pipeline to the project site. Air emissions from dredge machinery and pump equipment would be significantly less than those arising from the required surface transport if land based sand sources were used. The sourcing of sand directly from Moreton Bay means approximately two million less truck movements than would be required if land based sources were used.

Environment – Land Use: Land use indicators take account of site location, planning intent and issues such as flooding, contaminated land or acid sulfate soils. A more sustainable project makes use of previously developed land, is in context with surrounding land uses and complies with relevant planning intents for the site.

Relevant Chapters of the Draft EIS/MDP:

Chapter B2 Land Use and Planning;
Chapter B3 Geology, Soils and Groundwater;
Chapter A4 Project Description: Runway Layout;
Chapter A5 Project Description: Runway
Construction;
Chapter B7 Surface Hydrology;
Chapter B14 Environmental Management
Framework.

Whilst the NPR is to be located on a greenfield site, a large percentage of the site represents native vegetation regrowth from when the Airport was originally developed in the 1980s or has been specifically managed (i.e. planted with casuarinas) in anticipation of the need for the NPR project.

The location of the NPR on the airport site is in line with local, regional, state and Australian Government planning intent for the airport. It is consistent with the Airport Master Plan (2003); the South East Queensland Regional Plan 2005-2026 identifies the airport as a Specialist Activity Centre with state significance and the Brisbane City Plan identifies the airport as a Special Purpose Centre. It is located within the 'urban footprint', is a key element of the region's transport system, and plays an important role in the Australia TradeCoast and economic development in the region in general.

In relation to the context with the surrounding area, the airport (and NPR) has considerable buffers between it and surrounding land uses. In addition, the Brisbane Airport Master Plan establishes Australian Noise Exposure Forecasts (ANEFs) for existing and future airport operations allowing for development projects in the vicinity of the airport to be planned with consideration of aircraft noise effects. State Planning Policy 1/02 Development in the Vicinity of Certain Airports and Aviation facilities regulates the encroachment of incompatible development on the airport therefore reducing future land use conflict with the NPR.

Middle Banks (where the sand extraction activity is proposed to be undertaken) is located in the General Use Zone of Moreton Bay Marine Park, which is intended for 'the general use and public enjoyment of the zone in ways that are consistent with the conservation of the marine park'. The Moreton Bay Sand Extraction Study identifies Middle Banks as the most appropriate site for sand extraction for the NPR project in Moreton Bay (given the findings of this EIS).

Brisbane Airport is situated on the low lying floodplain of the greater Brisbane River system. The Airport site comprises a highly modified hydrological system which retains some remnants of the natural drainage system.

During large regional flood events, the capacity of Schulz Canal (which feeds into the Kedron Brook Floodway upstream) is insufficient to contain flow within the banks of the main channel and significant overland flow occurs in floodplain areas on the east and west of the main channel, downstream of the Gateway Motorway. Currently, a large regional flood event will also overflow the banks of Kedron Brook Floodway into Nudgee Golf Course.

Overland flow during large regional flood events moves through a low-lying floodplain area of Brisbane Airport, west of Airport Drive and Dryandra Road. Flow travels through the Landers Pocket Drain, Serpentine Creek and Jacksons Creek systems, and enters Kedron Brook Floodway near the mouth at Moreton Bay.

Construction of two new main drains (including Kedron Brook Floodway Drain), smaller inter-connector drains and surcharging of the site during construction will raise the NPR out of the floodplain and will alter the existing (but highly modified) drainage system on the site.

Flood modelling undertaken for the NPR project identified potential flooding and drainage impacts which resulted in the incorporation of mitigation measures into the project's design (including the drains mentioned above).

Modelling shows that the flooding characteristics following development of the NPR are similar to those experienced under existing conditions. Kedron Brook Floodway Drain will intercept regional overland flow that moves through the floodplain area of Brisbane Airport and the Landers Pocket Drain, Serpentine Creek and Jacksons Creek systems and diverts the flow to Kedron Brook Floodway. Flood modelling indicates that impacts from development of the NPR are negligible to minor and are experienced locally around the confluence of Kedron Brook Floodway Drain and Kedron Brook Floodway. The NPR does not result in increased maximum flood levels upstream of the start of Kedron Brook Floodway, and accordingly the modelling indicates that there would be no impact to existing off-airport residential and commercial developments. Flow velocity within channel and overland flow regimes following development of the NPR increases slightly, but resultant velocities are very low and would not be sufficient to cause bed or bank scouring.

Variable levels of Potential Acid Sulfate Soils and Acid Sulfate Soils are mapped across the project site and have been further investigated as part of the Draft EIS/MDP. Acid Sulfate Soils will be excavated for site preparation associated with construction of the runway and will be managed and treated according to best practice measures. The EMF provides a comprehensive strategy to manage acid sulfate soils and groundwater impacts and mitigation measures to prevent environmental harm from the construction activities associated with the NPR project.

Six sites on the BAC contaminated sites register are located within or in close proximity to the development area but all have been remediated. Other contaminants and some in excess of regulated accepted limits have been detected on the project site. The EMF describes best practice mitigation measures that will manage the risk from these contaminants during construction which overall is considered to be low.

Environment – Water Discharge: indicators for water discharge assess the impact of the project on natural drainage systems and the risk of water pollution during construction and operation. A more sustainable project will reinforce natural water cycles and set challenging water quality targets.

Relevant Chapters of the Draft EIS/MDP:

- Chapter A4 Project Description Runway Layout;
- Chapter A5 Project Description Runway Construction;
- Chapter B7 Surface Hydrology;
- Chapter B8 Water Quality.

As stated above the Airport site comprises a highly modified hydrological system which retains some remnants of the natural drainage system. Overland flow during large regional flood events moves through a low-lying floodplain area of Brisbane Airport, west of Airport Drive and Dryandra Road. Flow travels through the Landers Pocket Drain, Serpentine Creek and Jacksons Creek systems, and enters Kedron Brook Floodway near the mouth at Moreton Bay. Construction of two new main drains (including Kedron Brook Floodway Drain), smaller inter-connector drains and surcharging of the site during construction will raise the NPR out of

the floodplain and will alter the existing (but highly modified) drainage system on the site.

During operation of the new drainage system, gates would be used to limit intrusion of saline water. This would control the influx of saline water and therefore further alter the natural drainage regime. However, the main drains will be constructed to include natural features and enable mangroves to re-establish along their length.

Existing receiving waters around the Airport (including Bramble Bay, part of the larger Moreton Bay) are characterised as ‘poor water quality and biological health’ by the Ecosystem Health Monitoring Program (EHMP). The existing ambient concentrations at the proposed NPR discharge locations of Kedron Brook Floodway and Serpentine Inlet are currently elevated for nutrients and suspended solids and in the majority of cases, exceed the relevant Brisbane City Council or EPA water quality objectives for those locations. Bramble Bay is the ultimate receiving water for the most highly populated and developed regions of South East Queensland via the Brisbane River, Kedron Brook and Pine River catchments. These river systems transport significant loads of nutrients and suspended sediments from their highly urbanised catchments. Luggage Point Wastewater Treatment Plant, commonly identified as one of the principal contributors of nitrogen and phosphorus to Bramble Bay, discharges directly into the tidal region adjacent to the Airport. Therefore, as waters flow into airport lands from up-catchment and also enter directly from Bramble Bay, it is not surprising that existing water quality within airport drains and surrounding waterways is dominated by water quality of a similar nature to the degraded adjacent embayment.

Given the poor condition of the receiving waters with respect to nutrients and suspended material, the approach with respect to water quality from the NPR is to incorporate management measures to avoid any long term sustained effects.

If not managed appropriately, a project of this nature has the potential to result in increased levels of nutrients and suspended material being released to waterways associated with site clearing and sand surcharging activities.

During construction activities, water quality within Bramble Bay or Kedron Brook Floodway area is likely to be temporarily impacted such that whilst mitigation measures would prevent changes to water quality over an annual period, short term exceedences are likely to occur.

Mitigation (specified in the EMF for the project) includes construction of sedimentation ponds proposed to manage turbidity and suspended solids in the discharge water. Best practice erosion and sediment controls are to be undertaken to limit entrainment of on-site sediments during the reclamation and filling process. In addition, monitoring of water quality will be undertaken. The EMF for the project specifies all of the best practice measures that will be undertaken to manage water quality impacts during construction and BAC's Environmental Management System aims for continual improvement in water quality targets on the Airport as a whole.

The operation of the dredge at Middle Banks will generate sediment plumes. Modelling predicts a small increase in concentrations of suspended solids within a portion of the area identified as High Ecological Value (HEV) Waters in Moreton Bay. However, in general, the dredge plume is confined to the dredge area (outside the HEV waters) and dissipates rapidly.

The location and method associated with the dredge pump-out operations at Luggage Point avoid water quality impacts through direct pumping from the dredge (removing the need to create and operate a dredge rehandling basin) and selection of a location adjacent to the Port of Brisbane swing basin that does not require capital dredging to accommodate the dredge vessel (which avoids water quality impacts from the additional re-suspension of sediments and management of dredge spoil on land).

Environment – Natural and Cultural Heritage:

The indicators for natural and cultural heritage relate to the impact of the project on natural habitats, biodiversity, cultural and archaeological resources. A more sustainable project will contribute to habitat conservation, not impact designated sites, maximize opportunities for species diversity, and will protect, retain and enhance cultural or archaeological resources.

Relevant Chapters of the Draft EIS/MDP:

- Chapter B5 Terrestrial and Marine Ecology;
- Chapter C5 Marine Ecology;
- Chapter B6 Cultural Heritage;
- Chapter C6 Cultural Heritage.

Natural Heritage – Airport and Surrounds

Much of the vegetation within the NPR project area has been either planted or has recolonised following the construction of Brisbane Airport. As a result, the vegetation on Airport lands is very simple, and includes five main vegetation communities: casuarina plantation, mangroves, mown (managed) and rank (unmanaged) grasslands, and saltmarsh. Mangrove habitats within the NPR project area are not unique, but are representative of mangrove-lined creek habitats in the broader region. This proposed development will therefore not represent a loss of ecosystem function at this scale. The major vegetation communities that were identified in the NPR site and the amount of these communities that would be removed by the NPR project proposal are as follows:

- Casuarina plantation: 209 ha
- Mangroves: 94 ha
- Managed grassland: 31 ha
- Saltmarsh/saltpan: 18 ha
- Phragmites wetland: 3 ha

No designated sites or Endangered or Of Concern Regional Ecosystems or vegetation species of conservation concern have been identified on the NPR site or the dredge pipeline corridor.

Fish and Marine Invertebrates

Although modified by past and in some cases ongoing disturbances, the NPR project area supports habitat types that contribute to fisheries production in the wider region. However, no fish of conservation significance were recorded or are likely to occur within the waterways of the NPR project area. The number of fish species and their abundances within the NPR project area are not unique, but representative of environments within the wider Moreton Bay region, particularly the western side of Moreton Bay.

Infilling of waterways and mangrove/saltmarsh vegetation within the NPR project area would result in a reduction in the available spawning (reproduction), foraging and nursery habitat for some fish and crustacean species.

Benthic fauna (small animals living in or on the seafloor) form important food resources for many fish and bird species and also perform important functions in their own right. These communities within the NPR project area are not unique, meaning they are comprised of species that are typical of such environments. The proposal would result in the loss of benthic fauna inhabiting the waterways and aquatic vegetation within the NPR project area. Impacts to population status of benthic fauna outside the NPR area are not expected.

Land-Based Fauna

Fauna assessments undertaken specifically for the Draft EIS/MDP and the findings of previous field surveys indicated that the NPR project area may potentially be used by a number of fauna species of conservation significance. A large proportion of these fauna are likely to use the habitats within the NPR project area on a seasonal basis (e.g. migratory waders, grey goshawk and dollar bird) rather than having resident populations.

Casuarina plantation and grassland habitats are of relatively low conservation value to fauna, as they support a comparatively low biodiversity with few species of conservation significance utilising these communities on a regular basis. Low numbers of the grey-headed flying fox utilise the NPR project area, reflecting the lack of food resources in this area. It is more likely that the NPR project area is used by the species as a movement corridor, rather than as a key habitat.

A survey of the site found that the NPR project area was mostly unsuitable as a sustained habitat for the Illidge's ant blue butterfly, which is of conservation significance and known to occur in mangrove environments.

Only a small number of shorebird species were found to use the NPR project area as a roosting habitat. Overall, the NPR project area is not considered to be an important habitat when compared with other available roosts in the local area (e.g. Fisherman Islands, Jubilee Creek).

During the construction of the seawall and the approach lighting system, a range of mitigation strategies will be implemented to minimise impacts on migratory species including the timing of construction and an observation program.

The grassland habitat traversed by the Luggage Point dredge pipeline corridor is of low ecological value and consequently is only likely to support a low biodiversity. Most species known or considered likely to utilise these habitats are those tolerant of high and frequent levels of disturbance (regular slashing, vehicle and human activity).

Management and Mitigation

A number of environmental management measures are proposed to minimise and/or mitigate the potential negative effects of marine and terrestrial ecology on the Airport, including:

- Avoidance of nearly all the freshwater (*Phragmites* sp.) wetland habitat through the design and layout of the Kedron Brook Floodway Drain so that the wetland area can continue to provide habitat for species of conservation significance;
- Retaining the remnant Jacksons Creek and associated mangroves outside the runway footprint to ensure it continues to provide fish habitat values in the long term;
- Sensitive design of the main drainage channels to minimise scour in the bed of the drain and to provide a benched level for mangrove colonisation;
- Creating about three hectares of mangrove habitat within the proposed construction of tidal discharge/stormwater channels at Kedron Brook and Serpentine Creek;

- Selection of a dredge pump-out facility in an already modified environment, which avoids dredging and pump-out operations in the Moreton Bay Ramsar site;
- Water sensitive drainage design for the completed airfield utilising grassed swales and vegetation buffers; and
- Avoiding the construction of a hard seawall structure along the northern foreshore west of the new runway that will avoid construction impacts on birds.

An EMF will be applied during construction and operational phases incorporating:

- An Estuarine Fauna Management Plan that involves a program to relocate fish from the NPR site to adjacent waterways that will be implemented prior to the commencement of the reclamation stage;
- A Mangrove Rehabilitation Plan for establishing mangroves along the major drainage channels in the project area;
- An Animal Welfare and Fauna Movement Plan (including undertaking actions to locate an alternative roosting site for the white-bellied sea eagle nest that will be displaced by the NPR footprint); and
- A Vegetation Protection and Management Plan associated with the clearing.

The plans will be augmented by monitoring and survey programs undertaken in consultation with relevant Government departments.

In addition to measures to be implemented specifically relating to environment protection in and around the NPR site, BAC has developed the Biodiversity Management Strategy 2006, which aims to protect significant vegetation communities and habitat across the Airport site. It maps an Airport Biodiversity Zone encompassing 285 hectares of on-Airport land that is to be managed to conserve a wide range of identified environmental assets in the long term. This zone will be kept free of future development.

In addition to the on-site mitigation measures proposed, BAC is also investigating contributing to an offsite mitigation project involving estuarine or marine habitat monitoring and/or rehabilitation in consultation with State agencies and community conservation groups.

Natural Heritage – Middle Banks

Middle Banks is located in Moreton Bay, which is designated as a Marine Park. In terms of ecological values of the General Use zone (which contains the dredge area and surrounds), it is not expected that there will be long term negative impacts. The most significant impacting processes from dredging are the loss of fauna in the dredge footprint, potential changes in community structure of benthic communities in the dredge footprint, and changes to movement patterns. Mitigation measures to reduce the impact of the dredging process are detailed in the Dredge Management Plan for the project.

Cultural Heritage

Overall the effect of the NPR upon known cultural heritage material is extremely low given the paucity of sites identified within the footprint of the NPR project. In terms of non-Indigenous cultural heritage, no historic buildings/sites would be impacted by the project. Only one non-Indigenous site of low scientific significance has been identified in the NPR site. This site will be covered by sand fill required for surcharging the NPR site. As such, it is considered that the impact of the project on the site will be negligible as the site will remain in its current condition and be 'preserved' in situ.

Overall on the airport site the effect of the project upon known Indigenous cultural heritage material is negligible. The NPR project proposes that two drainage channels be constructed at either end of the NPR and there is a low probability that either of these excavations may disturb subsurface archaeological deposits.

Consultation has occurred with the Jagera People relating to issues on Airport and will continue throughout the construction period in accordance with the signed Cultural Heritage Management Plan. Representatives of the Jagera People will be present when excavation of the Kedron Brook Floodway and

Serpentine Inlet drains occurs. During construction, BAC will retain the services of an archaeologist with expertise in the local area on as needs basis to be called to assess any objects of potential historic or Aboriginal heritage significance.

Dredging at Middle Banks has a low potential impact to cultural heritage, and measures have been taken to avoid dredging of Pleistocene layers which have higher potential for cultural heritage. Mitigation measures are included in the Cultural Heritage Management Plan and include collection of any discovered artifacts during the dredge process.

Environment – Design and Operation:

Sustainability assessment of the design and operation of the NPR project takes into account the assessment methods used, the use of appropriate technology and other issues such as Environmental Management Systems, management principles, flexibility of the project and consideration of life cycle impacts. A more sustainable project will use new assessment techniques and appropriate technology in the design, will be operated according to sustainable principles and will have in built flexibility to extend life.

Relevant Chapters of the Draft EIS/MDP:

Chapter A1 Background;
 Chapter A4 Project Description: Runway Layout;
 Chapter A5 Project Description: Runway Construction.

The detailed studies undertaken as part of the Draft EIS/MDP process for the project have described the baseline conditions at the project site and assessed the potential impacts arising from the project. The information from this process has been used to inform the design and methods of construction in order to minimise impacts where possible. Best practice methodologies have been used throughout this project, these included:

- Multi criteria analysis in the selection processes for certain flight tracks to ensure the full range of relevant issues have been considered in their selection.
- Triple bottom line assessment has been used in the selection of pipeline routes and dredge mooring locations enabling social, economic and environmental factors to be considered in the choice of a preferred option.

- A constraints analysis using Geographical Information Systems was used as the process for determining the most appropriate location for the dredge footprint at Middle Banks.
- Arup’s SPeAR® sustainability assessment has provided a leading edge approach to sustainability assessment of the NPR project enabling all aspects of the project to be considered holistically and document the sustainability performance of the project.
- In order to ensure transparency and consistency in the impact assessment contained in the Draft EIS/MDP, ARUP’s Significance Criteria® have been used.
- The method used for the assessment of noise impacts is beyond best practice, drawing on and refining techniques and methods developed following the assessment of the Third Runway at Sydney Airport.
- The risk management strategy has enabled the identification of risks at all stages in the project and the implementation of management measures where possible.

Appropriate technology has been incorporated into the construction methods and design of the project. Some examples of the use of appropriate technology include:

- Use of vacuum consolidation to expedite the surcharging of areas with exceptionally poor ground conditions.
- Investigating the use of a ‘green valve’ on the dredge vessel as a further mitigation measure for reducing sediment plumes.
- The construction of sedimentation ponds (with baffles and weir boxes) to manage turbidity and suspended solids in discharge.
- The assessment of the impact of noise from aircraft has included consideration of changes in aircraft design during the life of the project. These technology improvements result in reduced noise footprints and improved fuel efficiency (resulting in lower emissions).

The EMF for the project will encourage the consideration of best practice and more sustainable practices during construction and operation. BAC has an existing Airport Environment Strategy which outlines strategic action plans for a range of prescribed environmental elements across the airport. It has been in effect since 1999 with a range of environmental initiatives undertaken since then. The Environmental Management System for the airport is operational and is consistent with ISO14001.

In terms of in-built flexibility to the NPR project, planning has included the use of ground treatment works to allow the extension of the new runway from 3,000 m to 3,600 m in the future. The layout of the project also allows for development in the Future Aviation Facilities Area and caters for the existing and planned transport infrastructure such as an additional passenger terminal. The drainage design has considered and caters for the cumulative impacts of other developments that will occur on-airport within the timeframe of the NPR project.

Consideration of life cycle environmental impacts during the project has resulted in the following:

- The proposed re-use of topsoil and gravel where possible during construction (particularly during the upgrade of the 14/32 runway);
- The planned use of cleared and chipped casuarina trees either on the Airport site or removed off-site for use as biofuel.
- The planned extraction of sand from Moreton Bay rather than from land based sources. The Moreton Bay Sand Extraction Study investigated the overall sustainability of the use of the sand resource in Moreton Bay and included an assessment of the life cycle benefits of extraction of sand from Moreton Bay rather than a variety of land based sources for the NPR project.

Environment – Transport: Sustainability assessment of the transport aspects of the project considers the public transport infrastructure at the site, the variety of transport choices, the project's dependence on road based freight traffic during construction. A more sustainable project will integrate with public transport infrastructure, encourage more sustainable transport choices and minimise the need for freight traffic.

Relevant Chapters of the Draft EIS/MDP:

Chapter B10 Surface Transport.

Dedicated public transport to and from the Airport is via the Airtrain, which will remain operational throughout construction and operation of the NPR. Public transport to and from Brisbane Airport also includes scheduled bus and train services. Taxis, limousines and minibuses are also modes of travel to the Airport terminals, although the majority of trips to the Airport are private vehicle trips (67 percent). In 2005, approximately 7 percent of passengers to the Airport travelled by Airtrain, 7 percent travelled by bus, 1 percent travelled by limousine and 18 percent travelled by taxi.

Public transport to and from the area is quite frequent, particularly during daylight hours. This is due to the Domestic and International Terminals providing concentrated areas of employment and trip generating activities allowing for more viable public transport operation.

An important factor in the attractiveness of travel to the area by public transport is its availability during the employees working hours. Due to the hours of operation of the Brisbane Airport, there are a significant number of shift work employees with working hours outside typical business hours. Public transport servicing the Brisbane Airport is not frequent during these periods, resulting in a small proportion of Airport employees using it. In addition, late night and early morning arriving and departing airport passengers are also not able to make use of this service.

The sourcing of sand from Moreton Bay rather than land based sand quarries, significantly reduces the need for road based transport during the construction period. However, other construction materials such as rock, gravel and fill material are to be brought to the site by truck. This material comprises 3.5 percent of the total materials required for the project and will be sourced locally (i.e. within 150 km of the Airport site) where possible. Some material such as cleared and chipped vegetation will also need to be transported off-site.

Sand sourced from Moreton Bay will be delivered directly to the NPR site via a mooring at Luggage Point and then pipeline directly to the site. The pipeline, mooring structure and other infrastructure will need to be delivered to the site by construction machinery. Once the sand delivery phase is completed, this infrastructure will be dismantled and removed from the site.

Construction site traffic will include workforce transportation; haulage of excavated material; importation of construction materials and equipment; and site visitors. This will result in a variety of vehicle types travelling to and from the construction site on a daily basis including cars, vans, semi trailers and trucks. Once the Northern Access Road is constructed, this will provide the main entry and exit from the site for construction vehicles. Once operational, NPR traffic would be distributed predominantly on the Northern Access Road, Gateway Upgrade Project and Airport Drive which were designed to operate as the major access points to the Airport terminals.

Internal transport and material handling is to be undertaken with the use of conventional vehicles, machinery and equipment, with no alternative transport means planned for the construction phase.

The use of a sand source that does not require road based travel and local sourcing of other construction materials where possible are positive transport elements for the project. However, the limited existing and future public transport services to the Airport mean that the project has an average performance overall in this sector. Proposed mitigation measures include a review of the Airtrain operating hours and frequencies; and improved bus service network integration to and from the Airport terminals.

7.3.4.2 Social Quadrant

Social – Social Responsibility: Social responsibility indicators consider issues such as community interaction, stakeholder relations, equity, corporate responsibility and social planning. A more sustainable project will promote equity and community interaction, will consult with stakeholders and assess social impacts.

Relevant Chapters of the Draft EIS/MDP:

Chapter A2	Need for the Project;
Chapter A6	Public Engagement;
Chapter B9	Social Impact Assessment;
Chapter C7	Social Impact Assessment.

During the preparation of the Draft EIS/MDP a comprehensive Public Engagement Program (PEP) commenced with the aim of informing and educating the public about the project (Phase 1). Phase 2 of the PEP involves engagement activities undertaken after the release of the Draft EIS/MDP.

Key goals of the PEP are to develop an understanding among the community about the purpose and process of the EIS/MDP, including the relevant technical aspects of the project and their likely impacts. The PEP aims to provide sufficient opportunities/activities for all people and groups to receive information and provide feedback on the Draft EIS/MDP. The process respects the rights of the community to voice their opinions and to have those opinions considered in the development of the EIS/MDP and any mitigation strategies.

Following an extensive stakeholder identification process (which is continually being refined), BAC has actively engaged with stakeholders for over 12 months ahead of Public Notification (Phase 1). In this time BAC has endeavored to reach and inform as many people across Brisbane as possible. It has extended the reach of its information to communities located as far as 15–20 km from the Airport. Stakeholders that have been engaged with include those communities directly adjacent to the Airport site; key interest groups such as commercial and recreational fisher groups in Moreton Bay, community and environmental groups; government agencies; local, state and federal elected representatives; businesses; media; Brisbane Airport staff and Airport users. In order to reach residents living up to 20 km from the airport in Phase 1, the project web site, 1800 line and email address, information newsletters, media advertisements and general media about the project has been issued. Forums have also been held as part of the PEP process as a means of undertaking research into community views on certain issues. The feedback received from these forums has informed and refined the public engagement process.

A full social impact assessment has been undertaken for the project which has social, economic and health impacts of the project during construction and operation.

Social – Amenity: The assessment of the project against amenity indicators takes account of the level of landscape design integrated into the project that enhances the area, the levels of noise and vibration from construction and operation and identifies and solves amenity conflicts with surrounding land uses.

Relevant Chapters of the Draft EIS/MDP:

- Chapter A6 Public Engagement;
- Chapter B9 Social Impact Assessment;
- Chapter B11 Construction and Traffic Noise;
- Chapter B13 Landscape and Visual;
- Chapter D5 Noise Assessment;
- Chapter D9 Social Impact Assessment.

The Airport has the locational advantage of being positioned adjacent Moreton Bay and has extensive buffer zones, providing significant displacement between aviation facilities and established communities.

Views into the proposed NPR site are limited by areas of vegetation located to the north of the site, intervening development, and the relatively flat terrain which surrounds the site. In addition, the areas surrounding the proposal, particularly to the west and south, will undergo considerable change over the coming years. In particular, the Port of Brisbane development and Gateway Upgrade Project will be visually prominent during day and night time conditions. Further development associated with the airport itself will also contribute to the changing character of this landscape. This additional development generally reduces the visual impact of the NPR, with a number of these developments being considerably more visually prominent during both day and night time conditions.

The visual amenity of areas close to the NPR, including parts of Nudgee and passive recreation areas within the Kedron Brook corridor, will be affected by some views of sand surcharge stockpiles and vegetation clearance. Some elevated locations in the residential areas of Ascot, Clayfield and Hamilton will be subject to distant views of construction activities. In most situations,

the magnitude of visual modification would not be great enough to have a perceivable effect on visual amenity. Visual impact would be greater during the construction phase than upon completion.

Some elevated locations in the residential areas of Ascot, Clayfield and Hamilton will have distant views of the NPR operating. By 2015 planned urban growth, such as at the Australia TradeCoast and construction of the Gateway Upgrade Project (an elevated road structure), would alter the view shed within which the NPR is contained. It is considered that the liveability of residential areas and enjoyment of recreational facilities would not be adversely affected by views of the NPR facility.

In relation to light spill from the high intensity approach lights into the surrounding community, these lights are highly directionally focussed and luminescence would not occur. However, several hundred metres of the northern end of the landing light structure would be visible from Nudgee Beach.

It is likely that with the implementation of some minor mitigation measures, there will be some lessening of the visual effects of the proposal, particularly during construction. Through these measures there is likely to be some reduction in the significance of the visual effect upon the Kedron Brook path view.

In relation to the visual amenity associated with dredging at Middle Banks, the visibility of the dredging activity is limited to areas along the western coast of Moreton Island including the Tangalooma Resort and pier; beaches and headlands to the north and south of the resort; the communities at Cowan Cowan, as well as from boats within Moreton Bay. In addition, a visual plume will be observable while the dredge is operating.

The area from which the dredging activity is likely to be seen, while not including large numbers of residential areas, is sensitive due to the recreational uses that occur and the scenic environment in which it is set. However, visual amenity from these areas is not considered to be affected by the process of dredging given the distance at which these views are appreciated and the extent of dredging activity which would be visible. Any dredging activity at night will be largely indistinguishable from other existing shipping activity on the Bay.

Noise levels from aircraft overflights are expected to increase steadily to 2015. With the opening of the NPR in 2015, in the daytime (6am–6pm) and evening (6pm–10pm) periods, suburbs close to the existing runway or beneath some existing approach and departure flight paths are predicted to experience a reduction in noise exposure. These suburbs are generally to the south. Suburbs close to the new runway or beneath new approach and departure flight paths are predicted to experience an increase in noise exposure. These suburbs are generally to the south-west.

At night (10pm–6am), in the most noise sensitive period, there are a notable number of residences in eight suburbs under existing flight paths predicted to benefit from noise decreases as a result of opening the NPR.

Noise levels from aircraft performing take-off, reverse thrust and to a lesser extent taxiing on the NPR are likely to be audible on occasion at some of the nearest residential locations under adverse meteorological conditions. At one residential location, representing an aged care facility, predicted noise levels from reverse thrusts occurring on the NPR are predicted to exceed 70dBA for a proportion of evening and night periods.

The amenity of individual community facilities will be affected (either positively or negatively) to varying extents, generally in a similar manner and patterns as residential dwellings. Generally, it is unlikely that the change in noise exposure would result in the closure of any facility, or significantly alter patterns of demand for services.

The construction and operation of the runway has the potential to cause amenity conflicts through noise impacts to residential areas. Flight tracks are designed to maximise efficiency and reduce residential impacts.

Social – Access: Access issues relate to the integration with public transport reducing the reliance on private transport and the improvement of connection to regional, national and international destinations.

Relevant Chapters of the Draft EIS/MDP:

Chapter B10 Surface Transport.

The NPR project will facilitate mass transit opportunities and make local, regional and international travel from Brisbane into the future possible, thereby increasing business and social interaction. The NPR contributes to less congestion at Brisbane Airport by increasing capacity. The benefits of a less congested Airport and lower airfares make it easier to travel to and from Brisbane, improving the living standards of people at both ends of the city pair air route.

Social – Stakeholder Satisfaction: The indicators for stakeholder satisfaction take account of employees, customers, regulatory authorities and other stakeholders.

Relevant Chapters of the Draft EIS/MDP:

Chapter A6 Public Engagement;

Chapter B9 Social Impact Assessment.

Employee satisfaction for the NPR project will be addressed through BAC's procurement policy for new staff, contract provisions for new and existing staff and through the implementation of formal systems to ensure employee health and safety.

Customer satisfaction for the NPR relates to the users of the airport. The NPR project increases airport capacity and airport efficiency, allowing for the increase in demand for air travel. A reduction in congestion improves the availability of flights to national and international destinations and counteracts the increase in prices that congestion would cause.

Regulatory authority satisfaction includes Local, State and Australian Governments who are responsible for administering approvals requirements for the project and whose policies and plans may have a bearing on project planning.

Due to the complexity of the project and that all three levels of government have a role in its assessment and approval, BAC proposed a model for coordination and engagement between the relevant government stakeholders. The Working Group Model proposed comprised of a Steering Group to oversee a series of four discipline-focused Working Groups. The Steering Group consisted

of high level officers from the key coordinating agencies while representation on the Working Groups was at project officer level from the range of agencies which may have an interest in the project.

The four Working Groups focused on the following areas of study:

- 1 Airspace and Emissions;
- 2 Land and Marine Impacts including dredging, coastal processes, ecology and water quality;
- 3 Social and Economic; and
- 4 Cultural Heritage.

The role of the Working Groups was to provide a forum for discussion and direction between relevant Government agencies and BAC during the course of drafting the EIS/MDP. In particular, the Working Groups were able to:

- Provide clarification on issues that BAC's consultants raised within the course of their investigations;
- Comment on whether the scope of the studies met the intent of the Guidelines;
- Advise on relevance of independent peer review requirements;
- Identify if additional work was likely based on the baseline and impact assessment findings of the EIS studies; and
- Provide comment on study reports.

The role of the Steering Group was to ensure the key Federal and State agencies were kept abreast of the range of issues, discussions, and outcomes of the Working Groups.

The Working Group Model approach was seen to be of benefit for both BAC and Government for mutual understanding and communication of the range of issues which may arise in the project.

Most of the Working Groups met about 4-5 times during the course of the EIS development at critical milestones during the process. These meetings occurred approximately as follows:

- Following commissioning of sub-consultants to undertake specialist studies;
- Following completion of gap analyses by specialist consultants;
- Following completion of the baseline conditions reporting; and
- Upon completion of initial assessment of impacts and mitigation options.

The indicator for stakeholder satisfaction relates to the opportunity for the community to feel that they have had a say and that they have been listened to. This is an aspect that can only be assessed once the public notification period (Phase 2) has been undertaken. The PEP in Phase 2 provides numerous opportunities for community members to provide input and comment on the project and specifically the Draft EIS/MDP. These opportunities include the publication of the Draft EIS/MDP in hard copy and CD format, copies available at publicly accessible locations (such as libraries and certain electoral offices); publication of a DVD summarising the project, a Summary of Findings and Flight Paths and Noise Information booklets; continuation of the NPR website where the Draft EIS/MDP will be uploaded; numerous displays and open days staffed by BAC's Core Project Team. In addition, a permanent staffed static display site will be located for the duration of the Public Notification period at the Airport.

A requirement of the EIS/MDP process is for BAC to review and report on all submissions received during the 90 public notification period.

It should also be noted that a formal complaints system for noise complaints arising from aircraft noise exists and is managed by Airservices Australia. This process will continue into the future and will be operational upon opening of the NPR.

Social – Health and Wellbeing: The indicators for health and wellbeing take account of security, health and safety issues, community environmental health and the risk of hazard that arises from operation of the project.

Relevant Chapters of the Draft EIS/MDP:

- Chapter B11 Construction and Traffic Noise;
- Chapter D5 Noise Assessment;
- Chapter D7 Health Impact Assessment;
- Chapter D8 Hazards and Risks of Airport Operation.

Security during construction and operation of the NPR will be best practice as with security for the airport as a whole. The construction site will be fenced to limit access and provide security. Health and safety during construction will be ensured by the health and safety management system of each contractor and required to adhere with existing BAC health and safety requirements.

There is the potential for noise from the operation of the NPR to result in annoyance effects, sleep effects and affect the cognitive performance of children. It is estimated that on opening of the NPR that there will be a reduction in annoyance throughout the day and sleep disturbance at night, whilst there will be a potential increase in sleep induced awakenings during the daytime. Increased sleep induced awakenings may result at approximately 20 childcare and kindergarten facilities and 7 hospitals that are predicted to experience an increased number of 60dB(A) overflights in the daytime. Additionally, a greater number of shift workers may be affected by sleep induced awakenings. The extent of these effects will depend on the individual facilities and residences.

Airport operations have certain associated risks however the likelihood of an aircraft crash incident in areas surrounding the airport has been assessed through the NPR project as being extremely low. In addition, Brisbane Airport has large buffer zones between the end of runways and residential and commercial areas in each runway direction. The proposed NPR would have an even longer buffer zone between it and the nearest residential areas. There are legislative requirements for safety, airport security, storage and handling of dangerous goods and hazardous substances, emergency planning and risk management controls, which are prescribed under Australian and State legislation that are in place at Brisbane Airport and will be extended to cover the operations of the new NPR.

7.3.4.3 Natural Resource Quadrant

Natural Resources – Materials: The indicators for assessment of material used during construction takes into account minimal use of new materials, the design being driven by efficiency of materials use, materials used are from a renewable, re-used or recycled source, maximised use and sourcing of local materials and a materials specification and purchasing policy that requires the supplier to demonstrate commitment to sustainability.

Relevant Chapters of the Draft EIS/MDP:

- Chapter A3 Options and Alternatives;
- Chapter A4 Project Description: Runway Layout;
- Chapter A5 Project Description: Runway Construction.

Negative aspects of the project from a sustainable materials perspective include the amount of sand to be sourced from Middle Banks (15 Mm³) and the extent of use of other new materials in construction. Despite this efforts have been made to reduce and recycle materials in the project planning and materials are to be sourced locally where possible.

The major source of new materials for the project is sand from Middle Banks. The use of sand from this source is driven by factors such as the ground conditions on-airport which comprise soft compressible clayey materials to depths of up to 30 m. The properties of the sand are highly suitable for the purpose of filling and surcharging the site in a consistent manner which is extremely important for the construction of the runway pavement which must be built on a stable and uniform base.

The potential to reduce the amount of sand required for the project was assessed in two studies undertaken by BAC, a fill minimisation study and a levee study. The objective of the fill minimisation study was to determine methods of minimising the amount of fill required to construct the NPR by identifying areas within the runway/taxiways that high quality fill materials could be substituted with low quality materials while maintaining the required pavement strength and flood immunity. The levee study investigated the potential to use levee banks along the perimeter of the airport to hold floodwater out of the site and reduce the filling requirements of the new runway. A combination of both flood levees and fill minimisation techniques were considered during the development of the NPR design.

It was concluded that there were many disbenefits associated with both options that included an increased need to bring materials on-site from land based sources (so increasing environmental and social concerns) and increased maintenance and risk of repairs utilising alternative materials for pavement construction.

It was concluded that there is no practicable alternative to the proposed use of 15 Mm³ to achieve fill and surcharge of the NPR site as the total volume of fill is required for three critical tasks:

- Consolidation of the soft compressible soils present on-site;
- Provision of a stable platform to enable the construction of runway and taxiway pavements; and
- Sufficient fill height to provide for flood immunity to the runway and taxiways.

Approximately 600,000 m³ of pavement and structural materials are required to be brought onto site.

These materials include crushed rock and gravel, material for sub-base and base courses. These materials will be sourced from local land based quarries. There are 190 operating, licensed hardrock, gravel and sand quarries currently operating within South East Queensland (DNRM, 2006). While not every quarry can produce all of the materials required for the project, all of these quarries produce some materials that will be suitable for use on the runway project. Of these licensed quarries, 130 are situated within 100 km of the Brisbane Airport and it is reasonable to expect that the majority of pavement and structural materials will be sourced from within 100 km of the Brisbane Airport as the cost to supply materials increases with haulage distance from the supplier to the Airport site.

The construction of the runway project will require the supply of various materials to the site to suit the Contractor's construction requirements. In selecting the supplier to provide pavement and structural materials to the project, the Contractor will be required to consider a number of factors including:

- The ability of the supplier to provide the specified materials;

- The ability to deliver the materials to the site in the required timeframe;
- The price to supply the specified materials; and
- Environmental performance of suppliers and their ability to consistently meet the licence conditions applying to their various facilities (e.g. operating hours).

Natural Resources – Water Use: The indicators for assessing water quality take account of water efficiency, water monitoring and the sourcing of water for construction purposes.

A more sustainable project is highly water efficient through construction and operation, includes water monitoring to drive improvements and uses on-site or renewable water sources for construction water.

Relevant Chapters of the Draft EIS/MDP:

- Chapter A4 Project Description: Runway Layout;
- Chapter A5 Project Description: Runway Construction.

The project will require significant quantities of water during construction. Some construction activities, such as concrete batching and production, require high quality, reliable water supplies while other activities, such as dust suppression, do not require the same quality of water (i.e. potable water). Where possible the contractor(s) will be required by BAC to use recycled water in preference to potable water. The construction compound will be connected to existing services including water mains. No specific water efficiency or monitoring measures have been planned for the construction phase.

Natural Resources – Energy: The indicators for energy consider issues such as energy efficiency during construction and operation, the types of energy sources used.

Relevant Chapters of the Draft EIS/MDP:

- Chapter A4 Project Description: Runway Layout;
- Chapter A5 Project Description: Runway Construction.

During construction energy is required for lighting the construction compound and construction equipment and will be sourced from mains electricity and generators. The use of alternative energy sources is not included in planning for the construction phase.

Energy efficiency during construction is driven by the project timeframes and the reduced cost of efficient operations, however specific energy efficiency measures are not planned for the construction phase. All phases of the project will have some requirement for 24 hour construction work, with artificial lighting required either from mains electricity or generator. At other times construction will be between the hours of 7:00am and 7:00pm and will therefore not require artificial lighting.

Natural Resources – Waste Hierarchy:

Indicators regarding waste hierarchy consider how waste is avoided and reduced and whether re-use and recycling is implemented in the project. Where waste disposal is unavoidable, best practices should be employed for disposal and minimal waste should be sent to landfill. The amount of hazardous waste generated should be minimised.

Relevant Chapters of the Draft EIS/MDP:

Chapter A4	Project Description: Runway Layout
Chapter A5	Project Description: Runway Construction;
Chapter B14	Environmental Management Framework.

A waste management plan will be implemented for the project taking consideration of the waste management hierarchy and will be subject to regular monitoring. Segregation of waste at the source is specified within the Waste Management Plan in order to enhance recovery rates of re-usable and recyclable materials.

The NPR project has considered the following opportunities for waste avoidance/reduction:

- Utilisation of materials and products that have a recycled content wherever cost and performance competitive;
- Accurate estimation of required material quantities to reduce over-ordering or on-site stockpiling of materials;
- Any unused construction materials to be returned to suppliers;
- Goods to be ordered in bulk where possible to minimise packaging wastes and packaging material returned to the suppliers wherever practicable; and

- Encouraging employees to avoid and reduce waste wherever possible.

20,000 m³ of pavement materials (concrete and asphalt) will be generated from the removal of existing access roads and taxiways during construction of the NPR. It is the intention to re-use recovered materials for the highest use possible and if recovered materials meet required cost and quality criteria they will be reused on-site in the construction of proposed perimeter road pavements and in the lower layers of taxiway pavements. Gravel used for temporary access to the dredge pipeline is to be reused for fill and recovered top soil will also be reused on-site as top soil.

Any suitable construction waste such as pavement materials or crushed concrete will be taken to the Construction and Demolition recycling facility which is being constructed on the airport site. Depending upon the project requirements, recycled materials can be reused within the construction process. Other opportunities exist for the recycling of glass, plastic, waste paper, metals, oils and water during the construction phase as stated in the EMF.

In the context of best practice disposal of vegetation, the preferred method for disposal of vegetation cleared off the site will be to transport the chipped material for generation of biofuel or another beneficial use. Alternatively it will be re-used on-site as mulch during the reclamation phase to stabilise exposed soil or other areas on the Airport site. If there is excess that cannot be used elsewhere on the Airport site, the material will be disposed off-site.

It is proposed to have an on-site batching facility for both concrete and asphalt production. Recycled material will be re-used wherever possible and a quality management system implemented to minimise waste generation during this manufacturing process.

Hazardous waste generation on the airport as a whole is managed through the AES and through the construction waste management plan for the project in the EMF. The objectives within the AES are to:

- Minimise the volumes as far as possible, of hazardous and non-hazardous waste generated by Brisbane Airport operations;
- Minimise the use of hazardous substances at Brisbane Airport where practicable.

However, unavoidable hazardous wastes resulting from the project may include ASS leachate, oils, batteries and treatment tank sludges and residues. These wastes will be disposed of to an appropriate licensed landfill.

7.3.4.4 Economic Quadrant

Economic – Viability: This aspect of the sustainability assessment of the project takes into account the financial viability of the project and back-up where financial risk is present, expenditure on improving environmental and social performance that goes beyond best practice, the degree of innovation and research and development and risk management measures in place.

Relevant Chapters of the Draft EIS/MDP:

Chapter A2 Need for the Project.

The need for the NPR project is driven by an increase in the demand for air travel. With solid growth expected in passenger numbers a point will be reached where Brisbane Airport will not be able to accommodate all the passengers who want to travel through it, at least during peak times and later, as congestion continues to increase, at other times of the day. Without the NPR congestion would result in increased flight prices and reduced availability of flights. The cost of building the NPR will be levied to the cost of air tickets. The project is considered to be financially viable under current prevailing market conditions for air travel.

During the NPR Draft EIS/MDP process a range of mitigation measures have been planned to improve environmental and social performance of the project. These measures have included a firm, long term commitment to the retention of significant ecological habitats on the Airport site as well as investigating a financial contribution to a project involving rehabilitation or monitoring of estuarine habitat in the local area off-site. The retention of the biodiversity zone and associated biodiversity management actions on the Airport site equate to a \$3 Million commitment over a twenty year period.

In terms of innovation and research and development, BAC has invested in the NPR project over a long period of time prior to and including the development of this EIS/MDP. The following studies have been undertaken prior to the Draft EIS/MDP phase:

- Previous Airport Master Plans dating back thirty years which plan and cater for a NPR;
- Baseline ecological and water quality studies;
- Development of the Biodiversity Management Strategy, pre-empting the need to off-set impacts of Airport development projects including the NPR; and
- Pre-NPR project feasibility, planning and risk management studies.

Considerable research has gone into the development of the Draft EIS/MDP.

Risk management has underpinned the Draft EIS/MDP stage of the project including the Public Engagement Process. This has ensured identification of risks and management measures for all stages of the project. This project process integrates with the risk management reporting that BAC performs at a corporate level.

Economic – Competition Effects: The assessment of competition effects considers the extent to which the project promotes ethical competition, brings vitality and regeneration to the region and precipitates downward pressure on prices through local, regional and national competition. Diversity of employment and consumer choice as well as supply chain issues are also considered.

Relevant Chapters of the Draft EIS/MDP:

Chapter A2 Need for the Project.

BAC has a procurement policy for contractors specifying the tender process for jobs of varying sizes to ensure fair procurement and competitive behaviour. The BAC procurement policy does not specify the percentage of goods and services to be supplied by local companies however during the NPR project materials will be sourced from South East Queensland where possible.

The proposed expansion is projected to increase South East Queensland output (real GSP) and produce a welfare gain above business-as-usual levels. The Airport is a key element of the region's transport system, and plays an important role in the Australia TradeCoast and economic development in general. The NPR provides for increase in demand for air travel and improves connection of Brisbane to national and international markets. The spending of nearly \$1 Billion to construct a runway helps to

stimulate economic activity during the construction phase, particularly in the Brisbane-Moreton region.

A key driver of the economic benefits of the NPR is the consequence on the air transport sector if Brisbane Airport becomes congested. Increased Airport capacity allows for more flights and prevents the increase in prices that would result from Airport congestion. The project increases the connection of Brisbane to regional national and international markets improving business opportunities and competition. If no additional runway capacity was added at Brisbane Airport, it is estimated that there would be a loss of up to 35 percent of regular airline movements. This represents not only a loss of passengers for the airport and airlines, but a loss of other tourist spending which would otherwise have occurred. The loss in tourist spending is estimated at nearly \$5 Billion per annum in 2035 if the NPR is not constructed.

By allowing for airport expansion the project creates additional jobs in the aviation industry and several associated Airport industries. The project also contributes to Brisbane economic development.

Economic – Employment/Skills: The indicators for employment and skills relate to the contribution of the project to creation of local jobs and a commitment to using local labour and materials, the nature of employment generated by the project and the diversity of employment opportunities that are created.

Relevant Chapters of the Draft EIS/MDP:
Chapter A2 Need for the Project.

The NPR project increases investment and production in South East Queensland which has resultant impacts on employment. At particular stages of the construction process there will be peaks in the job numbers provided by the project. During the construction stages a range of employment types are provided by the project. The majority of jobs are likely to be sourced in the region with some specialist activities (such as the dredge contractor) being sourced from overseas.

The growth in Airport facilities resulting from the NPR allows for an increase in aviation related employment. This includes operational employment such as air traffic controllers, BAC technical staff, and support industries such as catering and aircraft maintenance.

The nature of employment such as permanent or temporary and the diversity of employment opportunities for airport related jobs depends on the nature of the position and is determined by BAC employment policies. During construction, employment conditions are determined by the contractors' employment policies and are not directly linked to BAC policy.

Economic - Transport: The transport indicators in the economic quadrant deal with issues such as the need for reduced travel dependency, facilitates the modal switch to public transport use, reduces the need for road haulage and truck kilometres, optimises the use of rail and water for goods transport, minimises the number of kilometres travelled per annum and promotes efficient handling of goods, material and waste within the site.

Relevant Chapters of the Draft EIS/MDP:
Chapter B10 Surface Transport

The NPR project will cater for increased air travel and will therefore contribute to travel dependency. Most of the roads and intersections in the study area surrounding the airport currently operate over capacity during either the morning or evening peak. Development of Greater Brisbane and lands surrounding the Brisbane Airport is forecast to result in significant congestion on the road network in both 2015 and 2035 without NPR traffic.

The majority of freight that travels into and out of Brisbane Airport currently is carried on passenger aircraft rather than dedicated freight aircraft. Australian Air Express and Heavy Lift are two companies that have regular dedicated freight flights into and out of Brisbane Airport. Australian Air Express and Heavy Lift have only a few jet freighter movements per day. While BAC expects that dedicated freighter aircraft flights will increase, their percentage of total aircraft movements will remain very small. Freight is carried to the Airport by road access.

Efficiency of internal transport and handling is driven by the need for reduced time and cost; however a strategy for efficient internal materials handling has not been formulated for the project to date.