Airport Link Project

Terms of Reference
for an
Environmental Impact Statement

The Coordinator-General
March 2006

Project and Process Information

Project Proponent

The proponents for the Airport Link Project are the State of Queensland and the Brisbane City Council.

Project Summary

The Airport Link Project (the Project) is part of an overall strategy to improve the efficiency of Brisbane's road network, consistent with transport planning objectives of the Queensland Government and Brisbane City Council (BCC). Proposed new infrastructure outlined in the BCC's *Transport Plan for Brisbane 2002-2016* included the Airport Link. The Project was included in the BCC's *TransApex* transportation strategy as part of a wider set of transport infrastructure (primarily tunnels) around the city in order to take traffic away from Brisbane's CBD and inner and middle suburbs. The TransApex Prefeasibility Report identified that the Airport Link's primary function would be to provide an alternative high-speed route to the CBD bypass network or beyond, for airport and northern suburbs traffic using the East West Arterial, Sandgate, Gympie and Lutwyche roads.

The State Government's South East Queensland Regional Plan 2005-2026 (SEQRP) and its supporting Infrastructure Plan and Program (SEQIPP) includes support for the full feasibility study for the Project in the first phase of the Infrastructure Plan. The SEQRP establishes a range of desired regional outcomes, principles and policies to guide the development of SEQ through to 2026. The SEQRP recognises the significant role BCC has in transport in the region and provides in-principle support from the State Government as a partner in the detailed feasibility study of the Project.

The Project is a predominantly underground toll road proposed between Brisbane's northern suburbs and Bowen Hills. The Project is proposed to connect the northern arterials of Gympie Road at Kedron, Sandgate Road and the East-West Arterial at Toombul, to the Inner City Bypass and the proposed North-South Bypass Tunnel at Bowen Hills. The Project also includes the potential to connect Stafford Road and Gympie Road to Sandgate Road and the East West Arterial at Toombul. The study corridor for the EIS is shown in **Figure 1**.

There are four phases to the Project, namely:

- Phase 1 – Pre-feasibility Studies for the TransApex strategy, including a financial investigation and an engineering investigation;
- Phase 2 – Detailed Feasibility Studies including an Environmental Impact Statement (EIS), traffic and transport studies, concept design studies, reference design and business case studies;
- Phase 3 – Documentation and tendering; and
- Phase 4 – Implementation and operation of the Project.

The EIS is prepared as part of the Phase 2 Detailed Feasibility Studies being undertaken by the Queensland Government and the Brisbane City Council into the Project.

The proponent has prepared an Initial Advice Statement (IAS) that provides further detail relating to the Project. The IAS provides a general indication of the possible Project corridor. Attached to these Terms of Reference (TOR) is a diagram indicating the EIS study corridor, being that area to be investigated specifically during the preparation of the EIS and its component parts. Other areas of the City may also be investigated should the need arise.

Relationship with Other Projects

In August 2005 the Coordinator-General (CG) recommended that the North South Bypass Tunnel (NSBT) could proceed subject to the recommendations and conditions in the Coordinator-General's Report on the EIS for the NSBT project. The EIS for the Project will assess its impact on the NSBT.

TransLink is undertaking a detailed feasibility study for the section of the proposed Northern Busway between the Inner Northern Busway at Royal Children's Hospital (Herston) and Gympie Road at Kedron. The study corridor for the Northern Busway covers much of the study corridor for the Project between Bowen Hills and Kedron. The Project will coordinate its EIS process where relevant with that of the Northern Busway. The TOR for the Project includes the need to explore opportunities to integrate the Northern Busway Project and the Airport Link Project.

Administrative Details for these Terms of Reference

The Project was declared a 'significant project for which an EIS is required' by the CG, pursuant to Section 26 of the Queensland *State Development and Public Works Organisation Act 1971* (SDPWO Act). These TOR are to assist the Queensland Government and the Brisbane City Council to develop a comprehensive EIS for the Project.

The CG is coordinating the assessment of the EIS for this Project.

When the proponents have prepared the EIS, it will be made available for public review and comment. Further details on this process are provided in Section 3.

The proponents may be requested to provide a response to the comments received on the EIS and make any consequential changes to the Project to address the comments, and will prepare a Supplementary EIS for this purpose. At the conclusion of this process, the CG will prepare a report evaluating the EIS.

With respect to any subsequent development application required under the *Integrated Planning Act 1997* (IPA) for the Project, the EIS process under Part 4, Division 4 of the SDPWO Act:

- Replaces the information and referral stage and the notification stage under the Integrated Development Assessment System (IDAS) of the IPA;
- Means that the Coordinator-General's Report is taken to be the concurrence agency's response under IDAS (i.e. there are no concurrence agencies); and
- Provides that submissions received in relation to the EIS are taken to be 'properly made submissions' under the IPA.

The Coordinator-General's Report may state for the assessment manager one or more of the following:

- The conditions that must attach to any development approval;
- That the development approval must be for part only of the development; and
- That the approval must be a preliminary approval only.

Alternatively the Report may state for the assessment manager:

- That there are no conditions or requirements for the Project; or
- That the application for the development approval must be refused.

Where another Act (for example *Environmental Protection Act 1994*) requires the preparation of an EIS, or similar statement to address the environmental effects of the Project, this EIS can be taken as a statement satisfying those requirements. Where approval is required under another

Queensland Act, the Coordinator-General's Report may recommend to the person who will consider an approval required for the Project that:

- Approval for the Project be refused; or
- Stated conditions be imposed on the approval.

Alternatively, the Coordinator-General's Report may recommend that there are no conditions to be attached to any approval given under another Act.

Where the TOR are addressed for a particular stage of the process under section 32 of the SDPWO Act, the Proponent should identify the particular stage and the TOR addressed for that stage.

The Delegate of the Commonwealth Minister for the Environment and Heritage determined on 19 January 2006 that the Project constitutes a controlled action pursuant to s75 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act). This decision was subsequently reconsidered after substantial new information was provided to the Commonwealth Minister. Based on this new information, a decision was made on 20 March 2006 by the Minister for the Environment and Heritage that the proposed action is not a controlled action and that assessment and approval of the proposal under the EPBC Act is not required.

The contact for coordination of the EIS process will be:

Project Manager– EIS Airport Link
The Coordinator-General
Major Projects Division
PO Box 15009
City East QLD 4002
Tel: (07) 3234 0540 Fax: (07) 3225 8282

CONTENTS

PART A – INFORMATION AND ADVICE ON THE PREPARATION OF THE ENVIRONMENTAL IMPACT STATEMENT (EIS)

1 INTRODUCTION

This Terms of Reference (TOR) for an EIS for the Project has been prepared in accordance with the requirements of the *State Development and Public Works Organisation Act 1971.*

The purpose of the TOR is to identify those matters that should be addressed in the EIS.

The nature and level of investigations should be relative to the anticipated Project benefits and likely extent and severity of impacts. These investigations are also to address, as relevant, potential impacts on matters protected under the *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act). Commonwealth and State Governments, from which the Proponents require approvals, may request additional information on any matter not adequately dealt with in the report. The Proponents are required to contact relevant government agencies and peak bodies representing particular areas of interest in the wider community to clarify the required nature and level of investigations.

Reference to any culturally sensitive confidential information should be indicative only and disclosure of any such information must be negotiated with traditional custodians. Other confidential information supplied by or to the Proponent must be clearly identified and placed in discrete attachments to the main report, together with a statement of confidentiality.

An executive summary should be provided in the EIS and be available separately for public information.

2 EIS OBJECTIVES

The objectives of the EIS are:

- To identify potential environmental, social and economic impacts and to ensure that adverse impacts are avoided or mitigated and managed where possible; and
- To identify potential community benefits, including environmental, social and economic benefits.

Where unavoidable, the likely impacts (direct, indirect and cumulative) must be examined fully and remedial measures proposed, so that the development of the Project, including the selection of the final project specification, is based on sound economic, social and environmental protection and management criteria. Consistent with this objective, the EIS should be a stand-alone and comprehensive document containing sufficient information to make an informed decision on the potential impacts. The document should provide:

- For interested bodies and persons, a basis for understanding the Project, alternatives for the proposed Project reference design, the existing environment that it would affect, both on and off the site, and in relation to other major social and engineering infrastructure coordination, the impacts that may occur and the measures to be taken to mitigate all adverse impacts, and possible legislative approvals and delivery mechanisms;
- For groups or persons with rights or interests in land, an indication of Project impacts on that land including access and measures to mitigate identified adverse impacts; and
- For the CG, a framework against which to:
    - consider the economic, social and environmental aspects of the Project in view of legislative and policy provisions and decide whether the Project can proceed or not;

- set conditions for approval, as appropriate, to seek to achieve economically, socially and environmentally sustainable development; and
- where necessary, recommend an environmental management and monitoring program.

It is the responsibility of the Proponents to identify and address, as fully as possible, the matters relevant to the Project in complying with the statutory requirements for EIS preparation.

3 EIS PREPARATION GUIDELINES

The key principle is that there should be sufficient detail presented in the EIS to enable readers to identify and understand the benefits and to balance those against the impacts of the Project on the natural, social, economic and built environment (including existing infrastructure). Readers are likely to include representatives of Commonwealth, State and Local Governments, special interest groups and the general public. The EIS should contain sufficient information to avoid the need to search out previous or additional reports.

The EIS should state the criteria adopted in assessing the Project and its impacts, such as compliance with relevant legislation, policies, standards, community acceptance and maximisation of economic, social and environmental benefits and minimisation of risks.

The level of analysis and detail in the EIS should reflect the level of significance of the expected impacts on the environment.

The EIS should identify the anticipated life of the Project, where reasonable, taking into account the current planning phase of the Project. The EIS should identify reasonable economic and technically achievable measures to be developed to ensure that the adverse impacts of the Project are limited to acceptable levels.

The EIS should include analysis of any cumulative impacts on economic, social and environmental values directly caused by the Project. The cumulative impacts of the Project must be considered over time and in conjunction with other major projects, approved and known to be proceeding at the time of commencement of operations of the Project.

Within the context of 'scenario testing', the EIS should also address the potential for cumulative impacts with and without the proposed Northern Busway based on concepts of the Northern Busway publicly available at the time of preparation of the EIS.

The EIS should state the following about information given in the EIS:

- The source of the information;
- How recent the information is;
- How the reliability of the information was tested; and
- Any uncertainties in the information.

All uncertainties in the assessment and assumptions made should be clearly stated. Where possible, information provided in the EIS should be clear, logical, objective and concise, so that non-technical persons may easily understand it. Where appropriate, text should be supported by maps and diagrams. Factual information contained in the document should be referenced wherever possible. Where applicable, aerial photography and/or digital information should be presented.

The terms "describe", "detail" and "discuss" should be taken to include both quantitative and qualitative matters as practicable and meaningful. Similarly, adverse and beneficial effects should be presented in quantitative and/or qualitative terms as appropriate. Within this TOR the term "Project" includes all activities and ancillary works undertaken on lands related to the Project.

Should the proponent require any information in the EIS to remain confidential, this should be clearly indicated, and separate information should be prepared on these matters.

A listing of all Advisory Agencies for the EIS process should be provided in the EIS.

Copies of the prepared EIS should be lodged with the CG for distribution for comment and review during the public review period. In addition, an electronic version of the EIS is to be provided to the CG to be made available through the CG's web site or through a link to a web site maintained by the Proponent or its consultants. Copies of the EIS should also be prepared for distribution to relevant libraries and other key Government offices. Documents are to be made available in both CD ROM and hard copy format, at a cost not exceeding the cost of reproduction.

While every attempt has been made to ensure that these TOR address all of the major issues associated with this Project, they are not necessarily exhaustive and should not be interpreted as excluding from consideration matters deemed to be significant but not incorporated in them or matters (currently unforseen) that emerge as important or significant during the completion of scientific studies, from public consultation, or otherwise, during the course of preparation of the EIS.

4 ADVISORY AGENCY CONSULTATION

To facilitate the assessment process, the Proponent (Queensland Government and Brisbane City Council) should consult with Advisory Agencies and other appropriate stakeholders when required during the conduct of the EIS. The purpose of this consultation will be in part to identify legislation, policies and methodologies relevant to the assessment of the proposed project.

Advisory Agencies should include but are not limited to:

Department of Aboriginal and Torres Strait Islander Policy (DATSIP)

Department of Communities (DoC) and Disability Services Queensland (DSQ)

Department of Emergency Services (DES)

Department of Employment and Training (DET)

Department of Housing (DoH)

Department of Industrial Relations (DIR)

Department of Local Government, Planning, Sport and Recreation (DLGPSR)

Department of Main Roads (DMR)

Department of Natural Resources, Mines and Water (DNRMW)

Department of the Premier and Cabinet (DPC)

Department of Primary Industries and Fisheries (DPIF)

Department of Public Works (DPW)

Department of State Development, Trade and Innovation (DSDTI)

Environmental Protection Agency (EPA)

Office of Urban Management (OUM)

Queensland Health (QH)

Queensland Police Service (QPS)

Queensland Rail (QR)

Queensland Transport (QT)

Queensland Treasury (Treasury)

Department of the Environment and Heritage (Commonwealth) (DEH)

5 GENERAL STYLE AND FORMAT

The EIS should be written so that any conclusions reached can be independently assessed. This means that all sources must be appropriately referenced. The EIS should be written in a format matching the TOR or include guidelines, preferably as an appendix, describing how the EIS responds to the TOR. The EIS is to include a draft Outline Environmental Management Plan (EMP) as a framework for addressing potential environmental impacts during both the construction and operational phases of the Project.

The EIS should also include appendices containing:

- A copy of the TOR;
- A consultation report that lists the persons and agencies consulted during the EIS; and
- The detailed specialist studies that support the main EIS document.

Maps, diagrams and other illustrative material should be included in the EIS.

6 TERMS OF REFERENCE GLOSSARY

The following abbreviations have been used in this document:

CG – The Coordinator-General;

DES – the Department of Emergency Services

DMR – the Department of Main Roads

DNRMW – the Department of Natural Resources, Mines and Water;

DSDTI – the Department of State Development, Trade and Innovation;

DPIF – the Department of Primary Industries and Fisheries;

EIS – Environmental Impact Statement;

EMP – Environmental Management Plan;

EPA – Environmental Protection Agency;

EPBC Act - *Environment Protection and Biodiversity Conservation Act 1999*;

QT – Queensland Transport;

Project – the Airport Link Project

SDPWO Act – *State Development and Public Works Organisation Act 1971*

PART B – SPECIFIC REQUIREMENTS – CONTENTS OF THE EIS

EXECUTIVE SUMMARY

The Executive Summary should be written as a stand-alone document, able to be reproduced on request for interested parties who may not wish to read the EIS as a whole. The structure of the executive summary should follow that of the EIS, though focused strongly on the key issues allowing the reader to obtain a clear understanding of the Project, its environmental, social and economic implications and management objectives. The summary should include, utilising visual aids where appropriate:

- The title of the Project;
- Name and contact details of the Proponent and its commitment to effective environmental management;
- A concise statement of the aims and objectives of the Project;
- The legal framework, decision-making authorities and involved agencies;
- A discussion of the background to, and need for, and the justification for the Project, including the consequences of not proceeding with the Project;
- A discussion of the alternative options for the Project reference design and reasons for the selection of the proposed development option;
- A brief description of the Project (pre-construction, construction and operational activities) and the existing environment;
- A brief discussion of the relationship between the Project and other planning studies and projects in the vicinity of the study area including the Northern Busway project, the North-South Bypass Tunnel, and Gateway Upgrade Project; and
- An outline of the principal economic, social and environmental impacts predicted and proposed management strategies and commitments to minimise the significance of adverse impacts.

GLOSSARY OF TERMS

A glossary of technical terms, acronyms and references should be provided.

1 INTRODUCTION

The introduction should clearly explain the function of the EIS, why it has been prepared and what it sets out to achieve. It should also define the audience to whom it is directed and contain an overview of the structure of the document.

1.1 The Proponent

This section describes the Proponent in terms that are relevant to the proposed Project. The section should outline the experience of the Proponent, including the nature and extent of business activities and the Proponent's environmental record and environmental policy.

1.2 Purpose of the EIS

Summarise the role and purpose of the EIS including inputs to the development of concepts and preliminary design for the Project, compliance with regulatory requirements, reference to the TOR and any complementary or subsequent documentation (i.e. technical background papers).

The audience should be able to distinguish the EIS as the key environmental document providing information to decision makers considering approvals for the Project.

1.3 The Environmental Impact Statement Process

Describe the EIS process undertaken for the Project with respect to any linkages between Commonwealth and State approvals required for the Project.

Provide an explanation of the legislative process under which the EIS is being produced, including timing and decisions to be made for relevant stages of the Project. Also provide an explanation of the relationship between the EIS and the process for the Northern Busway Project.

The explanation should include a description of the EIS evaluation process as a significant project pursuant to the SDPWO Act, and any other State approvals required as part of the project.

The linkages between relevant State and Commonwealth legislation should also be identified if relevant.

1.4 The Public Consultation Process

The EIS should report on the consultation program which has been conducted with community members and other stakeholders throughout the study period. The full details of consultation should be provided in an Appendix. Objectives for consultation should include:

- To ensure community members, businesses and organisations in the study corridor and other stakeholders have access to information to allow their informed consideration of the Project's potential issues, benefits and impacts;
- To ensure the consultation process enables participation by people and organisations who have a direct interest in the study's outcomes;
- To provide ongoing and transparent two-way communication between the study team and community members and stakeholders, throughout the study process;
- To ensure community members' values, local knowledge and other input are considered in the assessment and design processes; and
- To contribute to the development of a project that addresses community concerns and values, and maximises opportunities for local and regional community benefit.

Proactive consultation should be undertaken with stakeholders within the study corridor and other stakeholders with a direct interest in the Project's impacts and benefits.

The EIS should particularly report on consultation with direct stakeholders with an identifiable interest in the Project outcomes.

The EIS should report the extent to which the public consultation program satisfied the requirements under the SDPWO Act.

This section should outline the methodology that was adopted to identify social and economic benefits and mitigate impacts that may arise from the Project.

It is recommended that a Table of Consultation Findings be provided in the EIS, either as an appendix to, or included in, the EIS. The table should identify all the groups, agencies, and people who have been consulted, the issues they raised and the strategies put into place to resolve these concerns and or enhance particular positive impacts.

2 BACKGROUND AND PROJECT RATIONALE

This section is to provide the justification for the Project, with particular reference made to conclusions on economic and social benefits, including employment and spin-off business development. This section should also discuss feasible alternatives, if any, including conceptual, technological and locality alternatives for the Project and include discussion of the consequences of not proceeding with the Project.

2.1 Background

The background leading to the Project proposal should be provided. It should include general information about the Project in the local, regional and strategic context.

2.2 Need for the Project

State the objectives that have led to the development of the Project. Outline the events leading up to the Project's formulation and the alternatives considered for the Project reference design.

The EIS should detail the specific objectives and justification for the Project within the context of the *South East Queensland Regional Plan,* the *Brisbane City Plan,* the *Integrated Regional Transport Plan,* the *Transport Plan for Brisbane* and the *South East Queensland Infrastructure Plan and Program* which has established an investment plan for greater Brisbane transport infrastructure.

2.3 Project Development

The EIS is to provide a description of the various design options that were assessed in the development of the Project reference design. Design options should be discussed in sufficient detail to enable an understanding of the criteria for selecting the preferred option in terms of technical, commercial, social and natural environment aspects. The consequences of not progressing the Project (the "do nothing" scenario should also be discussed.

Relevant illustrations, maps and drawings that show the location and context of the assessed options should be provided.

3 PROJECT DESCRIPTION

The objective of this section is to describe the Project through its lifetime. This information is required to allow assessment of all aspects of the life of the Project including all phases of the Project from planning, construction, decommissioning of the construction site and long-term operation.

A description of the Project is to be provided including:

3.1 Construction Arrangements (including decommissioning of the construction site)

The description of construction arrangements for the Project should include:

- A preliminary predictive program of activities relating to design, delivery and construction. The description should also state the anticipated construction period for the Project, including the proposed construction hours;
- Options for potential construction areas, and parking facilities for the construction workforce;
- Description of construction access and traffic arrangements for construction-related activities;
- Spoil management arrangements including re-use options, transport options and potential haulage routes for transport of spoil to possible placement locations;
- The likely types of vehicles (or alternative arrangements) to be used for spoil haulage, including numbers of vehicle trips and frequency of trips;
- Likely scenarios for origin and destination of inputs/supply source and likely transport routes;
- Arrangements to ensure safety and operational integrity of the adjacent road network, pedestrian and cycle mobility, and railway infrastructure during construction;
- An assessment of the likely impacts on the adjacent road/rail network during construction; and
- Hazardous or dangerous material that may be transported to or from the site during construction.

The above construction arrangements should also describe, where appropriate, integration with the potential or likely arrangements envisaged for the construction of the proposed Northern Busway Project. The EIS should also describe the impact that construction of the Project would have on the public transport network and operations, and how these impacts would be managed.

3.2 Finished Design

Schematic identification of:

- The design criteria applied to tunnels, roads and bridges;
- The proposed vehicle use and any restrictions that would apply.
- The corridor within which the tunnel and roadway will be located, with the aid of maps and diagrams, describing indicative:
  - entry and exit roadways, intersections and interchanges;
  - indicative sections on typical embankments and bridged sections;
  - tunnel lighting;
  - location of electronic tolling infrastructure;
  - ventilation and drainage works and outlets;
  - works within and outside of existing road reserves, including ancillary works such as for pedestrian and cycle movements;
  - measures required for emergency access, retrieval of stalled or crashed vehicles, management of smoke or toxic emissions in the event of spillage etc.; and
  - design parameters including, horizontal and vertical alignment, representative road and tunnel cross-sections, predicted traffic volumes / capacity and anticipated design life.

- Indicative road reserve widths and access requirements along the alignment including the use of existing areas of disturbance for machinery access and future maintenance;
- Options for corridor acquisition;
- Proposed tunnel management and control, including monitoring of traffic and air quality; and
- Options for tenure.

3.3 Other Infrastructure Requirements - Utility Services

3.3.1 Description of Existing Environment

Describe the existing and any planned utility services that may be affected by the Project, including electricity, sewerage, water, gas and telecommunications infrastructure. Owners of the utilities should be identified, together with significant or critical users of the utilities (eg health care facilities).

3.3.2 Potential Impacts and Mitigation Measures

This section is to assess the potential impacts of the Project on existing and any planned utility services, including the identification of any critical users of the service. Strategies to minimise potential impacts on existing utility services, including required upgrading of infrastructure, should be provided, especially in regard to any users where it is critical to maintain constant service (eg health care facilities).

3.4 Permits, Licences and Approvals

This section should identify permits, licences and approvals required for the Project. The section should identify the legislation under which the permit, licence or approval is required (including all relevant international conventions, Commonwealth and State legislation), together with the administering authority, and the trigger mechanism for obtaining the permit, licence or approval.

3.5 Rehabilitation of Construction Sites

This section should present the strategies and methods for progressive and final rehabilitation of the environment disturbed during construction. Final rehabilitation of the construction sites should be discussed in terms of ongoing land use suitability, management of any residual contaminated land and any other land management issues.

4 TRAFFIC AND TRANSPORT

This chapter provides an outline of the traffic and transport studies undertaken to demonstrate the need for the Project and the provision of data for other aspects of the impact assessment.

4.1 Description of Existing Transport Network

The existing transport operations should be described, in terms of:

- The road network, broadly for the regional network and in more detail for the local road system, including travel speeds and times;

- Road traffic composition and movement patterns, including the source and destination of such traffic;
- Traffic flows – peak, daily, composition;
- Public transport services (bus, ferry and rail) – existing service details and facilities;
- Rail corridors and associated rail infrastructure;
- Bicycle movements and facilities;
- Freight services;
- Emergency services vehicle flows; and
- Pedestrian movements and facilities.

4.2 Transport Network Performance

The performance of the existing road network should be described in terms of:

- Traffic demands (through, local and regional context);
- Local access requirements, both for properties and local streets;
- Travel speeds and travel times;
- Road capacity (level of service);
- Intersection operation including operating level of service (delays and queuing);
- Interaction with public transport (including reference to public passenger transport demand, capacity, level of service and mode share);
- Tolling; and
- Road user safety.

4.3 Description of Traffic Forecasting Methodology

A description of the studies undertaken for the Project should be provided, with particular emphasis on:

- Land use patterns – a description of the population and demographic forecasts used and assumed generation rates;
- The scope and validity of the transport models used;
- The provision of year forecasts for relevant design years to 2026;
- An analysis of trends in household travel behaviour (by comparison of 1992 and 2004 household travel surveys) and assessment of the sustainability as reflected by those trends;
- Network improvements – which upgrades have been included and at what time (e.g. Gateway Upgrade Project, North-South Bypass Tunnel Project, the proposed Northern Busway);
- An explanation of how and what alternative future scenarios, including tolling effects and vehicle operating costs were considered;
- Effects of major public transport infrastructure and/or services within the corridor;
- An explanation of how induced and suppressed traffic demand has been incorporated; and
- Sensitivity of the model outputs to changes in key parameters and assumptions.

4.4 Future Base Traffic Conditions

Future conditions on the road network should be outlined from appropriate models for relevant design years such as the anticipated opening year 2012, and relevant design years up to 2026, without the Project in place, in terms of:

- Transport and traffic future demand, including traffic volumes and speeds**;**
- Through traffic demands and accessibility;
- Network performance within the local and broader network surrounding the Project – intersection operation (e.g. degree of saturation, delays and queues);
- Public passenger transport services (including levels of service, and utilisation of bus and rail passenger transport capacity); and
- Road user safety assessment (including consideration of pedestrian and cycle users).

4. Effects of the Proposal

The effects of the proposed works on the transport network should be demonstrated for future model years, as follows:

- Traffic volumes – changes from the anticipated opening year in 2012, and other relevant years up to 2026 with the Project;
- Traffic flow on major and minor roads (e.g. East–West Arterial and Nudgee Road);
- Regional route traffic implications;
- Effects of the Project in the immediate area and extending along the main feeder and exit routes to and from the Project;
- Intersection and road capacity performance (Levels of Service);
- Car movements (e.g. travel times, vehicle kilometres travelled (VKT), trip diversions, reliability);
- Commercial vehicle movements (e.g. travel times, VKT and trip diversions);
- Aggregate road network performance – VKT, Vehicle Hours Travelled (VHT), average vehicle speeds;
- Impacts on access to properties and existing roads;
- Impacts on pedestrian and bicycle movements within the transport system;
- Accidents and severity of accidents;
- Incident management;
- Bus services (e.g. travel times and new bus priorities);
- Rail services and infrastructure;
- Emergency service vehicle movements (in consultation with DES); and
- Implications of tolling on untolled route alternatives.

Traffic changes on the local road network to provide for potential local improvements, such as urban regeneration opportunities, community benefits and public transport benefits, should be identified and their implications provided. Any changes to the local traffic network are to consider the range of users, including emergency vehicles accessing hospitals within the catchment and pedestrian and cyclists, particularly in the vicinity of major land uses or public transport facilities (e.g. bus stops, train stations, and busway stations)**.**

4.6 Construction Impacts

The transport implications for both impacts and mitigation measures of construction activities should be described, in terms of:

- Construction site traffic generation and access;
- Impacts on local and regional traffic flows from temporary and permanent traffic changes;
- Impacts on bus routes and rail infrastructure and operations in the study area;
- Emergency service vehicle movements;
- Construction impacts on pedestrians and cyclists;
- Construction impacts on the provision of adequate access to businesses, public facilities, including schools, churches and parks and private residences;
- Construction workforce parking and impacts on existing parking; and
- Effects of construction traffic (deliveries and haulage of spoil) on the road network or rail/waterway systems if appropriate.

4.7 Pedestrian and Cyclist Issues

4.7.1 Description of Environment

Describe the existing and planned future infrastructure, including usage levels, for pedestrian and bicycle movements and facilities within the environs of the Project.

4.7.2 Potential Impacts and Mitigation Measures

This section should describe the potential impacts of the Project on existing and planned infrastructure for pedestrian and cyclist movements and facilities affected by the proposal and identify opportunities for walking and cycling network improvements.

4.8 Proposed Northern Busway

The traffic and transport analysis should include a scenario where the proposed Northern Busway Project, or part of, is implemented and operational. The analysis must also address:

- The functional relationship between the proposed Northern Busway and the Project, from a traffic and transport standpoint;
- Timing implications; and
- Opportunities for service integration.

4.9 Proposed North-South Bypass Tunnel

The traffic and transport analysis should include a scenario where the proposed North-South Bypass Tunnel, or part of, is implemented and operational. The analysis must also address the underlying assumptions such as:

- The functional relationship between the proposed North-South Bypass Tunnel and the Project from a traffic and transport standpoint;
- Timing implications; and

- Opportunities for service integration.

5 ENVIRONMENTAL VALUES AND MANAGEMENT OF IMPACTS

Detailed descriptions of the existing environment should be provided followed by an assessment of the potential impacts on this environment during the construction and operational phases. The formulation and adoption of high-level environmental protection measures to prevent or mitigate adverse impacts is also required. Baseline information from other relevant studies should be used and referenced where appropriate.

5.1 Topography/Geomorphology/Geology/Soils

5.1.1 Description of Existing Environment

This section should include descriptions, including mapping, of the topographical, geomorphologic and geological features of the study corridor including:

- The topography of the site with contours shown at suitable increments, shown with respect to Australian Height Datum (AHD);
- Landforms of the study corridor and surrounding areas, including an analysis of subsurface and slope stability where appropriate (landform patterns and elements should be described using the standardised classification of the Australian Soil and Land Survey Field Handbook, McDonald et al, 1990);
- Significant geological and landform features;
- The presence of potentially economically significant mineral, energy and extractive material resources;
- The geology of the wider Project area, with particular reference to the physical and chemical properties of surface and sub-surface materials and geological structures likely to be intercepted during construction; and
- Hazards such as geological faults, unstable areas, potential and actual acid sulfate soils and erosive soils.

Soil profiles in areas likely to be affected by surface works should be described, with reference to McDonald et al 1990 and Australian Soil Classification Isbell 1996.

An overview of data on contaminated lands should also be conducted. This should identify sites likely to contain contaminated soil that requires off-site disposal.

5.1.2 Potential Impacts and Mitigation Measures

Assessment of the potential impacts and mitigation measures on soils, including erosion risk, settlement risk, rehabilitation potential, acid sulfate soils, contaminated land and construction spoil are required.

Erosion risk

The report should include an assessment of potential erosion effects, especially those resulting from the removal of vegetation, both on-site and off-site for all disturbed areas.

Strategies to prevent or control erosion should be specified and should be developed with regard to preventing soil loss in order to prevent significant degradation of local waterways by suspended solids.

Settlement risk

The report should present an assessment of the risk of settlement to adjacent land, due to tunnel construction, collapse or slope failure of cuts on the approach roads.

Rehabilitation potential

Strategies for the establishment and rehabilitation of worksites are to be provided. This should include descriptions of topsoil stripping, stockpiling and replacement. The minimisation of topsoil storage times, to reduce fertility degradation, should also be addressed.

Acid sulfate soils

The EIS should identify and outline strategies to manage acid sulfate soils consistent with State Planning Policy 2/02 - Planning and Managing Development involving Acid Sulfate Soils, DNRMW's 2002 Queensland Acid Sulfate Soils Technical Manual - Soil Management Guidelines and other relevant technical documents for example:

- *Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils in Queensland*. Ahern CR, Ahern MR and Powell B (1998).
- State Planning Policy 2/02 Guideline
- Acid Sulfate Soils Laboratory Methods Guidelines in the *Queensland Acid Sulfate Soils Technical Manual*. Ahern CR, McElnea AE and Sullivan LA (2004).
- Soil Management Guidelines in the *Queensland Acid Sulfate Soils Technical Manual*. Dear SE, Moore NG, Dobos SK, Watling KM and Ahern CR (2002).
- Legislation and Policy Guide in the Queensland Acid Sulfate Soils Technical Manual. Dear SE, Moore NG, Watling KM, Fahl D and Dobos SK (2004).

Contaminated land

The EIS should outline strategies to address the potential impacts associated with disturbance to any existing contaminated land and possible contamination of land from construction or operation of the Project.

Strategies to prevent land contamination, within the meaning of the *Environmental Protection Act 1994*, should be provided. Proposals for preventing, recording, containing and the remediation of any contaminated land likely to be intercepted by construction works should be outlined.

Investigation must be undertaken to identify all sites on the Environmental Management Register within the proposed project area.

The EIS should indicate how the Project could comply with existing Site Management Plans (SMP) for sites located within proposed portal footprints (i.e. surface works areas).

Describe the elements of emergency procedures which must be prepared for activities that have the potential to cause further soil contamination and should include but not limited to emergency response actions to be taken in the event of fuel leaks from storage or during refuelling procedures; or underground / above ground spills of contaminated soil.

Construction Spoil

An assessment should be undertaken of construction spoil in terms of its suitability for use and its contribution to the construction material supply in Brisbane compared with disposal to land fill.

The EIS should identify the possible options for the placement of construction spoil and should indicate the anticipated quantities of spoil to be removed from the construction sites. A description of the options for construction spoil haulage routes in relation to sensitive activities should also be provided.

5.2 Groundwater Quality

5.2.1 Description of Existing Environment

The EIS should review the significance of groundwater in the Project area, including current authorised users, together with groundwater use in neighbouring areas. The depth to groundwater and flow direction should be identified. All groundwater facilities within the influence of the Project should be recorded.

The groundwater assessment should take into account the findings of the acid sulfate soils assessments as per Section 5.1.2.

The environmental values of the groundwater should be described in terms of:

- Values identified in the Environmental Protection (Water) Policy;
- Sustainability, including both quality and quantity; and
- Physical integrity, fluvial processes and morphology of groundwater resources.

5.2.2 Potential Impacts and Mitigation Measures

The EIS should include an assessment of the potential for environmental impact to be caused by the Project to any affected groundwater resources.

The impact assessment should consider the impacts of the Project on groundwater resources, define the extent of the potential area within which groundwater resources are likely to be affected, and the significance of the Project to groundwater depletion or recharge. The assessment should take into account the potential impact of the Project on any affected groundwater regime caused by the altered porosity and permeability of any land disturbance. The assessment should also identify any groundwater-dependent ecosystems. Management options available to monitor and mitigate these effects should be provided.

Investigations of the potential for draw-down on known and potentially contaminated groundwater and, if relevant, the identification of measures to manage significant contaminant migration to adjacent previously uncontaminated sites generated by identified draw-down should be carried out.

5.3 Surface Water Quality

5.3.1 Description of Existing Environment

A description should be given of the watercourses affected by the Project with an outline of the significance of these waters to the catchment system in which they occur.

An assessment is required of existing water quality in surface waters and wetlands likely to be affected by the Project. The assessment should provide the basis for a long-term monitoring program.

The water quality should be described from available information, including seasonal variations or variations with flow, where applicable data are available. A relevant range of physical, chemical and biological parameters should be considered to gauge the potential for environmental harm on any affected watercourse or wetland system.

The environmental values of the waterways of the affected area should be described in terms of:

- Values identified in the Environmental Protection (Water) Policy;
- Sustainability, including ongoing maintenance of quality; and

- Comparability with any Water Resource Plans, South East Queensland Regional Water Quality Management Strategy (SEQRWQMS), Land and Water Management Plans including the Brisbane River Management Plan and other local authority stream management initiatives relevant to the catchment, to the extent any of the above are relevant.

Where known or specified, the water quality objectives associated with environmental values for local catchments and watercourses should be described so that impacts from any proposed releases resulting from construction or operation of the Project can be identified, along with measures proposed to mitigate expected impacts.

5.3.2 Potential Impacts and Mitigation Measures

This section is to define the potential impacts of the Project on the water environment, to outline strategies for protecting water resource environmental values, how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives may be monitored, audited and managed.

The EIS should describe the potential for environmental impact to be caused by the proposed works to environmental values for water as expressed in the Environmental Protection (Water) Policy.

Water management to address surface water quality, quantity, drainage patterns and sediment movements should be outlined. Key water management strategy objectives include:

- Measures to avoid or minimise any proposed release, including but not limited to source reduction and water recycling;
- Maintenance of sufficient quantity and quality of surface waters to protect existing beneficial downstream uses of those waters (including maintenance of in-stream biota and downstream wetlands including the Moreton Bay RAMSAR wetland); and
- Protection of important local groundwater aquifers.

The EIS should identify possible sources of releases from the proposed construction . Possible releases should be characterised in terms of their location and the likely contaminants. The EIS should describe options for managing and preventing such releases and mitigating any adverse impacts that might result. Options for mitigation and the effectiveness of mitigation measures should be discussed with particular reference to sediment, acidity, salinity and other emissions of a hazardous or toxic nature to human health, flora or fauna.

The EIS should also address the Project's potential for providing habitats for disease vectors. Measures to control mosquito and biting midge breeding should be described.

Reference should be made to the Environmental Protection (Water) Policy, *Water Act 2000* and the Australian and New Zealand Environment and Conservation Council (ANZECC) 2000 guidelines.

5.4 Air Quality

5.4.1 Description of Existing Environment - Construction

The aim of the construction air quality assessment is to identify the main air quality issues associated with the proposed tunnel excavation and construction project, identify nearby sensitive places and ascertain the potential for nuisance and amenity impacts associated with air emissions, including dust, odours and particulates from the proposed works. The need for appropriate construction air quality management measures will also be identified as part of the works. The scope includes:

- Legislative and regulatory requirements for construction air emissions and establish relevant construction air quality goals, including but not limited to Environmental Protection (Air) Policy;
- Consistency with the South East Queensland Regional Air Quality Strategy (SEQRAQS); and
- Description of the existing environment including:
  - an analysis of local ambient air quality at each of the possible vent site locations, as well as regional air quality conditions. Reference to existing monitoring data should include stations at Eagle Farm, City, South Brisbane, Rocklea and also the NSBT data from the Bowen Hills project monitoring station.
  - identification of nearby sensitive places;
  - description of existing sources of dust, odours and particulate emissions influencing air quality within the study area; and
  - review of prevailing meteorology and analysis of prevailing wind directions and threshold wind speeds (for dust and particulate generation).

5.4.2 Description of Environment - Operational

Operational air quality impacts are likely to be associated with the motor vehicle emissions resulting from the ventilation of the tunnel sections of the Project. For comparison purposes, an assessment of air quality in the without project scenario should be made.

To assess the air quality changes associated with dispersion from ventilation outlets and changes in road traffic volumes, the following tasks should be undertaken:

- Preparation of land use and terrain information of the area to enable adequate prediction of air concentrations at ground level;
- Review of existing air quality monitoring and meteorological data for the area;
- Discussion of existing air quality within the study corridor and the area potentially affected by the Project;
- Preparation of a 3-dimensional wind field model for the area to support impact assessment requirements;
- Estimation of likely future vehicle emissions in the study area including those from surface roads and ventilation outlets;
- Computer dispersion modelling of emissions into the study area and assessment against relevant air quality criteria and existing ambient air quality, including concentrations at any nearby high set buildings; and
- Presentation of the findings of the modelling for the construction and operational phases of the Project. This is to include maps of modelled emissions from tunnel ventilation outlets and their predicted concentrations in different weather conditions in surrounding areas.

Additionally, the above information should be detailed in a health risk assessment (HRA), and should also include but not restricted to:

- Estimation of emission rates;
- Estimation of ambient concentrations using dispersion modelling, calibrated and based on existing monitoring data; and
- Identification of populations and estimation of exposure levels.

5.4.3 Potential Impacts and Mitigation Measures - Construction

Environmental impacts of air emissions, including dust and odours, during construction (nuisance impacts) should be described, including:

- Review of Project activities likely to cause air emissions including likely construction activities such as location of route, surface excavations, site compounds, stockpiles, proposed spoil transport routes etc;
- Discussion of proximity of construction activities to nearest sensitive places;
- Recommended requirements for heavy construction vehicles and machinery emissions; and
- Identification of air quality issues associated with the location for site compounds and construction works etc, discussion of the potential for air dust and odour emissions from these sources and the likely risk for nuisance impacts.

This section should also review any proposed control methods for construction works including during tunnelling, and recommend management measures which would minimise air emissions, including dust and odour impacts on adjacent receivers during these works.

5.4.4 Potential Impacts and Mitigation Measures - Operational

Impacts on air quality both in-tunnel and at ventilation outlets, during the operation of the tunnel section of the Project and adjacent roadways should be assessed in accordance with the National Environmental Protection (Ambient Air Quality) Measure 1998, and the EPA's Environmental Protection (Air) Policy, 1997.

Reference should also be made to Brisbane City Council's Air Quality Planning Scheme Policy and the Brisbane Air Quality Strategy (2004). The assessment should be undertaken by:

- Computer-based dispersion modelling of individual roadway emissions to give potential kerb-side concentrations of pollution for the build and no-build case;
- Computer-based dispersion modelling of emissions from the tunnel ventilation outlets. This should be based on traffic modelling results and take into account the length of the tunnel sections of the Project, grade and proposed speeds within the tunnel sections as well as the composition of the traffic predicted to use the tunnel sections. The modelling should include air quality concentrations at high set buildings if present in the vicinity of a tunnel ventilation outlet. Emission estimates should be based on a composite of Australian vehicle fleet emissions as well as using factors derived from World Road Association (PIARC) or equivalent sources to determine the effects of grade and speed; and
- Assessment of predicted air quality conditions within the tunnel relative to PIARC standards for in-tunnel air quality. This assessment should include a discussion on comparable standards for in-tunnel air quality currently adopted in other countries.

The suitability and availability of air filtration technologies should be identified in terms of their effectiveness, benefits, operational costs and energy requirements. Trends in technology development should also be considered.

An assessment of the potential impacts of motor vehicle emissions from the Project on public health should be provided.

In undertaking this assessment, the proposed location(s), size and heights of ventilation outlets and contingency measures in the case of a breakdown of the ventilation system should be presented.

Impacts of Greenhouse Gas Emissions

The greenhouse gas emission impacts of the Project, both during construction and operations are to be assessed. This assessment should include the calculation and presentation of changes in volume of greenhouse emissions resulting from the predicted

changes in traffic volumes (as per section 4.5) and also the greenhouse gas emissions associated with energy used to operate ventilation equipment in the tunnel. Discuss the implications of the Project in relation to both State and Council Greenhouse, or Climate Change strategies.

5.5 Noise and Vibration

5.5.1 Description of Existing Environment

The existing noise environment should be assessed by:

- Reviewing available data from any ambient noise monitoring in the study corridor; and
- Conducting additional baseline noise monitoring at selected locations, primarily at sensitive locations in the vicinity of the proposed works.

5.5.2 Potential Impacts and Mitigation Measures - Construction

To assess construction impacts the following should be undertaken:

- Identification and assessment of significant noise and vibration impacts which may arise from the construction of the Project, including noise and vibration generated by tunnelling works and surface construction sites, particularly in regard to sensitive sites;
- Identification and assessment of significant noise impacts associated with potential spoil haulage routes; and
- Identification of mitigation measures to address construction noise and vibration impacts.

This assessment is to be inclusive of noise and vibration impacts to or on critical areas (eg health care facilities) and ground vibration effects on equipment within health care facilities.

5.5.3 Potential Impacts and Mitigation Measures - Operational

To assess operational impacts the following should be undertaken:

- Assess the potential for direct noise impacts associated with the Project by preparing a 3-D noise contour model of air-borne noise transmission from critical areas such as portals, new surface roadways and ventilation outlets;
- Carry out calculations to assess operational phase vibration and regenerated noise impacts in critical shallow tunnel areas;
- Analyse significant changes in predictions for traffic noise generation;
- Assess and document the noise predictions against relevant guidelines and legislation;
- Comparison of predicted noise levels with planning levels stated in the Environmental Protection (Noise) Policy 1997 and Department of Main Roads 'Road Traffic Noise Management: Code of Practice 2000'; and
- Develop likely operational noise and vibration management measures. These measures are to include measures to limit vibration impacts to health care facilities' equipment if required.

5.6 Flora and Fauna

5.6.1 Description of Existing Terrestrial Environment

To assess terrestrial flora and fauna the study should:

- Conduct terrestrial flora and fauna assessments to identify the presence of species, communities and habitat that may be affected by the Project including but not limited to spoil placement areas, machinery storage areas and areas affected by earthworks;
- Identify areas of habitat that may be affected by the Project, especially from noise, dust or other particulates and light impacts;
- Assess the strategic importance of the Enoggera Creek and Kedron Brook green spaces as ecological corridors;
- Describe the existing distribution of terrestrial flora and fauna in terms of location, health and threats, including areas of community revegetation projects in the vicinity of the tunnel portals and interchange areas;
- Identify the presence of terrestrial fauna and flora species listed under the EPBC Act, Nature Conservation Act 1992 and the Vegetation Management Act 1999 and City Plan that may potentially be impacted by the proposed activities;
- Identify floral communities with potential for habitat, landscape or community value within the study area; and
- Undertake a review of information on terrestrial flora and fauna at potential spoil placement sites to determine the presence of species of conservation interest, communities of concern or other matters relevant to the assessment of impacts on terrestrial flora and fauna.

5.6.2 Description of Existing Aquatic Environment

To assess aquatic and intertidal flora and fauna:

- If existing bridges are to be widened or new bridges constructed, conduct an investigation of aquatic flora and fauna for at least 100 metres upstream and downstream of the proposed works;
- Identify protected aquatic environments and potential impacts on those habitats;
- Identify the presence of aquatic flora and fauna listed under the EPBC Act and the Nature Conservation Act 1992 and City Plan that may potentially be impacted by the proposed activities;
- If either construction or spoil placement are proposed to occur in a waterway, describe the existing marine plant community potentially impacted on by the proposed activities and identify the value of marine plants in Enoggera Creek and Kedron Brook with regard to fish habitats and conservation significance; and
- Flora and fauna investigations should also include riparian areas, in-stream habitat, and fauna habitat and wildlife corridors.

5.6.3 Potential Impacts and Mitigation Measures

This section is to define and describe the potential impacts of the Project on terrestrial and aquatic flora and fauna and provide mitigation measures to minimise or avoid such impacts.

The discussion should cover all likely direct and indirect environmental impacts on flora and fauna species and communities. Strategies for protecting any rare and threatened vegetation communities, species or habitat for rare and threatened species should be described, including any obligations imposed by State or Commonwealth legislation or City Plan.

Discuss the potential for environmental impact to be caused to the ecological values of the area affected arising from the construction, decommissioning of the construction sites and operation of the Project including clearing, salvaging or removal of vegetation, and the effects on remaining vegetation. Short-term and long-term effects are to be considered with comment on whether the effects are reversible or irreversible.

The potential impact on flora and fauna from any alterations to the surface and ground water environment should be discussed with specific reference to potential impacts on riparian vegetation, wetlands and other sensitive vegetation communities.

The EIS should:

- Assess the potential impact that may result from removal of marine plants, placement of spoil, and storm water run-off;
- Develop environmental management measures to minimise potential impacts on aquatic flora and fauna values; and
- Explore the option to restore intertidal habitats post-construction, should these habitats be disturbed, or other appropriate mitigation options to offset the loss of any fish habitat functions and services.

5.7 Land Use and Planning

5.7.1 Description of Existing Environment

This section should describe the existing land uses, both within and impacting on the study area, and the planning framework of the proposed works. The following issues should be addressed:

- Identify current land use within and adjacent to the area of the proposed Project;
- Identify in broad terms the regional patterns of development throughout the whole of the catchment area, and in particular, have regard for the South-East Queensland Regional Plan;
- Identify various tenures of the study area, including registered Native Title claims;
- Identify current planning designations within and adjacent to the area of proposed works as per City Plan;
- Describe likely future land use by reference to the SEQ Regional Plan and other local and regional planning documents including the SEQ Regional Infrastructure Plan and Program 2005 – 2016, Integrated Regional Transport Plan for South East Queensland and Transport 2007; and
- Identify requirements for the Project under relevant State Planning Polices (SPP).

5.7.2 Potential Impacts and Mitigation Measures

This section should discuss the potential impacts of the Project on existing and likely future land use including:

- Compliance of the Project with relevant planning policies and provisions, including relevant impacts to the operation of Brisbane Airport as contained in the relevant State Planning Policy and Commonwealth statutory provisions;
- Consistency with the SEQ Regional Plan, City Plan and associated local plans, policies and land use designations;
- Compatibility of the Project with the desired intent of City Plan as per the relevant planning scheme provisions and emerging urban renewal or future land use opportunities arising through the neighbourhood planning process.

The EIS should address impacts on existing residential, commercial, open space and sensitive activities in the vicinity of the Project that will or are likely to arise from the Project's implementation. This assessment should include:

- Consideration of necessary land acquisitions and land use implications;

- Identification of specific land use restoration proposals such as for public open space and parkland;
- Arrangements for property access and associated street closures or widening; and
- Land use impacts from amenity mitigation measures such as the construction of noise barriers adjacent to residential areas and other noise sensitive places.

Discussion should also include an assessment of any suggested land use and associated zoning changes that would mitigate the impacts of the Project on surrounding land holdings, in particular land uses to compliment the ultimate planning for the transport corridor.

Performance criteria should be specified where possible and protection measures identified for public spaces during construction stages.

5.8 Urban Design, Landscape and Visual Amenity

5.8.1 Description of existing environment

The Project has the potential to facilitate urban design, landscape and visual improvements in the study corridor and across a wider area. The urban design, landscape and visual analysis should consider the Project as a whole, on its merits within a wider context and at a local level in terms of Project surface works. To evaluate the urban design, landscape and visual elements of the Project, this section of the EIS should:

- Assess the existing urban design, landscape and visual context of and issues within the study area;
- Describe the overall visual elements and values of the built, landscape and street form in key locations, including access and amenity considerations for residents, pedestrians, cyclists and public transport users;
- Identify landscape elements that contribute to the landscape amenity of the local community including those elements protected by local planning orders or similar laws;
- Develop urban design, landscape and visual goals and objectives for the Project as a whole and in terms of key locations; and
- Develop urban design, landscape and visual assessment principles for the Project as a whole and for key locations.

5.8.2 Potential impacts and mitigation measures

To assess the urban design, landscape and visual outcomes of the Project, the study should:

- Develop urban design, landscape and visual concepts and guidelines for the key locations identified, reflecting predicted changes to land use, public amenity and public access and sustainable design principles; and
- Assess likely visual impacts of the proposed works on the landscape and viewer perceptions of changes to the landscape.

Mitigation measures for any potential visual impacts should be provided. The mitigation measures should relate to the urban design, landscape and visual goals and objectives for the Project. This should consider a range of treatments on visual elements and urban design opportunities, including surface landscaping, portal design, ramp design and siting and design of surface structures, including noise mitigation structures. The issue of lighting impacts, particularly associated with the construction phase should be identified and mitigated.

5.9 Cultural Heritage

5.9.1 Description of Existing Environment

The EIS should describe the existing values for Aboriginal and non-indigenous cultural heritage areas and objects that may be affected by the Project activities. This assessment should be developed in accordance with the *Queensland Aboriginal Cultural Heritage Act 2003*, administered by the Department of Natural Resources, Mines and Water (DNRMW), and the *Queensland Heritage Act 1992*, administered by the Environmental Protection Agency. Reference to the Brisbane City Council Cultural Heritage Manual and City Plan's Heritage Register Planning Scheme Policy is advised.

In regard to Aboriginal cultural heritage, a cultural heritage survey should be prepared which describes the location and value of any Aboriginal cultural heritage areas and objects in the EIS area. The survey should be conducted with the involvement of the Aboriginal parties for the Project corridor and/or by an appropriately qualified cultural heritage practitioner and should include the following:

- Engagement and consultation with relevant Aboriginal parties for the area concerning:
  - areas of significance to each community (including archaeological sites, natural sites, story sites etc);
  - appropriate community involvement in field surveys; and
  - provision of a statement of significance for identified objects or areas located during the survey;
- Consideration of any requirements by communities relating to confidentiality of site data;
- Identification and consideration of any places listed in the Commonwealth Heritage List, the National Heritage List and/or the Queensland Heritage Register, the Aboriginal Cultural Heritage Register and Database (maintained by DNRMW), any local government heritage register; and any existing literature relating to the affected areas that may be impacted by the proposed activities; and
- Systematic surveys of the proposed area of development to locate and record indigenous and non-indigenous cultural heritage objects and areas.

In determining the significance of any cultural heritage objects or areas located, as a minimum, investigations and consultation should be undertaken in such a manner and detail consistent with statutory responsibilities and duties of care and to assist with the establishment of a Cultural Heritage Management Plan ("CHMP") to protect areas and objects of cultural heritage significance.

5.9.2 Potential Impacts and Mitigation Measures

This section is to provide a description of any likely impacts on sites of indigenous and non-indigenous cultural heritage. The identification of indigenous cultural heritage impacts is to take place in consultation with relevant Aboriginal parties.

Recommended means of mitigating any negative impacts on indigenous cultural heritage values and enhancing any positive impacts is required.

Recommended means of mitigating any negative impacts on non-indigenous cultural heritage values and enhancing any positive effects is also required.

The management of indigenous cultural heritage impacts must be detailed in a CHMP, which will provide a process for the management of Aboriginal cultural heritage objects and places within the project study area. The CHMP must be completed prior to commencement of the Project works and does not need to be completed in the EIS.

5.10 Social Environment

5.10.1 Description of Existing Environment

This section is to describe the existing social values that may be affected by the Project. The amenity and use of the study corridor should be described.

The existing social environment is to be described by:

- Developing a set of social indicators to describe current social conditions in the study corridor;
- Describing existing social conditions (health, housing, social infrastructure, community values, amenity, connectivity, community safety and access); and
- Mapping social indicators and social infrastructure.

5.10.2 Potential Impacts and Mitigation Measures

This section is to define and describe the potential benefits and impacts of the Project on the social environment and propose mitigation measures to optimise the benefits and to minimise or avoid the impacts.

To assess the effects of the Project on the social environment, the assessment should:

- Analyse the existing social data and the results of consultation with the community to identify potential changes to demography, equity, quality of life and community values which may result from the Project;
- Undertake quantitative and qualitative assessment to determine specific social impacts and benefits within the study corridor and describe wider, including cumulative impacts and benefits;
- Undertake specific consultation to clarify and quantify impacts and benefits, including for community members, Council and other stakeholders;
- Predict potential social impacts and benefits, including quality of life, amenity, access, connectivity, changes to population diversity, changes to the social environment, employment, equity in local distribution of the community benefits and social impacts; and
- Develop mitigation strategies to optimise community benefits and minimise negative impacts, including development of design, public transport and urban renewal strategies.

5.11 Economic Environment

This section is to evaluate the benefits and impacts of the Project on the economic environment. An evaluation framework to estimate the benefits and costs of the Project should be established and described. This framework should, as a minimum:

- Provide a clear definition of the economic objectives and scope of the Project, including the extent of the study area for the purpose of economic assessment;
- Set and justify a timeframe for analysis that reflects the economic life of the principal asset;
- Identify and justify an appropriate project-specific discount rate;
- Identify and examine all costs and benefits of the Project. This should include, but not limited to, direct user benefits (such as travel time savings, reduced vehicle operating costs and safety improvements), environmental effects, and indirect benefits to the broader community such as transport network effects including induced travel, modal

shifts etc, socio-economic effects including employment, land use changes etc, and environmental effects; and

- Identify where appropriate, the distribution of net benefits and net costs to key stakeholders residing or operating within the study area.

All data used in the economic analysis should be as accurate, current and relevant as possible, with reference made to the source of the data and its credibility. All efforts should be made to quantify costs and benefits identified, including social and environmental benefits and costs.

A cost-benefit analysis can be complemented by a computable general equilibrium (CGE) analysis to assess net economic impacts. This would be expected to capture socio-economic effects, such as the impact on employment.

All assumptions underpinning the analysis are to be outlined explicitly, and the sensitivity of the analysis to key parameters is to be established. Consideration should be given to all major transport/related projects located within the study area, that have either been approved to proceed to a tender process or are currently under construction. Refer to the CG and Queensland Treasury for guidance.

Care should be taken to ensure that benefits accounted for are the most appropriate and relevant to the objectives and scope of the Project and that double counting does not occur. The analysis should adhere generally to the economic assessment requirements contained in the *Queensland Treasury Project Evaluation Guidelines*.

5.12 Waste Management

Waste production and management during construction should be described, including development of an indicative waste inventory outlining types and anticipated volumes and potential impacts on the environment. This would include an outline of proposed waste management strategies, having regard to the Environmental Protection (Waste) Policy, the principles of waste avoidance, reuse, recycling, treatment and disposal. Proposed on-site storage and treatment requirements for wastes, including waste receptors as per ANZECC guidelines, should be described.

Where solid or liquid wastes are to be disposed of off-site the following details should be provided:

- Typical facilities (locations) to which waste would be sent for disposal;
- Target rates for recycling;
- Indication of how the transport of the wastes from the site to the disposal facility will be undertaken, particularly regulated wastes; and
- The likely times and days of the week that wastes, including hazardous or dangerous materials, would be transported from the site to the disposal facility.

5.13 Hazard and Risk

5.13.1 Description of Existing Environment

A hazard and risk analysis, using an all-hazards approach, should be outlined which:

- Addresses the handling, transport, storage and use of hazardous good by reference to applicable Codes of Practice and Australian Standards;

- Describes the environmental values likely to be affected by hazardous materials and incidents; and
- Identifies hazardous events or activities likely or which may possibly occur both during construction and operational phases of the Project. These could include:
  -storage and handling of hazardous goods;
  - transportation of hazardous goods in the tunnel and on the adjoining road network;
  - vehicle accidents in the tunnel and on the surrounding road network;
  - inundation/ flooding of the tunnel by water including during construction;
  - the implications of climate change;
  - fire in the tunnel due to accidents;
  - spillage of hazardous or other goods (e.g. gas leak) in the tunnel or on the adjoining roadway;
  - tunnel collapse or subsidence;
  - explosions within the tunnel and associated infrastructure; and
  - development and implementation of a Hazardous Materials and associated Material Safety Data Sheet (MSDS) Register.

The EIS should report on a risk assessment of the above hazards, in order to outline the levels of risk, if possible in terms of consequences and probability arising from potential hazards, events and situations. The assessment should also include the identification of hazardous materials likely to be used in the operation of the Project.

5.13.2 Potential Impacts and Mitigation Measures

This section is to outline strategies for hazard and risk management including measures proposed to avoid or minimise flooding of the works as well as upstream flood impacts resulting from any changes to drainage patterns, emergency disaster and evacuation plans for access and egress for emergency vehicles, containment procedures for the spillage of goods and hazardous substances, the adequate provision of hydrant water systems and the specific details of the traffic management system to deal with emergencies. It would facilitate emergency planning if a personal accountability system was developed and implemented during each construction phase.

The EIS should describe the design features of the Project and emergency services arrangements to manage accidents/incidents in the tunnel and on the road network, including all fire and life safety provisions in the design and incident management procedures proposed. These features are to consider the specific needs of people with a disability who may experience access problems, in particular to any emergency evacuation exit points within the tunnel.

6 ENVIRONMENTAL MANAGEMENT PLAN

A draft Outline Environmental Management Plan (EMP) should be provided outlining the strategies to be adopted to address identified impacts (as per Section 5 of these TOR).

The purpose of the draft Outline EMP is to describe generally the Proponents' commitments to environmental management and to provide a framework for the subsequent development of detailed environmental management plans relevant to project implementation and operation. The draft Outline EMP is an integral part of the EIS and should encapsulate the recommendations from the EIS about environmental management and mitigation measures for the Project, which could be adopted to the extent required by a contractor constructing or operating the Project. The draft Outline EMP should include the following:

- An introduction to the Project that includes a concise project description;
- The Project's legislative requirements;

- The environmental objectives and mitigation measures for inclusion in the detailed design of the Project and for the development of the construction contract documentation;
- The environmental objectives and mitigation strategies for the construction phase;
- The environmental objectives and mitigation strategies for the operational / maintenance phase;
- Mitigation and management measures should provide for flexibility in achieving performance-based environmental outcomes consistent with the environmental objectives. These are to be measurable criteria against which the implementation of the actions and the level of achievement of the performance objectives will be measured;
- Monitoring, auditing and reporting strategies for the construction and operational aspects of the Project;
- Responsibilities assigned to a relevant person/organisation; and
- The procedure and reporting framework, including a complaints mechanism for the identification of non-conformances and the implementation of the subsequent corrective action is to be outlined.

When information is unavailable during the EIS preparation, this should be described with an indication of how and when the information will be acquired and incorporated into the final EMP.

7 CONCLUSION AND RECOMMENDATIONS

A balanced overview of the Project's impact should be provided together with recommendations (based on the studies undertaken and the environmental management plan developed) aimed at ensuring the Project contributes to ecologically sustainable development.

8 REFERENCES

References should be presented in a consistent and recognised format.

9 RECOMMENDED APPENDICES

9.1 Terms of Reference for this EIS

A copy of the Terms of Reference should be included in the EIS. Where it is intended to bind appendices in a separate volume from the main body of the EIS, the Terms of Reference at least should be bound with the main body of the EIS for ease of cross-referencing.

9.2 Consultation Report

The Consultation Report should summarise the results of the community consultation program, focussing on the issues raised and the means by which the issues were addressed. The discussion should include the methodology used in the community consultation program including criteria for identifying stakeholders and the communication methods used.

A list of all parties consulted should be included, in addition to a description of how ‘interested’’ and/or ‘affected persons’ and ‘affected parties’, if relevant were identified.

9.3 Study Team

The qualifications and experience of the study team and specialist sub-consultants and expert reviewers should be provided.

9.4 Specialist Studies

All reports generated on specialist studies undertaken as part of the EIS are to be included as appendices.