Roads and Traffic Authority of NSW

Oxley Highway to Kempsey
Upgrading the Pacific Highway

Environmental Assessment

MAIN VOLUME

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PART C – ENVIRONMENTAL ASSESSMENT

9. Environmental risk analysis

This Chapter describes the environmental risk analysis that has been undertaken for the Proposal. The analysis is an important part of the environmental assessment process. It provides a framework for identifying and analysing potential environmental impacts of the Proposal, and ensuring that the route selection and concept design is developed in accordance with the principles of ecologically sustainable development. It is an iterative process that has been applied throughout the phases of the project.

The Director-General's environmental assessment requirements state that an environmental risk analysis must be undertaken. **Table 9-1** indicates where the aspects of the Director-General's environmental assessment requirements that relate to environmental risk analysis are addressed, either in this chapter or in other chapters (in *italics*).

Table 9-1 Environmental risk analysis

Environmental assessment requirements	Where addressed
Environmental Risk Analysis - Notwithstanding the above key assessment requirements, the EA must include an environmental risk analysis to identify potential environmental impacts associated with the project (construction and operation), proposed mitigation measures and potentially significant residual environmental impacts after the application of proposed mitigation measures. Where additional key environmental impacts are identified through this environmental risk analysis, an appropriately detailed impact assessment of this key environmental impact must be included in the EA.	**Section 9.2** *Chapters within **Part C** of this Environmental Assessment*

9.1 Approach to the environmental risk analysis

A wide range of environmental factors were taken into account during the route selection process for the Proposal. The selection process and analysis are detailed in the *Route Options Report Development Report* (RTA 2005f) and *Preferred Route Report* (RTA 2006e).

Following the selection of the preferred route an ongoing environmental risk analysis approach has been undertaken, generally comprising:

- Initial analysis to identify potential environmental impacts of the Proposal and to assist stakeholders to identify issues for the environmental assessment. These issues were provided to the Department of Planning and used in drafting the Director-General's environmental assessment requirements for this Environmental Assessment.
- Convening an environmental risk analysis workshop with the RTA project team at the commencement of the Environmental Assessment, following receipt of the Director-General's environmental assessment requirements. The workshop assisted in scoping the environmental investigations and identifying any potential additional issues that would require investigation.
- Ongoing analysis to continually verify and update the identified environmental risks as the environmental investigations progressed and refinements were made to the concept design.

The risk analysis assessment is an iterative process designed to evolve as more information is generated from the investigations. As a clearer understanding of the environmental risks for each issue became apparent during the investigations, initial risk categories were reviewed for each of the issues. The three risk categories outlined in **Table 9-2** have been used to inform specialist investigations, the development of this Environmental Assessment and the development of management measures.

In summary this structured risk-based process has:

- Confirmed the key issues identified in the Director-General's environmental assessment requirements.
- Examined potential impacts at a level commensurate with the risk category assigned and proposed management measures in relation to the identified issues.
- Identified and examined impacts likely to remain after application of management measures.

Table 9-2 Environmental risk categories

Risk category	Initial risk description	Re-evaluated risk description
A	The Proposal may have a significant impact. Detailed assessment is required to determine the potential impact and to develop appropriate management measures which may include the application of specific (non-standard) environmental management measures.	After the implementation of management measures, there would be significant residual environmental impacts as a result of the Proposal.
B	The Proposal may have a moderate impact. These can be mitigated by the application of standard environmental management measures. Detailed assessment not required.	After the implementation of management measures, there would be moderate residual environmental impacts as a result of the Proposal.
C	The Proposal may have a low impact. These can be mitigated by standard environmental management measures. Detailed assessment not required.	After the implementation of management measures, there would be negligible residual environmental impacts as a result of the Proposal.

Key issues identified in the Director-General's environmental assessment requirements were all initially assigned a risk category of A. Following the risk analysis, in some cases, this risk category may have changed due to design refinements or having regard to the findings of the environmental investigations and identified management measures.

9.2 Environmental risk analysis results

The results of the environmental risk analysis are presented in **Table 9-3**. The table identifies potential impacts and provides a brief description of the nature of the impacts remaining after application of mitigation measures.

The risk category assigned to the impact is shown, along with the section of this Environmental Assessment where each impact is addressed.

Table 9-3 Environmental risk analysis results

Issue	Potential impacts	Analysis –proposed management measures and potentially significant residual impacts remaining after their application	Initial risk category	Risk category following analysis	Where addressed
Land use and property	Acquisition of public and private lands	Approximately 255 hectares of public and private land is to be acquired as part of the Proposal. Acquisition would be negotiated with affected landowners in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* and the *RTA Land Acquisitions Policy* (1999a). There are not expected to be any significant residual impacts following implementation of mitigation measures.	A	C	**Chapter 10 Land use and property**
	Impacts to state forest estate	Approximately 114 hectares of productive state forest would be acquired, following an Act of Parliament or via land exchange, with access to and within state forest land consolidated but retained for forestry operations, fire management activities and recreation purposes. Whilst the state forest land would not be available for future generations, the loss is not expected to have a significant residual impact on the local timber industry as those areas to be acquired have limited production and harvesting value as well as having high visual aesthetic values.	A	B	**Chapter 10 Land use and property**
	Impacts on nature reserve	Approximately 1.5 hectares (0.45%) of Cooperabung Nature Reserve would be acquired, following an Act of Parliament, with access to and within the reserve, consolidated but retained for fire management activities and recreation purposes. Whilst that part of the nature reserve would not be available for future generations, the loss is not expected to have a significant residual impact on biodiversity or recreational activities.	A	C	**Chapter 10 Land use and property**

Issue	Potential impacts	Analysis –proposed management measures and potentially significant residual impacts remaining after their application	Initial risk category	Risk category following analysis	Where addressed
Socio-economic	Altered property access during construction and operation	Access to individual landholdings would be maintained during construction. Where this cannot be achieved, alternative access would be provided following consultation with landowners. The Proposal, via the service road network, would provide for improved safety of access to the upgraded highway following construction. There are not expected to be any significant residual impacts following implementation of mitigation measures.	A	C	**Chapter 11 Social and economic**
	Loss of agricultural land during construction and operation	The loss of regionally significant farmland would be offset by acquisition in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* and the *RTA Land Acquisitions Policy* (1999a). Whilst this farmland would not be available for future generations, the loss is not expected to have a significant residual impact on the local agricultural economy or food security and the Proposal would facilitate better linkages to regional and interstate markets.	A	C	**Chapter 11 Social and economic**
	Loss of passing highway traffic on local businesses	Access would be maintained for local businesses relying on highway trade via the upgraded highway and the proposed service road network. It is possible that improvements in access to the upgraded highway could positively influence economic growth in some areas. There are not expected to be any significant residual impacts following implementation of mitigation measures.	A	C	**Chapter 11 Social and economic**

Issue	Potential impacts	Analysis –proposed management measures and potentially significant residual impacts remaining after their application	Initial risk category	Risk category following analysis	Where addressed
Surface and groundwater	Water quality impacts during construction and operation	The RTA would ensure all construction and operation stage controls for soil and stormwater management including any acid sulfate soil treatments are located, designed, constructed, operated and maintained to minimise impacts on water quality. There are not expected to be any significant residual impacts following implementation of mitigation measures.	A	C	**Chapter 13 Water quality**
	Groundwater impacts during construction and operation	While there would be some impact to groundwater, these impacts would generally be localised. Further groundwater modelling would be undertaken during detailed design and a water management plan developed to manage impacts. There are not expected to be any significant residual impacts following implementation of mitigation measures.	A	C	**Chapter 14 Groundwater**
	Surface water flooding impacts as a result of construction and future operation	The installation of flood relief structures as part of the Proposal would minimise the impacts of flooding and are not anticipated to create any additional flooding issues for the Hastings and Wilson river floodplains. The changes in flood levels as a result of climate change could present a residual risk to residential areas upstream of the Proposal.	A	B	**Chapter 12 Hydrology**

Issue	Potential impacts	Analysis –proposed management measures and potentially significant residual impacts remaining after their application	Initial risk category	Risk category following analysis	Where addressed
Flora and fauna	Loss of native vegetation	The Proposal has been located and designed where possible to minimise loss of native vegetation, in particular high value vegetation such as endangered ecological communities. Approximately 203 hectares of native vegetation would be removed during construction. To mitigate this impact, an offset strategy would be developed in consultation with DECCW and DII to minimise any significant residual impacts.	A	B	**Chapter 15 Flora and fauna**
	Potential impact to threatened fauna during construction and operation	Searches of potential nest sites, hollow-bearing trees and target habitats would be undertaken and the feasibility of relocating directly affected threatened species to suitable habitat nearby would be investigated. To mitigate this impact, an offset strategy would be developed in consultation with DECCW and DII to minimise any significant residual impacts.	A	B	**Chapter 15 Flora and fauna**
	Impacts on aquatic habitat and fish species during construction and operation	The RTA would ensure the design and construction of bridges and culverts are consistent with RTA and Department of Industry and Investment (Fisheries) guidelines where appropriate. There are not expected to be any significant residual impacts following implementation of mitigation measures.	A	C	**Chapter 15 Flora and fauna**

Issue	Potential impacts	Analysis –proposed management measures and potentially significant residual impacts remaining after their application	Initial risk category	Risk category following analysis	Where addressed
Noise and vibration	Noise impacts on sensitive receptors during construction and operation	Works would generally be carried out during standard construction hours, as described in **Section 7.5.3**. During operation, the relevant traffic noise criteria are likely to be exceeded at 92 residences in 2026 (10 years after the opening of the Proposal). Of these, 8 would require consideration in relation to sleep disturbance. Architectural treatment was determined to be the most feasible and reasonable noise management measure to mitigate noise during operation. There are not expected to be any significant residual impacts following implementation of the identified mitigation measures.	A	B	**Chapter 16 Noise and vibration**
	Effects of any required blasting, pile driving and similar activities on the community	Any blasting would be undertaken in accordance with ANZECC guidelines. There are not expected to be any significant residual impacts following implementation of the identified mitigation measures.	A	C	**Chapter 16 Noise and vibration**
Visual amenity	Visual impact due to changes in landscape during construction and operation	To help reduce and manage the potential visual impacts of the Proposal, a detailed urban and landscape design plan would be developed based on the strategy developed for the concept design, to guide the final detailed design. Disturbed areas would be progressively revegetated with consideration to related controls such as erosion and sedimentation, drainage and future road user safety requirements. There are not expected to be any significant residual impacts following implementation of the identified mitigation measures.	A	C	**Chapter 17 Visual amenity and urban design**

Issue	Potential impacts	Analysis –proposed management measures and potentially significant residual impacts remaining after their application	Initial risk category	Risk category following analysis	Where addressed
Traffic and transport	Damage to existing roads as a result of construction	Any damage resulting from construction (not normal wear and tear) would be repaired or an alternative arrangement for road damage would be agreed with the relevant authority.	A	C	**Chapter 18 Traffic and transport**
	Interruption to traffic movements on the existing road network during construction	Control measures to manage traffic during construction would be consistent with the RTA's Traffic Control at Work Sites Manual (RTA 2003a). There are not expected to be any significant residual impacts following the implementation of the identified mitigation measures.	A	C	**Chapter 18 Traffic and transport** and **Chapter 11 Social and economic**
Aboriginal heritage	Impacts on Aboriginal heritage during construction	An Aboriginal heritage management plan would be developed in consultation with the registered Aboriginal stakeholders which would specify the policies, procedures and management measures to address the potential impacts of the Proposal on Aboriginal heritage. There are not expected to be any significant residual impacts following implementation of the identified mitigation measures.	A	C	**Chapter 19 Aboriginal heritage**
Air quality	Dust generation and emissions from machinery during construction Emission impacts during operation of the Proposal	Appropriate air quality management measures have been identified to reduce the potential for dust generation during construction. Emissions during operation would be reduced due to improved grades and reduction in conflicts between local and highway traffic. There are not expected to be any significant residual impacts following implementation of the identified mitigation measures.	B	C	**Section 20.1**

Issue	Potential impacts	Analysis –proposed management measures and potentially significant residual impacts remaining after their application	Initial risk category	Risk category following analysis	Where addressed
Non-Aboriginal heritage	Impacts on non-Aboriginal heritage items during construction	Known heritage items within the Proposal area would be appropriately managed in accordance with relevant statutory requirements. There are not expected to be any significant residual impacts following implementation of the identified mitigation measures.	B	C	**Section 20.2**
Resource conservation and waste management	Generation of waste	The waste minimisation hierarchy principles of avoid / recover / dispose would be applied to all aspects of the Proposal and waste would be managed in accordance with relevant guidelines. There are not expected to be any significant residual impacts following implementation of the identified mitigation measures.	C	C	**Section 20.5** and **Chapter 21 Principles of ecologically sustainable development**
Hazards and risks	Incidents during construction	Appropriate safeguards would be implemented during construction to minimise the risk of incidents that would impact on the surrounding environment. There are not expected to be any significant residual impacts following implementation of the identified mitigation measures.	B	C	**Section 20.6**
Climate change	Generation of greenhouse gases during construction and operation (including energy consumption)	Energy efficient work practices would be adopted to limit energy use, including conducting awareness programs for all site personnel regarding energy conservation methods and conducting energy audits during the project to identify and address energy waste. There are not expected to be any significant residual impacts following implementation of the identified mitigation measures.	B	C	**Section 20.7**

Issue	Potential impacts	Analysis –proposed management measures and potentially significant residual impacts remaining after their application	Initial risk category	Risk category following analysis	Where addressed
Utilities and services	Disruption to utilities and services	Utilities and services potentially affected by construction would be identified and requirements for their diversion, protection and / or support would be negotiated with service providers to ensure that any disruption to services is limited and advised to customers. There are not expected to be any significant residual impacts following implementation of the identified mitigation measures.	C	C	**Section 6.4.19**

Service road network

Since the completion of field investigations and environmental assessment of the Proposal, details of the proposed service and access roads have been clarified and confirmed. As part of the ongoing environmental risk analysis, desktop assessments have been carried out to determine the potential impacts of the service road network.

Subject to further detailed design refinement, the proposed service road network could have the following additional impacts:

- Possible minor strip acquisition of a number of properties.
- Altered access arrangements during construction.
- Limited additional loss of native vegetation and habitat.
- Noise impacts on sensitive receivers during construction and operation.
- Minor change in visual amenity.
- Altered traffic conditions.
- Impacts on Aboriginal heritage.

Based on the comprehensive investigations undertaken for the Proposal, the desktop analysis of these risks indicates that the following would require further investigation to identify any potential residual environmental impacts:

- Determination of any acquisition requirements following detailed design.
- Identification of vegetation communities, threatened species and habitat that could be cleared through additional surveys, where required.
- Identification of the likelihood of presence of any Aboriginal heritage items at locations where the desktop analysis has identified the potential for Aboriginal heritage evidence.

All other issues are considered low risk and would be subject to application of the relevant proposed management measures detailed throughout this Environmental Assessment and the Statement of Commitments in **Appendix B**.

Further discussion on potential environmental impacts associated with the proposed service road network and further assessment required is contained in chapters in **Part C** of this Environmental Assessment.

9.3 Findings

No additional key environmental issues (category A issues) were identified during the environmental risk analysis for the Proposal to those identified in the Director-General's environmental assessment requirements. **Chapters 10 Land use and property** to **19 Aboriginal heritage** address the key issues and respond to the Director-General's environmental assessment requirements. **Chapter 20 Other environmental issues** addresses environmental issues assigned category B or C risk level.

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