8 Environmental risk analysis

This chapter describes an environmental risk analysis that has been undertaken for the proposed upgrade. This risk analysis has been an important part of ensuring that the proposed upgrade is developed in accordance with the principles of ecologically sustainable development.

The environmental assessment requirements (see Appendix A and below) identify environmental risk analysis as a key issue for assessment in the environmental assessment.

Environmental assessment requirement	Where addressed
The environmental assessment 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.	Section 8.2
Where additional key environmental impacts are identified through this environmental risk analysis, an appropriately detailed impact assessment of this additional key environmental impact must be included in the environmental assessment.	No additional key impacts identified

8.1 Approach

A wide range of environmental factors were taken into account in the route selection phase of the project. These factors were included in multi-criteria analyses for identification of shortlisted route options and for selection of the preferred route (described in detail in the ***Route Options Development Report*** (RTA 2005) and the ***Preferred Route Report*** (RTA 2006a)).

After the selection of the preferred route, an initial environmental risk analysis was undertaken to identify potential impacts of the proposed upgrade and to assist the Department of Planning in drafting the requirements for the environmental assessment.

A further environmental risk analysis was undertaken during the preparation of this environmental assessment. The analysis:

> Identified environmental issues, including key issues in the environmental assessment requirements and other issues.

> Examined potential impacts and proposed mitigation measures in relation to the identified issues.

> Examined impacts likely to remain after application of mitigation measures.

Based on this analysis, an environmental risk category was assigned to each impact. This enabled the identification of any matters that might be considered as additional key issues and established the basis for an appropriately detailed assessment of those additional key issues to be included in this environmental assessment.

The environmental risk categories are described below.

Category A - May have a high or moderate impacts. Detailed assessment necessary to determine the level of potential impact and to develop appropriate measures to mitigate

and manage the impacts.

Category B - May have high or moderate impacts. These can be mitigated by the application of standard environmental management measures.

Category C - Have low impacts. These can be managed by standard environmental management measures.

Impacts that have been assigned a risk category of 'A' are considered in all cases to indicate key issues. The environmental risk analysis has automatically allocated a risk category of 'A' to all key issues identified in the Director General's Requirements.

8.2 Results of environmental risk analysis

The results of the environmental risk analysis are summarised in the following table. The table includes a list of the potential environmental risks, a brief analysis of the nature of impacts and associated management measures, and the identified risk category as described above. The section of the environmental assessment where each risk category is addressed is also included.

Results of environmental risk analysis

Issue	DGRs - Key Issue?	Potential Impacts	Analysis – Proposed mitigation measures and impacts remaining after their application	Risk category	EA Reference
Land use and property	Yes	> Loss of contiguity of settlements and communities > Change in land use within and adjacent to the proposed upgrade > Loss of dwelling entitlements	> Proposed upgrade located to avoid severance of contiguous settlements > Direct loss of 197 ha of agricultural land, including 112 ha of grazing land and 46 ha of macadamia plantations > Remnant land strategy has been prepared to identify the most appropriate use for portions of lots remaining outside the proposed road reserve	A	Chapter 14 and Working Paper 7
Social and economic	Yes	> Relocation of residents due to property acquisition > Impacts to amenity of local residents from noise, visual, traffic > Impacts to road safety > Business opportunities for local contractors during construction > Impact on businesses during operation > Impact on businesses during construction > Loss of agricultural production > Impacts to tourism and regional economy	> 73 lots subject to acquisition requiring a number of residents to be relocated. This has a potential impact on community structure and dynamics > Increased local business revenue and employment opportunities during construction > Potential loss of revenue to Newrybar businesses which would be minimised by the provision of efficient access > Loss of 197 ha of agricultural land > Remnant land strategy has been prepared to maximise agricultural production on remaining land > Improved safety by separating local traffic and highway traffic and higher standard road design > Benefits for the regional economy and tourism through increased accessibility to region	A	Chapter 17 and Working Paper 10

Results of environmental risk analysis (cont)

Issue	DGRs - Key Issue?	Potential Impacts	Analysis – Proposed mitigation measures and impacts remaining after their application	Risk category	EA Reference
Noise and vibration	Yes	> Noise and vibration impacts from construction activities Noise and vibration from highway traffic during operation	> Blasting resulting in ground vibration and airblast > Blasting noise and vibration managed through control of blasting technique > Likely to be some noise impacts from construction equipment, such as earthmoving equipment > Construction noise primarily managed through control of operating hours and provision of respite. Early installation of mitigation measures > Proposed upgrade designed to decrease noise impacts during operational phase > Some operational noise impacts likely > Operational noise impacts managed through noise attenuation in the road reserve and treatment of individual buildings where required	A	Chapter 15 and Working Paper 8
Visual amenity and urban design		> Visual impacts during construction > Visual impacts during operation > Changed experience for highway users	> Some temporary impacts during construction due to earthworks, stockpiles and ancillary facilities. > Proposed upgrade would be a prominent feature in the scenic landscape for residents and other viewers. > An urban design strategy, has been developed to mitigate visual impact for both residents and motorists. > Proposed upgrade designed to maximise driver experience.	A	Chapter 18 and Working Paper 11

Results of environmental risk analysis (cont)

Issue	DGRs - Key Issue?	Potential Impacts	Analysis – Proposed mitigation measures and impacts remaining after their application	Risk category	EA Reference
Traffic	Yes	> Impacts to local road network > Impacts to regional roads	> Increased travel distance for a small number of people. > Improvements in road safety by separating local and regional traffic movements, and improving design of road (straighter and flatter). > Temporary increase of traffic on local roads during construction. > Minimal impact on regional roads.	A	Chapter 13 and Working Paper 6
Soils and geology	No	> Potential for land slips > Erosion potential during construction and operation. > Potential for contamination	> Detailed geotechnical investigations undertaken to identify major risk areas. > Route selection process and design of proposed upgrade to minimise the potential for landslips. > Stability of cut and fill embankments will be ensured through standard design measures. > Standard erosion control measures will be implemented. > Negligible risk of acid sulfate soils.	B	Section 20.1

Results of environmental risk analysis (cont)

Issue	DGRs - Key Issue?	Potential Impacts	Analysis – Proposed mitigation measures and impacts remaining after their application	Risk category	EA Reference
Surface and ground water	Yes	> Impacts on drinking water catchments > Impacts on water quality > Impacts on surface water flows including flooding > Impacts on groundwater flows	> Mitigation measures designed to minimise potential risk of pollution to drinking water during construction and operation. Mitigation measures designed to higher standard than normal and in consultation with Rous Water. Residual risk is low. > Cuttings have the potential to change the flow of groundwater, which may cause some springs to dry up. > Alternative sources of water will be considered where replacement of any disrupted groundwater supply is required. > General flow of groundwater in the vicinity of the tunnel maintained through tanking of the tunnel and through drainage design. Any impacts would be localised. > Bridges and culverts are designed to minimise disruption to surface water flows. > Route selection process resulted in avoidance of major flood prone and acid sulfate soil areas.	A	Chapters 10 and 11 and Working Papers 2 and 3

Results of environmental risk analysis (cont)

Issue	DGRs - Key Issue?	Potential Impacts	Analysis – Proposed mitigation measures and impacts remaining after their application	Risk category	EA Reference
Flora and fauna	Yes	> Potential impacts to threatened species and endangered ecological communities. > Potential impacts to native vegetation and wildlife habitat and corridors. > Potential impacts to aquatic ecosystems and groundwater dependent communities.	> Removal of approximately 2 ha of lowland rainforest (endangered ecological community). Biodiversity offset strategy would be implemented to minimise residual impacts > Removal of approximately 10 ha of terrestrial habitat (including endangered and non-endangered communities) > Riparian rehabilitation program to be undertaken within the road reserve > Limited impacts to groundwater dependent communities > Any significant waterway would be bridged to minimise disturbance to aquatic ecology > Localised disturbance to aquatic habitat at bridge abutments > Proposed upgrade crosses one identified wildlife corridor > Wildlife corridor impacts mitigated through highway tunnel under St Helena ridge	A	Chapter 12 and Working Papers 4 and 5

Results of environmental risk analysis (cont)

Issue	DGRs - Key Issue?	Potential Impacts	Analysis – Proposed mitigation measures and impacts remaining after their application	Risk category	EA Reference
Air quality	Yes	> Impact of dust from construction activities > Impact of road operation on sensitive receivers, including Newrybar School > Impact of tunnel on sensitive receiver > Potential for airborne contaminants to enter drinking water	> Minimal impact from construction activities after standard mitigation measures implemented > Proposed upgrade located and designed to minimise air quality impacts. Modelling of air quality impacts of tunnel suggests minimal impact on surrounding community > Air quality assessment indicates low risk of airborne contaminants affecting drinking water quality	A	Chapter 19 and Working Paper 12
Aboriginal heritage	Yes	> Potential impact to Aboriginal heritage.	> Potential archaeological deposits (PADs) have been identified. > Further investigation of PADs will be undertaken to ensure minimal or no impact on Aboriginal heritage.	A	Chapter 16 and Working Paper 9
Non-Indigenous heritage	No	> Potential impact to non-indigenous heritage	> Likely impact to three non-Aboriginal heritage items of local significance. > Heritage items would be recorded prior to impacts.	C	Section 20.4 and Working Paper 9
Hazards	**No**	> Risks associated with hazardous handling and storage of hazardous materials during construction > Risks associated with the transport of hazardous materials during operation	> Risks associated with spills and fog minimised due to design of proposed upgrade. > Low risk of natural hazards to road.	C	Chapters 10 and 13 and Working Papers 2 and 6

Results of environmental risk analysis (cont)

Issue	DGRs - Key Issue?	Potential Impacts	Analysis – Proposed mitigation measures and impacts remaining after their application	Risk category	EA Reference
Resources and waste	No	> Adequate supply of resources. > Potential impacts from waste during construction. > Energy consumption and greenhouse gas emissions	> Adequate supply available locally. No major competing projects for resources. > Waste during construction managed through standard measures. > Greenhouse gases will be emitted during construction during construction. > Greenhouse gases saved in the operation of the proposed upgrade compared to the do nothing alternative. > Estimated to be an cut/fill surplus of approximately 790,000 m^3	C	Section 20.6.

The risk assessment above has identified no additional key issues (category A issues) to those identified in the Department of Planning environmental assessment requirements. Chapters 9 to 19 address the Department of Planning's key issues. Chapter 20 addresses environmental issues that are allocated a category B or C risk level.