

10 Environmental risk analysis

This chapter explains how environmental issues for the project were identified and evaluated through an environmental risk analysis process. It also provides a summary of the environmental risk analysis results. The environmental risk analysis covered bio-physical, social and economic risks.

Director General's requirements	Where addressed
Environmental Risk Analysis – notwithstanding the above key assessment requirements, 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 10.2
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.	Section 10.2 Section 10.2

10.1 Overview

Before lodging the project application for the M5 West widening project, the RTA reviewed the outcomes of preliminary investigations during concept design development and identified those environmental issues of most importance.

The findings were documented in the preliminary environmental assessment and helped the Director General formulate the 'key issues' for the project as outlined in the Director General's Requirements.

As required by the Director General's Requirements, the process of environmental risk analysis continued during the course of preparing the environmental assessment. Emphasis was placed on using the detailed information gathered during the assessment process to review the environmental aspects of the project. More specifically, the analysis:

- Identified environmental issues, including key issues in the Director General's Requirements, and any other issues.
- Examined potential impacts and proposed mitigation measures in relation to the identified issues.
- Identified the nature and extent of impacts likely to remain after mitigation measures are applied.

Based on this analysis, an environmental risk category was assigned to each potential impact. This enabled the identification of any matters that might be considered additional key issues. The environmental risk categories assigned to each impact are described in Table 10.1. The environmental risk analysis is summarised in Table 10.2 (key issues) and Table 10.3 (other issues).

Table 10.1 Environmental risk category descriptions

Risk category	Description
A	May have 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.
B	May have high or moderate impacts. These can be mitigated by the application of standard environmental management measures.
C	Has 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.

10.2 Environmental risk analysis results

A summary of the environmental risk analysis results is provided in Table 10.2. The results of the environmental risk analysis confirm that the Director General's Requirements included all key issues. None of the additional environmental issues assessed for the project were considered to pose a high environmental risk.

Table 10.2 Environmental risk analysis – key issues

Issue	DGRs – key issue?	Potential impacts	Analysis – Proposed mitigation measures and impacts remaining after their application.	Risk category following analysis	EA reference
Traffic and transport	Yes	Overall risk category		A	Section 8.1
		Operational traffic impacts of the project on the M5 South West Motorway.	The project would provide the additional capacity required to accommodate future travel demand generated by growth in population, employment and the freight task. It would reduce travel times on the M5 South West Motorway, by 22 per cent in the AM peak eastbound direction in 2026, when compared with the unimproved situation The project is expected to have a residual benefit for traffic flow.	B	Section 8.1
		Operational traffic impacts on the surrounding local and regional road network.	The project would reduce travel times on the parallel route, by 7 per cent in the AM peak eastbound direction in 2026, when compared with the unimproved situation. For feeder and cross routes a mixture of increases and decreases in traffic volumes are expected. Total traffic flows through the intersection of feeder routes would remain relatively unchanged despite some variation in directional flow volumes. The project would generally reduce traffic numbers on the surrounding road network, resulting in a residual benefit.	C	Section 8.1

Issue	DGRs – key issue?	Potential impacts	Analysis – Proposed mitigation measures and impacts remaining after their application.	Risk category following analysis	EA reference
		Operational implications for public transport	The project would remove traffic from the surrounding road network by providing increased capacity. This would assist the operation of strategic bus corridors, in particular Corridor 31 (Liverpool to Campbelltown via the Hume Highway) and Corridor 33 (Liverpool to Bankstown via Newbridge Road and Milperra Road). Small increases in private vehicles trips and some diversion from public transport modes (most likely rail) are predicted. These effects are considered minor in the context of future travel demand increases driven by population growth, employment growth and associated land use changes. The project is expected to have a residual benefit given that it would improve the efficiency and reliability of public transport services by reducing congestion. It would also provide further opportunity for bus priority measures.	C	Section 8.1
		Impacts on cyclists and pedestrian access and safety.	Barriers would be erected during construction to protect and maintain cyclists' access. The road shoulder would be available for cyclists' use during operation. Pedestrians would continue to be restricted from accessing the motorway for safety reasons. Impacts on cyclists' access would be limited to the construction phase and are expected to be minimal. There would be no residual impact on access for cyclists and pedestrians during operation.	C	Section 8.1

Issue	DGRs – key issue?	Potential impacts	Analysis – Proposed mitigation measures and impacts remaining after their application.	Risk category following analysis	EA reference
		Disruption to existing traffic flows during construction.	Standard traffic management measures would be introduced to maintain safety at work sites. Reduced speed limits and lane widths would increase travel times. General travel time increases of 10 per cent are expected in peak periods with slightly higher delays at other times. The existing number of operating traffic lanes on the motorway would be maintained during the daytime and peak periods to minimise traffic congestion impacts. Measures are proposed to minimise construction traffic impacts on local road networks. The residual impacts are expected to be moderate compared to current congestion levels.	B	Section 8.1
Noise and vibration	Yes	Overall risk category	A	Section 8.2	
		Noise impacts from construction works within the corridor.	All feasible and reasonable mitigation measures would be put in place to manage construction noise. Additional mitigation measures would be put in place for night-time works, including early scheduling where practicable, activity restrictions and respite periods. Substantial noise impacts are expected during construction.	B	Section 8.2
		Noise impacts from 24-hour access to construction site compounds.	Varying noise management levels would be adopted for different times of the day to reduce noise impacts from construction site compounds. Residual noise impacts from construction site compounds are not expected to be significant.	B	Section 8.2
		Impacts on nearby properties from construction vibration.	Construction vibration is not likely to be an issue, given offset distances and the types of activities planned. Monitoring would be undertaken where works occur in proximity to potentially affected receivers.	C	Section 8.2

Issue	DGRs – key issue?	Potential impacts	Analysis – Proposed mitigation measures and impacts remaining after their application.	Risk category following analysis	EA reference
		Operational noise above road traffic noise criteria at residences and sensitive receivers.	Raising the height of existing noise walls at Revesby and installing additional noise walls would reduce noise-affected residences that might otherwise be affected by acute noise. In addition, architectural treatments would be provided for residences where augmented noise walls would not be effective or feasible.	A	Section 8.2
Biodiversity	Yes	Overall risk category		A	Section 8.3
		Removal of 76 State (TSC Act) and nationally (EPBC Act) listed Downy Wattle stems.	The Downy Wattle (<i>Acacia pubescens</i>) stems were planted as part of the landscaping for the original motorway and would be removed as part of the project. About 60% of the population would remain in the corridor. Residual impacts are expected to be significant and would be the subject of a translocation strategy to be agreed with the NSW Department of Environment, Climate Change and Water and the Commonwealth Department of the Environment, Water, Heritage and the Arts.	A	Section 8.3
		Impacts on potential Green and Golden Bell Frog (<i>Litoria aurea</i>) habitat at some proposed drainage basins. (This is a state and nationally listed threatened fauna species.)	The drainage for the project would be designed to reduce direct impacts and off-site hydrology impacts on these habitats. Pre-clearing surveys would minimise impacts during construction and inform the need for appropriate design and implementation of measures to limit residual impacts during operation.	B	Section 8.3
		Clearing of native vegetation communities.	Limited areas of natural vegetation remain within the corridor due to the complete re-profiling of the soil and subsoil during the original construction of the M5 Motorway. Safeguards have been proposed to protect sensitive areas, control weeds, minimise erosion and sedimentation, and rehabilitate disturbed areas. There are not expected to be any residual impacts on ecological communities.	C	Section 8.3

Issue	DGRs – key issue?	Potential impacts	Analysis – Proposed mitigation measures and impacts remaining after their application.	Risk category following analysis	EA reference
		Impacts on adjoining waterways (including the Georges River and Salt Pan Creek), riparian vegetation and aquatic habitats.	Water runoff from the project would be captured during both construction and operation and treated if necessary. Construction activities would avoid riparian areas near water crossings. Drainage construction would be avoid riparian areas. Residual impacts are expected to be minimal and may result in a net improvement in operational water quality.	C	Section 8.3 Section 9.1 Section 9.2
Urban design and landscaping issues	Yes	Overall risk category		A	Section 8.4
		Reduced visual amenity along the corridor from removal of median vegetation.	Urban design and landscaping measures would be incorporated into the project, including additional plantings on batters and verges with suitable groundcover and trees/shrubs where appropriate. Residual visual impacts have been assessed as low to moderate, given the existing urban landscape and motorway use of the corridor.	A	Section 8.4
		Impact of built structures on sensitive receivers.	Variable message signs would be located to avoid impacts on sensitive receivers such as residences. Residual impacts on heritage items are expected to be minimal given the lack of sightlines, and opportunities to further reduce impacts would be investigated.	B	Section 8.4
		Visual impacts during the construction period.	Most construction would occur within the motorway corridor. Compounds would be fenced and shielded as appropriate to minimise visual impact. Disturbed areas would be progressively rehabilitated. Residual visual impacts during construction would be minor and temporary.	C	Section 8.4

Table 10.3 Environmental risk analysis – other issues

Issue	DGRs – key issue?	Potential impacts	Analysis – Proposed mitigation measures and impacts remaining after their application.	Risk category following analysis	EA reference
Geology, soils and water quality	No	Overall risk category		C	Section 9.1
		Construction impacts on water quality from erosion and sedimentation, chemical spills and loss of vegetation.	Erosion and sedimentation controls would be implemented. Residual impacts are expected to be minor and limited to the construction phase.	C	Section 9.1
		Removal of native topsoil, excavation of contaminated soils or contaminated groundwater during construction.	Drainage basins would be provided during construction to capture and treat any extracted groundwater. Residual impacts are expected to be minor and limited to removal of topsoil.	C	Section 9.1
		Polluted runoff during operation.	Water quality devices and gross pollutant traps would be established permanently to capture most operational runoff and treat it, if necessary. Spill containment would be provided where necessary, based on a risk analysis of the receiving environment's sensitivity. Residual impacts are expected to be negligible.	C	Section 9.1
Hydrology and flooding	No	Overall risk category		C	Section 9.2
		Increase in stormwater runoff and subsequent downstream flooding.	The adequacy of existing drainage/water quality structures has been considered as part of the design process. New and augmented structures would be incorporated into the design so as not to worsen the receiving environment and reduce the potential for downstream flooding from the existing case. The residual impacts on downstream areas would be negligible.	C	Section 9.2

Issue	DGRs – key issue?	Potential impacts	Analysis – Proposed mitigation measures and impacts remaining after their application.	Risk category following analysis	EA reference
		Hydrological impacts on waterways crossed by the project.	Any increases in peak flows would be detained in drainage basin infrastructure. There would not be any residual hydrological impacts.	C	Section 9.2
Air quality	No	Overall risk category		B	Section 9.3
		Construction air quality impacts from dust and exhaust emissions.	Measures to minimise dust would be implemented during construction. Any residual impacts resulting from dust and emissions are expected to be minor.	B	Section 9.3
		Decrease in air quality during operation as a result of increased traffic volumes.	Analysis has concluded that there would be no discernible change in the air quality of the corridor during operation as a result of the project. There are not expected to be any residual impacts on air quality.	C	Section 9.3
Climate change and greenhouse gases	No	Overall risk category		B	Section 9.4
		Increased greenhouse gas emissions during operation.	The increase in traffic flow would result in increased greenhouse gas emissions. Residual impacts are expected to be minor when compared to total greenhouse gas emissions.	B	Section 9.4
		Increased greenhouse gas emissions during construction.	An increase in the production of greenhouse gases is expected during the construction period from the increase in resource use and vehicle emissions. Residual impacts are expected to be minor when compared to total greenhouse gas emissions.	B	Section 9.4
		Impacts on the project from the effects of climate change.	Given the lack of immediate sensitivity of the project to projected climate change effects, an adaptive response management strategy would be implemented in the event of significant impacts from the effects of climate change. There are not expected to be any residual impacts given the lack of sensitivity of the project.	C	Section 9.4

Issue	DGRs – key issue?	Potential impacts	Analysis – Proposed mitigation measures and impacts remaining after their application.	Risk category following analysis	EA reference
Aboriginal heritage	No	Overall risk category		C	Section 9.5
		Disturbance of known items of Aboriginal heritage.	The project would not disturb known Aboriginal heritage items or sites. There would be no residual impacts on Aboriginal heritage.	C	Section 9.5
		Disturbance or destruction of previously unidentified Aboriginal heritage artefacts in the road corridor.	Works would primarily occur in the motorway corridor, which has been previously disturbed. Three potential archaeological deposits were identified within the study area. These sites were destroyed during previous works in accordance with relevant legislation. There would be no residual impact on Aboriginal artefacts in the corridor.	C	Section 9.5
		Disturbance or destruction of previously unidentified Aboriginal heritage artefacts at construction site compounds.	It is possible that there are unrecorded artefacts at proposed construction site compounds. However, excavations would not be undertaken at these compounds and they would be covered with hardstand material. This would limit the potential for impacts to potentially occurring Aboriginal heritage items. If there is the potential for works at construction site compounds to impact on Aboriginal heritage, alternative sites would be used. There would be negligible potential for residual impacts given avoidance of potential heritage sites following field investigations.	C	Section 9.5

Issue	DGRs – key issue?	Potential impacts	Analysis – Proposed mitigation measures and impacts remaining after their application.	Risk category following analysis	EA reference
Non-Aboriginal heritage	No	Overall risk category		C	Section 9.6
		Impacts on previously non-Aboriginal heritage items from construction of the project.	The project would not significantly affect items of non-Aboriginal heritage. Additional mitigation measures would be implemented during the design phase to reduce impacts from variable message signs on heritage sites outside the corridor. During detailed design, variable message signs would be sited to minimise residual impacts.	C	Section 9.6
		Impacts on previously unidentified archaeological heritage items from construction of the project.	Management measures would be implemented during construction to preserve heritage items, if found. It is unlikely there would be any residual impacts on archaeological heritage items.	C	Section 9.6
Socio-economic and land use	No	Overall risk category		B	Section 9.7
		Reduced amenity during construction (traffic and access, temporary congestion, construction impacts).	Suitable mitigation measures, including community consultation, would be used to manage temporary construction impacts. Landholders would continue have access to their properties. There may be residual construction impacts on stakeholders, but it is expected that these would be minor as a result of consultation and separation of construction areas from the public.	B	Section 9.7
		Impacts on amenity from construction site compounds.	Detailed consultation would be undertaken with landholders adjacent to construction site compounds to collaboratively address any concerns. There would be moderate residual impacts on stakeholders during the construction period.	C	Section 9.7

Issue	DGRs – key issue?	Potential impacts	Analysis – Proposed mitigation measures and impacts remaining after their application.	Risk category following analysis	EA reference
		Impacts from temporary construction land occupation and permanent acquisition.	The acquisition or leasing of land would be in accordance with applicable legislation. No permanent acquisition of private land is anticipated. There would be no residual impacts from land acquisition.	C	Section 9.7
		Socio-economic benefits from operation of the project.	The project would provide substantial residual socio-economic benefits for commuters and the freight industry as a result of reduced travel times.	C	Section 9.7
Resources and waste management	No	Overall risk category		C	Section 9.8
		Consumption of natural resources to construct the project.	The need for natural resources would be minimised during the design and construction planning processes. Any residual impacts from the consumption of natural resources are not expected to be significant.	C	Section 9.8
		Production and disposal of waste materials during construction.	Wastes would be managed according to the waste reduction hierarchy (avoid, minimise, recycle, dispose). Residual impacts from waste production during construction would be minor following application of management measures.	C	Section 9.8

