



Transport  
Roads & Traffic  
Authority

# M5 West widening

*moving goods, people and the economy*

Submissions and Preferred Project Report

MAIN VOLUME / MAY 2011



## Executive summary

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The NSW Roads and Traffic Authority (RTA) proposes to widen around 20 kilometres of the M5 South West Motorway between King Georges Road, Beverley Hills and Camden Valley Way, Casula (the project). Community consultation for the M5 West widening project began in November 2009 with the release of the M5 corridor expansion overview booklet. Over 200 community submissions were received through the preliminary submissions process that took place between November 2009 and March 2010.

The issues raised as a result of the consultation process held between November 2009 and March 2010 were considered during the continued development of the design for the project and were also addressed as appropriate in an environmental assessment prepared for the project that was publicly exhibited for 38 days from 22 September 2010 to 29 October 2010.

### Exhibition of the environmental assessment

The exhibition was advertised in a media release, as well as local and city-wide newspapers. The environmental assessment was exhibited at six display locations and was made available for review and electronic download on the RTA and Department of Planning and Infrastructure (formerly Department of Planning) websites.

Community consultation activities were undertaken during the environmental assessment exhibition period that included release of a community update, letters to various stakeholders, an email alert to those pre-registered to receive project updates. Six community information sessions were also held during the exhibition period. The project team was available at these sessions to discuss the project and answer any enquiries.

### Submissions received to the exhibition of the environmental assessment

A total of 67 submissions were received regarding the environmental assessment. Four of these submissions were from government agencies; five were from councils; two were from associations; 46 were from community members and 10 copies of one form letter were received.

Most community submissions related to potential noise and traffic impacts as a result of the project. Other community submissions raised issues around tolls, including suggestions for alternative tolling regimes and tolling the M5 East. Details around the construction of the project were questioned, and a number of submissions raised issues related to the strategic justification and need for the project. Approximately one third of community submissions stated support for the project.

Agency and council submissions predominantly identified construction and operation phase noise and traffic related issues. Cycleway improvements were identified, and hydrology and biodiversity issues were also raised.

### Additional investigations

The traffic and transport working paper exhibited as part of the environmental assessment referred to the development of a microsimulation traffic model to facilitate a more detailed analysis of the operational aspects of the project and to assist in further project refinement. This microsimulation modelling was undertaken and confirms that the project delivers travel time savings to road users similar to those reported in the environmental assessment. It also highlights that in addition to reducing overall travel times, the project has the effect of redistributing delay from the western end of the M5 Motorway to the eastern end in the AM peak period. This specifically benefits road users who do not use the whole length of the motorway.

The noise and vibration working paper has been reviewed since the exhibition of the environmental assessment in order to incorporate refinements to the assessment based on recent information; confirm mitigation measures for the community; and respond to questions about the assessment from the Office of Environment and Heritage (formerly DECCW). This resulted in a substantial increase to the extent of proposed noise mitigation, including additional new and augmented barriers.

The localities of four variable message signs were identified in the environmental assessment as near known heritage items. A non-Aboriginal heritage review was conducted to assess the potential heritage impact of these variable message signs and identify appropriate measures to manage identified impacts.

A biodiversity review was undertaken to consider the potential impacts associated with a number of project elements including the introduction of additional new and augmented noise barriers and specific spoil reuse sites.

## Preferred project report

The following project changes are proposed to minimise environmental impacts and have been assessed in the preferred project report:

- Eastbound widening between Fairford Road and King Georges Road to increase the number of lanes from two to three.
- One additional drainage basin, augmentation of two other drainage basins and the inclusion of one drainage basin not included in the environmental assessment.
- Reconfiguration of the Hammondville toll plaza layout to provide three free flow lanes and one to two cash lanes in each direction.
- Incorporation of four emergency crossover gates into the median design to facilitate traffic management in the case of an emergency.
- Additional noise walls, augmentation of existing noise walls and at-house architectural noise treatments.

The preferred project report assessment demonstrates that project changes will minimise environmental impacts. A risk assessment for the preferred project report did not identify any new environmental project risks. All residual impacts, particularly those associated with operational noise issues, will be managed and minimised.

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# Glossary and abbreviations

Term	Meaning
Acid sulfate soils (ASS)	The extremely acidic soils that result from the disturbance or drainage and subsequent oxidation of previously waterlogged potential acid sulfate soils.
Annual average daily traffic (AADT)	The total traffic in both directions at a specified location calculated from mechanically obtained axle counts.
Annual exceedance probability (AEP)	The probability of a rainfall or flood event exceeding a nominated level in a year. A one percent AEP is the probability of an event exceeding a nominated level in 100 years.
Australian Height Datum (AHD)	The standard reference level used to express the relative height of various features. A height given in metres AHD is essentially the height above sea level.
Alignment	The general route (eg of a roadway) in plan and elevation.
Alluvium	Unconsolidated deposit of gravel, sand or mud formed by water flowing in identifiable channels. Commonly well sorted and stratified.
AM peak period	6–10am weekdays.
ANZECC	Australian and New Zealand Environment and Conservation Council. A Ministerial Council operating between 1991 and 2001 that provided a forum for member governments to develop coordinated policies about national and international environment and conservation issues.
Aquifer	Geologic formation, group of formations, or part of a formation capable of transmitting and yielding quantities of water.
Archaeological site	A site with any material evidence of past Aboriginal activity that remains within a context or place that can be reliably related to that activity.
Asphalt or asphaltic concrete	A dense, continuously graded mixture of coarse and fine aggregates, mineral filler and bitumen usually produced hot in a mixing plant.
Background noise level	The ambient sound-pressure noise level in the absence of the sound under investigation exceeded for 90 per cent of the measurement period. Normally equated to the average minimum A-weighted sound pressure level.
Batter	The side slope of walls, embankments and cuttings or the degree of such slope, usually expressed as a ratio of horizontal distance to one vertical height.
Bedrock	The side slope of walls, embankments and cuttings or the degree of such slope, usually expressed as a ratio of horizontal distance to one vertical height.
Benefit–cost ratio	The ratio of the present value of benefits to the present value of costs of a project.
Bore	A cylindrical drill hole sunk into the ground from which water is pumped for use or monitoring.
Borehole	A hole produced in the ground by drilling for the investigation and assessment of soil and rock profiles.
Carriageway	The portion of a roadway devoted to vehicular traffic generally delineated by kerbs, a verge or a median.
Cast in situ	The placement of wet concrete in forms at the construction site.
Catchment	The area drained by a stream or body of water, or the area of land from which water is collected.
CO	Carbon monoxide.
Colluvial soils	Stony clays that have been moved down slope by soil creep and slope wash but may include a proportion of windblown red clay (pama) and higher terrace alluvium.

Term	Meaning
Concentration (air quality)	Vehicles emit pollutants to the air, which are transported and diluted resulting in a volume of pollutant per volume of ambient air. Ambient air quality goals are expressed in terms of concentrations, which are measured in parts per million or micrograms per cubic metre.
Concept design	Initial functional layout of a concept, such as a road or road system, to provide a level of understanding to later establish detailed design parameters.
dBA	Decibels using the A-weighted scale measured according to the frequency of the human ear.
DECCW	NSW Department of Environment, Climate Change and Water (now Office of Environment and Heritage).
DEWHA	Commonwealth Department of the Environment, Water, Heritage and the Arts.
Decibel	A scale unit used in the comparison of powers and levels of sound energy.
Dioxin	A group of halogenated organic compounds, significant because they act as environmental pollutants.
DoPI	NSW Department of Planning and Infrastructure.
DPI	Department of Primary Industries
Design speed	A nominal speed used for the design of geometric features of the road, such as curves.
DGRs	Director General's requirements. Requirements and specification for the environmental assessment prepared by the Director General of Planning under section 75F of the <i>Environmental Planning and Assessment Act 1979</i> .
ESD	Ecologically sustainable development.
Ecology	The relationship between living things and the environment.
Ecosystem	A functional unit of energy transfer and nutrient cycling in a given place. It includes all relationships within the biotic community and between the biotic components of the system.
EEC	Endangered ecological community. An ecological community identified by relevant legislation as having endangered status.
EMP	Environmental management plan.
Environment	A term for all the conditions (physical, chemical, biological and social) in which an organism or group of organisms, including humans, exists.
Environmental assessment	An environmental assessment is a focussed analysis undertaken for the purposes of Part 3A of the <i>Environmental Planning and Assessment Act 1979</i> , written generally to comply with the requirements issued by the Director-General of the Department of Planning and Infrastructure.
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i> (NSW).
EPA	Environment Protection Authority (now part of the Office of Environment and Heritage).
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth).
Grade separation	The separation of road, rail or other traffic so that crossing movements, that would otherwise conflict, are at different levels.
Groundwater	Subsurface water contained within the saturated zone.
Hydrocarbon	Any organic compound – gaseous, liquid or solid – consisting only of carbon and hydrogen.
Hydrology	The study of rainfall and surface water runoff processes.

Term	Meaning
I&I	Industry and Investment NSW (now DPI)
LA <sub>10</sub>	The noise level that is exceeded for 10 per cent of the sample period. During the sample period, the noise level is below the LA <sub>10</sub> level for 90 per cent of the time. The LA <sub>10</sub> is a common noise descriptor for environmental noise and road traffic noise.
LA <sub>90</sub>	The noise level that is exceeded for 90 per cent of the sample period. During the sample period, the noise level is below the LA <sub>90</sub> level for 10 per cent of the time. This measure is commonly referred to as the background noise level.
LA <sub>eq</sub>	The equivalent continuous sound level. This is the energy average of the varying noise over the sample period and is equivalent to the level of constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.
Local road	A road or street used primarily for access to abutting properties.
Longitudinal section	The section drawn along the length of the route showing vertical elevation.
NPWS	NSW National Parks and Wildlife Service (now part of the Office of Environment and Heritage).
PAD	Potential archaeological deposit – any location considered to have a moderate to high potential for subsurface archaeological material.
pH	A measure of acidity or alkalinity of a solution, numerically equal to seven for neutral solution, increasing with increasing alkalinity and decreasing with increasing acidity. Originally stood for the words potential of hydrogen.
Piling – bored	A method of inserting piles using a drilling or boring motion.
Piling – driven	A method of inserting piles using a driving or hammering motion.
Proponent	The person or organisation that proposes carrying out a project or activity.
RBL	Rating background level. This is the median noise value of the assessment background levels values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and nighttime.
Receptor/receiver	An environmental modelling term used to describe a map reference point where the impact is predicted. A sensitive receptor is a home, workplace, school or other place where people spend some time. An elevated receptor is a point above ground level.
RTA	Roads and Traffic Authority of New South Wales.
South West Growth Centre	The South West Growth Centre is within the boundaries of Liverpool, Camden and Campbelltown local government areas. It covers about 17,000 hectares and has capacity for around 110,000 new dwellings for 300,000 people.
Threatened	As defined under the <i>Threatened Species Conservation Act 1995</i> , a species, population or ecological community is threatened when it is likely to become extinct or is in immediate danger of extinction.
TSC Act	The NSW <i>Threatened Species Conservation Act 1995</i> is an Act to conserve threatened species, populations and ecological communities of animals and plants.
Turbidity	A measure of light penetration through a water column containing particles of matter in suspension.
Water table	The surface of saturation in an unconfined aquifer at which the pressure of the water is equal to that of the atmosphere.
Western Sydney Employment Hub	The Western Sydney Employment Hub will be located near the intersection of the M4 and M7 motorways and is expected to offer 2450 hectares of space, creating up to 36,000 jobs in Greater Western Sydney.



# I Introduction and background

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## I.1 The project

The NSW Roads and Traffic Authority (RTA) proposes to widen around 20 kilometres of the M5 South West Motorway between King Georges Road, Beverley Hills and Camden Valley Way, Casula (the project).

The project would include:

- Additional lanes on the M5 South West Motorway for the majority of its length. The additional lanes would be provided by pavement widening, asphalt overlays and new line marking.
- An operations management control system on and in the vicinity of the M5 South West Motorway. It would include a new control building at Hammondville and variable message signs on the motorway and surrounding arterial roads.
- Bridge widening. This would be done by placing new infill decking in the central median between existing bridges over Queen Street and Nuwarra Road. All other bridges can accommodate the proposed road widening without the need for structural modification.
- Noise attenuation measures at various locations along the M5 South West Motorway between King Georges Road and Camden Valley Way.

The project also includes associated or ancillary works, activities, uses, structures or facilities for the purposes of the project, including (but not limited to) any of the following:

- Construction and associated construction site compounds.
- Drainage works and drainage modifications.
- Landscaping.
- Environmental management and pollution control.

The project does not include preliminary works associated with the design and/or environmental assessment of the project. These preliminary works – such as surveys, test drilling, test excavations, preliminary geotechnical investigations, contamination investigations, utility identification and location, and pavement investigations – would occur prior to the commencement of construction.

A more detailed description of the project is found in Chapter 5 of the M5 West widening environmental assessment (RTA, 2010).

## I.2 Statutory context

The Minister for Planning has declared by Order on 10 March 2010, and published in the NSW Government Gazette No. 40 on 19 March 2010, that the M5 West widening project is a project to which Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) applies. The Minister has also declared that the M5 West widening project is a critical infrastructure project under section 75B of the EP&A Act.

In accordance with the requirements of the EP&A Act, an environmental assessment was prepared to assess the potential impacts of the project (RTA, 2010).

## 1.3 Environmental assessment exhibition

The environmental assessment was exhibited for 38 days, from 22 September to 29 October 2010.

### 1.3.1 Publicity

The exhibition was advertised in a media release, as well as the following newspapers:

- *The Sydney Morning Herald.*
- *The Daily Telegraph.*
- *The Liverpool Leader.*
- *Canterbury-Bankstown Torch.*
- *St George Leader.*

In addition:

- A community update – providing information on the environmental assessment, community information sessions and the submissions process – was delivered to 40,000 residents and 10,000 businesses along the M5 South West Motorway.
- Letters were sent to 50 stakeholders, including community groups, transport and bicycle groups and environmental groups, announcing the formal exhibition period and inviting submissions.
- An email alert was sent to all stakeholders who had provided their email address during the consultation period to notify them about the exhibition of the environmental assessment documents.

### 1.3.2 Exhibition

The environmental assessment was made available for review and electronic download on the RTA website: [www.buildingsydneyhighways.com.au](http://www.buildingsydneyhighways.com.au) and the Department of Planning and Infrastructure website: [www.planning.nsw.gov.au](http://www.planning.nsw.gov.au). It was also exhibited at the following display locations:

- Department of Planning and Infrastructure, Information Centre, 23-33 Bridge Street, Sydney.
- NSW Roads and Traffic Authority, Level 9, 101 Miller Street, North Sydney.
- Bankstown City Council, Civic Tower, 66-72 Rickard Road, Bankstown.
- Canterbury City Council, 137 Beamish Street, Campsie.
- Liverpool City Council, Liverpool City Library, 170 George Street, Liverpool.
- Nature Conservation Council of NSW, Level 2, 5 Wilson Street, Newtown.

During the exhibition period, the public was able to review the environmental assessment and obtain information from display materials. The public was also able to access information from the project's enquiries email ([m5\\_west\\_widening@rta.nsw.gov.au](mailto:m5_west_widening@rta.nsw.gov.au)), telephone information line (1800 633 332) and community information sessions.

There were six community information sessions. The project team was attended these sessions to discuss the project and answer any enquiries. These sessions were held at:

- Moorebank Community Centre, corner Nuwarra Road and Maddecks Avenue, Moorebank, Thursday 30 September, 5–8pm.
- Revesby Community Hall, Macarthur Avenue, Revesby, Wednesday 6 October, 5–8pm.
- Casula Public School Hall, De Meyrick Avenue, Casula, Saturday 9 October, 10am–1pm.

- Hannans Road Public School Hall, Hannans Road, Riverwood, Tuesday 12 October, 5–8pm.
- University of Western Sydney Bankstown Campus, Ashford Avenue, Milperra, Saturday 16 October, 10am–2pm.
- Punchbowl Community Centre, 44 Rossmore Avenue, Punchbowl, Saturday 23 October, 10am–2pm.

## 1.4 Previous consultation and consideration of issues

Community consultation for the M5 West widening project began in November 2009 with the release of the M5 corridor expansion overview booklet. The overview booklet identified separate environmental assessment processes for the M5 South West Motorway and M5 East Freeway and requested initial community submissions.

Following the release of the booklet, the consultation process included posters and displays in locations surrounding the M5 South West Motorway, including council offices, community centres and libraries. Over 190,000 residents and local businesses received a postcard drop to raise awareness of the project, and advertisements were placed in local papers, on websites and on the radio. A website ([www.M5corridorexansion.com.au](http://www.M5corridorexansion.com.au)) and a telephone line (1800 633 332) were also set up to answer queries, allow the community to obtain further project information and send through submissions. Community information sessions were also held locally in Moorebank and Liverpool.

Over 200 community submissions were received through the preliminary submissions process that took place between November 2009 and March 2010. The issues most frequently raised by the community are summarised in Table 7.5 of the environmental assessment and included:

- Project scope – such as suggested project inclusions and capacity issues relating to the road not being widened enough to meet growing population and transport demand.
- Various tolling related issues.
- Construction impacts – such as location of construction site compounds and construction noise.
- Operational impacts – such as noise, traffic congestion and placement of off-motorway variable message signs.

The issues raised during this consultation process were considered in the project design and addressed as appropriate in the environmental assessment (refer to Table 7.5 of the environmental assessment, which indicates where the issues raised are considered).

A number of the issues raised during this preliminary consultation period were raised again during the environmental assessment exhibition period and have been further considered and responded to in Chapter 3 of this submissions report.

## 1.5 Purpose of this document

During the exhibition of the environmental assessment, there were 67 submissions. The Director-General of the then Department of Planning provided copies of the submissions to the RTA. In accordance with section 75H(6) of the EP&A Act, the Director-General required the RTA to address the issues raised in the submissions.

Also in accordance with section 75H(6) of the EP&A Act, the Director-general also required a preferred project report (including a revised statement of commitments) to be prepared where changes to the project are proposed to minimise its environmental impact.

This submissions report contains the following chapters:

- Chapter 1 – introduction.
- Chapter 2 – issues raised during exhibition of the environmental assessment.
- Chapter 3 – responses to the issues raised by the community.
- Chapter 4 – the preferred project report. This identifies and assesses changes made to the project to minimise environmental impacts, and outlines additional investigations that have been undertaken since the exhibition of the environmental assessment.
- Chapter 5 – the revised statement of commitments.
- Chapter 6 – references.

This report is supported by four appendices:

- Appendix A – a list of all submissions and where the issues are addressed.
- Appendix B – an addendum to the Traffic and Transport working paper.
- Appendix C – an addendum to the noise and vibration working paper.
- Appendix D – a review of non-Aboriginal heritage impacts from variable message signs.
- Appendix E – an addendum to the Biodiversity Working Paper presented in the environmental assessment.
- Appendix F – an addendum to the visual impact, urban design and landscaping working paper.

## 2 Overview of issues

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### 2.1 Respondents

#### 2.1.1 Submissions

The Department of Planning and Infrastructure received 67 submissions. Of these submissions:

- Forty-eight were received during the submissions period (22 September to 29 October 2010).
- Fourteen were received after the submissions period had closed, but were considered and are responded to in this report.
- Two submissions (numbers 21 and 27) were received from the same respondent, while three (numbers 48, 49 and 60) were received from Liverpool Council.

#### 2.1.2 Types of respondents

Submissions were received from a number of different respondents. (A list of all respondents is included in Appendix A.) Of these:

- Four submissions were from government agencies – the then Department of Environment, Climate Change and Water; Industry and Investment NSW; Transport NSW and the then NSW Office of Water.
- Five submissions were from councils – Liverpool Council made three separate submissions, while Bankstown Council and the South Sydney Regional Organisation of Councils each made one submission.
- Two submissions were from associations – the East Liverpool Progress Association and the National Roads and Motorists Association (NRMA).
- Forty-six submissions were from community members.
- There were 10 copies of a form letter from residents in Casula.

### 2.2 Submissions-handling process

Each submission has been examined individually to understand the issues being raised. The issues raised in each submission have been extracted and collated, and corresponding responses to the issues have been provided. Where similar issues have been raised in different submissions, only one response has been provided. The issues raised and the RTA's response to these issues forms the basis of this chapter.

### 2.3 Overview of issues raised in submissions

This section summarises the issues raised by the community, government agencies and councils. Responses to these issues are contained in Chapter 3.

#### 2.3.1 Main issues raised by the community

Most of the issues raised by the community were addressed in the environmental assessment. (As such, responses in Chapter 3 of this report mirror the environmental assessment structure.) The most common issues related to potential noise and traffic impacts; other issues related to tolls and construction, as listed below.

- Noise and vibration – this was by far the most common issue raised. Most submissions were concerned with existing noise from the motorway and the effects on quality of life. Other noise-related issues concerned:

- The potential of the project to increase traffic noise.
- The methodology used for the noise assessment, particularly the validity of noise testing locations and the way in which the noise model was validated.
- Ways to reduce noise. A number of submissions suggested alternative operating conditions for the motorway to reduce noise and/or requested additional noise mitigation.
- Traffic and transport impacts – there was a large crossover with issues that related to the project description, particularly around the impacts of merging after Fairford Road (eastbound) and at the M5 East. Submissions also suggested a number of operational changes to the project including truck-only lanes and additional or altered cycling facilities.
- Tolls – a large number of submissions were concerned with tolls; for example, there were suggestions for alternative tolling regimes and for tolling the M5 East.
- Construction – details around the construction of the project were questioned. There was a form letter from Casula residents requesting that noise walls are installed prior to construction commencing in their area to mitigate noise impacts.
- Strategic justification – a number of submissions related to the strategic justification and need for the project. About one-third of these stated support for the project.

### 2.3.2 Main issues raised by government agencies and councils

The key issues raised by government agencies and councils are presented below.

#### **Bankstown City Council**

- Raised concerns about the need to assess the project in the context of the expansion of the entire M5 corridor.
- Asked for additional consideration to be given to direct access to the Milperra–Bankstown Airport Specialised Centre to accommodate future growth, and suggested changes to the project description and supplementary works.
- Raised concerns about the impacts of the project on other arterial roads, notably Stacey Street and the Hume Highway. Council suggested additional road widening and grade separations to address existing congestion issues.
- Concerned with drainage at Milperra and beautification of the Fairford Road interchange.
- Raised concerns about the potential impacts of drainage basins on endangered ecological communities, the Green and Golden Bell Frog, and the Georges River and Salt Pan Creek wetlands.
- Suggested wire rope instead of concrete barriers to improve safety in the event of accidents.
- Requested the Department of Planning to inform council and affected residents about noise mitigation works and management plans, for construction noise and depots.
- Sought further clarification regarding operational noise impacts, particularly regarding impacts on the amenity of properties that are being offered architectural treatments.

#### **Industry & Investment NSW (now DPI)**

- Provided general considerations for infrastructure development near agricultural land.
- Stated that the project would not have impacts on minerals.
- Stated that the proposed management measures would be sufficient to mitigate impacts on aquatic habitats.

## **Liverpool City Council**

Liverpool City Council raised a large number of overlapping issues in its three submissions:

- Asked for clarification and ongoing consultation in relation to any impacts on its assets and council land. These included provisions for approval, fees, rents for occupation, and restoration conditions.
- Requested further consultation with council and affected residents throughout construction.
- Proposed limits on specific construction activities.
- Proposed additional air quality monitoring.
- Proposed bonus systems for early delivery of works.
- Proposed a number of changes to the design of the project to improve cycleways, increase access to the Hume Highway and address existing road network concerns.
- Stated that noise testing should be undertaken at Casula, as previous testing had indicated that residents were noise affected. Recommended additional noise mitigation in Casula including new and augmented noise walls. Also requested that affected properties be placed on the noise abatement program.
- Raised a number of concerns about the traffic impacts of the project given growth in south-western Sydney. These included cumulative impacts from the proposed Moorebank Intermodal Terminal.

## **Transport NSW (now Department of Transport)**

- Stated that the Director-General's Requirements have been satisfactorily addressed.

## **Department of Environment, Climate Change and Water NSW (now Office of Environment and Heritage)**

- Proposed conditions of approval relating to construction noise testing and monitoring, hours of work and additional review of the assessment methodology prior to construction.
- Recommended further consideration of noise mitigation measures in a number of locations.
- Proposed conditions of approval relating to the translocation of Downy Wattle and a requirement for biodiversity offsets for native vegetation clearing.
- Raised a number of concerns with the modelling of flooding and drainage on the motorway.
- Requested further consideration of cycling facilities during detailed design.
- Noted requirements for licensing during construction, and approval requirements for any additional ancillary facilities.

## **NSW Office of Water (now DPI)**

- Suggested riparian setback distances, establishment of additional riparian buffers, offsets for any disturbance to existing riparian vegetation and mitigation measures for revegetation and rehabilitation of riparian areas.
- Sought clarification regarding the extent of works at locations adjacent to watercourses.
- Provided recommendations regarding the positioning of construction site compounds relative to watercourses.



## 3 Response to issues

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This chapter contains responses to the issues raised in submissions to the environmental assessment.

Submission numbers in **bold** represent submissions received from government agencies or councils. Where appropriate, references to relevant sections of the environmental assessment are contained in the responses.

This chapter is structured generally in accordance with the structure of the environmental assessment. (Note that not all aspects examined in the environmental assessment were discussed in the submissions.)

### 3.1 Tolling

#### Submission numbers

12, 29, 32, 33, 44, 54, 62

#### Issue description

In summary, respondents raised the following issues concerning tolling:

1. A combination of taxpayer funds and tolls should be used to improve all of Sydney's motorways.
2. Cashless tolls and additional cashless lanes should be implemented to improve traffic flow.
3. The M5 South West motorway should be tolled in sections. One respondent suggested that the cashback program should be cancelled in order to fund the implementation of sectional/distance based tolling.
4. The environmental assessment needs to better address user-pays and polluter-pays principles as they relate to tolls.
5. The M5 East should be tolled.
6. The RTA should justify the extension of the tolling period for the M5 corridor.
7. Commuters do not mind paying tolls provided the expense is justified. South Sydney Regional Organisation of Councils stated that it would be unfortunate if the project funnelled motorists onto a privately operated toll road.

#### Response

1. The RTA, on behalf of the NSW Government, is responsible for building and maintaining Sydney's motorway network. Further information about road projects being planned for Sydney can be found at the Building Sydney Motorways website<sup>1</sup>. A combination of tolling and government funding has been used to develop and improve the motorway network. A decision on the funding arrangements has not been finalised. Potential sources of funding would include an extension of the toll collection/concession period and may include some form of government funding.

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<sup>1</sup> [www.buildingsydneymotorways.com.au](http://www.buildingsydneymotorways.com.au)

2. There are already cashless gates at all tolling points on the M5 South West Motorway, including at the main toll plaza at Hammondville to improve traffic flow. There are additional cash-only gates at the toll plaza to account for the fact that it takes those vehicles longer to pay the toll than vehicles with E-tags or similar electronic tags. This enables the cashless lanes to flow freely without the cash-only queues backing up. The preferred project report (chapter 4) clarifies the optimisation of the design of the project, and that three cashless lanes are currently planned in each direction at the toll plaza. Optimisation of the toll plaza will continue throughout detailed design, as outlined in Table 5.1 of the environmental assessment.
3. The cashback program is current NSW Government policy and provides assistance to residents of south-western Sydney who use the M5 South West motorway. There are no plans to change the cashback program as part of the project. Section 4.1.1 of the environmental assessment provides an analysis of demand management measures. The assessment concluded that distance based tolling was a complementary measure to the project rather than a viable stand-alone alternative to the project.
4. As travel speeds increase, vehicle emissions and air pollution decrease. However, some motorists may travel greater distances to access the motorway, which could result in greater overall impacts on air quality. The economic analysis undertaken for the project assumed the latter (very conservative) situation and concluded that the present value of vehicle emissions from the project was a negative value (disbenefit). This overall cost, however, is more than made up for by travel time benefits from the project alone.

The RTA is working with the Commonwealth Heads of Government Road Reform Plan to achieve more appropriate heavy vehicle pricing.

5. It should be noted that the M5 East expansion project is currently under development, following community consultation in late 2009–early 2010. Alternative 5 (in section 4.1.1 of the environmental assessment) discusses demand management alternatives that include tolling arrangements. Further information on the M5 East expansion project can be found at the building Sydney's motorways website. Future possible tolling arrangements for the M5 East expansion have not been considered as part of this project.
6. As described in section 1.2.3 of the environmental assessment, the NSW Government is yet to finalise negotiations and confirm the funding mechanism for the project. A number of potential sources of funding will be considered and may include one or a combination of options. The RTA is considering extension of the concession period as a method of paying for the project.
7. As discussed in section 8.1.4 of the environmental assessment, the project would result in a reduction in travel times on the M5 South West Motorway. The microsimulation modelling discussed in chapter 4 indicated that there would be a reduction in congestion on feeder routes surrounding the motorway. This supports the justification for the provision of an efficient, tolled motorway for commuters.

## 3.2 Planning and statutory requirements

### Submission numbers

33, 48

### Issue description

In summary, respondents raised the following issues concerning statutory requirements:

1. Externalities should have been considered in the environmental assessment, including the effects of road pricing and health effects.
2. Liverpool Council stated that the RTA is responsible for complying with all required statutory approvals necessary for the project.

### Response

1. Air quality, health effects and the ability of tolls to reflect economic consequences are considered in section 3.1.1 of this submissions report. Submission 33 was detailed and considered, providing significant background on the external health costs of heavy vehicles and the under-recovery of road costs through tolling. The statutory requirements for the project are included in Chapter 2 of the environmental assessment. It states that the project is assessed under the NSW *Environmental Planning and Assessment Act 1979*. Given that the project is not a federally funded initiative, there is no requirement to assess it under Auslink guidelines.

The submission correctly suggests that the costs of environmental externalities were not quantified as part of the environmental assessment. Environmental externalities have, however, been qualitatively assessed as part of the documentation and are considered when assessing the benefits and impacts of the project. The Australian Transport Council's *National Guidelines for Transport System Management* are published as a standard resource for transport planning, but do not relate to the detailed environmental assessment of a project. As such, they have not been used for the assessment of the project.

The tolls set for the M5 South West Motorway are based on a series of complicated factors and are subject to a commercial agreement between the NSW Government and Interlink Roads. There are no plans as part of the project to alter the tolls in order to mitigate the cost of externalities elsewhere in the Sydney economy.

The submission notes that commuters contribute to some external costs through fuel excise regimes, but that these are lower than for trucks, which have the highest external costs. Tolls and on-road costs are considerably higher for truck users, which reflect the greater effect they have on the economy. In addition, most private and business users of the M5 South West motorway pay taxes, which are used to offset any external costs of road developments.

2. The RTA recognises Liverpool Council's submission and will be responsible for complying with all statutory required approvals for the project. The RTA will continue to consult with Liverpool Council throughout the detailed design phase of the project. Should there be any impact on council assets or roads, the RTA shall seek the required permits. Section 2.1 of the environmental assessment explains the statutory planning requirements for the project. It lists the relevant State planning instruments that apply to the project, as well as the exemptions from certain other approvals.

## 3.3 Strategic justification

### Submission numbers

4, 6, 7, 11, 15, 16, 23, 32, 46, 53, 53, 60, 62

### Issue description

In summary, respondents raised the following issues concerning the strategic justification and need for the project:

1. Key aspects of the *Metropolitan Transport Plan – Connecting the City of Cities* (Metropolitan Transport Plan) were criticised, with the suggestion that they could undermine the development of regional cities. Specifically, it was stated that the plan has too much emphasis on enhancing road and public transport capacity towards the Sydney CBD and inadequate emphasis on cross-regional public transport.
2. The strategic justification for the project does not address the key strategic issues of liveability and sustainability as outlined in the *Sydney Metropolitan Strategy*.
3. Alternative public transport plans and associated observations were submitted which, the respondents suggested, more fully support the *Sydney Metropolitan Strategy*.
4. The project may result in a drop in patronage on the East Hills Line until large-scale growth occurs in the South West Growth Centre; and that, in turn, this would limit the ability of the NSW Government to meet *NSW State Plan* (State Plan) targets for public transport use.
5. The project would ease congestion and deliver economic and social benefits.
6. The project is not formulated to meet future population growth and associated traffic demand.
7. Existing and future challenges need to be considered in the environmental assessment, as they relate to congestion, motorway capacity, projected increases in dwellings by 2031, increases in truck movements from the Port Botany expansion, industrial intensification and a doubling of passenger movements at Sydney Airport.
8. The purpose of the project is to service the Moorebank Intermodal Terminal.
9. The proposal should consider the proposed intensification of activities at Bankstown Airport, outlined in the Preliminary Draft Master Plan.
10. The project would benefit commuters, which is necessary due to the delay in the delivery of extra rail capacity proposed under the *Metropolitan Transport Plan*. South Sydney Regional Organisation of Councils suggested that the project was not integrated with the plan, and that the RTA as proponent of the project has not suggested a cohesive approach to transport planning.

### Response

1. The Director-General's requirements specify that the environmental assessment must take into account the outcomes and objectives of the *Metropolitan Transport Plan*. Section 3.2.4 of the environmental assessment outlines how the project is consistent with the transport objectives for Sydney as provided in the *Metropolitan Transport Plan*.
2. The project would reduce congestion and travel times for commuters, which would reduce congestion related stress and enhance quality of life. These are key components that contribute to the realisation of a liveable and more sustainable city. As outlined in section 3.2.4 of the environmental assessment, the project would meet the aims of the *Sydney Metropolitan Strategy* by improving links between the key regional cities of Liverpool, Bankstown and Hurstville.

3. The plans presented relate the transport network as a whole and are more appropriately considered in that context. As discussed in section 3.3 of the environmental assessment, the M5 South West Motorway plays a key role in the metropolitan transport system and, with the M5 East, forms part of the Sydney Orbital Motorway.
4. The *State Plan* sets out a range of public transport patronage targets, including increasing the public transport share of trips made to and from the CBD to 80 per cent by 2016 and increasing the overall public transport share in Sydney to 28 per cent by 2016. Section 8.1.4 of the environmental assessment acknowledges an expected 0.2–0.8 per cent mode shift from public transport as a result of the project. Notwithstanding, it is expected the *State Plan* targets can still be achieved as a result of the other initiatives outlined in both the *State Plan* and the *Metropolitan Transport Plan*.
5. Section 3.6 of the environmental assessment establishes that the project would create benefits for the community that would outweigh its initial construction costs and ongoing operational costs. The potential for wider economic benefits is noted in section 9.7.2 of the environmental assessment (refer also to section 3.9.4 of this submissions report for consideration of socio-economic issues raised).
6. As noted in section 8.1 of the environmental assessment, strategic traffic modelling undertaken for the project considered projected land use changes, key development sites, trip demand and future transport infrastructure improvements to make predictions about traffic volumes, speeds and travel times into the future (to 2026). This included population predictions, as outlined in sections 8.1.1 and 8.1.2 of the environmental assessment. Section 8.1.4 of the environmental assessment notes that in 2026 the project is expected to deliver significant travel time savings and travel speed increases when compared to those experienced without the project. The benefits achieved are considered worthwhile. The formulation of the project was considered appropriate when considered in light of the additional cost, environmental and social impacts of further increases in capacity beyond that proposed.
7. Section 3.5 of the environmental assessment provides an assessment of the need for the project. This assessment includes the consideration of current pressures (such as existing congestion) and emerging pressures (such as population growth, employment growth and the growth of transport and infrastructure facilities such as Port Botany and Sydney Airport).
8. In section 3.5.2 of the environmental assessment, the Moorebank Intermodal Terminal is identified as just one of many emerging pressures that justify the need for the M5 West Widening project. As outlined above, additional emerging pressures include population and employment growth, and the expected growth of Port Botany and Sydney Airport. The additional traffic capacity provided by the project would service all of these needs, not just those of the Moorebank Intermodal Terminal. Moorebank Intermodal terminal is discussed further in section 3.9.5.
9. Section 3.2 of the environmental assessment outlines the strategic planning policy documents that have informed the assessment of the project. However, a brief overview of the traffic management provisions of the Preliminary Draft Master Plan for Bankstown Airport is shown below. The environmental assessment has also taken into account the provisions in local environment plans of Liverpool, Bankstown and Canterbury councils.

Section 17 of the Bankstown Airport Preliminary Draft Master Plan 2010 outlines surface traffic considerations for the expansion and development of Bankstown Airport. It notes that in the development of the plan, the following improvements to the external road network are expected to be required as a result of regional growth:

- Upgrade of Henry Lawson Drive.
- Upgrade of Milperra Road and Henry Lawson Drive intersection six.
- Upgrade of the local road network, as necessary, to maintain the current level of service.

- Construction of a new link from Henry Lawson Drive to the airport through Georges River Golf Club.
- Operational and signalling upgrades at intersections.

The plan also notes that Bankstown Airport Limited will continue to engage in discussions with the RTA and Bankstown City Council over road network upgrades. The RTA will continue to facilitate discussions and work with Bankstown Airport and Bankstown City Council to develop the significance of the airport within the broader regional context.

The project is consistent with the aims of the draft plan by improving access to the airport's specialised centre through improved travel times and reduced congestion.

10. As mentioned in the submission, the project would provide benefits for commuters. The timing for delivery of rail projects under the *Metropolitan Transport Plan* is outside the scope of the environmental assessment for the project. However, the M5 West widening project is one of a range of initiatives under the *Metropolitan Transport Plan* and it is noted in section 3.2.1 of the environmental assessment that public transport infrastructure planned for south-western Sydney would be complementary to the project.

The RTA is responsible for the maintenance and construction of NSW's major road network. The RTA is therefore the appropriate proponent for the project and provides a cohesive and strategic planning approach to road network performance. As provided in section 3.2.4 of the environmental assessment, the project is consistent with the broader transport objectives for Sydney given its status as a priority project in the *Metropolitan Transport Plan*.

## 3.4 Project development and alternatives

### 3.4.1 Public transport and other alternatives to the project

#### Submission numbers

14, 16, 29, 32, 32, 33, 46, 55, 64

#### Issue description

In summary, respondents raised the following issues concerning alternatives to the project:

1. Respondents suggested alternatives to the project including extending the quadruplication of the East Hills Line between Kingsgrove and Revesby to East Hills Station, investment in better public transport, and education regarding the benefits of reduced car use.
2. Support roads surrounding the M5 South West Motorway corridor should be upgraded, including Nuwarra Road, Fairford Road, Stacey Street, Canterbury Road and Hume Highway.
3. A tidal lane should be provided for peak-hour traffic westbound PM and eastbound AM.
4. An underground road system should be constructed between Camden Valley Way and General Holmes Drive.
5. Treatment of rail options needs more consideration (in addition to the Southern Sydney Freight Line and intermodal terminals).
6. Electric trolley buses should be provided as an alternative to the project because they can be rolled out faster than rail infrastructure.
7. The M5 corridor should be used as a rail corridor to transfer freight between Port Botany and industrial areas in Sydney's west.

## Response

1. Section 4.1.1 of the environmental assessment considers a number of alternatives to the project, including improvements to public transport provision (alternative 3) and investment to increase the rail share of the freight task (alternative 4).

Further investment in rail alone was not favoured over the M5 West widening project for a number of reasons, including the inability of the existing rail corridor (even with improvements) to meet future transport demand in the corridor, the extensive environmental, social and economic costs of expanding the East Hills Line, and the inability of light rail to achieve reasonable travel speeds without extensive property acquisition (and the associated environmental, social and economic costs) to provide an exclusive running space.

Initiatives to increase the freight task were considered complementary to the project rather than a viable alternative to it. This is because in most instances it is necessary to transport cargo to and/or from rail by truck.

2. Section 4.1.1 of the environmental assessment includes a number of alternatives that would involve improving the existing arterial road network (alternative 2).

While upgrading the support roads surrounding the M5 West Motorway corridor may improve local traffic conditions and complement the project, they are not considered a feasible alternative to the project itself. Reasons for this conclusion include the impact that widening arterial roads would have on adjacent land uses and parking, the extensive construction impacts and cost of viaducts and grade separations, and the marginal improvements achieved by upgrades.

It is also noted in section 4.1.1 of the environmental assessment that improvements to the operational efficiency of the arterial road network are currently being implemented as part of the NSW Government's \$100 million 'pinch point' program<sup>2</sup>, which aims to relieve traffic congestion at bottlenecks on 23 major road corridors across Sydney. To date, works on the arterial road network surrounding the M5 South West Motorway have included the intersection of Heathcote Road and the M5 South West Motorway and numerous improvements to King Georges Road at Beverley Hills.

It should also be noted that one of the benefits of the M5 West widening project would be the removal of traffic (particularly heavy vehicles) from heavily congested arterial and sub-arterial roads (refer section 8.1.4 of the environmental assessment). Upgrading support roads would not deliver this benefit.

3. Section 4.1.1 of the environmental assessment notes that while implementing tidal flow initiatives can be a useful targeted response to specific congestion areas, they are not a viable alternative on longer routes, such as the M5 South West Motorway.
4. Tunnels are considered to be a feasible option where surface conditions (eg land use or environmental constraints such as heritage or vegetation) preclude construction or result in significantly higher construction costs. Provision of a tunnel from Camden Valley Way to General Holmes Drive was not considered a feasible alternative when the constraints of constructing a tunnel were compared with the constraints of widening the existing motorway, which was originally designed to accommodate a future widening.
5. The Southern Sydney Freight Line and the Moorebank Intermodal Terminal were considered in section 3.4.3 of the environmental assessment as planned infrastructure that would help achieve the NSW Government's goal of a 40 per cent freight shift to rail from road.

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<sup>2</sup> [www.rta.nsw.gov.au/constructionmaintenance/majorconstructionprojectssydney/pinch\\_points/index.html](http://www.rta.nsw.gov.au/constructionmaintenance/majorconstructionprojectssydney/pinch_points/index.html)

Rail options, as alternatives to the project, were considered in section 4.1.1 of the environmental assessment. These alternatives included investment to improve public transport provision (alternative 3) and investment to increase the rail share of the freight task (alternative 4).

Rail options considered included improving the operation of existing passenger rail services, providing single deck carriages to improve loading and unloading times, improving park-and-ride facilities on the East Hills Line, providing a new heavy rail corridor or further expanding the East Hills Line, and providing a light rail network.

6. The existing heavy rail line (the East Hills Line) runs generally parallel to the M5 South West Motorway and extends beyond, into the city and to the airport. The provision of additional public transport infrastructure along this corridor (ie within the motorway corridor) would duplicate the function performed by the East Hills Line.

Further, the introduction of electric trolley buses would require the provision of substantial supporting infrastructure and, given safety considerations, would not be feasible within the existing median of the M5 South West Motorway. In addition to duplicating existing public transport infrastructure, provision of electric trolley buses outside the existing median of the M5 South West Motorway would likely involve construction activities outside of the existing motorway corridor, requiring property acquisition; increased costs; and greater environmental, community and property impacts.

7. As identified in issue response 6 above, the East Hills Line runs generally parallel to the M5 South West Motorway and the provision of additional public transport infrastructure along that corridor (ie within the motorway corridor) would duplicate the function performed by the East Hills Line. The M5 South West Motorway ends at King Georges Road in the east and the M5 East extends via twin dual carriageway tunnels, to the airport and port. The use of the M5 South West Motorway corridor as a rail corridor would necessitate the development of new tunnel infrastructure and was therefore not considered as a reasonable alternative to the project.

As identified in issue response 5 above, rail options, as alternatives to the project, were considered in section 4.1.1 of the environmental assessment. These alternatives included investment to improve public transport provision (alternative 3) and investment to increase the rail share of the freight task (alternative 4).

### 3.4.2 M5 corridor options and alternatives

#### Submission numbers

1, 6, 7, 8, 11, 12, 13, 15, 18, 29, 44, 46, 54, 56, 57, 60

#### Issue description

In summary, respondents raised the following issues concerning project options and corridor alternatives:

1. The M5 East also needs to be upgraded.
2. The M5 East should be constructed through the Wolli Creek valley.
3. The project should be four lanes in each direction.
4. The project should include additional ramps at the Hume Highway.
5. The construction of a Hume Highway underpass would result in unacceptable impacts in 2016, soon after the completion of the M5 South West Motorway widening in 2014. The respondent suggested an alternative collector distribution system to the underpass option.
6. The project should investigate the provision of direct access to the Bankstown Airport–Milperra Specialised Centre, such as ramps at the Beaconsfield Street overpass.

## Response

1. As discussed in section 1.2.1 of the environmental assessment, options to improve the M5 East Motorway are currently being considered by the RTA. Further information regarding the progress of this proposal can be accessed at the RTA's Building Sydney Motorways website<sup>3</sup>.
2. Design options for any future upgrade of the M5 East Motorway is not part of this assessment. Any proposal to upgrade the M5 East Motorway would be the subject of a separate environmental assessment and approval process. This process would include further community consultation, with the opportunity for the community to comment on the proposal.
3. Section 4.2 of the environmental assessment considers a number of motorway widening options. These options include widening to achieve four lanes in each direction between Camden Valley Way and King Georges Road (option 3 – section 4.2.1). This option was not selected as the preferred option as it would involve construction activities outside of the existing motorway corridor, requiring property acquisition, increased costs and greater environmental, community and property impacts.
4. Section 4.3 of the environmental assessment considers a number of other design options to address specific issues. These options include providing additional ramps at the Hume Highway (refer section 4.3.2 of the environmental assessment).

The provision of a west-facing (eastbound) off-ramp at this location was not included as part of the project as it was considered that it would increase traffic along the Hume Highway, necessitating a capacity increase of the highway to accommodate the anticipated additional traffic. Given the costs of widening the highway, as well as the project objectives, a west-facing off-ramp was not considered a priority for inclusion in the project.

The provision of a west-facing (westbound) on-ramp from the Hume Highway to the motorway for vehicles travelling south was also considered. While preliminary investigations indicated that provision of this ramp may reduce northbound congestion and also benefit southbound traffic, the option was not considered a priority at this time in the context of the project objectives.

It should be noted that the design of the M5 West widening project does not preclude potential construction of these ramps at some time in the future.

5. Section 4.3 of the environmental assessment considers a number of other design options to address specific issues, including a Hume Highway underpass (section 4.3.1). The provision of a Hume Highway underpass was not considered a priority and was not included in the project. However, the design of the M5 West widening project would not preclude the potential future provision of an underpass. The RTA will continue to monitor traffic performance along this section of the motorway and reconsider the need for this option. Similarly, the use of collector distributor lanes in lieu of this underpass, as suggested, would not be precluded; however, this solution would require a narrower lane width of 3.2 metres, which is considered too narrow for heavy vehicles such as B-doubles.
6. As noted in issue response 9 in section 3.3 above, the Preliminary Draft Master Plan for Bankstown Airport indicates that Bankstown Airport Limited will continue to engage in discussions with the RTA and Bankstown City Council over road network upgrades. No additional access to Bankstown Airport was considered as part of the project, given there are already two major arterial access routes to the M5 South West Motorway; Henry Lawson Drive and The River Road/Milperra Road. However, the RTA will continue to facilitate discussions and work with Bankstown Airport and Bankstown City Council to develop the significance of the airport (including access to the Bankstown Airport–Milperra Specialised Centre) within the broader regional context.

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<sup>3</sup> [www.buildingsydneymotorways.com.au](http://www.buildingsydneymotorways.com.au)

## 3.5 Project description

### Submission numbers

29, 44, 46, 58, 62, 63

### Issue description

In summary, respondents raised the following issues concerning the project description:

1. The proponent should prepare a review of variable message signage to provide more information to motorway users, as well as address the management of variable message signs in the context of Sydney's motorway network.
2. Further detail is needed regarding the types of crash barriers proposed as part of the project.
3. More detail is needed regarding the operational components of the project, including toll signage, provision of travel time information, incident notification, the graphics of variable message signs and the use of profiled (raised) line marking to delineate the traffic lanes from the road shoulder.
4. Would the widening result in narrower lanes?
5. Support for new variable message signs.
6. The project should include widening of Henry Lawson Drive to alleviate congestion and allow for projected growth in the Bankstown Airport–Milperra Specialised Centre.
7. South Sydney Regional Organisation of Councils welcomed the installation of noise mitigation measures and variable message signs to provide increased amenity to drivers and residents.
8. The RTA should review the width of new lanes on freight corridors, as existing lane widths are not sufficient to accommodate heavy vehicles.
9. The Department of Primary Industries (including the Office of Water) requested clarification on structural works at major watercourse crossings, given that the environmental assessment indicates that no structural works are required at major watercourses yet widening by construction is proposed over Anzac Creek.
10. The Department of Primary Industries (including the Office of Water) requested clarification on the distance between the drainage basin to the east of the Georges River East and the riverbank. It recommends that the basin be located outside of a 50 metre riparian buffer, in a cleared area and that the basin is revegetated with native species.

### Response

1. Section 5.4 of the environmental assessment identifies features that would be introduced as part of the operations management control system, including variable message signs. The proposed variable message sign localities are identified in Table 5.7 of the environmental assessment and include six on-motorway signs and 16 variable message signs that would be introduced on the surrounding road network. These localities have been selected in accordance with RTA guidelines and would provide motorists with adequate warning of incidents on the M5 South West Motorway prior to accessing the motorway.

The ongoing management of variable message signs would be the responsibility of the operator of the M5 South West Motorway, in accordance with RTA standards. There are no current plans to prepare management plans for variable message signs over the entire Sydney motorway network. However, it has been standard practice to warn motorists on all motorways in advance of events that may have broader network implications.

2. Standard 'Type F' traffic safety barriers would generally be provided to separate the two carriageways throughout the motorway. These barriers are commonly used throughout NSW as separation barriers and are regarded as very effective. Current 'wire rope' barriers on the motorway would be replaced by 'Type F' barriers.
3. The variable message signs that would be introduced as part of the project's new operations management control system would provide a text-based facility to communicate with motorists in relation to incidents on the M5 South West Motorway or the broader network. These signs are consistent with those used by the RTA on the wider road network. Graphic signage is not proposed for the M5 West widening project.

While the variable message signs would not provide travel time information, they would display traffic information and provide advice to road users with both real-time information about road and traffic conditions and incident management and advance information about potential traffic impacts and changes to road networks as a result of major events or road maintenance activities.

The RTA is piloting a new travel time system on the F3 Freeway between Wahroonga and Ourimbah. The system uses some 20 fixed electronic tag readers placed along the freeway to estimate point-to-point travel time. A similar system for the M5 South West Motorway would require substantial additional infrastructure, which would result in an increase to the cost of the project and hence lead to higher tolls.

The RTA's Live Traffic NSW website ([www.livetrafficnsw.com](http://www.livetrafficnsw.com)) provides accurate, up-to-the-minute conditions for journeys throughout the State, including Sydney's motorways. Further, the RTA's transport management centre monitors and manages the 18,000 kilometre NSW State road network 24 hours a day, 7 days a week. The transport management centre uses advanced monitoring, communication and traffic management systems to respond to and clear traffic incidents as quickly as possible, improve consistency of journey times, and provide the public with quality, up-to-date traffic information.

The design of the Hammondville toll plaza is discussed in section 4.3 of this report. The reconfiguration of the toll plaza would provide three free-flow lanes and two cash lanes in each direction. The eastbound cash toll plaza would be relocated about 150 metres to the west to allow for the design speed of 100 kilometres per hour on the main carriageways. Carriageway widening would be required on the south-western side of the toll plaza to accommodate these changes.

Detailed designs for appropriate new signage relating to tolling would be developed in accordance with RTA guidelines. Existing tolling, static and directional signage would be updated and relocated if affected by the M5 South West widening project.

The M5 South West Motorway includes a breakdown shoulder lane, which is used by some cyclists. The RTA estimates the total number of cyclist trips in both directions to be less than 20 per day. The use of raised lane markings is not in line with RTA practise for urban roads. This is due primarily to the noise generated by errant vehicles crossing the markings, causing disturbance to nearby residences. Road noise is a significant issue for residents adjacent to the motorway, and is the main issue raised in submissions to the M5 West widening environmental assessment.

4. Section 5.2 of the environmental assessment discusses design criteria that would be adopted for the project. This includes discussion of technical criteria (section 5.2.1) where it is stated that all project components would be designed to be generally consistent with the RTA's *Road Design Guide* (RTA, 2000). Existing lanes in all sections of the motorway are 3.5 metres wide. All lanes on the eastbound and westbound carriageways would be 3.5 metres wide. The outside breakdown lane/shoulder would be 2.5 metres wide for the length of the motorway except at bridge crossings and where the required working width does not allow for the provision of 2.5 metre shoulders (refer Figure 5.2 and section 5.3.1 of the environmental assessment).
5. Support for new variable message signs is acknowledged.

6. Chapter 5 of the environmental assessment identifies the scope of works for the M5 West widening project. Widening of Henry Lawson Drive is not included within the scope of works. As discussed in section 4.1.1 of the environmental assessment, improvement to the existing arterial road network was considered as an alternative to the preferred project. This alternative would involve measures targeting both the capacity and operation of the arterial road network. The environmental assessment indicates that measures to improve the operational efficiency of the arterial road network are being implemented as part of the NSW Government's \$100 million 'pinch point' program (a program to relieve traffic congestion at bottlenecks on 23 major road corridors across Sydney). These initiatives complement the project but are not an adequate standalone response to the identified strategic need.
7. As outlined in Chapter 5 of the environmental assessment, noise mitigation is designed to limit impacts from the project and variable message signs would be provided to improve information for drivers.
8. As outlined in section 5.3.1 of the environmental assessment, the proposed lane widths would stay at 3.5 metres wide. This width is sufficient for general-access heavy vehicles.
9. Section 8.3.2 of the environmental assessment provides that no structural works would be required at the bridges over the Georges River East, Georges River West and Salt Pan Creek. Construction would occur over Anzac Creek into the existing median, as outlined in section 5.3.1 of the environmental assessment.
10. Appendix C of the environmental assessment (concept design) shows that the closest edge of the drainage basin is located about 50 metres from the bank of the Georges River East. Appendix E of the biodiversity working paper contains an assessment of the significance of removing 0.14 hectares of River Flat Eucalypt Forest for the introduction of the drainage basin and concludes that there would not be a significant impact on the ecological community.

## 3.6 Project construction

### Submission numbers

11, 17, 25, 37, 38, 39, 40, 41, 42, 43, 48, 50, 51, 52, 60, 61

### Issue description

In summary, respondents raised the following issues concerning the project construction:

1. All construction site compounds are considered as subject to a licence under the *Protection of the Environment Operations Act 1997*. The Office of Environment and Heritage (formerly DECCW) proposed a condition of approval related to assessment criteria for selecting the location of future compounds.
2. Contractors should be rewarded for delivering work ahead of schedule and penalised for being behind.
3. Liverpool Council requested clarification of any impacts on its assets or land during construction. Council also stated that occupation of council land should only occur subject to council approval, the application of conditions and indemnification of council. Council also stated that permits should be obtained for any occupation or closure of council roads, with appropriate fees paid.
4. Mitigation measures must be implemented during construction to protect the environment surrounding Liverpool Council lands.
5. If construction starts early in the morning it would increase noise levels.
6. Road sheeting should not occur any later than 2am on weekdays and 4am on weekends.
7. The project should commence as soon as possible.

8. The RTA is responsible for remediation of all land used during the construction of the project, to the satisfaction of landowners.
9. WorkCover should conduct regular inspections during construction to ensure noise levels, dust emissions and safety standards are followed.
10. Southern Sydney Regional Organisation of Councils raised concerns over reduced lane widths during construction and the impacts and safety of heavy vehicles navigating construction areas.

## Response

1. Construction of the project would require a licence under the *Protection of the Environment Operations Act 1997*, as outlined in section 2.2.1 of the environmental assessment. This licence would apply to the management of construction site compounds. The RTA also acknowledges that the Office of Environment and Heritage (formerly DECCW) has suggested that the Department of Planning and Infrastructure include a condition of project approval that requires assessment of, and Director-General's approval for, any ancillary facility not already assessed within the environmental assessment. It is noted that the project does not propose rock crushing and screening at any construction site compound.
2. The details of the contract have not yet been finalised. The inclusion of incentive payments and penalties within contract documentation is at the discretion of the RTA.
3. The RTA has consulted with Liverpool Council regarding the use of council land for construction site compounds and will continue to do so. Separate planning approval under the *Environmental Planning and Assessment Act, 1979* would not be required for the use of council sites; however, conditions for the use of any council-owned site would be further discussed with council.
4. Mitigation measures would be implemented to protect the environment at all sites along the project corridor. These mitigation measures are outlined in Chapter 8 and Chapter 9 of the environmental assessment, and in the draft statement of commitments (Chapter 11).
5. Section 6.5.2 of the environmental assessment identifies the standard working hours for the project to be 7am to 6pm, Monday to Friday; and 8am to 1pm on Saturdays. However, much of the works would need to be undertaken outside these standard working hours due to safety, design and quality considerations, and to avoid substantial traffic delays on the motorway and the surrounding road network. The rationale for out-of-hours works is explained in more detail in section 6.5.2 of the environmental assessment.

The RTA acknowledges that work outside of the standard working hours may result in noise impacts on local residents. An assessment of the potential noise impacts associated with the construction of the project (including potential impacts from out-of-hours construction) is included in section 8.2 of the environmental assessment and measures to mitigate these impacts are in section 8.2.4.

During construction, the RTA would aim to finish noisy activities before midnight where practicable. Activities would be undertaken in accordance with an approved Construction Noise and Vibration Management Plan and the project would be subject to a licence and regulated by the Office and Environment and Heritage (DECCW).

6. Road resurfacing works are likely to take place at night to minimise potential traffic and safety impacts. Section 8.2.4 of the environmental assessment outlines mitigation measures, including that construction scheduling and planning would minimise noisy activities at night. As above, noisy activities would generally be scheduled before midnight where practicable. Ceasing sheeting work by 2am would limit the construction efficiency and lead to a longer total duration of construction activities in any given location.

7. As described in section 6.2 of the environmental assessment, construction of the project is anticipated to commence in the first quarter of 2011. The project cannot commence until the Minister for Planning has approved it and the appropriate construction documentation has been prepared and approved.
8. Table 6.1 of the environmental assessment identifies finishing works as the final phase of construction activities. Finishing works would include asphalt paving, and landscaping and vegetation works to rehabilitate disturbed areas. Where practicable, disturbed areas would be restored progressively. Restoration works would seek to restore the land to its pre-construction condition, unless otherwise agreed with the property owner.
9. WorkCover is a NSW Government body that seeks to promote productive, healthy and safe workplaces for workers and employers in New South Wales. WorkCover ensures compliance with work health and safety legislation through inspections of work places, investigations, penalties and prosecutions. The regularity of WorkCover inspections of the construction site would be at the discretion of WorkCover, not the RTA.

A Construction Environmental Management Plan (CEMP) would be prepared prior to commencement of construction in consultation with relevant agencies. It would include monitoring of compliance with any approval or licence conditions for the project (including noise and air quality conditions).

10. Section 6.3.3 of the environmental assessment indicates that lane widths during the central median and side works would be reduced from 3.5 metres to 3.2 metres and that lower speed limits of 80 kilometres per hour, additional signage and temporary concrete barriers would be used to maintain safety during construction.

## 3.7 Community involvement and consultation

### Submission numbers

9, 10, 23, 33, 44, 46, 48, 56

### Issue description

In summary, respondents raised the following issues concerning community consultation:

1. Little community discussion has taken place to date.
2. Request that the Department of Planning and Infrastructure and Infrastructure inform council and affected residents about noise mitigation works and management plans for construction noise and depots.
3. Request that residents are notified prior to commencing works.
4. Request that the RTA consult with Liverpool Council for any impacts on its assets, land requirements, liability and project commencement.
5. The name, address and 24-hour contact number of the RTA's representative should be provided during construction.
6. The online submissions process was not easy for the elderly or migrant community.
7. The project has not considered community submissions, particularly from the November 2009 M5 corridor consultation process.
8. Information at the community information session was flawed in relation to the majority of vehicles exiting the motorway before the M5 East.

## Response

1. Chapter 7 and Appendix D of the environmental assessment provide a comprehensive overview of the community consultation undertaken and how community submissions received during the preparation of the assessment have been considered.

Apart from written communication materials and advertising, community consultation also included two-way communications such as the door knocking of up to 500 properties in the region, community information sessions in the affected areas, a dedicated free community information phone line, a website feedback form and postal and email addresses which were advertised in all communication materials. This has so far resulted in 273 face-to-face conversations in addition to conversations during community information sessions and 64 telephone conversations as well as 132 emails and online feedback forms and 17 letters and posted preliminary submissions. Consultation also included the exhibition of the environmental assessment and consideration of submissions.

2. Section 7.6.2 of the environmental assessment outlines future consultation activities for the project. The RTA would continue to consult with all residents whose properties would be eligible for architectural treatment to confirm the details of treatments and scheduling of works.
3. As mentioned above, section 7.6.2 of the environmental assessment provides that residents would be notified of works, including letters to properties near construction sites.
4. The RTA would continue to consult with Liverpool Council about the project. Should any impacts on or occupation of its assets be identified, the RTA would negotiate any statutory approvals that may be required. Specific mitigation measures for construction site compounds would be included in the Construction Environmental Management Plan. This plan would be developed in consultation with relevant councils and agencies, and with any relevant conditions of approvals.
5. A 24-hour toll-free project information phone line as well as construction updates and consultation meetings with councils would be provided prior to construction. The Construction Environmental Management Plan would include contact details of key project personnel, and would be provided to council.
6. Submissions to the Department of Planning and Infrastructure in response to the M5 West widening environmental assessment could be made in writing via email or posted letter, and a translation service was available for migrant communities. Information about the environmental assessment and how to make a submission was available online as well as in printed form. The RTA distributed about 50,000 printed community updates to properties along the alignment of the M5 South West Motorway.
7. All community submissions received during consultation for the environmental assessment are summarised in section 7.5.3, Table 7.5. The table also indicates where these issues are addressed in the environmental assessment. A more detailed listing of issues received, especially during the preliminary submissions process from November 2009 to February 2010, can be found in Appendix D of the environmental assessment, section 1.3 and tables 1.5 and 1.6. As noted in issue response 1 in section 3.2 above, the cost of environmental externalities (such as the health costs of air pollution and road pricing) were not quantified as part of the environmental assessment, but were qualitatively assessed and considered when assessing the benefits and impacts of the project.
8. Section 8.3.1 of Appendix E of the environmental assessment (traffic and transport working paper) identifies that only 40 per cent of traffic that passes through the Hammondville toll plaza during the AM peak period continues onto the M5 East, meaning that a majority of vehicles exit the motorway prior to the M5 East.

## 3.8 Key issues

### 3.8.1 Traffic and transport

#### Assessment approach

##### *Submission numbers*

33, 58, 59

##### *Issue description*

In summary, respondents raised the following issues concerning the approach to assessing traffic and transport impacts:

1. A study is needed to examine induced traffic from the project.
2. There are concerns about the traffic modelling justifying the project in isolation from the expansion of the M5 East, particularly the effects on King Georges Road and alternative routes into the CBD.
3. The Department of Transport (formerly Transport NSW) stated that the Director-General's Requirements for the project had been adequately addressed.

##### *Response*

1. Section 8.1.4 of the environmental assessment considers induced traffic. The traffic modelling process accounts for and incorporates induced traffic by assuming that the provision of increased network capacity would improve the utility of travel (travel time, congestion and speed) and result in additional trip making. Modelling indicates that the M5 West widening project would result in an increase in private vehicle trips of between 0.1–0.3 per cent from areas in south-western Sydney, such as Bankstown, Fairfield, Liverpool, Campbelltown and Camden.
2. The project has been assessed and justified in isolation, as discussed in Chapter 12 of the environmental assessment. It has also been assessed considering the future introduction of an M5 East expansion, as outlined in section 8.1.6 of the environmental assessment. Appendix E of the environmental assessment notes that arterial routes in the vicinity of King Georges Road are at or near capacity and that traffic modelling undertaken indicates very little demand change in the area.

Detailed microsimulation modelling undertaken after the exhibition of the environmental assessment (refer chapter 4 and Appendix B) shows an overall increase in intersection delay from the 2010 base model to the 2016 'without project' scenario. This is most pronounced in the AM peak period, with increases in average delay predicted for intersections including those on King Georges Road, Canterbury Road, Newbridge Road, Stacey Street, Heathcote Road and the Hume Highway. This is consistent with the observation of traffic growth in the corridor forecast by the strategic model between 2009 and 2016 and reported in the environmental assessment.

Intersection delays for both the exhibited project and the preferred project scenarios show a general pattern of reduced delays for intersections at the western end of the corridor, associated with traffic being attracted to the motorway from the toll-free alternative route. At the eastern end of the corridor, the intersection delays show a pattern of increases associated with greater traffic demand on the motorway. Consequently, it is expected that delays on King Georges road would increase for the project scenarios due to additional queuing from the eastbound on ramp to the motorway and traffic growth on King Georges Road itself (refer section 4.2.3 and Appendix B).

3. Comment acknowledged.

## Existing traffic and transport environment

### *Submission numbers*

29, 32, 44, 46

### *Issue description*

In summary, respondents raised the following issues concerning the existing traffic and transport environment:

1. Bankstown Council requested that additional consideration be given to direct access to the Milperra-Bankstown Airport Specialised Centre to accommodate future growth. Council suggested the provision of ramps at Beaconsfield Street and duplication of Henry Lawson Drive between the M5 motorway and the Hume Highway.
2. Existing traffic congestion is causing stress and limiting free time for commuters.
3. The M5 should be three lanes in each direction the whole length of the corridor.
4. An eastbound on-ramp should be constructed at Belmore Road to provide an additional access point and reduce congestion and merging pressures at the King Georges Road interchange.
5. Bankstown Council suggested the project should address current congestion issues at major intersecting metropolitan roads by:
  - Providing grade separation at the Stacey Street and Hume Highway intersection.
  - Widening Stacey Street between the Hume Highway and Macauley Avenue.

### *Response*

1. Reference should be made to issue response 9 in section 3.3 above regarding access to the Milperra-Bankstown Airport Specialised Centre. Although the environmental assessment does not specifically consider potential impacts of traffic congestion on specialised economic centres in Bankstown, section 9.7.2 of the environmental assessment discusses the potential impacts of the project on economic productivity more broadly. The provision of ramps at Beaconsfield Street was not considered as part of the project given that access to Bankstown Airport already exists via both Henry Lawson Drive and Milperra Road. For information on why the duplication of Henry Lawson Drive has not been considered, refer to issue response 6 in section 3.5 above.
2. Section 8.1.4 of the environmental assessment documents the travel-time savings expected to be realised as a result of the project, due to reduced congestion.
3. Section 4.2.2 of the environmental assessment noted a concern that widening to three lanes eastbound between Fairford Road and King Georges Road would result in increased congestion levels, as the three lanes would need to merge to two as the M5 South West Motorway joins the M5 East at King Georges Road. Currently, there is significant congestion for eastbound traffic during the morning peak period and to add another lane would exacerbate this situation.

More detailed modelling undertaken since the exhibition of the environmental assessment now indicates that widening through this section to three lanes would deliver additional benefits. It has therefore been included in the preferred project (see chapter 4 and Appendix B).

Section 4.2.1 of the environmental assessment identifies that further widening in the Bexley Road to King Georges Road section of the motorway would be best investigated as part of the M5 East expansion. This is because benefits associated with improved capacity in this section largely depend on other improvements in the M5 East corridor. These are currently being investigated.

4. A preliminary assessment of the suggestion to construct an eastbound on-ramp connection to the Motorway at Belmore Road has found that this arrangement would likely further worsen congestion on the eastbound carriageway during the morning peak period due to the additional merging that would be introduced onto the motorway.
5. The scope of the project is identified in Chapter 5 of the environmental assessment and does not include grade separation or widening works in areas outside the M5 corridor. Section 4.1.1 of the environmental assessment considers a number of alternatives to the project, such as improving the existing arterial road network (alternative 2).

The traffic and transport investigation undertaken as part of the environmental assessment forecast that the project would lead to minor increases in traffic on Stacey Street. That is, the impact of the widened motorway on Stacey Street would not noticeably worsen any traffic congestion that already exists.

The preferred project discussed in chapter 4 includes eastbound widening of the motorway between Fairford Road and King Georges Road. While this would improve eastbound AM peak period travel times, it is also likely to result in more traffic on the surrounding road network, particularly on Stacey Street. This is because it would reduce congestion on the motorway allowing more traffic to flow onto Fairford Road and Stacey Street.

While upgrading the support roads surrounding the M5 West corridor may improve local traffic conditions and complement the project, they are not considered a feasible alternative to the project itself. Reasons for this conclusion include the impact that widening arterial roads would have on adjacent land uses and parking, the extensive construction impacts and cost of viaducts and grade separations, and the marginal improvements achieved from upgrades such as grade-separated pedestrian crossings (refer to section 3.4 of this submissions report for further detail).

## Construction traffic and transport impacts

*Submission number*

48

*Issue description*

In summary, the respondent raised the following issue concerning construction traffic and transport impacts:

1. Bankstown Council stated that roads should remain open to traffic at all times. Permits should be obtained for occupancy of council roads and appropriate fees paid during construction.

*Response*

1. Roads would remain open where practicable, although some closures may be required. Any potential impacts on council managed roads would be appropriately managed and council would be consulted as required.

## Operational traffic and transport impacts

*Submission numbers*

3, 7, 14, 19, 29, 31, 32, 44, 46, 54, 55, 56, 57, 60, 62, 64

*Issue description*

In summary, respondents raised the following issues concerning operational traffic and transport impacts:

1. A third lane should be provided between Fairford Road and King Georges Road (eastbound) to avoid a bottleneck.
2. There are concerns about safety on the M5 due to speed limits and barrier type. Bankstown Council is concerned that concrete barriers are more hazardous during accidents and proposed that wire rope barriers be used instead.

3. There should be operational changes to the project, including truck-only lanes, additional signage, and higher and lower speed limits. One respondent questioned whether trucks would be prohibited from using Anzac Road at Moorebank.
4. The project would create more traffic.
5. Liverpool Council and the South Sydney Regional Organisation of Councils stated that travel-time savings in the environmental assessment are not likely to be realised given population growth in western Sydney, pent-up demand and possible continued private vehicle growth.
6. Bankstown Council and the South Sydney Regional Organisation of Councils raised concerns about the impacts of the project on other arterial roads, notably Stacey Street, the Hume Highway; and increased demand at interchanges. Council suggested widening works on Stacey Street and grade separation at the Stacey Street and Hume Highway intersection to address existing congestion issues.
7. If oil supply declines due to peak oil or an oil war, traffic would not reach the assumed traffic volumes and toll revenue would not meet expectations.
8. If there were a potential future financial crisis, this would impact on traffic forecasting due to the lack of finance for projected subdivisions in Sydney's South West.

#### *Response*

1. The preferred project discussed in chapter 4 includes eastbound widening of the motorway between Fairford Road and King Georges Road.

This additional widening was considered as part of microsimulation modelling undertaken after the exhibition of the environmental assessment (refer chapter 4 and Appendix B). The modelling indicates that eastbound widening in this section would have the effect of further reducing eastbound travel times in the AM peak period. It is also likely to reduce the length of the eastbound morning queue on the motorway, but would result in more traffic on the surrounding road network, particularly on Stacey Street. On balance, it was considered that the additional widening would be beneficial.

2. The central median of the widened motorway would not be of sufficient width to safely allow the wire rope barriers to deflect on-vehicle impact without encroaching into the opposite carriageway. On this basis, 'Type F' concrete barriers have been adopted to maintain safety for all motorway users in the event of incidents.
3. Trucks would not be prohibited from using Anzac Road. Truck-only lanes are not warranted on this project, as any benefits would not justify the disbenefits to other vehicles that this arrangement would create. The benefits of a dedicated truck lane would be shorter trip times over the length of the lane provided, while the disbenefits would include:
  - The motorway would be heavily underutilised due to the proportion of heavy vehicles comprising the overall traffic mix.
  - Overall trip times would not reduce substantially as heavy vehicle trips are usually long and there are other congested links in the arterial and motorway network.

Trucks passing the toll collection points account for about eight per cent of the total traffic. This is a low proportion of the total traffic volume and, on this basis, truck-only lanes would not improve traffic congestion, nor improve general traffic travel times, both key factors justifying the project. Signage requirements and speed limits for the project have been determined in accordance with relevant RTA technical criteria and are considered appropriate having regard to the horizontal and vertical alignment of the road.

4. Section 8.1.4 of the environmental assessment considers induced traffic. Modelling indicates that the M5 West widening project would result in an increase in private vehicle trips of between 0.1–0.3 per cent from areas of South West Sydney including Bankstown, Fairfield, Liverpool, Campbelltown and Camden.
5. As noted in section 8.1 of the environmental assessment, traffic modelling undertaken for the project considered projected land use changes, key development sites, trip demand and future transport infrastructure improvements to make predictions about traffic volumes, speeds and travel times into the future (to 2026). In other words, future growth was factored into the analysis. Section 8.1.4 of the environmental assessment notes that in 2026 the project is expected to deliver significant travel-time savings and travel speed increases when compared to what would be experienced without the project. The response to issue 13 above also notes that modelling indicates there would be a limited increase (of between 0.1 and 0.3 per cent) in private vehicle trips from South West Sydney.
6. Microsimulation modelling conducted after the exhibition of the environmental assessment indicates that that the preferred project would, in addition to reducing travel times on the motorway, reduce delays at intersections in the western part of the corridor while increasing delays at intersections in the east (refer section 4.2.3 and Appendix B). It is expected that delays on King Georges road would increase due to additional queuing from the eastbound on ramp to the motorway. Increased delay at intersections on Stacey Street is expected as a result of reduced congestion on the motorway allowing more traffic to flow onto Fairford Road and then Stacey Street.

No supplementary works at Stacey Street are proposed as part of the project, but the RTA will continue to monitor the performance of the existing network.

7. Under current traffic volumes, widening of the M5 South West Motorway is already required to reduce traffic congestion and improve travel times. Should worst-case peak oil projections occur, this would reduce the requirement for additional future widening of the motorway.

For transport, the solutions to the problem of peak oil are similar to those for climate change. Alternatives to fossil fuels need to be found and transport must become more energy efficient. There are moves to establish alternatives to oil as a fuel for transport and to improve energy efficiency. The RTA is a member of the NSW electric vehicles taskforce, which is investigating the implications of increasing the uptake of electric vehicles, including economic and environmental outcomes (such as anticipated changes in emissions of greenhouse gases and other air pollutants and pressures on the demand for electricity). The RTA is also a member of the Australian Transport Council and the Environment Protection and Heritage Council vehicle fuel efficiency working group, which has investigated potential measures to encourage the uptake of more efficient and low-carbon-emission vehicles. These and other initiatives should enable the economic benefits provided by road transport to continue to be delivered with a reduced need for fossil fuels.

The implication of a peak oil scenario on toll revenues is a matter for consideration by the motorway operator.

8. The potential impacts from such a financial crisis would not be limited to the M5 West widening project; it would impact more broadly on consumer behaviour across various sectors of the economy.

## **Bicycle network integration and enhancement**

### *Submission numbers*

7, 22, 24, 28, 30, 36, 60, 61, 62, 63, 65, 67

### *Issue description*

In summary, respondents raised the following issues concerning integration of the project with the bicycle network:

1. The Office of Environment and Heritage (formerly DECCW) suggested that the draft statement of commitments in the environmental assessment should identify cycle paths along the M5 South West Motorway.
2. The project should provide a cycleway to address access and safety issues associated with the requirement for cyclists to use the emergency breakdown lane. South Sydney Regional Organisation of Councils stated that cycling needs to be encouraged and that the *RTA BikePlan 2010* and the *Metropolitan Transport Plan* are not sufficient.
3. Liverpool City Council requested that the current off-road cycleway be extended from Salt Pan Creek to Prestons, and gave other examples of on-motorway cycleways.
4. The Office of Environment and Heritage (formerly DECCW) supported plans to integrate the project with the surrounding cycle network and stated that particular attention should be given to river and motorway crossings to reduce barriers to cyclists.
5. The Department of Primary Industries (including the Office of Water) (part of DPI) recommended that any cycleway on the western side of the Georges River should be located outside the riparian corridor.

#### *Response*

1. Section 5.4.3 of the environmental assessment notes that cyclists would continue to have access to the 2.5 metre shoulder and notes that marked cyclist crossings are provided at some interchange on-ramps and off-ramps. No additional cycling facilities are proposed as part of the project. Opportunities to enhance cycleways in areas surrounding the M5 South West Motorway are considered in section 8.1.5. Some of these are being addressed separately as part of the RTA's Bicycle Program.
2. It is not proposed to provide a separate cycleway as part of the M5 West widening project. There are currently about 20 cycling trips per day on the M5 South West Motorway. The project would maintain the existing level of access for cyclists along the corridor. Cyclists would continue to have access to the motorway shoulder and marked cyclist crossings would be provided at some interchange on- and off-ramps. An M7-style cycleway would require substantial work including complex bridge and waterway crossings as well as potential land acquisition beyond the corridor. This would result in significant costs and increased environmental impacts during construction.

The RTA (through its Bicycle Program), together with local councils, is currently progressing a number of cycleway improvements in areas surrounding the motorway corridor.

3. As mentioned above in issue response 17, no additional cycling facilities are proposed as part of the project as the proposed motorway configuration would maintain existing levels of access for bicycles along the corridor.
4. As mentioned above in issue response 17, the motorway would maintain existing levels of access for cyclists. The configuration of lane markings and motorway ramp crossings for cyclists would be investigated during detailed design.
5. Appendix C to Appendix E (traffic and transport working paper) of the environmental assessment examined possible ways to integrate cycling facilities with the project and proposed a number of possible bike paths. However, no bike path along the western side of the Georges River is proposed as part of the project.

## Potential impacts of an M5 East expansion

### *Submission numbers*

6, 7, 11, 12, 15, 18, 44, 62

### *Issue description*

In summary, respondents raised the following issue concerning the M5 East:

1. The M5 East needs to be upgraded at the same time as the M5 West to avoid a bottleneck at King Georges Road.

### *Response*

1. Section 8.1.4 of the environmental assessment notes that without the M5 West widening project about 40 per cent of cars passing through the toll plaza in the peak direction (in 2026) would be expected to use the M5 East. With the project, that proportion drops to about one-third, indicating that the additional traffic attracted to the improved motorway would have more local destinations. Modelling indicates that a similar conclusion can be drawn for commercial traffic. This underlines the importance of the M5 West widening as a project that is justifiable in its own right and that can be successfully implemented in advance of improvements to the M5 East.

## Management of traffic impacts

### *Submission numbers*

58, 60

### *Issue description*

In summary, respondents raised the following issues concerning the management of traffic impacts:

1. Breakdown areas and lanes should provide enough room for B-doubles and semi-trailers to be parked safely.
2. An operational traffic management plan should be prepared before the construction of the project in consultation with government agencies and the NRMA.

### *Response*

1. All project components would be designed to be generally consistent with the RTA's Road Design Guide. Shoulders would be 2.5 metres wide throughout the length of motorway, except at bridge crossings, where existing working width does not allow for the provision of 2.5 metre shoulders. These shoulders would be used as breakdown areas for any vehicles including B-doubles and semi-trailers.
2. Operationally, the M5 South West Motorway would continue to be managed by Interlink Roads (as it is now) in accordance with RTA requirements. As noted in Table 11.1 of the environmental assessment (draft statement of commitments), the RTA is committed to improving reliability and efficiency for users of the M5 South West Motorway and would monitor the operation of the M5 South West Motorway following completion of project construction and compare results with the operational conditions predicted in the environmental assessment to identify further potential opportunities for operational refinement to optimise the performance of the project.

## 3.8.2 Noise and vibration

### Assessment approach

#### *Submission numbers*

2, 10, 21, 26, 27, 31, 34, 35, 37, 38, 39, 40, 41, 42, 43, 49, 50, 51, 52, 61, 66

#### *Issue description*

Respondents raised the following issues concerning the existing noise environment and approach to assessing noise and vibration:

- 1 Existing noise levels from the motorway are causing sleep deprivation, stress and ill health. These effects are affecting quality of life, including safety risks in relation to vehicle and work-related injuries.
- 2 The calibration of the noise model should be validated using traffic counts taken during noise monitoring, rather than using adjusted averages of annual traffic data. It was also noted that the model was conservative in its assumptions. Office of Environment and Heritage (formerly DECCW) requested that the RTA provide additional justification that the noise model validation and calibration presented in the noise assessment was accurate, and reflective of future traffic noise levels from the project. The Office of Environment and Heritage (formerly DECCW) also indicated that this should include a justification of the signposted versus actual traffic speeds.
- 3 The methodology for noise assessment was inadequate. Noise testing was not undertaken in Casula and the model did not take into account the topography of the area or historic increases in traffic noise. Liverpool Council stated that additional testing should be undertaken, as previous testing in 2006 had indicated that residents in Casula were highly noise affected.
- 4 The Office of Environment and Heritage (formerly DECCW) recommended that the conditions of project approval relating to a review of operational noise mitigation measures (based on the detailed design of the project) also require that the RTA endorse, as correct, the traffic data used in the detailed noise monitoring and that noise model validation compares traffic noise measurements against modelled noise levels using traffic count data acquired during the noise measurement period.

#### *Response*

1. To address the effects of road traffic noise, the RTA is proposing install new noise barriers and increase the height of many existing barriers (refer section 4.1). Over five kilometres of new noise barriers would be provided and over 15 kilometres of existing noise barriers would be increased in height.

The revised noise and vibration working paper assesses the potential for sleep disturbance as a result of the project, taking into account the proposed noise barriers (refer section 9.2). It indicates that while it is not possible to adopt a noise level goal that directly correlates with sleep disturbance for the majority of people, an  $L_{Amax}$  noise level which exceeds the  $L_{Aeq, 1 \text{ hour}}$  noise level by more than 15 dBA is an appropriate indicator in this case. The revised working paper concludes that, with the additional noise barriers now proposed, the number of events exceeding the  $L_{Aeq, 1 \text{ hour}}$  noise level by more than 15 dBA would be similar to, or lower than, the current number.

2. The RTA has consulted with the Office of Environment and Heritage (formerly DECCW) regarding their comments and amended the noise validation and calibration approach. The revised noise modelling has used actual traffic counts to calibrate the model. The revised noise assessment is discussed further in section 4.1.
3. The process and methodology for noise assessment is detailed in section 8.1 through to 8.3 of the revised noise and vibration working paper (Appendix C).

A three-dimensional computer model of the motorway corridor was developed to predict noise levels, based on traffic numbers, traffic speeds, pavement surface type, topography, receivers (homes), existing noise walls and other nearby roads. The initial predicted results from the model were then compared to the results of noise monitoring which was conducted in 2009 to ascertain whether the model was accurate, or needed calibration.

Calibration procedures are outlined in section 8.3 of the revised working paper. After calibration and re-checking against measured 2009 figures, the calibrated model was used to predict noise levels for future existing (2013) and future design (2023) scenarios. The future existing scenario reflects expected noise levels in the year of project opening, but without the project. This is used to establish the noise assessment criteria.

It was not necessary to complete noise testing for all areas along the motorway. Noise-testing locations were chosen to represent typical noise catchments along the motorway, with results used for calibration. The model considers topography and the different heights between noise sources and receivers, such as at the Georges River bridge. The model includes considerations of historic increases in traffic noise, as it is based on current traffic figures and calibrated using conservative assumptions (refer section 8.2 of Appendix C).

4. The traffic demand modelling was calibrated with actual traffic counts to ensure greater accuracy. The RTA considers the modelling to be the conservative worst-case approach as it uses an average weekday traffic forecast based on a five-day average (instead of a seven-day average), and includes the expansion of M5 East and its impact of increased vehicle usage along the M5 South West Motorway.

## Assessment of operational impacts

### *Submission numbers*

2, 4, 5, 9, 21, 25, 26, 31, 34, 35, 45, 46, 49

### *Issue description*

In summary, respondents raised the following issues concerning operational noise impacts:

1. The height of existing noise walls near respondents' residences is not adequate.
2. The project would result in more noise from the motorway.
3. Liverpool Council stated that additional augmentation of noise walls is required at the Hume Highway interchange, as the noise wall is undersized and noise levels have increased over the last five years, and predicted noise levels are greater than 60 dBA.

### *Response*

1. The revised noise and vibration working paper (Appendix C) identifies refinements to the noise attenuation measures for the project. As a result of the additional noise investigations, the RTA now proposes to provide over five kilometres of new noise barriers across the project with over 15 kilometres of existing noise barriers to be increased in height. Figure 4.1 shows the location of new and augmented noise barriers (refer also Appendix C).
2. As identified by the environmental assessment and the revised noise and vibration working paper (refer Appendix C), the project would result in increased noise at receivers in some areas adjacent to the M5 South West Motorway corridor. The revised noise and vibration working paper indicates that 944 residences would experience noise levels requiring mitigation.

As part of the project, over five kilometres of new noise barriers would be provided and over 15 kilometres of existing noise barriers would be increased in height. These measures would significantly reduce noise in adjacent areas. The revised noise and vibration working paper (refer Appendix C) indicates that after the implementation of the proposed new and augmented barriers, 322 residences

would still need to be considered for architectural treatments. Architectural treatments are considered where road traffic noise criteria are already exceeded and (1) predicted noise increases are above future existing levels by more than 2 dBA or; (2) the residence would be acutely affected (levels above 65 dBA  $L_{Aeq}$ , 15hr or 60 dBA,  $L_{Aeq}$  9hr); or both. The revised noise and vibration working paper identifies the residential buildings in these categories (refer Appendix C).

3. As a result of the additional noise investigations, the RTA now proposes new and augmented noise walls at the Hume Highway interchange. Figure 4.1 shows the location of new or augmented noise walls (refer also Appendix C).

## **Assessment of construction noise and vibration impacts**

### *Submission numbers*

37, 38, 39, 40, 41, 42, 43, 45, 46, 48, 50, 51, 52, 61

### *Issue description*

In summary, respondents raised the following issues concerning construction noise and vibration impacts of the project:

1. Noise during construction and from construction site compounds would exceed acceptable levels. Bankstown Council is concerned that the Gibson Avenue compound site would have unacceptable impacts on residents in Gibson Avenue, and that trucks would access the Beaconsfield Road site during the night.
2. Noise walls should be erected before construction begins at Flame Tree Avenue, Casula, to protect the local community.
3. Liverpool Council stated that dilapidation surveys should be completed before and after the project and any damage repaired by the RTA to council's satisfaction.
4. The Office of Environment and Heritage (formerly DECCW) stated that the construction noise assessment was not based on detailed information regarding construction practices or work methods. The Office of Environment and Heritage (formerly DECCW) also stated that consultation with the community was unlikely to have included specifics of the construction process.
5. The Office of Environment and Heritage (formerly DECCW) noted that out-of-hours work is routinely required for major infrastructure projects, and that the Environment Protection Licence provides a mechanism to review construction noise following project approval. The Office of Environment and Heritage (formerly DECCW) also provided recommended standard construction hours, along with standard exemptions.

### *Response*

1. Section 8.2.3 of the environmental assessment shows that noise levels would only be exceeded at night at one site, the construction site compound proposed for 24-hour use at M5/Graham Avenue (1), if mitigation measures were not put in place. Section 8.2.4 provides that mitigation measures, such as hoardings, which would be implemented at construction site compounds where noise levels are predicted to exceed night-time noise criteria. The assessment included an analysis of heavy vehicle movements and concluded there would be no significant impacts at the Beaconsfield Street site.
2. Noise walls are proposed between the M5 South West Motorway and the rear of properties on Flame Tree Crescent, as outlined in Figure 8.7 of the environmental assessment. An indicative program for construction is included in section 6.2 of the environmental assessment, which will be refined during detailed design and construction planning. At this stage there are no plans to prioritise building a noise wall at Flame Tree Crescent ahead of other construction activities.

3. Section 8.2.3 of the environmental assessment provides an assessment of construction vibration. It concludes that due to the offset distances there would be little risk of damage to buildings. The RTA will continue to consult with council regarding the project (including with regard to the need for pre-construction dilapidation surveys) to avoid any impacts on its assets.
4. Appendix F of the environmental assessment provides an assessment of construction noise, based on the typical noise values for activities to be undertaken at each section along the motorway. An assessment of construction noise is also included in the updated noise and vibration technical paper (Appendix C of this submissions report). These assessments consider noise from construction site compounds based on the types of activities that would be undertaken at each compound, and considers varying noise management levels for 24-hour compounds. Consultation with affected residents near proposed compounds was undertaken during public exhibition of the environmental assessment, as outlined in Chapter 7, and included discussion of noise impacts. Consultation would continue throughout the construction period as more specific detail for activities becomes available through detailed design.
5. The RTA notes the Office of Environment and Heritage (formerly DECCW) comments regarding construction noise and, where practicable, would limit specific activities during out-of-hours works in accordance with the mitigation measures presented in section 8.2.4 of the environmental assessment and updated in section 4.5 of this report.

## Mitigation measures

### *Submission numbers*

2, 5, 6, 10, 16, 21, 23, 25, 27, 31, 34, 35, 45, 46, 49, 57, 60, 61, 66

### *Issue description*

In summary, respondents raised the following issues concerning the noise mitigation measures of the project:

1. Additional noise barriers are required between Box Road and Beech Road, Casula.
2. Additional noise barriers are required on the bridge at the Queen Street overpass.
3. Bridgeworks should be completed during the day, or alternative accommodation should be arranged for affected residents.
4. The Office of Environment and Heritage (formerly DECCW) proposed a number of conditions of approval for the project relating to noise, including limits on working hours, exceptions governed by an environmental protection licence, noisy activities restrictions, vibration goals, limits to removal of noise barriers, assessment of reversing alarms and compliance monitoring.
5. Homes near the Georges River and Hume Highway should be placed on the noise abatement program if traffic volumes continue to increase.
6. In addition to noise barriers, the following noise mitigation measures should be implemented: imposing deterrents to speeding, providing signs to limit compression braking, sound-proofing properties, and improving the road surface.
7. The Office of Environment and Heritage (formerly DECCW) stated that noise barriers should be increased in height wherever noise is predicted to be acute and increase by more than 2 dBA. The Department also singled out noise barriers at Whitefield Parade, Hammondville and Louie Street, Padstow where raising the height of barriers would provide additional benefit.
8. Noise walls should be erected along the Georges River Bridge in the Liverpool/Casula Links area.
9. The government should compensate property owners or offer to purchase properties affected by noise.
10. The proponent should submit a review of operational noise mitigation to the Department of Planning and Infrastructure and Infrastructure for approval within six months of commencing construction. This review

should be undertaken in consultation with the Office of Environment and Heritage (formerly DECCW), and take into account the detailed design of the project. It should, where reasonable and feasible, refine the proposed mitigation measures with the objective of meeting criteria outlined in the RTA's *Environmental Criteria for Road Traffic Noise*.

11. There were questions about the details of noise mitigation, such as where architectural treatment would be provided. One respondent asked whether window insulation would be provided to all houses visible from the Georges River Bridge, and stated that window insulation is discriminatory as it prevents people from opening windows and enjoying fresh air.
12. Bankstown Council stated that changes to noise barriers and installation of architectural treatments would have negative impacts on the amenity of residents.

#### Response

1. Figure 8.7 and Table 8.19 in the environmental assessment show a new noise wall on the south side of the motorway, west of Box Road for 400 metres. On the basis of further detailed noise investigations, the RTA now proposes new and augmented noise walls on both sides of the Motorway between Box Road and Beech Road, Casula. Figure 4.1 shows the location of new or augmented noise walls (refer also Appendix C).
2. Augmentation of the existing noise walls is proposed on both sides of the motorway in the vicinity of the Queen Street overpass. A new noise wall is proposed on the overpass itself, adjacent to the westbound carriageway.
3. Section 6.5.2 of the environmental assessment outlines standard working hours for the project, including the provision that some activities would need to be undertaken outside standard hours. The rationale for out-of-hours works includes the need to maintain safety for construction personnel as well as maintain performance of the road network. The statement of commitment CNI outlines measures to minimise the impact on residents where construction occurs outside of standard working hours. Where appropriate, this would include offers of alternative accommodation.
4. The RTA acknowledges that the Office of Environment and Heritage (formerly DECCW) has suggested that the Department of Planning and Infrastructure and Infrastructure include a number of conditions of project approval that relate to the management of construction noise. It is noted that:
  - There would be a need for an Environment Protection Licence for the construction of the project, which would be negotiated with the Office of Environment and Heritage (formerly DECCW), as outlined in section 6.5.2 of the environmental assessment.
  - There are standard exceptions to the suggested working hours based on the types of work being undertaken.
  - High noise activities would be restricted through an environment protection licence.
  - Statement of commitment CNI provides that all reasonable and feasible management measures would be used to minimise noise and vibration impacts on sensitive receivers.
  - Section 8.2.3 of the environmental assessment states that noise walls would need to be temporarily removed to enable the installation of higher noise walls at Queen Street, Revesby. Where practicable, this process would be undertaken during the daytime.
  - No additional risk assessment for the use of reversing alarms is proposed. The noise assessment for construction compounds in section 8.2.3 has included alarms in calculating predicted noise levels.
  - Noise considerations will be taken into account during ongoing consultation with the Office of Environment and Heritage (formerly DECCW) prior to the granting of an Environment Protection Licence and as part of the development of a Construction Environmental Management Plan (CEMP)

and Noise and Vibration Management Plan. Ongoing monitoring to ensure compliance with the Environment Protection Licence for the project would form part of the Noise and Vibration Management Plan.

5. As a result of additional noise investigation and assessment, refinements to the noise attenuation measures for the project are now proposed, including a greater number of new and augmented noise walls (refer Figure 4.1 and Appendix C). The construction of these new and augmented noise walls would reduce the total number of residential buildings exceeding acute and/or allowance criteria to 322. For these residences, architectural treatments would be considered.
6. Section 5.3 of the environmental assessment provides that the design speed of the motorway would remain at 100 kilometres per hour. The operational noise assessment in section 8.2.2 of the environmental assessment shows the effects of traffic speeds at different times throughout the day. Existing speed warning signs and safety campaigns undertaken by the NSW Police would continue to deter motorists from speeding. No specific signage related to compression braking is proposed as part of the project, but opportunities exist to use variable message signs to convey safety and noise related information to motorists. The revised noise and vibration working paper (refer Appendix C) includes details of the properties that would be considered for architectural treatment, which may include seal improvements, provision of fresh air ventilation and, if justified, window glazing. All new pavement widening would use open-grade asphalt, which has noise reduction benefits in the order of 2.5 dBA. In addition, as part of periodic maintenance of the M5 South West Motorway, pavement is replaced with new open-grade asphalt. This would limit noise increases associated with the voids in the older pavement gradually filling with finer particles over time.
7. Section 8.2.2 of the environmental assessment outlines that under the RTA's *Environmental Noise Management Manual* (2001), noise barriers or architectural treatment can be considered typically where noise levels would increase by more than 2 dBA as a result of a project, or where properties are acutely affected. It is generally not feasible to provide noise walls in all circumstances where noise levels would be acute and/or where more than a 2 dBA increase is experienced. RTA's proposed noise mitigation strategy involves a combination of new noise walls, augmented noise walls and architectural treatment (refer Appendix C).
8. Figure 4.1 shows the proposed location of new or augmented noise walls (refer also Appendix C). While noise barriers are not proposed along the Georges River bridge, properties that are predicted to be acutely affected by noise or which would exceed the 2 dBA increase allowance criteria, would be considered for treatment. It should be noted that no widening work is proposed as part of the project between the Georges River bridge at Casula and Moorebank Avenue; however, this area was included in the noise assessment for consistency.
9. Where the introduction of noise walls is not considered reasonable and/or feasible, architectural treatments have been proposed as mitigation for residences that would be noise affected by the project. No property acquisition would be required as part of the project and acquisition is not considered an appropriate measure to manage identified noise impacts.
10. The statement of commitment ON2 provides that operational noise would be monitored within one year of the project opening and additional mitigation measures implemented if the noise levels are higher than those predicted. An additional noise review is not considered necessary, given that the heights and alignment of the project would not change following detailed design. There is very little scope for the current concept design to change and, consequently, any changes in assessed noise would be negligible. The Office of Environment and Heritage (formerly DECCW) would be part of an ongoing consultation process regarding the management of both construction and operational noise.

11. Details regarding the scope of architectural treatments and the RTA's proposed noise mitigation strategy are provided at section 4.6.2 and Appendix C. It is important to note that architectural treatment is a voluntary process, which would be organised and paid for by the RTA. Treatment of individual properties would not be offered to all residences that can see the motorway. Property owners would be offered architectural treatment based on the application of environmental noise guidelines and the results of the revised noise and vibration assessment (refer to Appendix C and section 4.5) and post opening noise monitoring. Consultation regarding the specifics of the architectural treatments would be undertaken with these property owners. Typically, this would include one treatment or a combination of treatments, including fresh air ventilation, sealing of wall vents, window seals and, where necessary, double-glazing of glass windows.

Property owners near construction site compounds would be notified prior to the commencement of construction. A summary of construction mitigation measures can be found in section 8.2.4 of the environmental assessment. These will be refined during detailed design and incorporated into the Noise and Vibration Management Plan for the project.

12. Architectural treatments would generally not limit the amenity of properties, as ventilation would be provided to offset measures designed to reduce noise through open doors and windows. As mentioned above, all architectural treatment would be offered following consultation with property owners, and its implementation would be voluntary.

The updated landscape character and visual impact assessment (Appendix F) acknowledges that in some areas, the loss of trees and shrubs for the construction of new noise walls and augmentation of existing noise walls, would make the noise walls a more dominant feature. The project does however represent an opportunity to implement an urban design strategy for noise walls across the corridor.

### 3.8.3 Biodiversity

#### Submission numbers

46, 47, 61, 63

#### Issue description

In summary, respondents raised the following issues concerning the biodiversity impacts of the project:

1. The Office of Environment and Heritage (formerly DECCW) proposed that the RTA develop a translocation proposal for *Acacia pubescens* as a condition of approval for the project. This would include provisions for geographical separation and spread, future security guarantees using either biobanking agreements or conveyancing covenants, and management plans for the translocation sites.
2. The Office of Environment and Heritage (formerly DECCW) also proposed that the RTA develop a biodiversity offset proposal for the clearing of native vegetation described in Appendix G of the environmental assessment. The Office of Environment and Heritage (formerly DECCW) recommended the use of the Biobanking Assessment Method to estimate the size of the offset required.
3. Drainage basins would have potential impacts on waterways and endangered ecological communities.
4. Bankstown Council raised concerns about potential impacts on green and golden bell frog habitat due to survey area. Council suggested that an additional fauna survey be completed prior to finalising the locations of drainage basins.
5. There would be few impacts on fisheries provided management measures are implemented.
6. Riparian setbacks along the Georges River should be increased from 40 to 50 metres, as described in the *Guideline for Controlled Activities* (Department of Water and Energy), or the previously recommended

100 metres as described in the *Riparian Corridor Management Strategy* (Department of Primary Industries (including the Office of Water)).

7. The Guideline *for Controlled Activities* recommends a 30-metre-wide riparian area be established either side of second order watercourses (including Anzac Creek), with a 20 metre offset plus a 10 metre wide vegetated buffer.
8. The Department of Primary Industries (including the Office of Water) recommended that any riparian vegetation disturbed east of Georges River East be rehabilitated or offset.
9. The Department of Primary Industries (including the Office of Water) recommended that construction site compounds be located more than 30 metres from Anzac Creek in an area that has not been landscaped or rehabilitated. If this is not possible, it suggests that an alternative site be found with rehabilitation provisions for riparian areas post-construction.
10. Previous disturbance of Anzac Creek due to construction of the M5 South West Motorway should not be used as a reason to limit protective measures or rehabilitation of the creek.
11. The Department of Primary Industries (including the Office of Water) recommended a two-stage method for rehabilitating disturbed riparian areas – by rapidly stabilising and then establishing permanent cover of local native vegetation.
12. The Department of Primary Industries (including the Office of Water) recommended that the mitigation measure from Table 14 of the biodiversity working paper be included as a statement of commitment, but with a 50 metre setback distance.
13. The Department of Primary Industries (including the Office of Water) proposed amendments to statement of commitment FF3 to include provisions for riparian corridor rehabilitation, use of native plant species from local vegetation communities, the completion of a Vegetation Management Plan to detail riparian land rehabilitation, two-year maintenance requirements following rehabilitation, and inspections of stabilisation works in disturbed areas following major rainfall events.

## Response

1. Section 8.3.3 of the environmental assessment identifies site-specific mitigation measures and ecological management procedures that have been developed for implementation during the pre-construction, construction and operational phases of the project. The draft statement of commitments (Table 11.1 of the environmental assessment) also includes specific commitments for the management of flora and fauna.

As identified in Table 8.30 of the environmental assessment proposed the following four distinct *Acacia pubescens* recipient sites within the motorway corridor:

- Northern road verge between King Georges Road and Penshurst Road.
- Interchange between the motorway, M7 on-ramp and Beech Road.
- Landscaped area in the motorway corridor near the corner of Graham Avenue and Grove Street.
- Northern road verge between the motorway on-ramp and Henry Lawson Drive.

Since preparation of the environmental assessment, it has been found that the site on the northern motorway verge between King Georges Road and Penshurst Road cannot be secured as an *Acacia pubescens* recipient site. The RTA has identified a number of alternative sites in consultation with the Office of Environment and Heritage (formerly DECCW) and the final location for the recipient site would be selected from these following further investigations by specialist ecologists and in consultation with the office.

A propagation and translocation program would be developed for the Downy Wattle (*Acacia pubescens*) in accordance with the *Guidelines for the Translocation of Threatened Plants in Australia – Second Edition* (Australian Network for Plant Conservation, 2004). This program would provide relevant information regarding provisions for the management of the identified translocation sites, including management plans and funding arrangements.

An arrangement for the provision of security of the translocation sites would be developed in consultation with the Office of Environment and Heritage as part of the development of the propagation and translocation program.

2. The RTA would consult with the Office of Environment and Heritage regarding the need for and scope of any proposal to offset the clearing of native vegetation.
3. Section 9.1.3 of the environmental assessment considers the potential impacts on water quality and identifies that the main potential impact on water quality posed by an increase in surface runoff is the associated increase in pollutant loads. To ensure that impacts of runoff pollutants are mitigated, the project would provide additional and enlarged drainage basins. Indicative locations are described in section 5.3.4 of the environmental assessment and refinements to the water quality management regime (by way of additional basins and changes to the size of proposed basins) are identified in Chapter 5 of this submissions report. The design philosophy is to improve the quality of runoff water by increasing on-site detention and improving treatment systems.

All basins would be designed and sized to allow a 'first flush' of pavements to meet the appropriate rainfall level defined in Office of Environment and Heritage criteria. (The first flush principle recognises that stormwater that initially runs off an area would be more polluted than the stormwater that runs off later, after the rainfall has 'cleansed' the catchment. The stormwater containing this high initial pollutant load is called the 'first flush' and would be treated where practicable). In designing the drainage basins in this way, runoff would be treated prior to discharge to the environment and, therefore, impacts on existing vegetation communities would be negligible.

Table 8.29 of the environmental assessment indicates that the introduction of drainage basins requires the removal of 0.35 hectares of vegetation listed as endangered or critically endangered under the *Threatened Species Conservations Act, 1995* (TSC Act) and/or the *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act). The extent of vegetation clearance for drainage basins would be limited to the extent practicable and as indicated in Table 8.30 of the environmental assessment. Table 4.3 provides updated information regarding the extent of vegetation clearance for the project more generally.

4. Table 8.30 of the environmental assessment identifies a range of measures relating to the management of potential impacts on the green and golden bell frog. This includes undertaking targeted surveys for the species and the preparation of a construction phase green and golden bell frog management plan. These and other measures relating to the green and golden bell frog are reflected in commitment FF5 of the draft statement of commitments (Table 11.1 of the environmental assessment) and further discussed in Chapter 5 of this submissions report.
5. The submission from Department of Primary Industries (including former Industry and Investment NSW) is noted. Mitigation measures to manage potential impacts on aquatic habitat and fisheries are identified in sections 8.3.3 and 9.1.4 of the environmental assessment and in the draft statement of commitments outlined in Chapter 11.
6. Table 14 in Appendix G of the environmental assessment provides that areas 40 metres from the top of either bank of a drainage line are protected under the *Water Management Act 2000*. The RTA would consult further with the Department of Primary Industries (including the Office of Water) regarding appropriate riparian setbacks.

7. Section 8.3.2 of the environmental assessment notes that the areas either side of Anzac Creek would be protected during construction. Following construction, any disturbed areas near Anzac Creek would be progressively reinstated to their previous condition. It is not planned to undertake any improvement works for Anzac Creek as part of the project.
8. No riparian vegetation is proposed to be disturbed in the area immediately to the east of Georges River East. The areas used for construction site compounds would be rehabilitated in accordance with statement of commitment FF3.
9. Table 14 in Appendix G to the environmental assessment provides that land within 40 metres of a drainage line would be protected by appropriate erosion and sedimentation controls. Locating construction site compounds in previously disturbed areas which are now landscaped is considered to have lesser impacts on biodiversity than locating these facilities in areas containing intact or remnant vegetation.
10. The assessment of the Heathcote Road construction site in Table 8.26 of the environmental assessment concluded that the area around Anzac Creek was disturbed, yet classified this area as a moderate ecological constraint. There have been no limitations on the mitigation measures for the creek, which are contained in section 8.3.3 of the environmental assessment. Table 8.30 of the environmental assessment notes that specific focus would be given to erosion and sedimentation controls for the Georges River and Salt Pan Creek crossings, due to the presence of endangered ecological communities. This should not be taken to mean that Anzac Creek would be neglected.
11. Table 8.30 of the environmental assessment provides mitigation measures for site rehabilitation. Sites would be rehabilitated progressively as soon as possible with native vegetation in accordance with the landscape design, to be completed during detailed design.
12. The statement of commitments is provided in Chapter 5 of this submissions report. As mentioned above, a 40 metre setback distance has been applied; the RTA would consult further with the Department of Primary Industries (including the Office of Water) regarding appropriate riparian setbacks.
13. As noted in section 8.3.2 of the environmental assessment, there would be limited impacts on riparian corridors and aquatic ecology as a result of the project. Therefore, no specific commitments for the rehabilitation of riparian corridors have been proposed. However, it should be noted that rehabilitation would occur progressively and use local native species.

### **3.8.4 Visual impacts, urban design and landscaping**

#### **Submission numbers**

25, 44, 46

#### **Issue description**

In summary, respondents raised the following issues concerning the visual impacts of the project:

1. One respondent noted experiencing visual impacts due to the visibility of trucks above the current noise wall near their property.
2. The interchange at Fairford Road should be upgraded to improve its visual amenity.
3. Signage proposed as part of the project should not be as bright as that on the M7. Respondent suggested that variable speed limit signs be located after the variable message signs to allow drivers time to respond to warnings.

## Response

1. Potential visual impacts of the project are discussed in Chapter 8 of the environmental assessment. An updated landscape character and visual impact assessment is included at Appendix F of this submissions report. With the provision of new and augmented noise walls the project may improve the current situation with regard to the visual impact associated with trucks passing above the height of current noise walls. Urban design and landscaping objectives are identified in section 8.4.1 of the environmental assessment and urban and landscape design treatments are proposed for various project elements in order to comply with those objectives. Measures such as landscape treatments and screening may also help to minimise this visual impact.
2. Urban design and landscaping objectives are identified in section 8.4.1 of the environmental assessment, and urban and landscape design treatments are proposed for various project elements in order to realise those objectives (refer Table 8.35 of the environmental assessment). For example, parkland style landscaping utilising Cumberland Plain Woodland species would be enhanced at a number of interchanges (including the interchange at Fairford Road) to differentiate these areas from the rest of the corridor.
3. An assessment of the visual impacts of proposed variable message signs can be found in section 8.4.4 of the environmental assessment. The specific locations and operational parameters of signs would be further developed during detailed design for the project. The RTA recognises concerns about the brightness of the variable speed limit signs on the M7, and advises that the introduction of variable speed limit signs does not form part of this project.

## 3.9 Other issues

### 3.9.1 Hydrology and flooding

#### Submission numbers

46, 48, 61

#### Issue description

In summary, respondents raised the following issues concerning hydrology and flooding:

1. A detailed flood and drainage study should be submitted to Liverpool Council for its approval.
2. The Office of Environment and Heritage (formerly DECCW) requested further information for flooding, including consideration of floods larger than a 1-in-100-year event, blockage of cross-drainage systems and sizing of drainage basins under climate change scenarios.
3. The Office of Environment and Heritage (formerly DECCW) requested that further flooding impacts be considered if the motorway is used for flood evacuation, including flood depth and velocity in traffic lanes, evacuation safety, evacuation time and access for emergency vehicles.
4. The project should address drainage issues at 191 Beaconsfield Street, Milperra.
5. There should be no net loss of floodplain storage volume below the 1-in-100-year floodline.

#### Response

1. The RTA recognises the submission of Liverpool Council. However, no flood and drainage study outside of the motorway lease area is planned as part of the project.
2. The preliminary modelling that was undertaken did not consider:

- Whether a reasonable percentage of blockages of culverts occur during various events, and whether the occurrence of a blockage would produce a significant change to the flood regime.
- The impact on the operation of the motorway for flood events larger than a 1-in-100-year flood event.

It is not proposed to undertake the modelling to consider these issues further.

3. A 1-in-100-year annual recurrence interval event has been modelled on the M5 South West Motorway to ascertain whether at least one lane on each carriageway would remain clear of surface water, and whether there would be no overflow from the median onto a carriageway. This event would only include runoff directly from the motorway lease area. No assessment of flooding on carriageways would be undertaken of a 1-in-100-year ARI or larger runoff event from surrounding catchments on the motorway carriageways.
4. It is understood that Interlink Roads has undertaken works at this location to attempt to address this issue.
5. The RTA recognises the submission of Liverpool Council. However, it is not planned to assess floodplain storage volumes as part of the investigations for this project.

## 3.9.2 Air quality

### Submission numbers

5, 16, 54, 55, 60

### Issue description

In summary, respondents raised the following issues concerning air quality impacts of the project:

1. Operation phase air quality management measures should be implemented to prevent the erosion of the ozone layer.
2. Air quality and dust monitoring should be undertaken during construction, with results published in local newspapers.
3. The community should not have to use the M5 East tunnels, which have existing air quality issues requiring a new filtering plant.
4. The project would result in additional soot and air pollution.

### Response

1. Section 9.3.4 of the environmental assessment contains information on air quality. It concludes that although there would be more traffic in 2021, air quality would improve. This is mainly due to the assumed different mix of vehicle types and improvements in fuel efficiency. Ozone depletion occurs primarily as a result of chlorofluorocarbons (CFCs). Emissions from motor vehicles do not contribute significantly to depletion of the ozone layer. As such, no additional operational air quality mitigation measures are proposed.
2. Section 9.3.5 of the environmental assessment, and AQ1, AQ2 and AQ3 in the draft statement of commitments, contain mitigation measures relating to the management of potential air quality impacts during construction. All reasonable and feasible measures would be implemented during construction, in accordance with Landcom's 'Blue Book', the industry standard for managing soil, erosion and dust on construction sites. AQ3 provides that dust monitoring would be undertaken during construction to ensure that levels are kept within acceptable limits, as set by an Environment Protection Licence that would apply to the project. The results would not be published in local newspapers, but annual returns

reporting on the performance of a project against its licence requirements are freely available via the Office of Environment and Heritage website.

3. Section 1.2.1 of the environmental assessment gives an overview of the project and how it relates to the M5 East. Users of the M5 South West Motorway are not forced to use the M5 East, and have many options for exiting the motorway prior to the start of the M5 East tunnels, such as Fairford Road, King Georges Road and Bexley Road, all of which offer alternative routes to the city. Air quality in the existing M5 east tunnels fall outside the scope of the project, but additional information about the air quality improvement plans and the performance of the M5 East filtration plant can be found at the Building Sydney Motorways website.
4. As identified in issue response 1 above, section 9.3.4 of the environmental assessment shows that air quality would improve over the course of the project due to improvements in vehicle emissions.

### 3.9.3 Climate change and greenhouse gases

#### Submission numbers

55, 64, 65

#### Issue description

In summary, the respondents raised the following issues concerning climate change and greenhouse gases:

- 1 The project would contribute to global warming.
- 2 The viability of the M5 West widening project is questioned due to potential future fuel shortages and the need to reduce oil consumption and dependency. The environmental assessment does not consider long-term energy requirements to sustain private vehicle use and traffic forecasts with the future availability of energy supplies and risks of shortages. Recommendations included the preparation of an energy availability assessment to confirm the economic and environmental feasibility of the M5 West widening project and the consideration of additional project alternatives such as the 'TransPerth' model and the use of electric buses and vehicles.
- 3 Major infrastructure projects such as the M5 must include greenhouse gas reduction strategies in order to meet current and future greenhouse reduction targets.

#### Response

1. The potential climate change and greenhouse gas impacts of the project are discussed in section 9.4 of the environmental assessment. It recognises the contribution of greenhouse gases to the warming of the earth's surface and also recognises that greenhouse gas emissions would be generated during construction and operation of the project. Measures to reduce greenhouse gas emissions during both construction and operation of the project are outlined in section 9.4.3 of the environmental assessment.
2. The NSW Government accepts that peak oil will happen, but there is no clear consensus at this time as to what its impact will be on transport activity. The *Peak Oil Response Plan* bill introduced to NSW Parliament in 2008 was not assented into legislation.

As identified in issue response 16 in section 3.8.1 above, the transport solutions to the problem of peak oil are similar to those for climate change. Alternatives to fossil fuels need to be found and transport must become more energy efficient.

Some initiatives are already underway to establish alternatives to oil as a fuel for transport and to improve energy efficiency:

- The RTA is a member of the NSW electric vehicles taskforce and the Australian Transport Council and the Environment Protection and Heritage Council vehicle fuel efficiency working group.
- The RTA is participating with Austroads and industry in research and trials with the goal of developing more sustainable road construction materials and practices and reducing reliance on products derived from oil.
- There are a number of other NSW government programs in place to reduce transport demand, to promote the use of public transport and increase the use of active transport (ie walking and cycling).
- Vehicle manufacturers and road users are seeking opportunities to reduce fuel consumption through the introduction of more fuel efficient vehicles such as hybrids and a general downsizing of the passenger car fleet.

The implementation of these initiatives will likely reduce the need for fossil fuels. However, irrespective of measures taken to reduce transport demand, there will continue to be a need for private road transport for access to essential services, for recreation, for work and for the transport of goods. Road transport is a significant and necessary element of the NSW economy that also provides many social benefits.

Alternatives to the project to improve public transport provision (alternative 3) were considered in section 4.1.1 of the environmental assessment. Carbon dioxide (CO<sub>2</sub>) emissions were not calculated for a new railway along the M5 corridor as this alternative was not favoured over the M5 West widening project for a number of reasons including its inability to meet future transport demand and its duplication of the nearby passenger rail line.

3. Section 9.4.2 of the environmental assessment contains an assessment of the potential for the project to generate greenhouse gases during both construction and operation. It shows that embodied energy would be the greatest contributor of greenhouse gases during construction and vehicle road use the greatest contributor during operation. Statement of Commitment GHGI also provides that energy efficient equipment and management measures would be implemented to reduce greenhouse gas emissions.

### 3.9.4 Socio-economic and land use

#### Submission numbers

14, 47, 54, 62

#### Issue description

In summary, respondents raised the following issues concerning the socio-economic impacts of the project:

1. Advice was provided on ways to minimise land use conflicts with rural agricultural land.
2. The project should address issues relating to the 'justice impact' of a toll road that provides the main access to south-western Sydney.
3. The project would result in a deterioration of the quality of life for local residents.
4. The ability of the M5 West to cope with population and employment growth is important to the economic prosperity of Sydney, due to the dependencies of commercial enterprises including Sydney Airport and Port Botany.

#### Response

1. Section 9.7.1 of the environmental assessment discusses the existing land use types surrounding the project alignment, which is described as highly urbanised with a mix of low- and high-density residential development, commercial and industrial areas, educational institutions and recreational and open space

uses. There is no rural or agricultural land in the vicinity of the project and, at this stage, no property acquisition would be required for the project and there would be no rural or agricultural land use conflicts as a result of the project.

2. Section 8.1.2 of the environmental assessment discusses the existing road network and identifies the M5 and F5 corridor as the main road freight, commercial and passenger route between Port Botany, Sydney Airport, and south-western Sydney. Section 8.1.2 of the environmental assessment also indicates that (un-tolled) principal arterial road routes parallel to the M5 South West Motorway include Canterbury Road, Milperra Road and Newbridge Road (from Roselands to Liverpool) and Campbelltown Road and the Hume Highway (from Casula to Liverpool). Microsimulation modelling undertaken after the exhibition of the environmental assessment indicates that the project does not have a substantial impact on travel times along the toll-free parallel route (refer Appendix B).

With regard to travel patterns, there is expected to be minimal change in the overall origins and destinations of traffic using the M5 South West Motorway. However, it is worth noting that without the M5 West widening project, about 40 per cent of cars passing through the toll plaza in the peak direction (2026) would be expected to use the M5 East. With the project, that proportion drops to about one-third, indicating that the additional traffic attracted to the improved motorway has more local destinations. Modelling indicates that a similar conclusion can be drawn for commercial traffic. This underlines the importance of the M5 West widening as a project that is justifiable in its own right.

The submission defines 'justice impact' as the perceived injustice impressed on the people of south-western Sydney by building a toll road to provide flood-free access to the CBD from Liverpool. There are numerous alternative routes to the M5 South West Motorway that would benefit from reduced congestion as a result of the M5 West widening project. In addition, Interlink Road's concession is due to expire in 2023, as explained in section 1.2.1 of the environmental assessment. The returns generated from the current operation of the M5 South West Motorway are not uncapped, and the concession period will be subject to negotiation with the NSW Government. Further, as noted in issue response 3 in section 3.1.1 above, the cashback program is current NSW Government policy and provides financial assistance to residents of south-western Sydney who use the M5 South West Motorway. There are no plans to change the cashback program as part of the project.

3. Section 9.7.2 of the environmental assessment discusses potential impacts of the project on local amenity, indicating that there would be minimal change to the amenity of the surrounding areas as a result of the operation of the project due to the works being undertaken predominately in the existing road reserve. The environmental assessment and the preferred project report (refer chapter 4) consider amenity-related impacts of the project through assessment of issues such as traffic, noise and vibration, air quality and visual impacts. Management measures have been developed to manage project-specific noise and vibration, traffic and visual impacts as they relate to the operation of the project; construction phase amenity is also considered throughout the environmental assessment with corresponding management measures proposed.
4. Section 9.7.2 of the environmental assessment addresses the economic benefits that the project would provide. The ability of the project to cope with population and employment growth is demonstrated by the traffic modelling in section 8.1.4 of the environmental assessment, which shows that there would be reductions in travel time, and subsequent economic benefits in 2024.

### 3.9.5 Cumulative impacts and interactions

#### Submission number

60

#### Issue description

In summary, the respondent raised the following issue concerning cumulative impacts:

1. The proposed Moorebank Intermodal Freight Terminal may increase stresses on the Moorebank Avenue interchange. Liverpool Council requested that impacts from the terminal be modelled prior to construction of the project.

#### Response

1. In combination with the M5 West widening project, traffic and other operational activities associated with the proposed Moorebank Intermodal Terminal were identified as potential cumulative impacts in section 9.9.4 of the environmental assessment. At the time of writing, there was limited information available regarding the likely scope (and therefore impacts) of the terminal.

The Moorebank Intermodal Terminal is still in preliminary design stages. Detailed planning, design and approval of the project is expected to be completed by mid-2012, and therefore more detailed assessment (such as modelling) of potential operational traffic impacts cannot be undertaken at this stage. It would therefore be premature to undertake the modelling and upgrade the intersection until design and development of the facility is further progressed. However, the Moorebank Project Office (the proponent for the project) has committed to considering all aspects of the proposed Moorebank Intermodal Terminal, including the impact of traffic movements in and around the Moorebank area. This will include undertaking traffic flow studies as part of the planning and development of that project.<sup>4</sup>

## 3.10 Environmental risk analysis

#### Submission number

62

#### Issue description

In summary, the respondent raised the following issue concerning cumulative impacts:

1. There is no reference in the risk analysis of the management of heavy vehicles and reduced lane widths.

#### Response

1. The risk assessment in Chapter 10 of the environmental assessment examined construction risks for all traffic. This included heavy vehicles. As noted in issue response 10 in section 3.2 above, section 6.3.3 of the environmental assessment indicates that lane widths for central median and side works would be reduced temporarily from 3.5 metres to 3.2 metres; and safety during construction would be maintained by lowering speed limits to 80 kilometres per hour, and installing additional signage and temporary concrete barriers.

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<sup>4</sup>Australian Government Department of Finance and Deregulation 2010, Moorebank Intermodal Freight Terminal, [www.finance.gov.au/property/property/moorebank-intermodal-freight-terminal/frequently-asked-questions.html#timeline](http://www.finance.gov.au/property/property/moorebank-intermodal-freight-terminal/frequently-asked-questions.html#timeline), accessed 10 November 2010

## 4 Preferred project report

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This chapter describes and assesses changes made to the project to minimise environmental impacts, and outlines additional investigations undertaken since the exhibition of the environmental assessment. It also presents a justification of the preferred project.

The main changes to the project relate to:

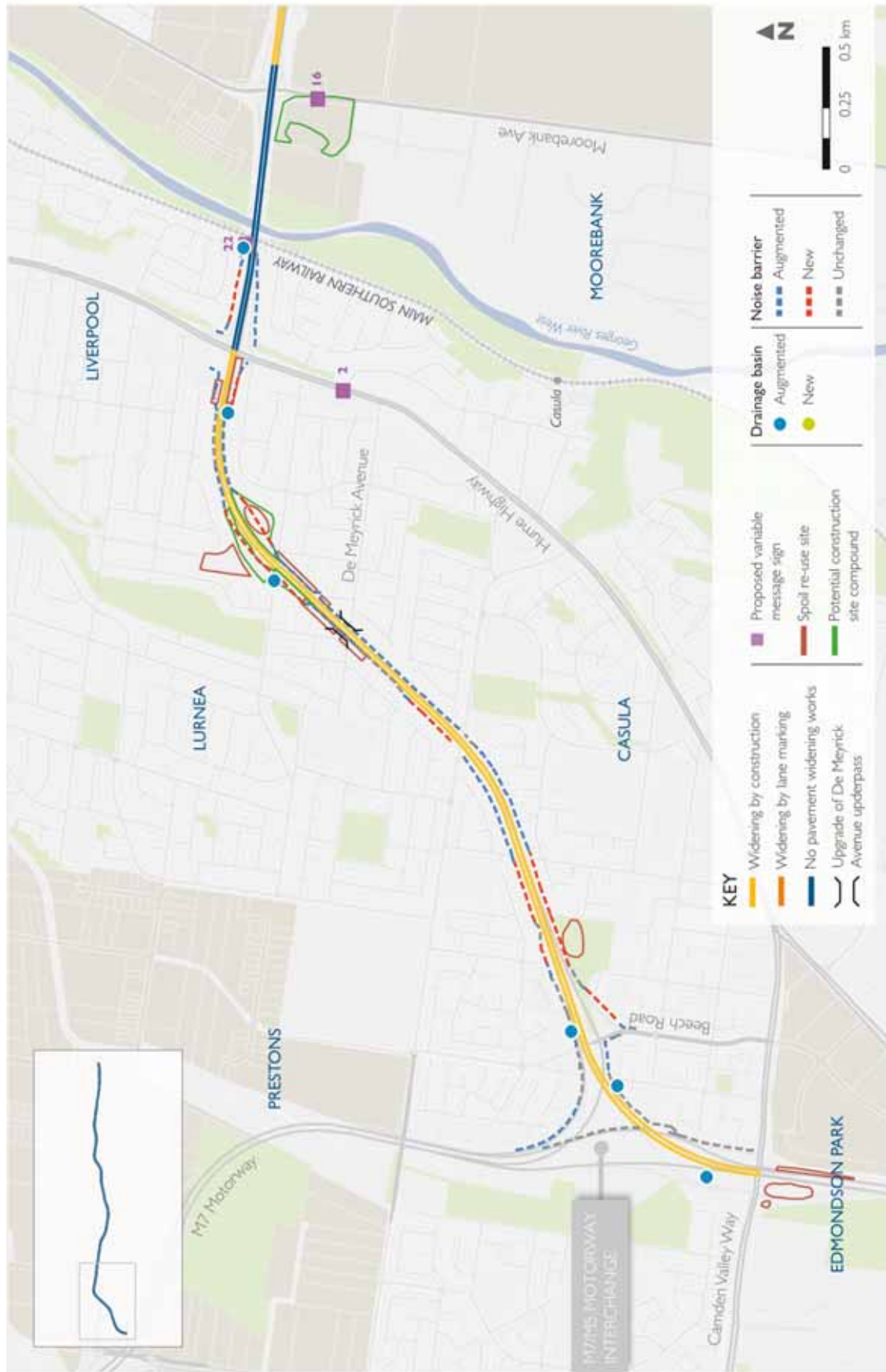
- Noise attenuation including new barriers and increases to existing barrier heights.
- Eastbound widening between Fairford Road and King Georges Road.
- Drainage basins.
- Hammondville toll plaza.
- Minor project changes and environmental assessment clarifications.

Figure 4.1 (a)-(d) illustrates the changes that have been made since the public exhibition of the environmental assessment. This is the preferred project.

The additional studies undertaken since the public exhibition of the environmental assessment are:

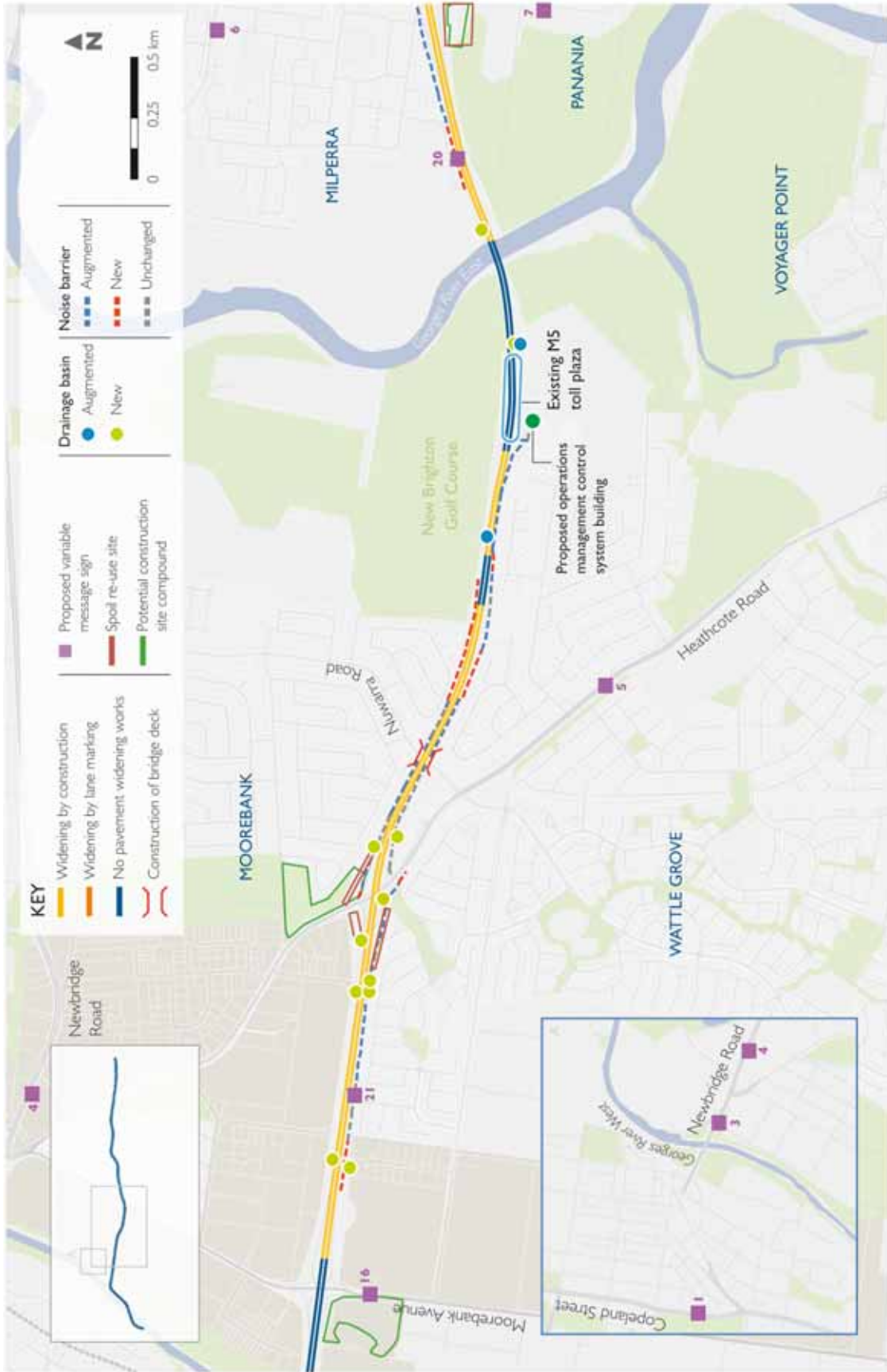
- Revised noise and vibration working paper (refer section 4.1.1 and Appendix C).
- Traffic and transport working paper addendum (refer section 4.2.2 and Appendix B).
- Non-Aboriginal heritage review (refer section 4.5.5 and Appendix D).
- Biodiversity working paper addendum (refer section 4.5.6 and Appendix E).
- Visual impact, urban design and landscaping addendum (refer Appendix F).

Figure 4.1(a) Preferred project – Camden Valley Way to Moorebank Avenue



Final Project Detail subject to approval only subject to detailed design

**Figure 4.1(b)** Preferred project – Moorebank Avenue to Georges River East



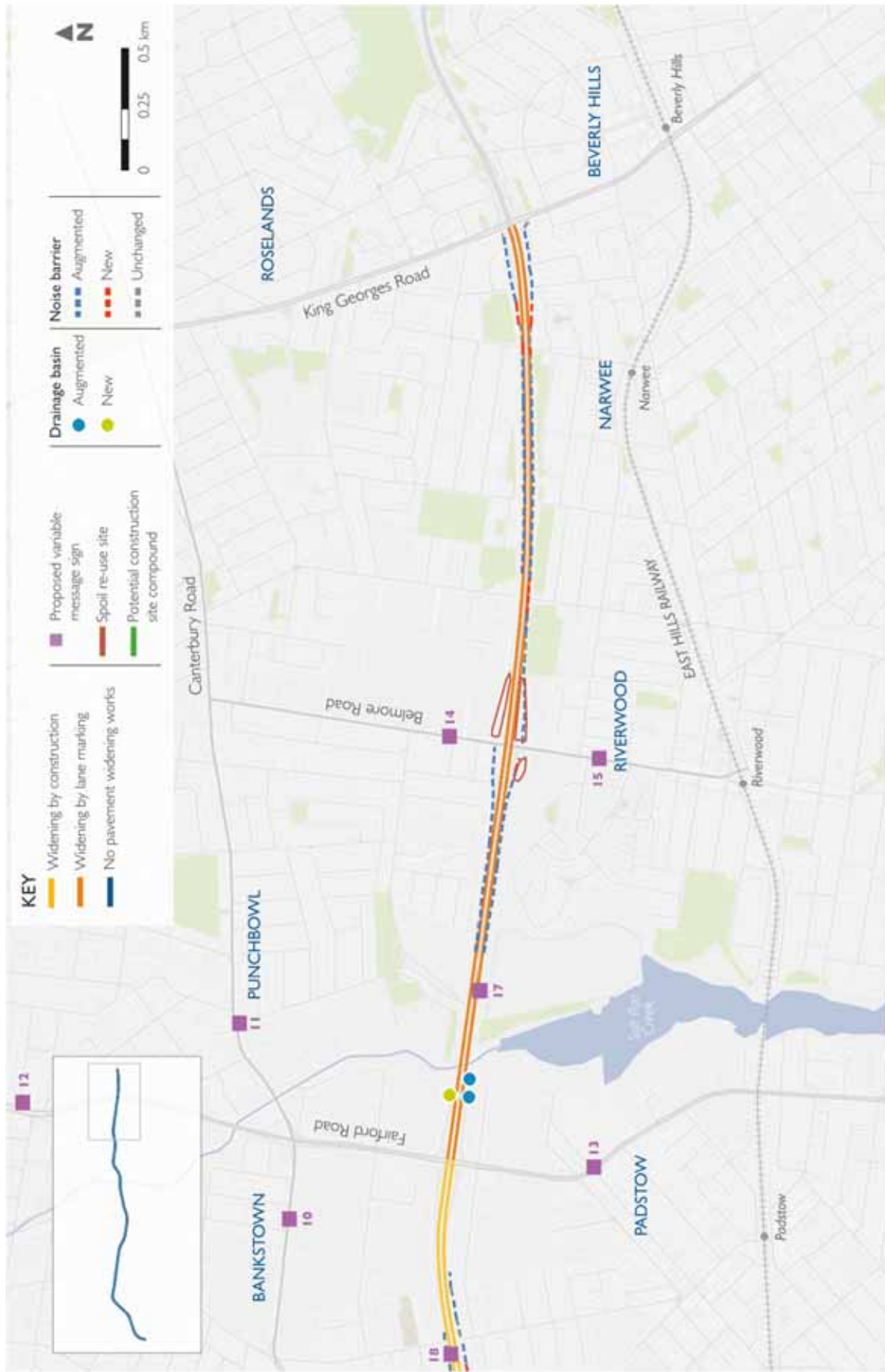
Some Project assets shown in red/orange are subject to detailed design

Figure 4.1(c) Preferred project – Georges River East to Fairford Road



Figure 4.1(c) Preferred project – Georges River East to Fairford Road

**Figure 4.1(d)** Preferred project – Fairford Road to King Georges Road



Map of Project (final project) is published only, subject to regulatory change

## 4.1 Noise attenuation changes

The noise and vibration working paper, included as part of the environmental assessment, was revised following the exhibition period and the receipt of submissions. This was to:

- Improve data inputs and respond to submissions regarding details of the assessment methodology.
- Confirm mitigation measures.
- Respond to questions from the Office of Environment and Water (formerly DECCW) regarding the assessment.

The revised noise and vibration working paper has led to a revised assessment of noise impacts and changes to the noise attenuation mitigation measures for the project. These changes are identified and assessed below.

### 4.1.1 Revised assessment approach

Following exhibition of the environmental assessment, a number of issues were identified with the original data inputs, methodology and conclusions of the noise assessment. In particular, the Office of Environment and Heritage (formerly DECCW) identified the need for more rigorous calibration of the noise model and greater use of measured rather than modelled data.

In response, further detailed noise investigations were carried out and a new revised noise model was developed. The accuracy of the input data was improved, particularly in relation to the identification of single and double storey properties. The noise criteria adopted in the model were also revised. These changes resulted in numerous properties along the motorway being modelled to experience small increases above the noise levels predicted in the original (September 2010) assessment.

While differences between the noise levels predicted in the original assessment and the revised noise and vibration working paper (refer Appendix C) are generally fractions of a decibel, they have led to additional properties exceeding the criteria for reasonable and feasible noise mitigation. This is because the noise model is very sensitive to small changes in predicted noise levels, as a high number of properties are very close to the relevant criteria.

It is important to also note that, a number of conservative assumptions were adopted in both the original and the revised noise assessments. These include:

- That traffic volumes will reflect a completed and untolled new M5 East expansion resulting in higher traffic volumes (mainly at the eastern end of the project).
- Application of a noise benefit for open graded asphaltic concrete (OGAC) for new lanes only, and not to resurfacing of existing lane sections that are already surfaced and maintained with OGAC.
- That all residential properties currently under construction will be double storey.

The revised noise and vibration working paper is included at Appendix C. The main outcomes are discussed below.

### 4.1.2 Assessment of operational impacts

The following is an assessment of the operational impact of this change on the relevant key issues identified in the environmental assessment. The assessment demonstrates that the change would deliver benefits and that impacts would generally be consistent with those described in the environmental assessment. Impacts can be appropriately managed through the implementation of the measures referred to in the revised statement of commitments (refer chapter 5).

## Noise and vibration

The revised noise and vibration working paper (refer Appendix C) identifies that the project would result in increased noise at receivers in some areas adjacent to the M5 South West Motorway corridor. It indicates that, without the implementation of noise barriers, 944 residences would experience noise levels requiring mitigation.

In response over five kilometres of new noise barriers would now be provided and over 15 kilometres of existing noise barriers would be increased in height as part of the project. These measures would significantly reduce noise in adjacent areas. The revised noise and vibration working paper (Appendix C) provides the predicted noise levels after the installation of the new and augmented noise walls. Figure 4.1 shows the location of new or augmented noise walls (refer also Appendix C).

The revised noise and vibration working paper (refer Appendix C) indicates that after the implementation of the proposed new and augmented barriers, 322 residences would still need to be considered for architectural treatments. Architectural treatments are considered where road traffic noise criteria are already exceeded and (1) predicted noise increases are above future existing levels by more than 2 dBA or; (2) the sensitive receiver would be acutely affected (levels above 65 dBA  $L_{Aeq, 15hr}$  or 60 dBA,  $L_{Aeq 9hr}$ ); or both. The revised noise and vibration working paper identifies the residential buildings in these categories (refer Appendix C).

Architectural treatments may include installing fresh air ventilation, sealing of wall vents, and checking window and door seals (and replacing these where necessary). The extent of treatment provided generally depends on the extent to which noise criteria are exceeded.

## Visual and urban design

Table 8.33 of the environmental assessment presents the operation phase visual and urban design impacts associated with the proposed new and augmented noise walls. A revised landscape character and visual impact assessment was carried out (Appendix F) to consider the impacts of the increased number of new and augmented noise walls now proposed. These additional measures were assessed as having a moderate visual impact as a result of additional screening of the motorway for receivers outside the corridor and a narrowing of vistas for motorists, limited to the road reserve. The revised assessment notes that in some areas, the loss of trees and shrubs for the construction of new noise walls and the augmentation of existing noise walls, would change the 'parkway' like character, making the noise walls a more dominant feature.

## Other issues

No other operational environmental impacts associated with the proposed changes to noise mitigation have been identified.

### 4.1.3 Assessment of construction impacts

The following is an assessment of the construction impact of this change on the relevant key issues identified in the environmental assessment. The assessment demonstrates that impacts would generally be consistent with those described in the environmental assessment. Impacts can be appropriately managed through the implementation of the measures referred to in the revised statement of commitments (refer chapter 5).

## Biodiversity

As a result of the need for new and augmented noise walls, there would be an increase in the construction footprint required for their construction. The change in vegetation removal requirements is identified and assessed in section 4.5.6 below.

## Visual and urban design

Section 8.4.3 of the environmental assessment considers the potential visual impacts of construction. The environmental assessment indicates that the construction works would not be visible from outside the motorway corridor for a majority of the project length. However, some works have the potential to result in short-term visual impacts for people adjacent to the corridor, typically as a result of activities such as vegetation clearance, drainage and sedimentation works and the construction of soil mounds and noise walls. The environmental assessment also notes that these impacts would be temporary given the transitional nature of the on-motorway construction works required.

Vegetation clearance would be limited to that required to construct the project; where practicable, landscaping would be progressively introduced to limit this impact. Where an existing noise wall requires removal (wholly or partly) prior to the introduction of a new noise wall, the new walls would be introduced as soon as practicable following removal of existing noise walls to ensure minimal impact on residents.

The construction phase visual and urban design impacts of the proposed new and augmented noise walls (increased height) are considered consistent with those already assessed in the environmental assessment. Table 8.35 of the environmental assessment provides mitigation measures that would sufficiently address the visual impacts resulting from the new and augmented noise walls.

## Aboriginal heritage

As described in section 9.5.3 of the environmental assessment, the archaeological potential of the M5 South West Motorway corridor and surrounding road corridors is considered to be low due to substantial previous disturbance.

The additional works would be contained within areas previously disturbed by motorway construction, and are therefore not expected to have additional Aboriginal heritage impacts compared with those identified in the environmental assessment. Mitigation measures presented in section 9.5.4 of the environmental assessment are considered appropriate and applicable.

## Non-Aboriginal heritage

Non-Aboriginal heritage items in the vicinity of the project are identified in Figure 9.5 of the environmental assessment. The additional works would not impact any non-Aboriginal heritage items.

## Socio-economic and land use

The proposed changes would reduce noise impacts on communities adjacent to the motorway corridor. Given the minor nature of the adverse impacts identified above, socio-economic and land use impacts as defined in the environmental assessment would generally not change as a result of these additional works.

### 4.1.4 Mitigation measures

#### Operation

The approach to the management of operational noise has not changed since the environmental assessment. Mitigation would involve new and augmented noise walls and architectural treatment. Over five kilometres of new noise barriers would now be provided and over 15 kilometres of existing noise barriers would be increased in height as part of the project. The specific height of each wall would be optimised as part of the detailed design process. A total of 322 residential buildings would be considered for architectural treatment.

Figure 4.1 shows the locations of new and augmented noise walls. The revised noise and vibration working paper (Appendix C) identifies those properties that would be considered for architectural treatment.

The noise wall design strategy proposed for this project would seek to:

- Establish a linear identity along the M5 for the road user – thereby enhancing legibility.
- Respond to the natural bushland setting of the road corridor.
- Improve visual amenity – particularly for the motorway user as the off road neighbour has substantial screening and it is proposed that this would be retained.

## Construction

Section 8.2.4 of the environmental assessment presents construction noise and vibration mitigation measures. Measures discussed in the environmental assessment include:

- Noise screens for mobile plant and equipment.
- Portable temporary screens.
- Screens or enclosures for stationary equipment.

However, these mitigation measures would not generally be used because:

- They are not generally used on linear road construction projects as they can pose safety risks by limiting driver visibility (for both construction workers and motorists).
- The placement of temporary screens generates noise and extends the duration of construction.

The construction noise and vibration management plan would detail specific construction noise and vibration mitigation measures, and would consider noise screens or enclosures for stationary equipment that is fixed in a single position for an extended period of time.

## 4.2 Eastbound widening between Fairford Road and King Georges Road

### 4.2.1 Description of works

An additional eastbound lane would be provided within the existing pavement between Fairford Road and King Georges Road. This would increase the number of lanes from two to three (over a distance of about four kilometres) and would generally be achieved by altering the existing line marking to suit the new lane configuration. Line marking would be changed to provide traffic lanes that are generally 3.5 metres wide and a 2.5 metre wide breakdown/shoulder lane. Works would be confined to the existing corridor and would be consistent with that required for the widening of the westbound carriageway through this section, as described in section 5.3.1 of the environmental assessment.

Widening to provide three lanes eastbound between Fairford Road and King Georges Road was excluded from the project considered in the environmental assessment. This was due to concern that it could further exacerbate existing congestion at the point where the M5 South West Motorway joins the M5 East at King Georges Road (refer section 4.2.2 of the environmental assessment). Microsimulation modelling undertaken since the exhibition of the environmental assessment indicates that widening through this section to three lanes would deliver additional benefits. It has therefore been included in the preferred project.

### 4.2.2 Microsimulation traffic modelling

The traffic and transport working paper, which was publicly exhibited as part of the environmental assessment, made reference to the development of a microsimulation traffic model to facilitate a more in-depth analysis of the operational aspects of the project. This has been completed and the results are reported in the traffic and transport working paper addendum (refer Appendix B).

Microsimulation is a vehicle-by-vehicle modelling of traffic that enables visualisation of expected traffic conditions and enables a more precise understanding of:

- Travel time of different categories of road users such as cars, trucks and buses.
- Effects of queuing at congestion points such as lane merges.
- Effects of blockage in one part of the system on other parts of the network.
- Effects of other road users on vehicle delays.

The microsimulation modelling indicates that the project has the effect of redistributing delay from the western end of the M5 South West Motorway to the eastern end, while also reducing overall eastbound travel times. The project is expected to reduce the length of the morning queue on the motorway, but as a consequence of redistributing delay from the west to the east, it is likely to increase delay on the surrounding road network in the eastern end of the corridor. King Georges Road between Canterbury Road and Stoney Creek Road and Stacey Street would be among those roads affected. Existing queues at the eastbound on-ramp at King Georges Road are also likely to be exacerbated.

In the PM peak period, the project has the effect of relieving westbound queuing on the motorway in the section between King Georges Road and The River Road. Delays currently observed in this section are caused by traffic merging onto the motorway at River Road and Fairford Road, and to a lesser extent Belmore Road. The project is likely to increase the efficiency of these merge areas, reducing the need for vehicles to slow down through this section and decreasing westbound delay. Reductions in westbound travel time are also likely between Moorebank Avenue and Camden Valley Way, where the additional approach and departure lanes would allow weaving in the section between Moorebank Avenue and the Hume Highway to operate more efficiently.

The project also has the effect of redistributing traffic and delay on the toll-free alternative route, particularly at the western end of the corridor around Liverpool. On balance, however, travel times along the toll-free alternative route would remain largely unchanged in both the AM and PM peak periods.

The traffic implications of the proposed additional eastbound widening between Fairford Road and King Georges Road were also considered using the microsimulation model and are considered in section 4.2.3 below.

### 4.2.3 Assessment of additional widening

The following is an assessment of the impact of this change on the relevant key issues identified in the environmental assessment. The assessment demonstrates that additional widening between Fairford Road and King Georges Road would deliver benefits and that impacts would generally be consistent with those described in the environmental assessment. Impacts can be appropriately managed through the implementation of the measures referred to in the revised statement of commitments (refer chapter 5).

#### Traffic and transport

The additional widening eastbound between Fairford Road and King Georges Road was considered as part of detailed microsimulation modelling for the project undertaken after the exhibition of the environmental assessment (refer section 4.2.2). The results are reported fully in the traffic and transport working paper addendum, which is a companion document to the traffic and transport working paper exhibited as part of the environmental assessment (refer Appendix B).

In summary, the modelling indicates that the additional widening has the effect of further reducing the overall eastbound travel times in the AM peak period. It is also likely to improve travel times on the M5 South West Motorway for most short trips in the west of the corridor and reduce the length of the eastbound morning queue on the motorway. There would, however, be an increase in travel times for some short trips, generally

in the east of the corridor. The largest travel time savings associated with the additional widening are between Henry Lawson Drive and the River Road.

Table 4.1 presents modelling results for the AM peak period. It compares predicted travel times for:

- 2010 base case.
- 2016 scenario without the project.
- 2016 scenario with the project as described in the environmental assessment.
- 2016 scenario with the project as described in the environmental assessment and with the proposed additional widening eastbound between Fairford Road and King Georges Road.

**Table 4.1 M5 AM peak eastbound travel times**

Section between	2010 base	2016 business as usual	2016 exhibited project	2016 project + KGR extension
Raby Rd and Brooks Rd	04:15	04:10	03:40	03:30
Brooks Rd and Camden Valley Way	03:00	07:10	03:50	03:50
Camden Valley Way and Hume Highway	03:45	10:15	02:50	03:05
Hume Hwy and Moorebank Av	00:52	01:05	01:04	01:08
Moorebank Av and M5 Toll Plaza	02:55	02:55	05:45	03:25
M5 Toll Plaza and Henry Lawson Dr	01:45	01:45	03:50	01:45
Henry Lawson Dr and The River Rd	03:45	05:10	08:30	03:40
The River Rd and Fairford Rd	02:35	03:25	04:50	03:20
Fairford Rd and Belmore Rd	03:40	04:10	03:55	05:45
Belmore Rd and King Georges Rd	08:20	08:15	08:30	13:00
<b>Total</b>	<b>34:52</b>	<b>48:20</b>	<b>46:44</b>	<b>42:28</b>

While the additional widening would improve overall eastbound AM peak period travel times, it is also likely to result in more traffic on the surrounding road network, particularly on King Georges Road and Stacey Street. It is expected that delays on King Georges Road would increase due to additional queuing from the eastbound on ramp to the motorway. Increased delay at intersections on Stacey Street is expected as a result of reduced congestion on the motorway, allowing more traffic to flow onto Fairford Road and then Stacey Street.

Modelling indicates that the additional widening would have little influence on westbound PM peak period travel times and on counter peak travel times. Results also indicate that the additional widening would not have any substantial impact on overall travel times along the alternative toll free route (refer Appendix B).

## Noise and vibration

The additional widening between Fairford Road and King Georges Road was considered as part of the revised noise and vibration working paper (refer section 4.1 above and Appendix C).

While a standalone analysis of the additional widening was not conducted, the revised noise modelling does confirm that a number of sensitive receivers adjacent to this section of the motorway would experience acute noise levels; would experience more than a 2 dBA increase above predicted future existing levels; or both.

As a result, new and augmented noise barriers are proposed through this section (refer section 4.1).

Architectural treatments would be considered for sensitive receivers experiencing acute noise levels and

those where allowance criterion levels would be exceeded after the implementation of the new and augmented barriers.

Construction noise associated with the additional widening would be generally consistent with that associated with the widening of the westbound carriageway through this section.

### **Visual, urban design and landscaping**

The additional widening between Fairford Road and King Georges Road has been considered as part of the revised landscape character and visual impact assessment (refer Appendix F).

The updated assessment indicates that the landscape character impact of the proposed upgrade in this precinct is likely to be negligible due to the low sensitivity to change of the precinct and the negligible magnitude of the works. The assessed visual impact for view points near this section of the motorway ranged from negligible to moderate-low.

### **Biodiversity**

The additional widening would be generally achieved by the remarking of existing pavements. It is not expected that removal of vegetation would be required for these works.

### **Aboriginal heritage**

As described in section 9.5.3 of the environmental assessment, the archaeological potential of the M5 South West Motorway corridor and surrounding road corridors is considered to be low due to substantial previous disturbance.

The additional works would be contained within areas previously disturbed by motorway construction, would not require removal of any remnant (intact) vegetation and would therefore have no additional Aboriginal heritage impacts compared with those identified in the environmental assessment. Mitigation measures presented in section 9.5.4 of the environmental assessment are considered appropriate and applicable.

### **Non-Aboriginal heritage**

Non-Aboriginal heritage items in the vicinity of the project are identified in Figure 9.5 of the environmental assessment. The additional works would not impact any non-Aboriginal heritage items.

### **Socio-economic and land use**

Given the minor nature of the impacts identified above, socio-economic and land use impacts as defined in the environmental assessment would generally not change as a result of these additional works. Some additional delays on the road network in the eastern section of the corridor have been identified, but these are offset by improved travel times for motorway users and reduced delays in the western section of the corridor.

## **4.3 Drainage basin changes**

The following is an assessment of the impact of drainage basin changes on the relevant key issues identified in the environmental assessment. The assessment demonstrates that the change would deliver environmental benefits and that impacts would generally be consistent with those described in the environmental assessment. Impacts can be appropriately managed through the implementation of the measures referred to in the revised statement of commitments (refer chapter 5).

### 4.3.1 Description of works

Potential water quality impacts from an increase in surface runoff stem from an increase in pollutant loads. These impacts can affect the ecological health of receiving watercourses and are typical of all road projects (refer section 9.1.3 of the environmental assessment).

It is proposed to introduce new drainage basins and augment existing basins to ensure that surface runoff is managed and that the impacts of runoff pollutants are appropriately mitigated. Section 5.3.4 of the environmental assessment describes the proposed drainage basins as well as identifying existing drainage basins that would be augmented as part of the project. Section 6.3.6 of the environmental assessment notes that, where practicable, new drainage basins would be constructed and existing basins modified during the early phase of construction in order to capture any stormwater runoff during construction.

Following further investigation and design (foreshadowed in section 5.3.4 of the environmental assessment), it is proposed to make some minor changes to these drainage basin arrangements. These changes would further contribute to the management of surface runoff and the mitigation of the impact of runoff pollutants on receiving watercourses. The proposed changes are listed in Table 4.2.

**Table 4.2** Changes to drainage basins

Approx chainage	Drainage basin as detailed in EA	North or South of M5	Access	Approx capacity	Change
12100	Existing basin not included in EA	South	Bryant Street or Motorway	300 m <sup>3</sup>	Reduce capacity of existing drainage basin from 520 m <sup>3</sup> to 300m <sup>3</sup> .
18430	Augmented	North	Motorway	200 m <sup>3</sup>	Capacity increased to 300 m <sup>3</sup>
22390	New	South	Moorebank Avenue off-ramp	300 m <sup>3</sup>	Capacity decreased to 200 m <sup>3</sup>
24270	Augmented	South	Future service station site*	400 m <sup>3</sup>	Capacity increased to 500 m <sup>3</sup>

\* not part of this project

The approximate location of the drainage basins that were not originally identified in the environmental assessment are shown in Figure 4.1.

### 4.3.2 Assessment of drainage basin changes

The proposed changes to the capacity of drainage basins at chainage 18430, 22390 and 24270 are minor and are not considered to have substantially greater or lesser environmental impacts when compared with the impacts identified in the environmental assessment.

The following drainage basin features were not identified in the environmental assessment and are assessed below:

- Reduce capacity of an existing drainage basin at chainage 12100 from 520 cubic metres to 300 cubic metres to accommodate the second adjacent basin.

### Traffic and transport

The drainage basin at chainage 12100 would be accessed via Bryant Street, Padstow or the M5 South West Motorway. This is the same access proposed in the environmental assessment for works on an adjacent drainage basin. Works at this drainage basin would likely result in a minor increase in construction traffic along Bryant Street. This is not considered significant given the surrounding commercial land uses, the limited duration of the works and the proximity of Bryant Street to the motorway.

The traffic and transport mitigation measures presented in the environmental assessment are considered sufficient to address any impacts associated with these works.

### **Noise and vibration**

The existing drainage basin at chainage 12100 is located between the Fairford Road exit (westbound) and Bryant Street, Padstow. This is adjacent to another existing drainage basin (chainage 12040) that would also be augmented as part of the project (refer to Table 5-5 of the environmental assessment). Given the minor nature of the additional works required and the proximity of these works to areas already affected by construction, the augmentation of the drainage basin at chainage 12100 would result in negligible additional noise and vibration impacts compared with those already identified in the environmental assessment. The noise and vibration mitigation measures identified in the environmental assessment are considered sufficient to manage the negligible additional impacts.

The construction noise impacts would be generally consistent with those identified in section 8.2.3 of the environmental assessment. Noise exceedences would be identified and addressed as part of the detailed design and development of the Construction Noise and Vibration Management Plan.

### **Biodiversity**

Table 8 of the biodiversity working paper (Appendix G of the environmental assessment) provides an assessment of impacts to vegetation communities from the construction of drainage basins. The augmentation of the drainage basin at chainage 12100 (southern side of the motorway) would require the removal of only a small area of vegetation. The biodiversity working paper identifies the vegetation in the general area of this drainage basin as landscape vegetation (refer Table 4.1) and as such additional impacts to vegetation communities as a result of the minor additional clearing are not expected.

The existing drainage basin at chainage 12100 is mapped as 'unlikely green and golden bell frog habitat' (refer Figure 8b of the biodiversity working paper) and therefore unlikely to contain this species. No green and golden bell frogs were recorded during surveys (refer section 4.6.1).

Overall the biodiversity working paper concludes that potential habitat along the project corridor is unlikely to constitute significant breeding habitat for the green and golden bell frog and a range of mitigation measures have been developed to manage potential impacts to this species (refer Table 8.30 of the environmental assessment). These measures are considered sufficient to address any impacts that may occur as a result of the additional works at the subject location.

### **Visual, urban design and landscaping**

The additional works proposed are at existing drainage basin / artificial wetland locations. Initially there would be some visual impact associated with removal of vegetation and general construction works, however any visual impacts would be minor and consistent with the impact assessment provided in the environmental assessment.

Table 8.35 of the environmental assessment provides mitigation measures that would sufficiently address any visual impacts resulting from additional drainage basin works.

### **Aboriginal heritage**

As described in section 9.5.3 of the environmental assessment, the archaeological potential of the M5 South West Motorway corridor and surrounding road corridors is considered to be low due to substantial previous disturbance.

The additional works would be contained within areas previously disturbed by motorway construction, would not require removal of any remnant (intact) vegetation and would therefore have no additional Aboriginal heritage impacts compared with those identified in the environmental assessment. Mitigation measures presented in section 9.5.4 of the environmental assessment are considered appropriate and applicable.

## **Non-Aboriginal heritage**

Non-Aboriginal heritage items in the vicinity of the project are identified in Figure 9.5 of the environmental assessment. The additional works would not impact any non-Aboriginal heritage items.

## **Socio-economic and land use**

Given the minor nature of the impacts identified above, socio-economic and land use impacts as defined in the environmental assessment would not change as a result of these additional works.

## **4.4 Hammondville toll plaza**

The following is an assessment to confirm the layout of the Hammondville toll plaza based on the relevant key issues identified in the environmental assessment. The assessment demonstrates that the impacts of the change would generally be consistent with those described in the environmental assessment. Impacts can be appropriately managed through the implementation of the measures referred to in the revised statement of commitments (refer chapter 5).

### **4.4.1 Description of change**

Table 5.1 of the environmental assessment noted that the optimal configuration of the Hammondville toll plaza was being investigated throughout detailed design. The environmental assessment indicates that configuration options could include the provision of both electronic and cash toll booths, with construction works including pavement widening, relocating the cash lane booths, upgrading the concrete safety barriers and extending the access walkways.

The preferred project includes carriageway widening by approximately 11 metres (width) for 500 metres (length) at the toll plaza (which was indicated as a possible element in Table 5.3 of the environmental assessment). This would provide a minimum of three free flow lanes in each direction and would include upgrading the existing toll collection gantries and information signs. Some earthworks would also be required. Works to facilitate these changes would occur within the existing motorway corridor and would not require property acquisition.

### **4.4.2 Assessment of potential impacts**

#### **Biodiversity**

It is not expected that removal of additional vegetation beyond that already considered in the environmental assessment would be required for the Hammondville toll plaza works.

#### **Visual, urban design and landscaping**

Potential visual impacts associated with these works would be minor and consistent with those identified in the environmental assessment.

The application of construction and operation phase mitigation measures as identified in section 8.4.5 of the environmental assessment would further limit potential impacts associated with changes to the Hammondville toll plaza.

#### **Traffic and transport**

The proposed change would assist traffic flow through the provision of additional free flow lanes at the toll plaza.

## Other issues

There would be no Aboriginal or non-Aboriginal heritage issues associated with the Hammondville toll plaza changes beyond those already considered in the environmental assessment. Socio-economic and land use impacts as defined in the environmental assessment would not change as a result of these additional works.

## 4.5 Minor project changes

This section clarifies some project elements that were described in the environmental assessment report and working papers.

As a general note, recommendations and other measures identified in technical working papers were included in the environmental assessment report as commitments where appropriate. There are some instances where detail in the working papers may be in conflict with the main environmental assessment volume. In these instances the latter prevails.

### 4.5.1 Emergency crossovers

#### Description of refinement

Section 5.1 of the environmental assessment noted that emergency crossovers would be provided at several locations along the motorway.

Further design development has identified that four emergency cross over gates are likely to be provided for emergency use and serious incident management. Suitable sites have been identified at the following locations:

- Approximate mid-point between Camden Valley Way and Hume Highway.
- Approximate mid-point between Heathcote Road and Henry Lawson Drive.
- Approximate mid-point between Henry Lawson Drive and The River Road.
- Approximate mid-point between Fairford Road and King Georges Road.

However, these locations are yet to be finalised and would be determined during detailed design in consultation with relevant authorities, including NSW Police.

#### Assessment of potential impacts

The introduction of crossovers is not considered to change the extent of environmental impacts identified in the environmental assessment, including for operational traffic impacts. Installation of emergency crossovers would deliver significant traffic and emergency management benefits during major incidents. No vegetation would be removed at any of the nominated emergency crossover locations.

### 4.5.2 De Meyrick Avenue underpass works

Extensive works to the existing De Meyrick Avenue underpass was initially included in the project scope. Section 6.5.2 of the environmental assessment states that the De Meyrick Avenue underpass works may require full closure of the motorway over about 20 nights. Further investigations have determined that the bridge was constructed to a standard equivalent to most other bridges on the motorway and significant structural works will not be required. The bridge is wide enough to accommodate three lanes.

Minor works may be carried out to upgrade the existing bridge screens and barriers adjacent to the bridge. These works would involve pavement shoulder widening of around 2.5 metres for around 500 metres on both sides of the corridor. Noise walls would also need to be moved outwards by around one metre to accommodate the widened road for a distance of around 300 metres eastbound and 360 metres westbound.

These minor changes have been considered as part of the revised noise, biodiversity, landscape character and visual impact assessments and are of minimal impact.

This reduced scope of works at the De Meyrick Avenue underpass would significantly reduce the requirement for motorway closures and night works.

### **4.5.3 Transport to construction sites**

Section 8.1.7 of the environmental assessment states that shuttle vehicles would be utilised to transport construction staff between nominated parking locations, public transport points and the construction sites.

The feasibility of using shuttle vehicles to transport construction staff to site has been further investigated. There are limited public transport services in the immediate vicinity of the construction site compounds and it is also noted that workers would need to travel to and from the site outside of peak travel times (for the 7am shift start time for standard hours and for night time work shifts). Workers would also need to transport tools and equipment to site and it is not appropriate or possible to carry these items via public transport. Therefore, adequate car parking facilities would be provided at construction site compounds for workers. These facilities would be accommodated within the construction site compounds identified in Table 6.2 of the environmental assessment and are not expected to result in any substantial impacts beyond those already considered in the environmental assessment. Any associated construction traffic or noise would be managed through standard measures in the environmental management plans for the project.

### **4.5.4 Safety measures for cyclists**

Section 9.7.2 of the environmental assessment states that concrete barriers would be erected to provide safe separation distances for cyclists for different travel speeds. To clarify, barriers would only be erected where works are being undertaken affecting the shoulder and/or outer lanes and where this is considered to be the appropriate safety measure. Barriers would not be erected where works are taking place in the median (refer Figure 6.2 of the environmental assessment) and the shoulder would continue to be available for cyclist use (that is, the existing situation would be retained).

### **4.5.5 Variable message sign localities**

A detailed locality based assessment of variable message signs was undertaken as part of the environmental assessment. This included direct consultation with potentially affected residents, visual impact assessment and assessment of other aspects. A more detailed assessment of potential heritage impacts associated with some variable message sign localities has been undertaken and is summarised below.

The environmental assessment described the localities of variable message signs and the general area was represented on figures within the environmental assessment. However, it should be noted that the localities of some of the variable message signs as shown in the environmental assessment figures were incorrect. However, environmental assessment of the variable message signs, and community consultation, was undertaken on the correct localities. The variable message sign localities are confirmed in Figure 4.1.

### **Non-Aboriginal heritage review**

Section 9.6.2 of the environmental assessment indicated there might be limited visual impacts on heritage items caused by the introduction of a number of variable message signs near listed heritage items. The localities of four variable message signs (identified as variable message signs 1, 3, 4 and 16) were identified as near known heritage items.

Targeted heritage investigations have now been undertaken on the four identified variable message sign localities by specialist heritage consultants to determine whether the introduction of the variable message signs would detract from the heritage setting of the heritage items (refer Appendix D). It was concluded that

there would not be impacts on the significance of heritage items. One variable message sign locality is near the heritage listed Kitchener House (Moorebank Avenue), but appropriate siting of the sign within the locality can avoid adverse impacts.

The environmental assessment of the four variable message signs, as well as the targeted investigations referred to above have been conducted on general localities for each sign. This means that there is scope to refine the location of variable message signs within each locality without increasing potential impacts. As a result of the heritage review, statement of commitment (NH2) has been updated and states that 'if during detailed design, there is a need to site variable message signs in areas outside those assessed in the environmental assessment, they would be located to avoid visual impacts on heritage items, wherever possible'.

#### 4.5.6 Vegetation clearance

Table 6 through to Table 13 of the biodiversity working paper (Appendix G to the environmental assessment) identified vegetation communities that would be affected by the project and vegetation clearance required for specific project elements. This information is also reproduced in Table 8.28 and Table 8.29 of the environmental assessment. In reviewing this information it was found that the extent of vegetation clearance identified in the biodiversity working paper did not include clearing required for the following project elements:

- A proposed stockpile area on the northern side of the motorway generally opposite the toll plaza at Hammondville.
- Two areas of pavement widening on the southern side of the motorway required for management of motorist line of sight requirements, namely:
  - An area between about 25 Grove Street, Casula and the proposed M5 / Graham Avenue construction site compound (1).
  - An area of 780 metres between Queen Street and Beaconsfield Street, Revesby.
- Widening for an on ramp from the M7 Motorway on the northern side of the M5 South West Motorway for about 380 metres between Beech Road and Box Road, Casula.

These areas were identified and considered in the environmental assessment, however were not included in clearing area calculations.

The extent of vegetation clearance required for the preferred project is confirmed in Table 4.3. The areas identified include the above project elements as well as any additional vegetation removal required by project changes (new or augmented noise walls etc) discussed in previous sections of this preferred project report. Appendix E concludes that there would not likely be any significant impacts from the minor additional clearing required for these additional works.

**Table 4.3** Vegetation communities affected by the project

Vegetation community	Conservation significance	Area identified for removal in the EA (ha)	Updated area identified for removal (ha) in the PPR
Castlereagh Scribbly Gum Woodland	Not listed under legislation	0.66	0.66
Cooks River/Castlereagh Ironbark Forest	Endangered under the TSC Act	0.27	0.27
Cumberland Plain Woodland	Critically endangered under the EPBC Act and TSC Act	0.33	0

Vegetation community	Conservation significance	Area identified for removal in the EA (ha)	Updated area identified for removal (ha) in the PPR
River Flat Eucalypt Forest	Endangered under the TSC Act	0.14	0.14
Shale Gravel Transition Forest	Endangered under the TSC Act, Critically endangered under the EPBC Act	0	0.02
Swamp Oak Floodplain Forest	Endangered under the TSC Act	0.18	0.18
Landscaping	Not listed under legislation	9.8	12.8
<b>Total</b>		<b>11.38</b>	<b>14.07</b>

## 4.6 Environmental management clarifications

This section clarifies some mitigation and management measures that were described in the environmental assessment report and working papers.

As a general note, recommendations and other measures identified in technical working papers were included in the environmental assessment report as commitments where appropriate. In the event of a conflict between the main environmental assessment volume and the working papers, the environmental assessment prevails.

### 4.6.1 Green and golden bell frog mitigation measures

Table 8.30 of the environmental assessment referred to a targeted survey for the green and golden bell frog. A targeted survey was undertaken over four non-consecutive nights in December 2010 and January 2011, during conditions considered reasonable for frog activity. The surveys were undertaken in areas that were previously identified in the environmental assessment as potential frog habitat. The results of the survey will inform the preparation of a construction phase green and golden bell frog management plan.

The nearest known population of the green and golden bell frog is located near Hammondville in the vicinity of Lieutenant Cantello Reserve and Voyager Point, approximately 800 metres from the project. No Green and Golden Bell Frogs were recorded during nocturnal call-playback surveys or during spotlighting. Similarly, no frogs, tadpoles or eggs were found during night time searches.

Table 8.30 of the environmental assessment states that if any green and golden bell frog is observed during construction, work would cease immediately and the Office of Environment and Heritage would be consulted. A contingency plan to cover the potential for finding a green and golden bell frog on site would be included in the management plan discussed above. To clarify, work would therefore stop only in the immediate vicinity of the find (not along the entire project corridor) so that the project manager could implement the contingency plan.

### 4.6.2 Aboriginal heritage management measures

Section 9.4.5 of the environmental assessment indicated that where detailed design of drainage basins identifies the need to impact intact vegetation on either side of Georges River east (Hammondville and/or Milperra), either side of Georges River west or the 'island' in the middle of the Salt Pan Creek, further archaeological investigations and consultation with the Aboriginal community will be undertaken. For clarity, the reference to 'intact vegetation' refers to previously undisturbed areas of native vegetation. The concept

design is confined to previously disturbed areas and therefore this requirement for further assessment would only be triggered if further refinements to the concept design are made during detailed design.

### 4.6.3 Contamination management

Section 9.1.1 of the environmental assessment reported the results of contamination testing undertaken for some sections of the M5 South West Motorway central median. Notwithstanding a commitment for further contamination testing and assessment to be undertaken during detailed design was included. Further, it was stated that this testing would focus on areas not already considered, such as drainage basin locations, and would be aimed at assisting in the classification of waste and assessing its suitability for re-use.

Further specific contamination testing is not proposed during detailed design as, based on preliminary site testing, it is not warranted. Further contamination testing may be undertaken during construction to assist in the classification of waste and assessing its suitability for re-use.

### 4.6.4 Spoil reuse sites

#### Spoil reuse sites near De Meyrick Avenue underpass

Figure 8 of the biodiversity working paper identified two small areas of Cumberland Plain Woodland, one to the north and one to the south of De Meyrick Avenue with medium confidence. The environmental assessment indicated that these areas of Cumberland Plain Woodland would be affected as a result of the introduction of spoil reuse sites. In re-visiting these areas, the ecologist found that the majority of vegetation in these areas has been planted as part of the original M5 South West Motorway landscaping and is of no ecological significance. This finding excludes the following:

- One remnant Grey Box (*Eucalyptus moluccana*) individual in the southern area of Cumberland Plain Woodland.
- One remnant Grey Box and one remnant Forest Red Gum (*Eucalyptus tereticornis*) in the northern area of Cumberland Plain Woodland.

The total extent of Cumberland Plain Woodland requiring removal from this site would therefore be reduced from 0.33 hectares (refer Table 8.29 of the environmental assessment) to 0 hectares.

The revised biodiversity working paper (refer Appendix E) determined that as the previously identified areas of Cumberland Plain Woodland were predominantly landscaping, clearing this small area of vegetation would not be a significant impact.

The three remnant trees identified above would be fenced off during construction at their drip-line to limit disturbance to their root systems.

#### Use of compound site south of Graham Avenue for spoil reuse

The environmental assessment assessed the impact of the removal of a small area (0.3 hectares) of Cumberland Plain Woodland within the corridor to the south of Graham Avenue for a proposed compound site (refer Table 6.2 of the environmental assessment). It is now proposed to use part of this site as a spoil reuse site. This is shown in Figure 4.1

The biodiversity review found that this small area of vegetation contained native species indicative of Cumberland Plain Woodland from all structural layers and is considered to meet the NSW *Threatened Species Conservation Act, 1995* criteria for this community. However, due to its' small size this area of vegetation was not considered large enough to meet the Commonwealth *Environmental Protection and Biodiversity Conservation Act, 1999* criteria for this critically endangered ecological community.

The clearing of this small area of Cumberland Plain Woodland was determined not to be a significant impact in the biodiversity working paper (September 2010).

The site would be revegetated following construction and dust management measures would be implemented to minimise impacts prior to these landscaping works. Construction scheduling would minimise access to the sites outside of standard work hours to limit any noise effects on nearby residents.

### **Additional spoil reuse site to the north of Graham Avenue**

An additional spoil reuse site for the project has been identified to the north of Graham Avenue and is shown in Figure 4.1.

The site would be north of the motorway in an unused area of the reservation for Liverpool Street, between Angelo Avenue and Amalfi Street. The spoil would be about three metres high, with landscaping to minimise visual impacts.

The site would conform to the details in section 6.4.2 of the environmental assessment, which states that material excavated from the corridor would be re-used on site for noise mounds or to stabilise batters. The visual impact of the site would be classified as medium, according to the assessment criteria outlined in Appendix H to the environmental assessment. The reuse site would be expected to have noise mitigating properties, however this has not been assessed or taken into account in the revised noise assessment.

Access to the additional spoil reuse site would be from the M5 South West Motorway, in accordance with the access arrangement identified for the Graham Avenue construction site compounds in Table 6.2 of the environmental assessment. This would minimise any traffic impacts on local streets.

The construction of spoil mounds may cause some limited visual impact for residents in Angelo Avenue and Amalfi Street. However, these impacts would be predominantly during the construction period prior to rehabilitation and landscaping taking place.

The site would be revegetated following construction and dust management measures would be implemented to minimise impacts prior to these landscaping works. Construction scheduling would minimise access to the site outside of standard work hours to limit any noise effects on nearby residents.

## **4.7 Preferred project justification**

The preferred project includes a number of changes to further improve outcomes for road users and minimise impacts on communities near the motorway and the environment.

In summary:

- Changes to the approach for noise attenuation along the corridor would see all residential areas receive noise barriers along the motorway where widening is proposed and a majority of existing barriers increased in height. This would be coupled with architectural treatments for sensitive receivers experiencing acute noise levels and those where the 2 dBA allowance criteria would be exceeded after the effect of the new and higher noise walls has been taken into account.

From a visual perspective, the loss of trees and shrubs for new and augmented noise walls would make the walls a more dominant feature but this would be addressed through a design and landscape response (refer 4.1.2). Ecological impacts associated with this part of the preferred project have been assessed and are not considered significant (refer 4.5.6).

- More detailed traffic modelling indicates that widening to three lanes between Fairford Road and King Georges Road delivers additional travel time savings over the length of the project for motorway users (refer section 4.2.3). The largest travel time savings associated with the additional widening are between Henry Lawson Drive and the River Road. However, the preferred project will increase travel times for

some short trips and potentially increase congestion in the eastern end of the project and surrounding roads.

Widening eastbound between Fairford Road and King Georges Road can be achieved by line marking changes and, as a result, construction disturbance would be minimal. Noise modelling has considered the operational noise implications of the additional widening and as part of the preferred project both new and augmented noise walls are now proposed in this section of the motorway (refer section 4.1.2).

- Changes to selected drainage basins along the motorway would assist the management of surface runoff and the impact of pollutants on receiving waterways. Impacts associated with this change have been identified as minor and would be largely limited to the construction period (refer 4.3.2).
- Changes to the configuration of the Hammondville toll plaza would assist traffic flow in this section of the motorway through the provision of additional free flow lanes. The visual change associated with this refinement is minor and there would be no additional biodiversity or heritage impacts (refer section 4.4.2).

On balance, it is considered that the preferred project would minimise environmental impacts. The benefits of lower travel times over the length of the project, improved noise mitigation and better management of runoff are considered to outweigh adverse impacts. In addition construction phase impacts will be minimal and can be adequately addressed through the proposed safeguards and mitigation measures.

## 5 Revised statement of commitments

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The environmental assessment for the M5 West widening identified a range of environmental outcomes and management measures that would be required to avoid or reduce the environmental impacts.

After consideration of the issues raised in the public submissions, the draft statement of commitments for the project (refer to Chapter 11 of the environmental assessment) has been revised. Should the project be approved, the revised commitments will guide the subsequent phases of the M5 West widening.

The following definitions apply in relation to the revised statement of commitments:

Stage	Definition
Pre-construction	Work in respect of the project that includes design, survey, acquisitions, fencing, investigative drilling or excavation, building/road dilapidation surveys, minor clearing (except where threatened species, populations or ecological communities would be affected), establishing ancillary facilities such as site compounds in locations which meet criteria identified in the environmental assessment, or other relevant activities determined to have minimal environmental impact (eg minor access tracks and adjustments to services/utilities etc).
Construction	All work in respect of the project other than that defined as a pre-construction activity/work.
Operation	The operation of the project, but not including commissioning trials of equipment, or temporary use of parts of the project during construction.

The revised statement of commitments, including commitments relating to the key issues described in the Director-General's environmental assessment requirements is provided in Table 5.1. Modified commitments are shown in *italics*.

**Table 5.1** Revised statement of commitments

Outcome	Reference	Commitment	Timing	Guiding principle
<b>Environmental management</b>				
Compliance and continuous improvement in environmental management.	EM1	The head contractor for the project will have an environmental management system.	Pre-construction and construction	<ul style="list-style-type: none"> <li>ISO 14001:2004 Environmental Management Systems – requirements with guidance for use.</li> <li>ISO 19011:2003 – Guidelines for Quality and/or Environmental Management Systems Auditing.</li> <li>RTA QA specification G36 – environmental protection.</li> </ul>
	EM2	Environmental management plans will be developed and implemented by suitably qualified and experienced personnel and will incorporate, as a minimum, the mitigation and management measures adopted in the environmental assessment.	Pre-construction and construction	<ul style="list-style-type: none"> <li>Guideline for the Preparation of Environmental Management Plans (DIPNR, 2004).</li> <li>RTA QA specification G36 – environmental protection.</li> </ul>
	EM4	All construction personnel will receive training regarding environmental management during project induction. Additionally, targeted environmental task-specific training will be provided to appropriate personnel.	Pre-construction and construction	
<b>Community engagement</b>				
Informed community.	CE1	The community will be provided with regular project updates, given prior notice of project activities and provided contact details for enquiries. Where required, affected individuals or groups will be consulted directly and provided with targeted notifications (eg pedestrians, bicycle user groups, noise affected residents etc.)	Pre-construction and construction	<ul style="list-style-type: none"> <li>Community Involvement and Communications. Draft: A resource manual for staff (RTA, 2008h).</li> <li>AS 4269 Complaints Handling.</li> </ul>

Outcome	Reference	Commitment	Timing	Guiding principle
	CE2	<p>An enquiries and complaints management system will be implemented and maintained throughout construction, including:</p> <ul style="list-style-type: none"> <li>• A 24-hour, 1800 telephone number.</li> <li>• A system to receive, record, track and respond to enquiries or complaints within a specified timeframe.</li> <li>• Acknowledgement of complaints within 24 hours and a process for responding to the complainant within 10 days.</li> </ul>	Pre-construction and construction	<ul style="list-style-type: none"> <li>• Community Involvement and Communications. Draft: A resource manual for staff (RTA, 2008).</li> <li>• AS 4269 – Complaints Handling.</li> </ul>
<b>Construction traffic and transport</b>				
Minimised traffic disruption on the M5 South West Motorway.	T1	A minimum of two traffic lanes in each direction will be available every weekday during peak periods.	Construction	<ul style="list-style-type: none"> <li>• AS 1742, Part 3 – Manual of uniform traffic control devices.</li> </ul>
Minimised traffic disruption on non-motorway roads.	T2	The impact on non-motorway roads will be minimised by using the motorway to access workites where practicable.	Construction	<ul style="list-style-type: none"> <li>• AS 1742, Part 3 – Manual of uniform traffic control devices.</li> <li>• Scope of works and technical criteria.</li> </ul>
Minimised impacts on cyclists.	T3	<del>An on-motorway route for cyclists will be maintained and sign posted during construction.</del> Cyclist access to the motorway shoulder will be maintained during construction where possible. In the event that on-motorway access cannot be maintained, an appropriate alternative off-motorway route will be developed in consultation with relevant stakeholders.	Pre-construction and construction	<ul style="list-style-type: none"> <li>• Scope of works and technical criteria.</li> </ul>
<b>Operational traffic and transport</b>				
Improved reliability and efficiency for users of the M5 South West Motorway	T5	The operation of the M5 South West Motorway will be monitored following completion of the project and compared to predicted outcomes to identify opportunities for any further operational refinement to optimise the performance of the project.	Operation	

Outcome	Reference	Commitment	Timing	Guiding principle
<b>Construction noise and vibration</b>				
Minimised noise and vibration impacts during construction.	CNI	All feasible and reasonable mitigation and management measures to minimise construction noise and vibration at sensitive receivers will be investigated. Noise and vibration will be monitored at key locations to measure effectiveness against predicted levels. Where required additional feasible and reasonable mitigation measures will be implemented.	Pre-construction and construction	<ul style="list-style-type: none"> <li>• Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration (ANZECC, 1990).</li> <li>• German Standard DIN 4150 Part 3 – Structural Vibration in Buildings.</li> <li>• Interim Construction Noise Guidelines (DECCW, 2009).</li> </ul>
<b>Operational noise</b>				
Operational noise and vibration managed.	ONI	All feasible and reasonable mitigation measures will be developed and investigated to meet the noise criteria applicable to the project. Where property treatments are considered, they will be undertaken in consultation with the affected sensitive receiver.	Pre-construction and construction	<ul style="list-style-type: none"> <li>• RTA Environmental Noise Management Manual (RTA, 2001).</li> <li>• NSW Government's Environmental Criteria for Road Traffic Noise.</li> </ul>
	ON2	Operational noise will be monitored within one year of the project opening. If monitoring indicates that traffic noise levels exceed those predicted, further feasible and reasonable measures will be implemented in consultation with affected sensitive noise receivers.	Operation	<ul style="list-style-type: none"> <li>• Environmental Noise Management Manual (RTA, 2001).</li> <li>• Environmental Criteria for Road Traffic Noise (DECCW, 2010).</li> </ul>
<b>Flora and fauna</b>				
Impacts on flora and fauna managed.	FF1	Native vegetation will be retained where practicable. Areas of vegetation, including Downy Wattle ( <i>Acacia pubescens</i> ) to be retained will be clearly marked in order to reduce the risk of over-clearing.	Pre-construction	<ul style="list-style-type: none"> <li>• RTA QA Specification 40 – Clearing and Grubbing</li> <li>• RTA QA Specification R178 – Vegetation.</li> </ul>
	FF2	Clearing for construction compounds will be minimised by retaining mature trees where feasible within compound sites.	Pre-construction and construction	<ul style="list-style-type: none"> <li>• RTA QA Specification 40 Clearing and Grubbing;</li> <li>• RTA QA Specification R178 – Vegetation.</li> </ul>
	FF3	Preference will be for the use of locally indigenous species in identified revegetation areas. Revegetation and landscaping activities will be undertaken progressively.	Pre-construction and construction	<ul style="list-style-type: none"> <li>• RTA QA Specification 40 – Clearing and Grubbing;</li> <li>• RTA QA Specification R178 – Vegetation.</li> </ul>

Outcome	Reference	Commitment	Timing	Guiding principle
	FF4	An approach to managing potential impacts on <i>Acacia pubescens</i> (Downy Wattle) will be developed in consultation with the Department of Environment, Climate Change and Water. Office of Environment and Heritage (DECCW). The management approach will involve the preparation of a propagation and translocation program for affected Downy Wattle individuals at four sites within the motorway corridor.	Pre-construction, construction and post-construction	<ul style="list-style-type: none"> <li>Guidelines for the Translocation of Threatened Plants in Australia – Second Edition (ANPC, 2004).</li> <li>Principles for the use of biodiversity offsets in NSW (DECCW, 2008).</li> </ul>
	FF5	An approach to manage potential impacts on green and golden bell frogs will be developed. The management approach will involve targeted surveys, mitigation measures and circumstances for the provision of compensatory habitat.	Pre-construction, construction and post-construction	<ul style="list-style-type: none"> <li>Management Plan for the Green and Golden Bell Frog Key Population of the Georges River (DECC, 2008a).</li> <li>Best Practice Green and Golden Bell Frog Habitat Guide (DECC, 2008b).</li> <li>Environmental Impact Assessment Guidelines: Green and Golden Bell Frog <i>Litoria aurea</i> (NPWS, 2003b).</li> <li>Section 8.3 of this environmental assessment.</li> </ul>
<b>Urban design, visual and landscape</b>				
Minimise the visual impact and enhance the character of the road corridor.	UDI	The detailed design will be undertaken with consideration of the visual and urban design objectives and principles for the project.	Pre-construction and construction	<ul style="list-style-type: none"> <li>RTA Urban and Regional Design Practice Notes, <i>Beyond the Pavement</i> (RTA, 1999).</li> <li>Bridge Aesthetics (RTA, 2003).</li> <li>Shotcrete Design Guidelines (RTA, 2005).</li> <li>Noise Wall Design Guidelines (RTA, 2006).</li> <li>Landscape Guidelines (RTA, 2008).</li> </ul>

Outcome	Reference	Commitment	Timing	Guiding principle
	UD2	Variable message signs and other visible elements of the operational maintenance control system will be located and installed with consideration of the visual and urban design objectives and principles for the project.	Pre-construction and construction	<ul style="list-style-type: none"> <li>RTA Urban and Regional Design Practice Notes – Beyond the Pavement (RTA, 1999).</li> <li>Landscape Guidelines (RTA, 2008).</li> <li>Location and Placement of Variable Message Signs, RTA, PN028.</li> <li>Guidelines for the location and placement of variable message signs, RTA, PN028/G.</li> </ul>
<b>Aboriginal heritage</b>				
Potential for impacts on Aboriginal heritage minimised.	AB1	Should any previously unidentified Aboriginal objects or items be located during the works, all work in the vicinity of the find will cease until specialist Aboriginal heritage advice is received.	Pre-construction and construction	<ul style="list-style-type: none"> <li>RTA Heritage Guidelines and National Parks and Wildlife Act 1974.</li> </ul>
	AB2	Should detailed design identify the need to affect any areas not assessed in the environmental assessment, including remnant vegetation in the immediate vicinity of <del>Cedar Road</del> <del>construction compound site</del> <del>at Georges River East</del> , further investigations and consultation with the Aboriginal community will be undertaken prior to the commencement of construction in that area.	Pre-construction and construction	<ul style="list-style-type: none"> <li>Procedure for Aboriginal Cultural Heritage Consultation and Investigation (RTA, 2008).</li> <li>Section 9.5 of the environmental assessment.</li> </ul>
<b>Non-Aboriginal heritage</b>				
Potential for impacts on non-Aboriginal heritage minimised.	NH1	Should any previously unidentified non-Aboriginal objects or items be located during the works, all work in the vicinity of the find will cease until specialist non-Aboriginal heritage advice is received.	Pre-construction and construction	<ul style="list-style-type: none"> <li>RTA Heritage Guidelines and Heritage Act 1977.</li> </ul>
Potential impacts on heritage items minimised.	NH2	<del>During detailed design, new variable message signs</del> <del>if, during detailed design, there is a need to site permanent variable message signs in areas outside those assessed in the environmental assessment, they will be located to avoid visual impacts on heritage items, wherever possible.</del>	Pre-construction	

Outcome	Reference	Commitment	Timing	Guiding principle
<b>Water management and soils</b>				
Risk of erosion and sedimentation minimised.	WS1	Management measures for erosion and sedimentation will be designed and installed in consultation with a soil conservation specialist. A maintenance and inspection program will be developed and implemented to ensure ongoing effectiveness.	Pre-construction and construction	<ul style="list-style-type: none"> <li>Managing Urban Stormwater: Soils and Construction (Landcom, 2005).</li> <li>RTA Code of Practice for Water Management.</li> </ul>
Minimised contamination risk for receiving waters.	WS2	Bunded areas will be used for storage of oils, chemicals, toxic substances, flammable and combustible liquids and potentially hazardous or contaminating activities, including, but not limited to refuelling stations and washing construction vehicles.	Pre-construction and construction	
	WS3	Sediment from existing basins will be cleaned out and taken to a licensed facility prior to the commencement of construction.	Pre-construction and construction	
	WS4	An 'unexpected finds' protocol for contamination will be developed and implemented.	Pre-construction and construction	
Minimised scour impacts.	WS5	Permanent stream protection and/or energy dissipation measures as appropriate will be provided at affected culverts downstream of transverse culvert outlets to minimise scour and erosion of the natural waterways, if required and where sufficient space is available.	Construction and operation	<ul style="list-style-type: none"> <li>RTA QA Specification G38 – Soil and Water Management.</li> </ul>
	WS6	Where practicable, drainage basins will be designed to detain any increase in peak flows attributable to the project and will aim to capture a 'first flush' of roads surfaces.	Construction and operation	
<b>Socio-economic</b>				
Adverse amenity impacts on residents avoided, minimised and managed during construction.	SI	Disturbance to adjacent residents will be minimised by: <ul style="list-style-type: none"> <li>Managing the movement of vehicles (especially outside of standard working hours).</li> <li>Attenuating construction noise, where feasible and reasonable.</li> <li>Managing visual intrusion, dust and light spill.</li> </ul>	Construction	

Outcome	Reference	Commitment	Timing	Guiding principle
<b>Air quality</b>				
Impacts on air quality minimised.	AQ1	Feasible and reasonable mitigation and management measures will be adopted to minimise windblown, traffic-generated or equipment-generated dust and emissions.	Construction	<ul style="list-style-type: none"> <li>Managing Urban Stormwater: Soils and Construction (Landcom, 2005).</li> </ul>
	AQ2	Dust-generating activities will stop where visible dust is being emitted outside the construction corridor with the potential to affect sensitive receivers and areas and when dust suppression methods are ineffective.	Construction	
	AQ3	Dust monitoring will be undertaken at a number of locations along the M5 South West Motorway. These will be compared to pre-construction levels.	Construction	
<b>Waste management</b>				
Waste production minimised.	W1	The 'waste hierarchy' will be adopted during construction and incorporated into work programs, purchase strategies and site inductions, and will be assessed quarterly to identify opportunities for improvement.	Pre-construction	<ul style="list-style-type: none"> <li>NSW Waste and Resource Recovery Strategy 2007 (NSW, WARR).</li> </ul>
<b>Hazards and risks</b>				
Minimised risk of an incident during construction.	H1	All storage areas for hazardous materials will be located an adequate distance away from watercourses and entry points to the stormwater system. Spillages will be contained and collected for disposal.	Pre-construction and construction	<ul style="list-style-type: none"> <li>AS 1940 – The Storage and Handling of Flammable and Combustible Liquids.</li> </ul>
	H2	Appropriate controls will be put in place for all hazardous and potentially contaminating activities to prevent contamination of watercourses.	Construction	
	H3	Site-specific safety issues and personnel responsibilities will be included in the project induction. Safety issues and responsibilities will be included in activity-specific briefings as required.	Construction	<ul style="list-style-type: none"> <li>Occupational Health and Safety Act 2000.</li> <li>Occupational Health and Safety Regulation.</li> </ul>
<b>Climate change</b>				
Greenhouse gas emissions and energy consumption minimised.	GH1	Energy efficient equipment and management measures will be used where feasible and reasonable to reduce greenhouse gas emissions.	Pre-construction and post-construction	

Outcome	Reference	Commitment	Timing	Guiding principle
<b>Property and land use</b>				
Impacts on property owners minimised.	P1	All property acquisitions will be negotiated in accordance with RTA's Land Acquisition Policy, and compensation will be assessed under the provisions of the <i>Land Acquisition (Just Terms Compensation) Act 1991</i> .	Pre-construction	<ul style="list-style-type: none"> <li>RTA Land Acquisition Policy.</li> <li><i>Land Acquisition (Just Terms Compensation) Act 1991</i>.</li> </ul>
	P6	Property access will be maintained for the duration of construction. Temporary access requirements will be assessed, designed and managed and rehabilitation will be prepared in consultation with affected landholders.	Pre-construction and construction	
<b>Ancillary facilities</b>				
Minimise adverse impacts associated with ancillary facilities.	AF1	Ensure the sites for any additional ancillary facilities satisfy the criteria provided in the environmental assessment unless otherwise approved through the construction environmental management plan.	Pre-construction and construction	



## 6 References

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