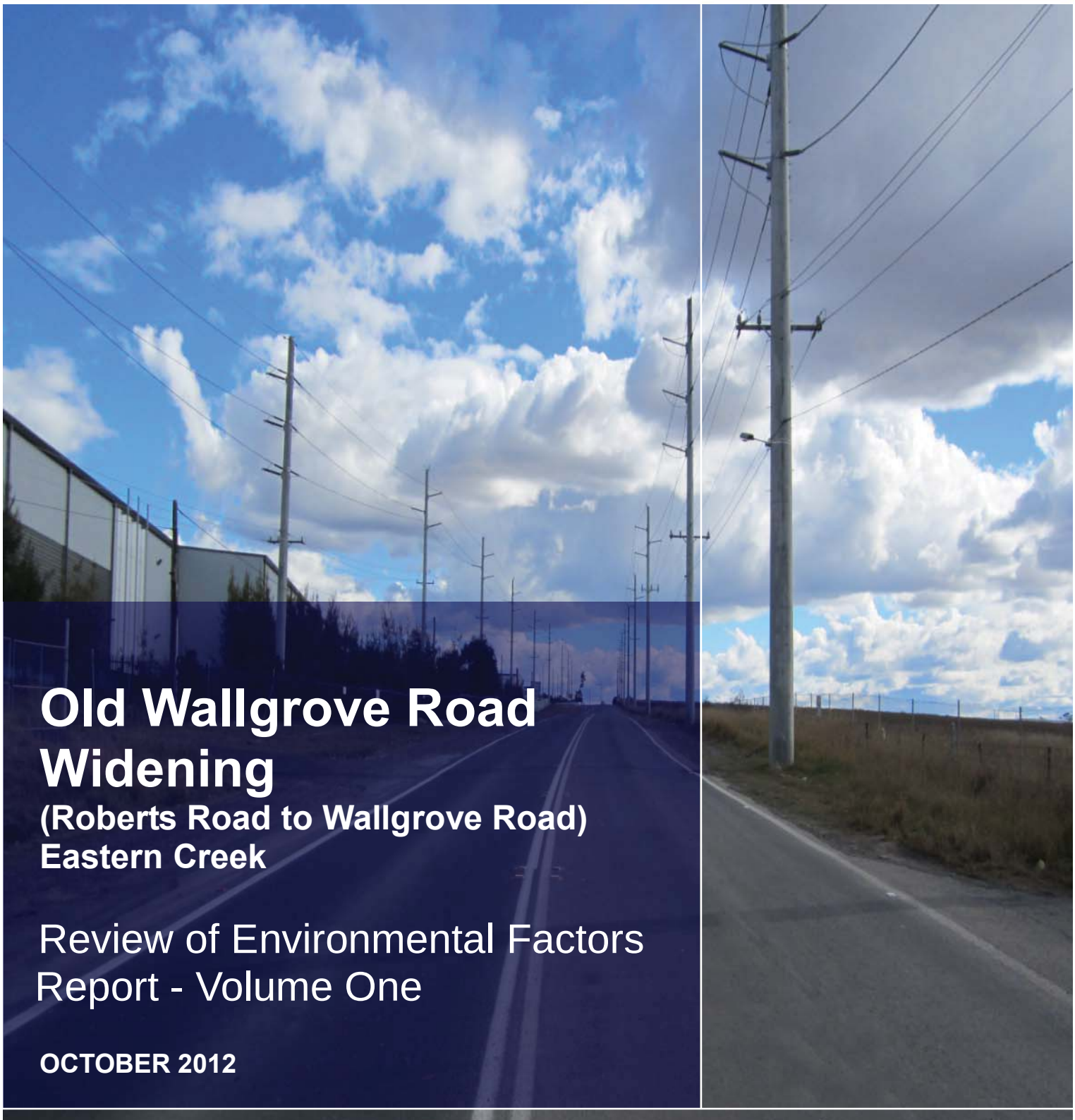
Transport Roads & Maritime Services



Old Wallgrove Road Widening

(Roberts Road to Wallgrove Road) Eastern Creek

Review of Environmental Factors Report - Volume One

OCTOBER 2012

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Roads and Maritime Services

Old Wallgrove Road Widening (Roberts Road – M7 Motorway), Eastern Creek

Review of environmental factors
October 2012

Prepared by

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Executive summary

The proposal

Roads and Maritime Services of NSW (RMS) proposes to widen Old Wallgrove Road between the intersection of Roberts Road and Wallgrove Road. Old Wallgrove Road requires upgrading to accommodate future traffic growth in the Western Sydney Employment Area (WSEA).

The proposal consists of the following features:

- The upgrade of Old Wallgrove Road to four lanes between Roberts Road and Southridge Street and six lanes between Southridge Street and Wallgrove Road within a 40 metre wide road corridor.
- Provision of a wide median between Roberts Road and Southridge Street to facilitate the potential future upgrade of the road to six lanes to accommodate future traffic generated by the WSEA.
- The upgrade of four intersections with local roads (Roberts Road, Eastern Creek Drive, Southridge Street and Quarry Road) to signalised intersections.
- The construction of a new mini-link road between Wallgrove Road (opposite the M7 northbound on/off ramps) and Old Wallgrove Road (opposite Quarry Road).
- The upgrade of a short length of Old Wallgrove Road just west of the intersection with Roberts Road to tie in with the Erskine Park Link Road project.
- The widening of the Reedy Creek Bridge and the duplication of the bridge over Eskdale Creek.
- The widening of Wallgrove Road between Old Wallgrove Road and the mini-link road including tie in works to the north of Wallgrove Road intersection with Old Wallgrove Road and south of Wallgrove Road intersection with the mini-link road.

Need for the proposal

In 2009, the Department of Planning approved the Western Sydney Employment Hub Erskine Park Link Road Network (EPLRN) concept plan environmental assessment (RTA, 2008) which along with other road network upgrades provided for the widening of Old Wallgrove Road. This REF has been prepared for the widening of Old Wallgrove Road, (part of the east-west route connecting Erskine Park Road with the interchange at Wallgrove Road and the M7 Motorway). The proposal has been designed to be consistent with the approved concept plan.

The proposal is required to meet the projected future traffic demand due to the development of the Western Sydney Employment Area (WSEA). A four lane dual carriageway from Erskine Park Road already exists for a distance of around 1.8 kilometres. Construction of the Erskine Park Link Road commenced in mid 2011, to extend this road further east by another 3 kilometres to meet with Old Wallgrove Road, near the Roberts Road intersection. Traffic modelling undertaken by RMS predicts that the last section of the link to the M7 Motorway (i.e. the proposal) would need to be widened to serve industrial complexes being rapidly developed adjacent to the road corridor.

Options considered

The options presented in this REF are limited, as this proposal was required to adopt the approved EPLRN concept plan.

Do nothing

This option consists of not widening Old Wallgrove Road, keeping the road at the current two lanes (one lane in each direction).

Widening of Old Wallgrove Road

Currently, Old Wallgrove Road is a two lane two way road (one lane in each direction) with little to no shoulder and no kerb. The proposal is to widen the road to four lanes (two lanes in each direction) west of Southridge Street and six lanes (three lanes in each direction) between Southridge Street and Wallgrove Road within a 40 metre wide road corridor. A wide median would be provided west of Southridge Street to facilitate the potential future upgrade of the road to six lanes to accommodate future traffic generated by the WSEA.

The proposal would consist of four intersection upgrades including works on side streets at Roberts Road, Eastern Creek Drive, Southridge Street and Quarry Road. A new mini-link road is also proposed between Wallgrove Road (opposite the northbound M7 on/off ramps) and Old Wallgrove Road (opposite Quarry Road), including a left-in/left-out intersection with Capicure Drive. The proposal would also include localised widening of Wallgrove Road including widening of the bridge over Reedy Creek and duplication of the bridge over Eskdale Creek.

The proposal would increase the capacity of Old Wallgrove Road to facilitate the projected future growth of the WSEA and provide capacity for the increase in traffic movements expected from Erskine Park Road to Wallgrove Road and the M7 Motorway. The proposal, in conjunction with the construction of the Erskine Park Link Road, would provide a consistent four lane road from Erskine Park Road to the M7 Motorway.

Statutory and planning framework

The concept plan approval for the EPLRN (August 2009), clause (b) states that "pursuant to s75 P (1) (b) of the *Environmental Planning and Assessment Act* (EP&A Act), further environmental assessment is required for approval to construct components of the concept plan, referred to in Schedule 1 under Part 5 of the EP&A Act (if carried out by or on behalf of a public authority)". As such the proposal is to be assessed under Part 5 of the EP&A Act.

In assessing the proposal and the potential degree of impact, RMS would consider Sections 111 and 112 of the EP&A Act and Clause 228 of the *Environmental Planning and Assessment Regulation 2000* (a checklist of the latter is provided in Appendix A). An environmental impact statement is not required as the assessment contained within the REF concludes that the proposal is unlikely to have a significant impact on the environment.

Community and stakeholder consultation

Consultation through the development of the proposal has consisted of consultation with relevant stakeholders and government agencies. RMS has held meetings with affected landowners and utility providers. Letters were sent out to stakeholders and adjacent landowners during the preparation of this REF. Blacktown City Council was consulted under the provisions of the *State Environmental Planning Policy (Infrastructure)* 2007 (ISEPP).

Six responses were received from stakeholders during the preparation of this REF. Their concerns and issues have been considered in the design of the proposal and in the preparation of the REF.

Environmental impacts

The main environmental impacts that would occur as a result of this proposal are:

- Traffic and access.
- Aboriginal heritage.
- Biodiversity.

Traffic and access

Minor disruption to traffic and accessibility would be experienced during the construction phase of the proposal. During construction, delays in travel time may be experienced due to potential changes in traffic conditions including localised reduction in speed limits. Additionally, a minor temporary increase in traffic may occur from construction and worker vehicles.

Construction would be carried out in a way that would have the least disturbance to local commuter traffic in the area.

Aboriginal heritage

The proposal would impact two Aboriginal heritage items including a disturbed artefact scatter (and associated Potential Archaeological Deposit (PAD) site) and an isolated artefact (known as EPLR2). It appears that the EPLR2 area has had extensive earthworks on the upper part of the soil profile in most areas. This proposal would impact on EPLR2 requiring a section 90 Aboriginal Heritage Impact Permit for the disturbance of the site to be sought prior to construction.

Test excavations of the artefact scatter PAD site was undertaken in conjunction with registered Aboriginal parties. The excavations found that the site has low scientific significance (and research potential).

Biodiversity

The proposal would result in less than one hectare of vegetation removal. Around 0.2 hectares of vegetation to be removed is mapped as the endangered ecological community River Flat Eucalyptus Forest under the *Threatened Species Conservation Act 1995*. The impacted area is highly disturbed with native and exotic grass species, but with impacts to some edge trees of the community. Management measures identified within this REF include limiting vegetation removal to the proposal area and implementing appropriate measures to manage accidental disturbance of vegetation outside the proposal footprint.

Justification and conclusion

A number of potential environmental impacts from the proposal have been avoided or mitigated during the concept design development process. The proposed works as described in the REF best meets the proposal objectives but would still result in some adverse impacts on ecology, traffic and access and on Aboriginal heritage. Mitigation measures as detailed in this REF would ameliorate or minimise potential adverse impacts. The preferred option is required to accommodate the future traffic growth of the WSEA and to meet the planning approval requirements of the EPLRN concept plan. The beneficial impacts of the proposal would include improved connectivity and access in the Western Sydney Employment Area. These beneficial impacts are considered to outweigh the adverse impacts associated with the proposal.

The assessment of the proposal and associated environmental impacts are in accordance with Clause 228 of the *Environmental Planning and Assessment Regulation 2000*, Section 111 of the *Environmental Planning and Assessment Act 1979*, the *Threatened Species Conservation Act 1995* and the *National Parks and Wildlife Act 1974.*

This REF finds that the proposal is unlikely to have a significant impact on the environment and therefore an environmental impact statement (EIS) is not required.

Display of the review of environmental factors

This review of environmental factors is on display for comment between 23 October and 23 November 2012. You can access the documents in the following ways:

Internet

The documents are available as pdf files on the Roads and Maritime Services website at www.rms.nsw.gov.au.

Display

The documents can be viewed at the following locations:

- St Clair Library
- Mount Druitt Library
- Mount Druitt Motor Registry
- Blacktown Motor Registry
- St Marys Motor Registry
- Wetherill Park Motor Registry

How can I make a submission?

To make a submission on the proposal, please send your written comments to:

Old Wallgrove Road Widening project manager:
Roads and Maritime Services
27-31 Argyle Street,
Parramatta NSW 2124
Matty.mathivanar@rms.nsw.gov.au

Submissions must be received by 23 November 2012.

Privacy information

All information included in submissions is collected for the sole purpose of assisting in the assessment of this proposal. The information may be used during the environmental impact assessment process by relevant RMS staff and its contractors.

Where the respondent indicates at the time of supply of information that their submission should be kept confidential, RMS would attempt to keep it confidential. However, there may be legislative or legal justification for the release of the information, for example under the *Government Information (Public Access) Act 2009* or under subpoena or statutory instrument.

The supply of this information is voluntary. Each respondent has free access at all times to the information provided by that respondent but not to any identifying information provided by other respondents if a respondent has indicated that the representation should be kept confidential.

Any respondent may make a correction to the information that they have provided by writing to the same address the submission was sent.

The information would be held at RMS Offices 27-31 Argyle Street, Parramatta.

What happens next?

Following the submissions period, RMS would collate submissions. Acknowledgement letters would be sent to each respondent. The details of submission authors would be retained and authors would be subsequently advised when project information is released.

After consideration of community comments RMS would determine whether the proposal should proceed as proposed, or whether any alterations to the proposal are necessary. The community would be kept informed regarding the RMS determination.

If the proposal is approved, RMS would proceed with final design and call for tenders for construction, followed by construction of the proposal.

If you have any queries, please contact the project manager on (02) 8849 2465.

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Appendices

Figures

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1 Introduction

1.1 Proposal identification

Roads and Maritime Services of NSW (RMS) proposes to widen Old Wallgrove Road between the intersection of Roberts Road and Wallgrove Road (the proposal). The proposal would include a new mini-link road between Old Wallgrove Road and the M7 northbound on/off ramps and localised widening of Wallgrove Road (refer to Figure 1-1). The proposal is required to accommodate future traffic growth in the Western Sydney Employment Area (WSEA). The proposal aims to cater for the staged release of employment lands in the WSEA.

Currently, Old Wallgrove Road is a two lane two way road (one lane in each direction) with little to no shoulder and no kerb. The proposal is to widen the road to four lanes (two lanes in each direction) between Roberts Road and Southridge Street and six lanes (three lanes in each direction) between Southridge Street and Wallgrove Road within a 40 metre wide road corridor. A wide median would be provided west of Southridge Street to facilitate the potential future upgrade of the road to six lanes to accommodate future traffic generated by the WSEA.

The proposal would consist of four intersection upgrades including works on side streets at Roberts Road, Eastern Creek Drive, Southridge Street and Quarry Road. A new mini-link road is also proposed between Wallgrove Road (opposite the northbound M7 on/off ramps) and Old Wallgrove Road (opposite Quarry Road), including a left-in/left-out intersection with Capicure Drive. The proposal would also include localised widening of Wallgrove Road including widening of the bridge over Reedy Creek and duplication of the bridge over Eskdale Creek.

The WSEA is located near the intersection of the M4 and M7 Motorways and is expected to provide more than 2200 hectares of accessible and diverse employment land supporting 40,000 jobs. The area provides well-located, accessible and diverse employment lands to support manufacturing, transport and logistics activities. The area comprises existing land at Greystanes, Huntingwood, Eastern Creek and Erskine Park, as well as newly released land at Ropes Creek and Horsley Park. The WSEA is divided into 8 precincts (refer to Figure 1-2). The proposal falls wholly within Precinct 2- Eastern Creek.

As part of the WSEA planning, a road network through the area was prepared and included construction of new roads and upgrade of existing roads. The road network was known as the EPLRN. In 2006, the then Minister of Planning declared the EPLRN to be a major project to which Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) applied and authorised the preparation of a concept plan for the project.

A concept plan application and concept plan environmental assessment was prepared and lodged in 2007 on behalf of RMS (previously RTA). Following exhibition of the environmental assessment in February 2008, a response to issues raised in public submissions and a Preferred Project Report outlining changes to the proposal, were prepared.

The Minister for Planning approved the road network concept plan for the EPLRN on 11 August 2009 (refer to Figure 2-1). The approved concept plan consisted of:

- An east-west route as an extension of Lenore Lane, connecting Mamre Road and Erskine Park Road with the interchange at Wallgrove Road and the M7 Motorway.
- Eastern and western north-south link roads connecting the Erskine Park Link Road (under construction) to the South-West Precinct of the WSEA.
- A northern access road to Archbold Road connecting the Erskine Park Link Road (under construction) to the M4 Motorway (at a new interchange) and the Great Western Highway.

The Minister's conditions of approval for the concept plan recognised that ongoing issues, namely funding, acquisition and staging of the network could not be resolved by the concept plan, and therefore these issues required further assessment for components of the EPLRN. The conditions of approval identified that project approval of the EPLRN would be subject to Part 5 of the EP&A Act (where the works would be undertaken by a public authority).

This REF has been prepared for the widening of Old Wallgrove Road, (part of the east-west route connecting Erskine Park Road with the interchange at Wallgrove Road and the M7 Motorway). The proposal has been designed to be consistent with the approved concept plan.

The Erskine Park Link Road (an extension of Lenore Lane to Old Wallgrove Road) was the subject of a separate REF which was determined in 2010. Construction began in mid 2011.

Old Wallgrove Road is located at Eastern Creek off Wallgrove Road on land with gently sloping topography and near Reedy Creek and Eskdale Creek. Land within the proposal area has previously been disturbed by land clearing and is currently dominated by industrial development. A small amount of remnant vegetation occurs along Old Wallgrove Road between Roberts Road and Southridge Street. Other adjacent lands are either developed or cleared of vegetation.

The proposal consists of the following features:

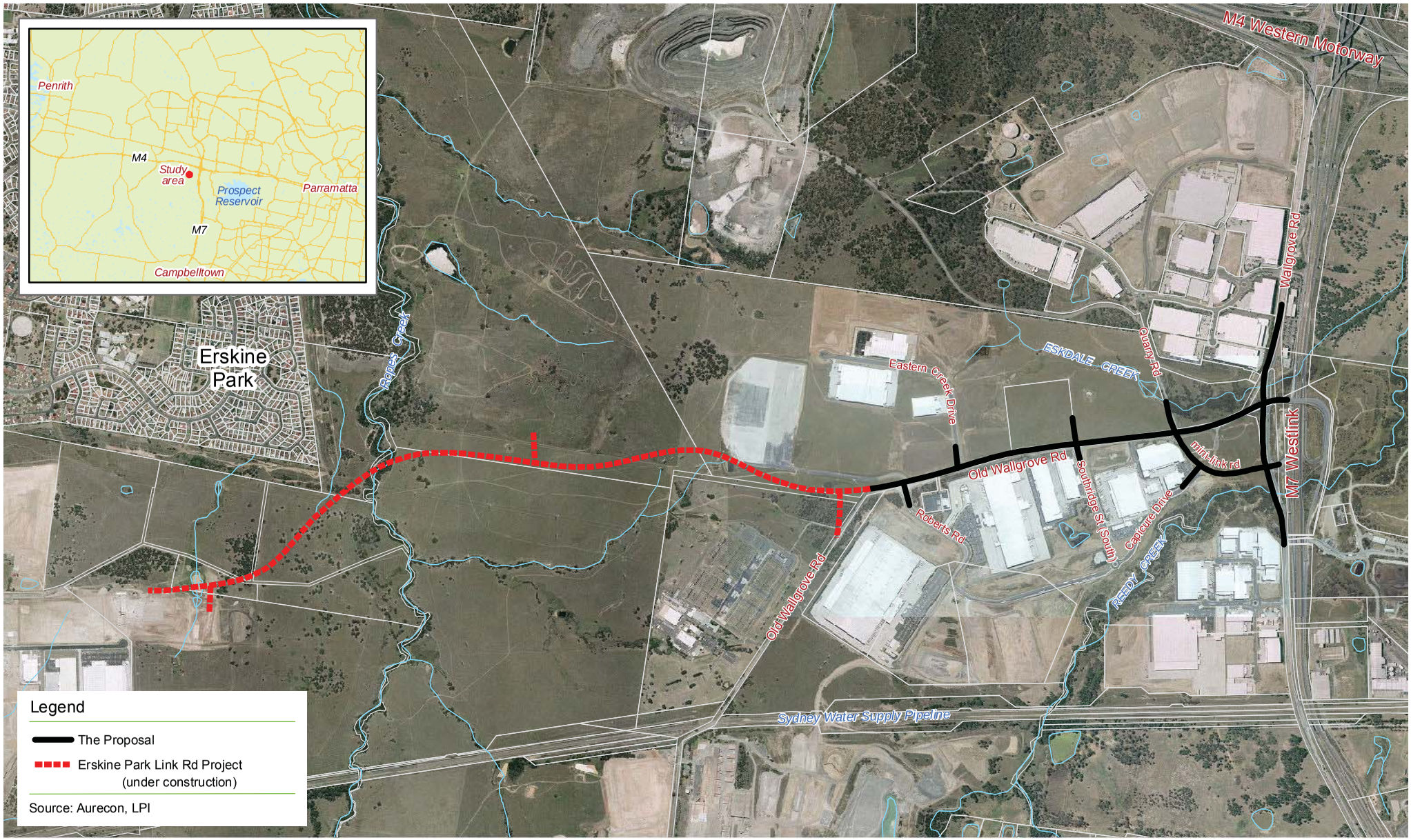
- The upgrade of Old Wallgrove Road to four lanes between Roberts Road and Southridge Street and six lanes between Southridge Street and Wallgrove Road within a 40 metre wide road corridor.
- Provision of a wide median between Roberts Road and Southridge Street to facilitate the potential future upgrade of the road to six lanes to accommodate future traffic generated by the WSEA.
- The upgrade of four intersections with local roads (Roberts Road, Eastern Creek Drive, Southridge Street and Quarry Road) to signalised intersections.
- The construction of a new mini-link road between Wallgrove Road (opposite the M7 northbound on/off ramps) and Old Wallgrove Road (opposite Quarry Road).
- The upgrade of a short length of Old Wallgrove Road just west of the intersection with Roberts Road to tie in with the Erskine Park Link Road project.
- The widening of the Reedy Creek Bridge and the duplication of the bridge over Eskdale Creek.
- The widening of Wallgrove Road between Old Wallgrove Road and the mini-link road including tie in works to the north of Wallgrove Road intersection with

Old Wallgrove Road and south of Wallgrove Road intersection with the mini-link road.

The proposal is shown in Figure 3-1. The design features are described in Chapter 3.

The proposal would be delivered by the NSW Government through an integrated approach involving two government departments. The Land and Property Management Authority would oversee funding and coordination of the proposal as the precinct manager for the WSEA. RMS would manage the land acquisition for the new road, environmental impact assessment, detailed design and construction phase of the proposal.

Construction of the proposal is expected to commence in 2014, subject to the availability of funding. Construction is expected to be over a period of around 24 months.



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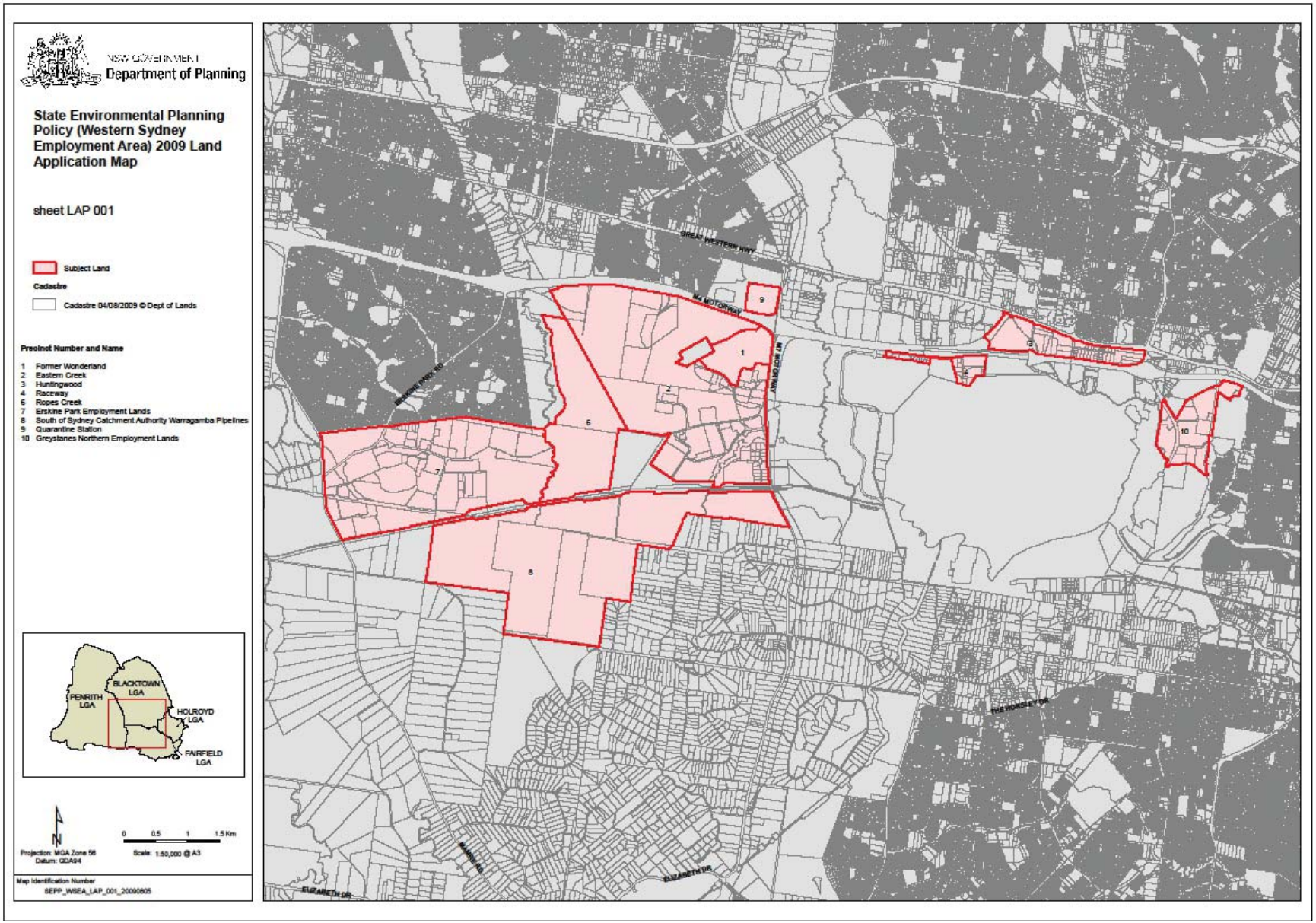
Projection: GDA 1994 MGA Zone 56

Old Wallgrove Road **REF**

FIGURE 1-1: Proposal context



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SCALE
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FIGURE 1-2: Western Sydney Employment Area

1.2 Purpose of the report

This Review of Environmental Factors has been prepared by Aurecon Australia on behalf of RMS Infrastructure Development Section, Sydney. For the purposes of these works, RMS is the proponent and the determining authority under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The purpose of the REF is to describe the proposal, to document the likely impacts of the proposal on the environment, and to detail protective measures to be implemented.

The description of the proposed works and associated environmental impacts have been undertaken in the context of clause 228 of the *Environmental Planning and Assessment Regulation 2000*, the *Threatened Species Conservation Act 1995* (TSC Act), *the Fisheries Management Act 1994* (FM Act), and the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). In doing so, the REF helps to fulfil the requirements of section 111 of the EP&A Act, namely that RMS examines and takes into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

The findings of the REF would be considered when assessing:

- Whether the proposal is likely to have a significant impact on the environment and therefore the necessity for an Environmental Impact Statement to be prepared and approval to be sought from the Minister for Planning and Infrastructure under Part 5.1 of the EP&A Act.
- The significance of any impact on threatened species as defined by the TSC Act and/or FM Act, in section 5A of the EP&A Act and therefore the requirement for a Species Impact Statement.
- The potential for the proposal to significantly impact a matter of national environmental significance or Commonwealth land and the need to make a referral to the Australian Government Department of Sustainability, Environment, Water, Population and Communities for a decision by the Commonwealth Minister for the Environment on whether assessment and approval is required under the EPBC Act.

2 Need and options considered

2.1 Strategic need for the proposal

The proposal is required to meet the planning approval conditions for the *Western Sydney Employment Hub Erskine Park Link Road Network concept plan environmental assessment* (RTA, 2008). The Minister for Planning granted approval for the EPLRN concept plan (refer to Figure 2-1) on 11 August 2009 subject to further environmental assessment being undertaken for components of the proposed road network. This REF has been prepared to meet these planning approval requirements.

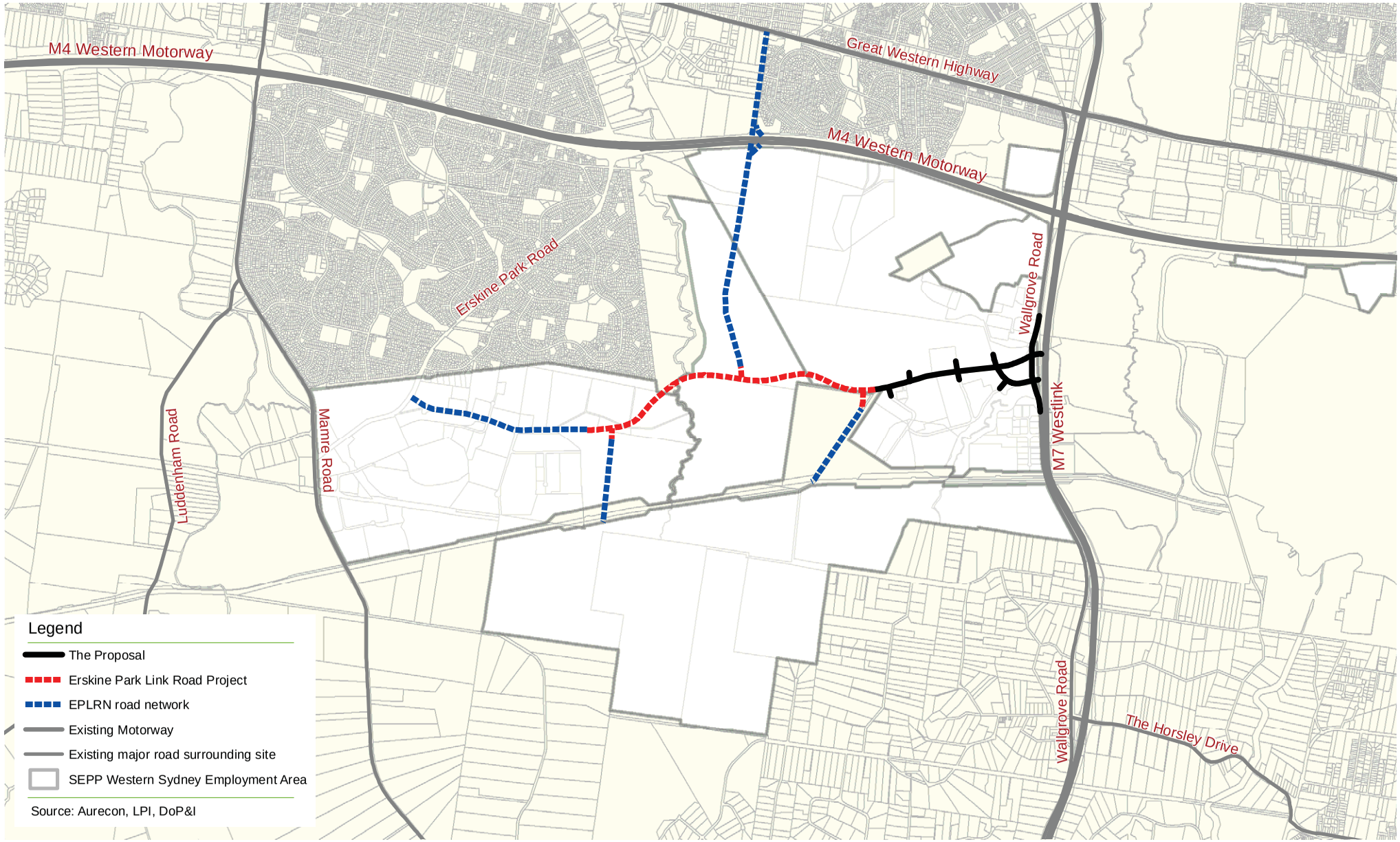
The proposal would facilitate the projected traffic demand generated by the development of the WSEA. The road corridor adopted in the proposal aims to cater for the full development of the WSEA while specifically addressing the traffic needs for the future year 2021. Assumptions with regard to development potential of various precincts in the WSEA for the future year 2021 would include 100 per cent of the Eastern Creek precinct and Erskine Park Employment Area; 67 per cent of the Ropes Creek Precinct and 53 per cent of the lands south of the Sydney Water Pipelines. The proposal has a widened median west of Southridge Street to allow for future upgrading to six lanes (three lanes in each direction) if required due to increased traffic demands once the WSEA is 100 per cent developed.

A four lane dual carriageway (two lanes in each direction) from Lenore Lane already exists for a distance of around 1.8 kilometres. Construction began in mid 2011 to extend this road further east by another three kilometres to meet with Old Wallgrove Road, near the Roberts Road intersection. Traffic modelling predicts that the proposal (to complete this link to the M7) is needed to serve industrial complexes being rapidly developed adjacent to the road corridor.

In 2005, the NSW Government released the *Metropolitan Strategy City of Cities: A Plan for Sydney's Future* (Metropolitan Strategy), which provides a broad framework to facilitate and manage growth and development in metropolitan Sydney until 2031. In 2010, the *Metropolitan Plan for Sydney 2036* (Metropolitan Plan) was released as an update for the Metropolitan Strategy.

The Metropolitan Plan identified that most employment lands are currently within Western Sydney (including the WSEA) (refer to Figure 1-2). The Metropolitan Plan estimated that there would be 1,105,000 jobs in Western Sydney by 2036 representing half of Sydney's population growth. The proposal would assist in achieving these actions by providing improved access to the WSEA from the M7 and M4 motorways.

The proposal would improve access into and throughout the WSEA, providing increased capacity to support future development of the WSEA. It would also provide a consistent driving condition across the entire east –west link between Erskine Park Road and the M7 Motorway.



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Projection: GDA 1994 MGA Zone 56

Old Wallgrove Road **REF**

FIGURE 2-1: EPLRN road network

2.2 Proposal objectives

The proposal objectives are:

- To provide a vital link to connect with the existing road network (the Erskine Park Link Road and the M4 and M7 motorways) and proposed employment lands in the WSEA.
- To ensure the provision of bus, cyclist and pedestrian facilities to connect with existing and planned facilities.
- To comply with the conditions of approval for the EPLRN concept plan environmental assessment.
- To ensure protection of the environment by either avoiding, minimising or mitigating disturbance to environmentally sensitive areas.
- To meet community expectations in relation to the provision of services and facilities.

2.3 Alternatives and options considered

2.3.1 Methodology for selection of preferred option

The EPLRN concept plan was approved in August 2009 and included option selection of the WSEA road network. The options presented in this REF are limited as this proposal was required to adopt the approved EPLRN concept plan.

In developing the EPLRN concept plan, various network options were considered to provide the optimal traffic outcome including external connections for fully developed North-West and South-West precincts of the WSEA.

The general location and layout of the Erskine Park Link Road Network (refer to Figure 2-1) was determined by the Department of Planning and Infrastructure (formerly the Department of Planning) in consultation with the major project stakeholders and in consideration of the environmental and engineering constraints.

Design refinements were made to the network in response to submissions received to the concept plan Part 3A environmental assessment. The route was further refined to minimise impacts to property and to ensure that the development potential of land within the North-West Precinct was maximised by the proposal. The revised concept plan was approved on 11 August 2009 and can be accessed on the Department of Planning and Infrastructure website provided below:
http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=201.

The proposal, in meeting the conditions of approval, adopted the alignment as per the concept plan. As such, the general alignment for the widening of Old Wallgrove Road was already determined and the road design has been developed based on the Part 3A approved alignment.

While the overall alignment was adopted from the concept plan, further design work was undertaken and different lane configurations investigated to provide optimal traffic efficiency.

2.3.2 Identified options

Do nothing

This option consists of not widening Old Wallgrove Road and keeping the road at the current two lanes (one lane in each direction).

Widening of Old Wallgrove Road

The widening of Old Wallgrove Road consists of road widening to four lanes west of Southridge Street and six lanes between Southridge Street and Wallgrove Road within a 40 metre wide road corridor, construction of a new mini-link road and localised widening of Wallgrove Road.

2.3.3 Analysis of options

The Do nothing option would not meet the proposal objectives as it would NOT:

- Provide a vital link to connect the existing road network (the Erskine Park Link Road and the M4 and M7 motorways) with the proposed employment lands in the WSEA.
- Improve bus, cyclist and pedestrian facilities within the WSEA.
- Comply with the conditions of approval for the EPLRN concept plan environmental assessment.
- Meet community expectations in relation to the provision of services and facilities.

The Do Nothing option would result in continuing deterioration of road performance as traffic increases.

The widening Old Wallgrove Road would be required when the Erskine Park Link Road opens to traffic as there would be a four lane divided carriageway from Erskine Park Road to Old Wallgrove Road, forcing traffic on to a two lane section of Old Wallgrove Road. This would impact on the efficiency of access to the WSEA and to the M4 and M7 motorways. The road widening would meet the proposal objectives as it would:

- Provide a vital link to connect with the existing and planned road network (the Erskine Park Link Road and the M4 and M7 motorways) and proposed employment lands in the WSEA.
- Ensure the provision of bus, cyclist and pedestrian facilities connecting with existing facilities on Wallgrove Road and the M7 Motorway.
- Comply with the conditions of approval for the EPLRN concept plan environmental assessment.
- Ensure protection of the environment by either avoiding, minimising or mitigating disturbance to environmentally sensitive areas, with mitigation measures being identified for potential environment impacts.
- Meet community expectations in relation to the provision of services and facilities, by increasing the capacity of Old Wallgrove Road which is required to facilitate the projected future growth of the WSEA.

2.4 Preferred option

The preferred option is to widen Old Wallgrove Road from Roberts Road to Wallgrove Road. This option would meet the proposal objectives, catering for future development of the WSEA and the expected increase in traffic.

The preferred option consists of the following features:

- The upgrade of Old Wallgrove Road to four lanes between Roberts Road and Southridge Street and six lanes between Southridge Street and Wallgrove Road within a 40 metre wide road corridor.
- Provision of a wide median between Roberts Road and Southridge Street to facilitate the potential future upgrade of the road to six lanes to accommodate future traffic generated by the WSEA.
- The upgrade of four intersections with local roads (Roberts Road, Eastern Creek Drive, Southridge Street and Quarry Road) to signalised intersections.
- The construction of a new mini-link road between Wallgrove Road (opposite the M7 northbound on/off ramps) and Old Wallgrove Road (opposite Quarry Road).
- The upgrade of a short length of Old Wallgrove Road just west of the intersection with Roberts Road to tie in with the Erskine Park Link Road project.
- The widening of the Reedy Creek Bridge and the duplication of the bridge over Eskdale Creek.
- The widening of Wallgrove Road between Old Wallgrove Road and the mini-link road including tie in works to the north of Wallgrove Road intersection with Old Wallgrove Road and south of Wallgrove Road intersection with the mini-link road.

2.4.1 Changes to the concept plan

In the development of the concept design for the proposal, there have been a number of minor changes from the approved EPLRN concept plan. These changes are:

- Wallgrove Road would be widened to accommodate left and right turning lanes into Old Wallgrove Road and the mini-link road to ensure the efficient operation of these intersections.
- Bus jump start and bus stop facilities provided at the Old Wallgrove Road intersections with Roberts Road, Eastern Creek Drive, Southridge Street and mini-link road.
- Old Wallgrove Road intersection with Roberts Road: increase of median width to 2.4 metres to provide a safe crossing for pedestrians, as per RMS' current design standards.
- Old Wallgrove Road intersection with Southridge Street: alignment altered to avoid land take at the southwest corner of the intersection and to tie the side road design alignment to the existing road (not present during the concept plan stage).
- Old Wallgrove Road intersection with the mini-link road: alignment altered to match cadastral boundaries and not impact on the existing building (not present during the concept plan stage), inclusion of a through lane from the mini-link road to Quarry Road thus shifting the centreline of Quarry Road two metres to the east.

3 Description of the proposal

3.1 The proposal

The proposal consists of the following features:

- The upgrade of Old Wallgrove Road to four lanes between Roberts Road and Southridge Street and six lanes between Southridge Street and Wallgrove Road within a 40 metre wide road corridor.
- Provision of a wide median between Roberts Road and Southridge Street to facilitate the potential future upgrade of the road to six lanes to accommodate future traffic generated by the WSEA.
- The upgrade of four intersections with local roads (Roberts Road, Eastern Creek Drive, Southridge Street and Quarry Road) to signalised intersections.
- The construction of a new mini-link road between Wallgrove Road (opposite the M7 northbound on/off ramps) and Old Wallgrove Road (opposite Quarry Road).
- The upgrade of a short length of Old Wallgrove Road just west of the intersection with Roberts Road to tie in with the Erskine Park Link Road project.
- The widening of the Reedy Creek Bridge and the duplication of the bridge over Eskdale Creek.
- The widening of Wallgrove Road between Old Wallgrove Road and the mini-link road including tie in works to the north of Wallgrove Road intersection with Old Wallgrove Road and south of Wallgrove Road intersection with the mini-link road.

The proposal is identified in Figure 3-1and Figure 3-2 shows the intersection layouts. Design drawings are attached as Appendix B.

3.1.1 Old Wallgrove Road widening

This involves the widening of around 1.5 kilometres of Old Wallgrove Road to four lanes west of Southridge Street and six lanes between Southridge Street and Wallgrove Road within a 40 metre wide road corridor. The description of the works on Old Wallgrove Road can be divided into various sections:

- Roberts Road to Eastern Creek Drive.
- Eastern Creek Drive to Southridge Street.
- Southridge Street to Quarry Road.
- Quarry Road to Wallgrove Road.

Roberts Road to Eastern Creek Drive

This section of the upgrade would consist of:

- A tie-in to the four lane Erskine Park Link Road (construction to be completed prior to construction of the proposal).
- Generally four lanes, two lanes in each direction.
- A wide median to accommodate future road widening to six lanes within a 40 metre wide road corridor.

- An upgrade of the existing intersection with Roberts Road to a signalised T-intersection, with a dedicated right hand turn lane (50 metres in length) from Old Wallgrove Road into Roberts Road.
- An upgrade of the existing T-intersection at Eastern Creek Drive to a signalised T-intersection with a dedicated right turn lane (220 metres in length) from Old Wallgrove Road into Eastern Creek Drive.
- A retaining wall on the southern side of Old Wallgrove Road.

Eastern Creek Drive to Southridge Street

This section of the upgrade would consist of:

- Generally four lanes, two lanes in each direction.
- A wide median to accommodate future road widening to six lanes within a 40metre wide road corridor.
- An upgrade of the existing T-intersection at Southridge Street to a new four way signalised intersection. A dedicated right turn lane from Old Wallgrove Road into Southridge Street (South) would be provided for a length of 100m metres. A northern stub would be provided for future Southridge Street extension to serve the northern precinct, with dual right hand turn lanes from Old Wallgrove Road over a length of 150 metres.

Southridge Street to Quarry Road

This section of the upgrade would consist of:

- Generally six lanes, three lanes in each direction.
- An upgrade of the existing T-intersection at Quarry Road to a new four way signalised intersection to include the mini-link road to the south. One right turn lane from Old Wallgrove Road into Quarry Road would be provided (110 metres in length). One dedicated left turn lane from Old Wallgrove Road would be provided into Quarry Road. Dual right turn lanes (160 metres in length) and one left turn lane from Old Wallgrove Road into the mini-link road would be provided.

Quarry Road to Wallgrove Road

This section of the upgrade would consist of:

- Generally six lanes, three lanes in each direction.
- An upgrade of the existing Intersection with Wallgrove Road would have increased capacity with two lanes to access the M7 ramp opposite and a slip lane from Old Wallgrove Road turning left onto Wallgrove Road. Due to the changes to this intersection, line marking on the M7 ramp would need to be altered to match the new lane configuration.

Mini-link road

A mini-link road would be provided to connect Old Wallgrove Road to the M7 northbound on/off ramps. This 400 metre long four lane dual carriageway would connect with Old Wallgrove Road at the Quarry Road intersection.

Along the mini-link road, there would be three intersections, consisting of:

- A new intersection on Wallgrove Road, opposite the M7 northbound on/off ramps. Dual right turn lanes (100 metres in length) would be provided on the mini-link road for access south on Wallgrove Road. Two through lanes at the approach - one lane would be a through lane to access the M7 Motorway. The kerbside lane would access the M7 Motorway and Wallgrove Road (north). From Wallgrove Road, two dedicated right hand turn lanes (70 metres in length) and a left hand turn slip lane (105 metres) into the mini-link road would be provided. Line marking on the M7 ramp would need to be altered to match the lane configuration of the intersection.
- A new intersection with Old Wallgrove Road and Quarry Road with two lanes turning west into Old Wallgrove Road and one lane to access Quarry Road. No right turn movements into Old Wallgrove Road would be permitted.
- A left in/left out intersection at Capicure Drive by removing the existing Capicure Drive cul-de-sac and extending the road to meet with the mini-link road.

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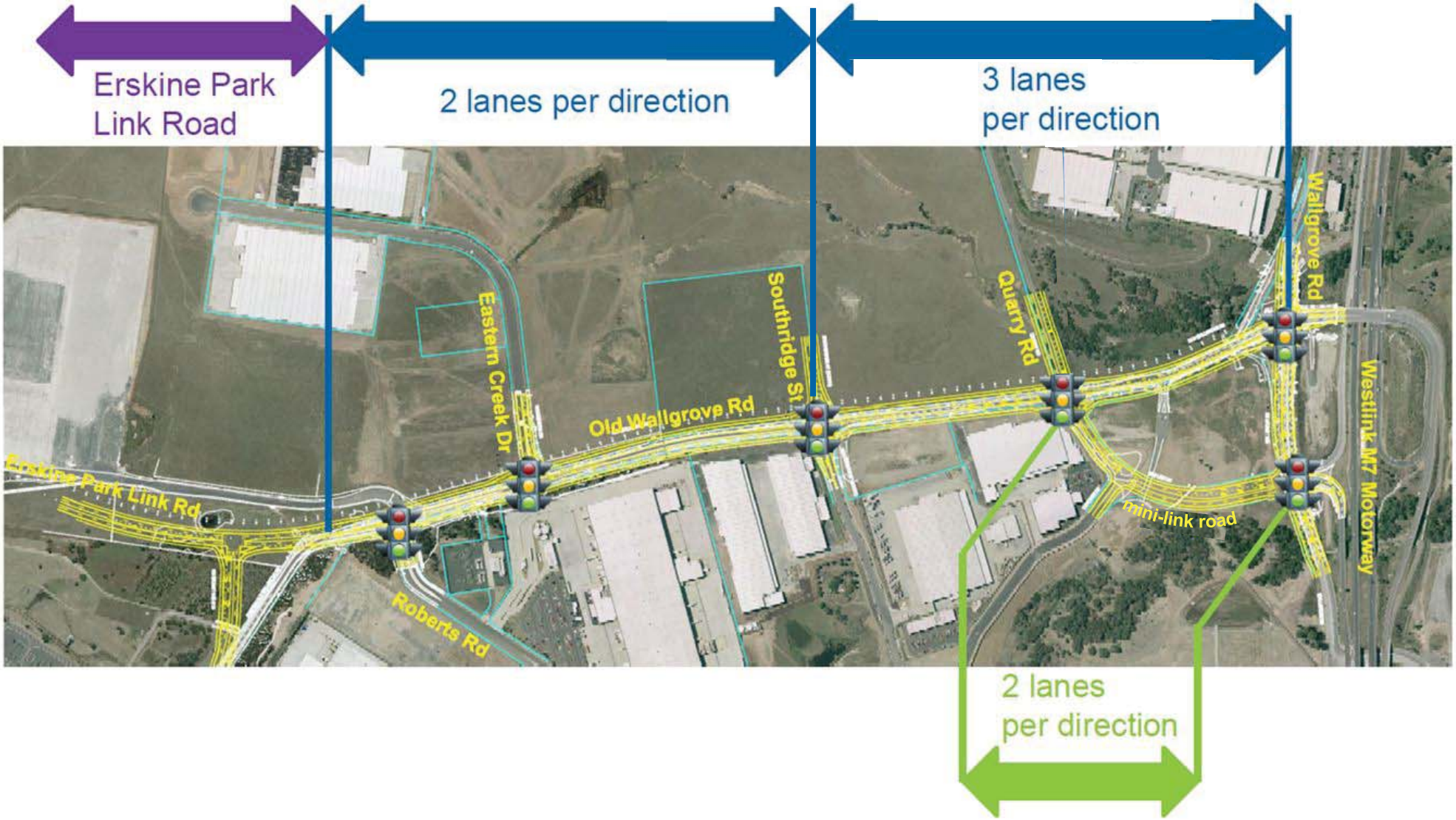
Projection: GDA 1994 MGA Zone 56

Old Wallgrove Road **REF**

FIGURE 3-1: The proposal



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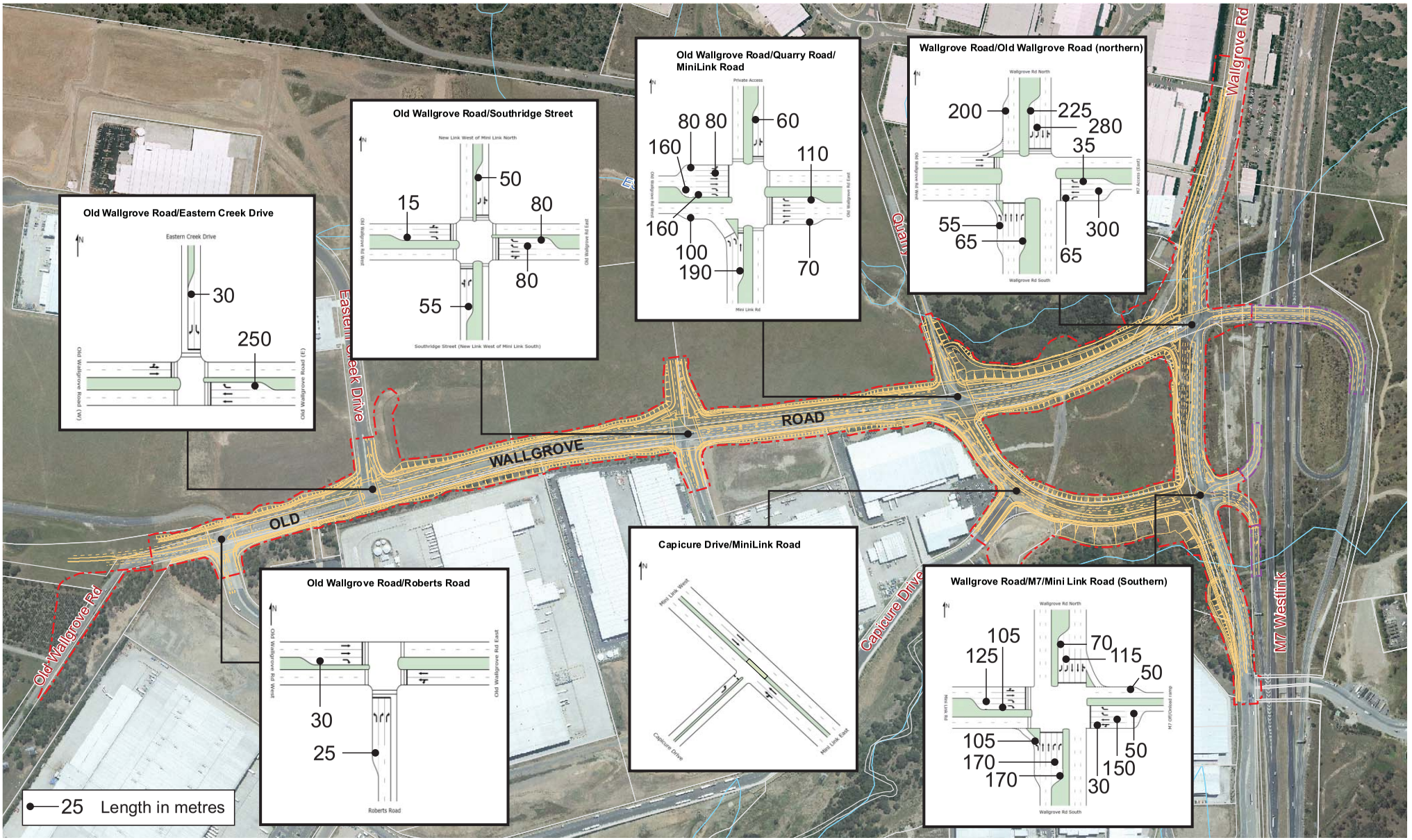
Source: GHD Traffic and Transport Report - 30 April 2012

Old Wallgrove Road **REF**

FIGURE 3-2: Proposed Lane Configurations



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SCALE

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Old Wallgrove Road **REF**

FIGURE 3-3: Intersection layouts

Wallgrove Road

Localised widening (of around 930 metres) would be required on Wallgrove Road from south of the mini-link road to north of the Old Wallgrove Road intersection. The widening would consist of three lanes for north and south bound traffic, with dedicated turning lanes into Old Wallgrove Road and the mini-link road. This would enable the efficient operation of the intersections.

Wallgrove Road (northbound) would have

- A dedicated left turn lane into the mini-link road for a distance of around 100 metres.
- Dual right turn lanes into the M7 Motorway.
- A dedicated left turn lane into Old Wallgrove Road of around 80 metres.

Wallgrove Road (southbound) would have:

- Dual right turn lanes into Old Wallgrove Road for a distance of around 225 metres (refer to Figure 3 5).
- Dual right turn lanes into the mini-link road for a distance of around 80 metres

The Wallgrove Road bridge over Eskdale Creek is to be duplicated (ie a separate bridge structure is to be constructed) to the west of the existing bridge. The bridge would be a three span plank bridge around 45 metres long and 19 metres wide to match the existing bridge. The new bridge would be separated from the existing bridge by 1.2 metres. This distance would be covered by galvanised iron mesh. The bridge would consist of precast concrete plank girders, circular piers and in-situ concrete piles. The bridge abutments would be the same as the existing abutments and similar scour protection would be provided (refer to the design drawings in Appendix B).

The bridge passing over Reedy Creek would be widened as part of the proposal. The bridge structure would be widened by around 22 metres to the west, consisting of five spans and match the existing 73 metres length of the existing bridge. The bridge would consist of precast planks, in situ concrete headstock and bored piles. Spill through abutments would be constructed and scour protection provided (refer to the design drawings in Appendix B).

Bus, pedestrian and cyclist facilities

Bus priority measures would be included at intersections along Old Wallgrove Road. This would consist of bus stops (with no indentation) on the departure side of each intersection and bus ‘jump start’ facilities. The bus stops would consist of a sign and an area for passengers to alight and disembark. No bus shelters would be provided (refer to the design drawings in Appendix B).

A three metre wide shared pathway (pedestrian and cyclist) would be provided along the northern side of Old Wallgrove Road (refer to Figure 3-1). This pathway would connect to signalised intersections (including pedestrian crossings) along Old Wallgrove Road. The shared pathway would connect to the shared pathway of the Erskine Park Link Road and via Wallgrove Road to the M7 Motorway shared pathway. A further link is provided along the west of Wallgrove Road south to the mini-link road and into Capicure Drive.

Associated works

Other associated works as a result of the proposal include:

- Augmentation and installation of cross drainage culvert structures (extending two structures along Old Wallgrove Road, and one new structure along the mini-link road).
- Construction of embankments where required in accordance with the concept designs shown in Appendix B.
- Construction of an access road near Wallgrove Road for the Sydney Water Sewage Pumping Station to the north of Old Wallgrove Road.
- Utility adjustments.
- Installation of road furniture, signage and linemarking.
- Installation of a variable message sign located mid-way between Southridge Street and Quarry Road to the north of Old Wallgrove Road.
- Construction of five temporary sedimentation basins.
- Outlet pavement drainage on northern (downstream) side of proposal at cross drainage (labelled X1) to discharge to future regional stormwater detention basin (by Blacktown City Council).
- To discharge to existing Capicure Drive stormwater detention basin and the M7 Motorway detention basins.
- Construction of a site compound (the area east of the new southern connection off Erskine Park Link Road at its intersection with Old Wallgrove Road corner of Erskine Park Link Road and Roberts Road) that would include stockpile sites.
- Landscaping works generally in accordance with the landscaping strategy.
- Installation of street and shared path lighting as appropriate.

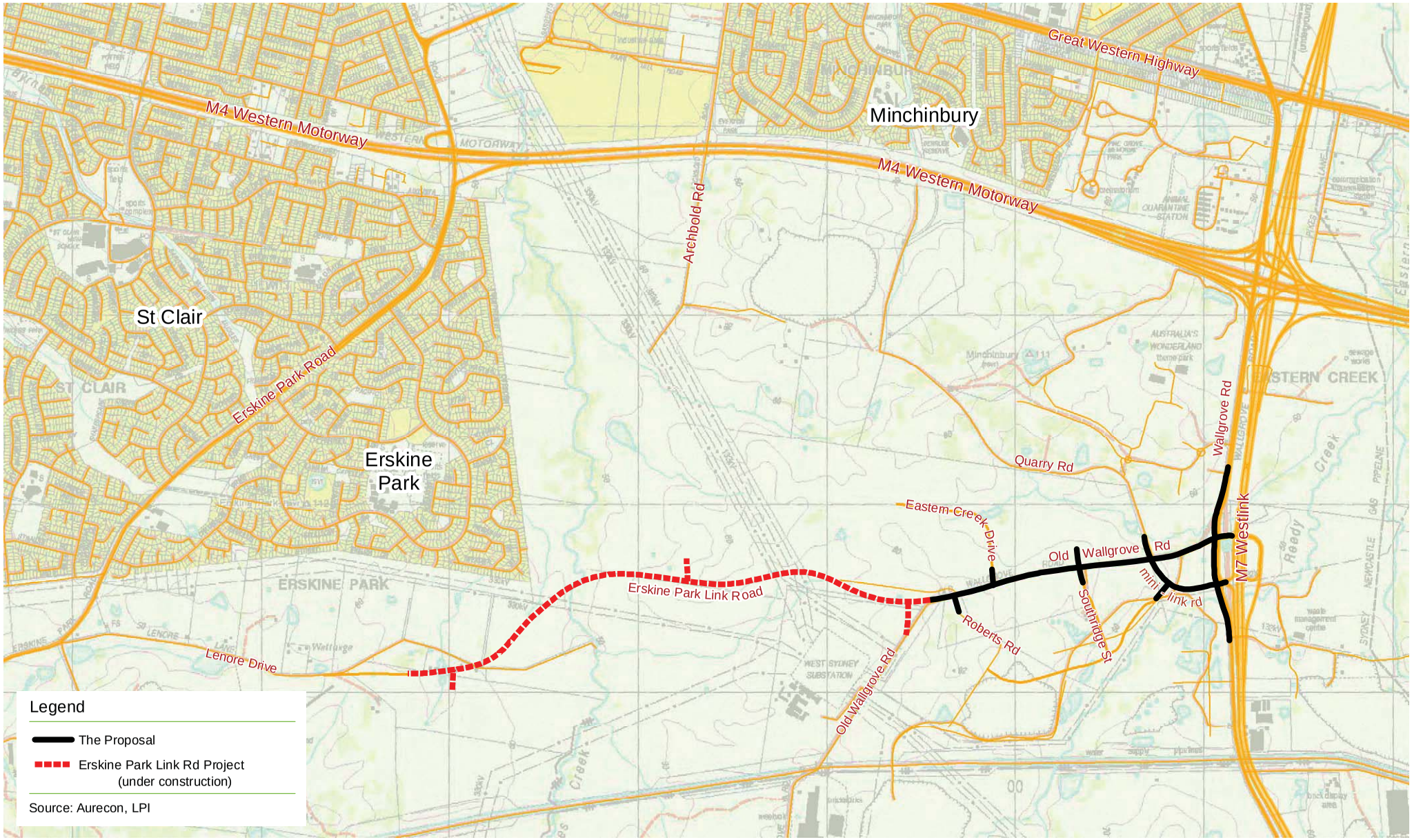
3.2 Existing road and infrastructure

Old Wallgrove Road is located at Eastern Creek off Wallgrove Road. Old Wallgrove Road serves the industrial area of the WSEA. There is open paddock to the north of Old Wallgrove Road. However, this will be developed into industrial precincts. Old Wallgrove Road connects to a number of local roads that also serve the existing industrial area, including Roberts Road, Eastern Creek Drive, Southridge Street, Capicure Drive and Quarry Road.

The existing road network within the vicinity of the proposal is summarised in Table 3-1 and shown in Figure 3-4: .

Table 3-1: Existing road network in the vicinity of the proposal

Road/ classification	Description
M4 Motorway (Freeway)	The M4 Motorway provides intra-regional links from Strathfield to Penrith forming the main east-west route across Sydney. It is an important freight corridor and has three lanes each way with a divided carriageway near the M7 interchange. The speed limit on the M4 Motorway in the vicinity of the Old Wallgrove Road study area is 100 km/h, and it carries around 100,000 vehicles per day.
M7 Motorway (Motorway)	The M7 Motorway provides a key western link between the M2 Motorway (to the north) and the M5 Motorway (to the south). Near the proposal, the M7 Motorway has four traffic lanes with a divided carriageway and a major interchange at the M4 Motorway. The speed limit on the M7 Motorway near the proposal is 100 km/h, and it carries around 70,000 vehicles per day. There is an existing off road shared path to the eastern side of the M7 Motorway to the south of Old Wallgrove Road and along the western side to the north.
Great Western Highway (Arterial road)	Four-lane divided arterial road with a posted speed limit of 80 km/h. The highway is located to the north of the proposal site and generally parallel to the M4 Motorway, with an intersection with Wallgrove Road adjacent to a half interchange with the M7 Motorway.
Wallgrove Road (Arterial road)	Wallgrove Road is a four lane, two way road which connects Elizabeth Drive and the Great Western Highway. Wallgrove Road runs parallel to the M7 Motorway with direct connections to both the M7 and M4 Motorways. The road is divided to the north of Old Wallgrove Road and undivided running south of the Wallgrove Road/M7 Motorway intersection. The speed limit on Wallgrove Road near the Old Wallgrove Road intersection is 70 km/h and it carries around 30,000 vehicles per day. A short section of an off road cycle path is situated on the western side of Wallgrove Road to the south of Old Wallgrove Road.
Erskine Park Link Road (Sub - arterial road (under construction))	Four-lane dual carriageway with a posted speed limit of 80 km/h. The Erskine Park Link Road connects with Erskine Park Road to the west and Old Wallgrove Road to the east. The road provides for intersections to both the southern and northern precincts of the WSEA. A shared pedestrian/cycle path would run along the northern side of the road.
Old Wallgrove Road (Local road)	Two-lane, 2-way undivided local road (with turning lanes into Southridge Street and Roberts Road), with a posted speed limit of 70 km/h. Old Wallgrove Road connects with the M7 Motorway and a number of local roads.
Archbold Road (Local road)	Typically a 2-lane, 2-way, undivided local road, with the exception of a 160 m long single lane section extending south from the M4 Motorway. Archbold Road has a posted speed limit of 50 km/h and is located to the north of the proposal site. The road adjoins the Great Western Highway and crosses over the M4 Motorway via an overpass.
Roberts Road, Eastern Creek Drive, Southridge Street and Quarry Road (Local roads)	Typically 2- lane, 2-way undivided local roads extending from Old Wallgrove Road to surrounding industrial development.



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Projection: GDA 1994 MGA Zone 56

Old Wallgrove Road **REF**

FIGURE 3-4: Road network

3.3 Design

3.3.1 Design criteria

The proposal has been designed against the criteria that meet current design standards. Table 3-2 summarises the design criteria.

Table 3-2: Design criteria

Design element	Required standard
Design speed: Old Wallgrove Road/Wallgrove Road	80 km/h sign posted speed limit.
Design speed: mini-link road and side roads	60 km/h (60 km/h sign posted speed limit).
Grade	0.5 per cent minimum.
	4.0 per cent maximum.
Cross section	Basic configuration of dual divided carriageway, providing two and three travel lanes in each direction.
Kerbside lane width	4.5 metres.
Median lane width	3.5 metres.
Median width	Minimum of 2.4 metres at signalised intersections.
Intersections	Five intersections would be provided.
Tie-ins	Erskine Park Link Road and existing intersection with Wallgrove Road at the western and eastern proposal boundaries respectively.
Road reserve width	40 metres excluding batters.
Property access	No direct driveway connections permitted.
Design life	100 years.
Pavement	Dense grade asphalt wearing surface.
Drainage	Parallel pit and pipe drainage.
Fill/cut batter slope	1 in 4 generally.

3.3.2 Engineering constraints

The engineering constraints for the proposal include:

- Existing road intersections (as identified above).
- Existing infrastructure including adjoining industrial development, telecommunications and electricity utilities passing near and beneath the road (refer to Section 3.6).
- Existing property boundaries and property easements (ie TransGrid and Integral Energy major overhead powerlines) and opportunities for future development.
- Specific geometric road alignment design requirements.

3.3.3 Urban design principles

The urban design principles that were considered in the development of a landscape strategy for this proposal include:

- A single, unified design that would complement to the adjoining Erskine Park Link Road landscape design.
- Reflecting the differences in the existing environment such as topography, and adjacent vegetation communities.
- Conserving and augmenting the existing remnant vegetation near the proposal.

- Structured planting along remainder of road corridor to create visual impact, filter views of future adjacent development and provide shade adjacent to cycle/pedestrian pathway and bus stops.
- Low planting along cut batters adjacent to Eskdale Creek and Reedy Creek to allow clear views to watercourses.
- Low frangible planting in the median and between pedestrian/cycle paths and road to provide a physical buffer while retaining sightlines.
- Low planting only around signalised intersections to retain critical sight lines.
- Low maintenance materials in accordance with RMS Landscape Design Guidelines.
- Plant species to be site appropriate and preferably native.
- Integrating Water Sensitive Urban Design (WSUD) initiatives to relieve pressure on nearby creek systems.
- Cut and fill batters to be no greater than 1:3 (1:4 preferred) to facilitate effective revegetation and on-going maintenance.
- If retaining walls are required, the design of these elements is to be of an appropriate scale and design, and potentially screened with vegetation.
- The profile and detailing of road bridges to be widened are to be similar in character and construction to that of the existing structure. Visually, the bridges are to recede into the broader landscape and minimise their impact on the creek corridors beneath.
- Contribute to the overall quality of the public domain for the community and road users.

The proposed landscape strategy for the proposal is shown in Figure 3-5: .

3.3.4 Drainage design

The drainage design for the proposal is detailed below and shown in Figure 3-6. Further information is provided in the Drainage investigation undertaken for the proposal (Lyall and Associates, 2012) (refer to Appendix C).

The concept drainage strategy consists of:

- Two existing cross drainage structures on Old Wallgrove Road would be upgraded:
  - The first is located immediately to the east of Eastern Creek Drive (labelled X1 on Figure 3-6). A new 900 mm pipe culvert would control runoff from the south of the road corridor.
  - The second is located immediately west of the Wallgrove Road intersection (labelled X2 on Figure 3-6), consisting of two 750 mm concrete pipes. These pipes would be extended to the north and south. New pipes at the same diameter would replace the current 750 mm pipes and extended to cross the increase road width.
- Energy dissipation and scour protection measures in the form of rock riprap would be provided at the outlet of these cross drainage structures.
- There are four locations where the pavement runoff from Old Wallgrove Road would be conveyed by the drainage system and discharge into receiving drainage lines:
  - The first pavement drainage outlet (marked as P1 shown in Figure 3-6) would connect two pavement drainage lines located in the northern and southern kerb line of Old Wallgrove Road west of Roberts Road and would drain into the Erskine Park Link Road pavement drainage system.

  - The second outlet is located immediately east of Eastern Creek Drive (marked as P2 on Figure 3-6) and runoff would join flow discharging from cross drainage structure X1, where it would drain into the proposed Blacktown City Council regional detention basin.
  - The third outlet along Old Wallgrove Road (marked as P3 on Figure 3-6) is located at the Southridge Street intersection, where runoff would be controlled by several inlet pits located in the median and eastern kerbline of Southridge Street.
  - The fourth outlet (marked as P1 on Figure 3-6) would drain to the M7 Motorway basin.
- Cross drainage along Wallgrove Road would comprise the construction of two new high level bridges over Eskdale Creek and Reedy Creek. Scour protection would be placed on the abutments of both bridges, similar to the adjacent bridges on Wallgrove Road and the M7 Motorway. The existing rock weir located within the main channel of Eskdale Creek under the existing Wallgrove Road bridge would not be altered.
- The new pavement drainage system along Wallgrove Road would connect into the existing road drainage system at four locations.
  - The first pavement drainage (marked as P5 on Figure 3-6), located at the northern limit of the proposed road works. The first outlet would discharge into a grass lined channel that would need to be widened to prevent frequent flooding of the Westlink M7 Operations Centre.
  - The second outlet along Wallgrove Road, located at the southern limit of the proposal near where the access road to the Eastern Creek Waste Management Centre crosses beneath the M7 Motorway (marked P6 on Figure 3-6), where this discharges to basin B18.30.
  - The third outlet marked as P7 on Figure 3-6, located immediately south of the mini- link road, into existing basin B18.01 on the eastern side of the road.
  - The fourth outlet marked as P8 on Figure 3-6, located at the southern extent of the works on Wallgrove Road, discharging into the existing basin B 17.80.
- The widening of Wallgrove Road between Old Wallgrove Road and the mini-link road would require the relocation of the centrally located pavement drainage line which controls runoff from the southbound carriageway.
- The proposal would require the removal of an existing water quality basin located on the south-western corner of the Wallgrove Road / Old Wallgrove Road intersection, because the pavement runoff from the upgraded intersection would be directed to basin B18.30.
- A cross drainage structure is proposed beneath the mini- link road near its intersection with Wallgrove Road (marked as X4 on Figure 3-6), to control runoff from the development lot immediately to the north. Energy dissipation and scour protection measures would be provided at the outlet of the cross drainage structure.
- There would be a short section of new pavement drainage (marked as P9 in Figure 3-6) on the mini-link road that would discharge to the existing stormwater detention basin located south of the Capicure Drive intersection.

Permanent basins

There are currently seven existing detention basins within the proposal area. These are located adjacent to Wallgrove Road and at the cul-de-sac end of Capicure Drive (refer to Figure 3-6). These basins currently manage run-off from Wallgrove Road and the M7. The proposal would utilise these basins to manage run-off from the road during operation of the upgraded Old Wallgrove Road. The surface run-off calculated for the proposal indicates that the proposal would not adversely affect the operation of these basins or require additional basin capacity. No works to these basins would be required as part of the proposal.

In addition, Blacktown City Council proposes to construct a regional basin to the north east of Eastern Creek Drive. This basin is proposed to assist in management of the WSEA development in the area and includes some run-off from the upgraded Old Wallgrove Road. However the construction and operation of this basin is not part of this proposal. Consultation with council identifies that this basin should be operational prior to the completion of construction of Old Wallgrove Road, however the operation of the road upgrade is not dependent on the operation of this basin. Ongoing maintenance of the basin would be the responsibility of Blacktown City Council.

Temporary basins

Five new temporary sediment basins would be constructed to manage erosion and sediment run-off during construction. These are shown in Figure 3-7a and Figure 3-7b. The basins are:

- Basin 1: situated east of Eastern Creek Drive on an existing drainage line. This basin would have a surface area of 1370 square metres. Topsoil would be removed to reduce the ground level by 300 mm across the basin.
- Basin 2: situated east of Quarry Road, south of Eskdale Creek. This basin would have a surface area of 650 square metres.
- Basin 3: situated north of Old Wallgrove Road between Quarry and Wallgrove roads. This basin would have a surface area of 1200 square metres.
- Basin 4: situated north of Old Wallgrove Road, west of Wallgrove Road. This basin would have a surface area of 1000 square metres.
- Basin 5: situated south of the mini link road, west of Wallgrove Road. This basin would have a surface area of 600 square metres.

The location and sizing of temporary sediment basins, was based on the guidelines and procedures set out in *Managing Urban Stormwater – Soils and Construction* Volume 1, 4th Edition (Landcom, 2004).

As these basins are only temporary, land would be leased from property owners during the construction period. Once construction is complete, the basins would be re-instated, in consultation with property owners.

Concept Design

The concept design illustrates a physical design response to the Vision, Objectives and Principles outlined previously. A unified design with subtle differences in landscape treatment between character zones ensures a `whole of road' design approach to the upgrades. These differences respond to the existing and future landscape character (refer Section 3) of the area once roads and `employment lands' have been fully developed.

Landscape treatments are contextually sensitive and cost effectively create a unique road identity that enhances the road users experience both physically and visually. Conceptually, four (4) landscape character zones have been designed along the road corridor including;

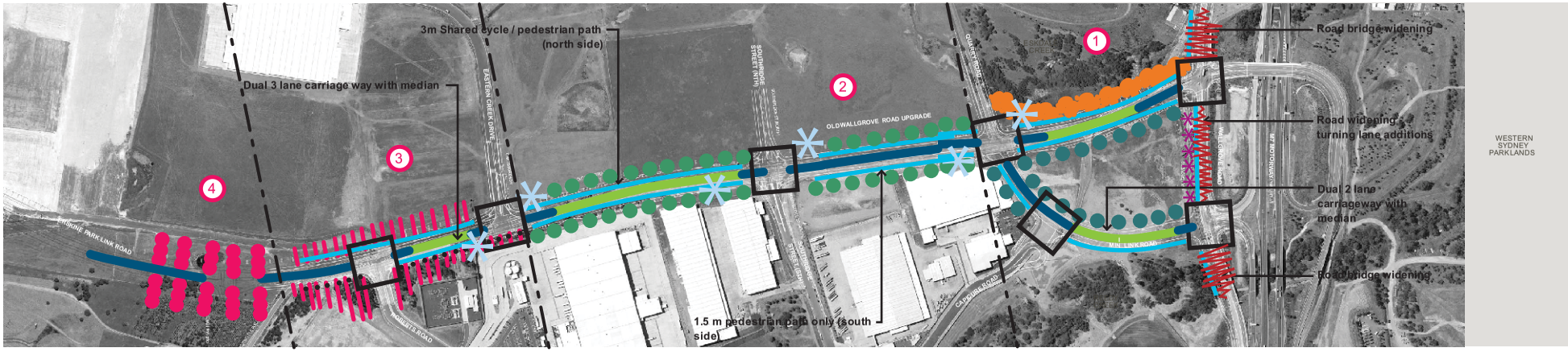
- Creek Corridor
- Tilted Avenue
- Remnant Woodland Ridge
- Feature Intersection

These have been illustrated in the Urban Design Concept Design Plan below (Figure 4.3.1). with further description of their design intent in the legend.

The planting palette will be similar to the EPLR design (Refer Section 4.2) and included appropriate species from Cumberland Plain Woodland and River Flat Eucalypt Forest plant communities which fringe the road upgrade. To ensure a consistent design thread along road corridor, planting within the median (where space permits) and buffer planting between paths and roads will be the same as will the design / material selection of pathways, bus stops and lighting.

Landscape Character Zones

1. Creek corridor
2. Tilted avenue
3. Remnant woodland ridge
4. Feature intersection (tie in with EPLR design)



Legend

- Filtered Screen Planting
- Riparian Planting - Make good around Bridge / Road widening and ramps
- Low riparian planting – Low planting only in order to read backdrop of existing creek planting (trees)
- Structured street tree planting (River Flat Eucalypt forest species)
- Structured street tree planting (Cumberland Plain Woodland species)
- Feature Tree Row planting (refer to EPLR design)
- Cumberland Plain Woodland retention / reinstatement (informal planting)
- Turf verge between road and path
- Low median planting
- Concrete median
- Potential retaining wall to protect significant vegetation.
- Landscape character zone divisions

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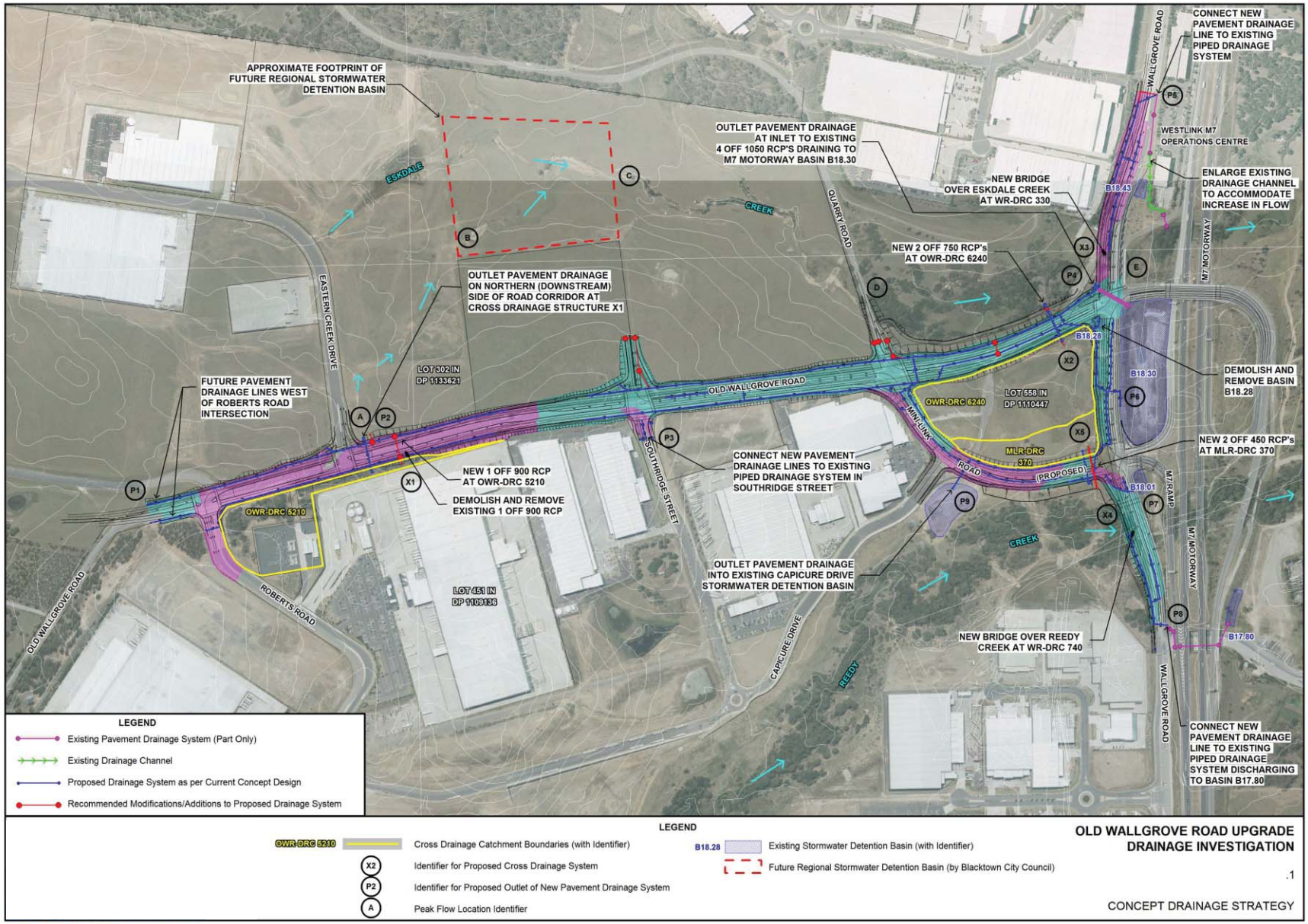
0 100 200m

Source: Aecom Urban Design Report and Landscape Character and Visual Impact Assessment. - March 2012

FIGURE 3-5: Landscape strategy



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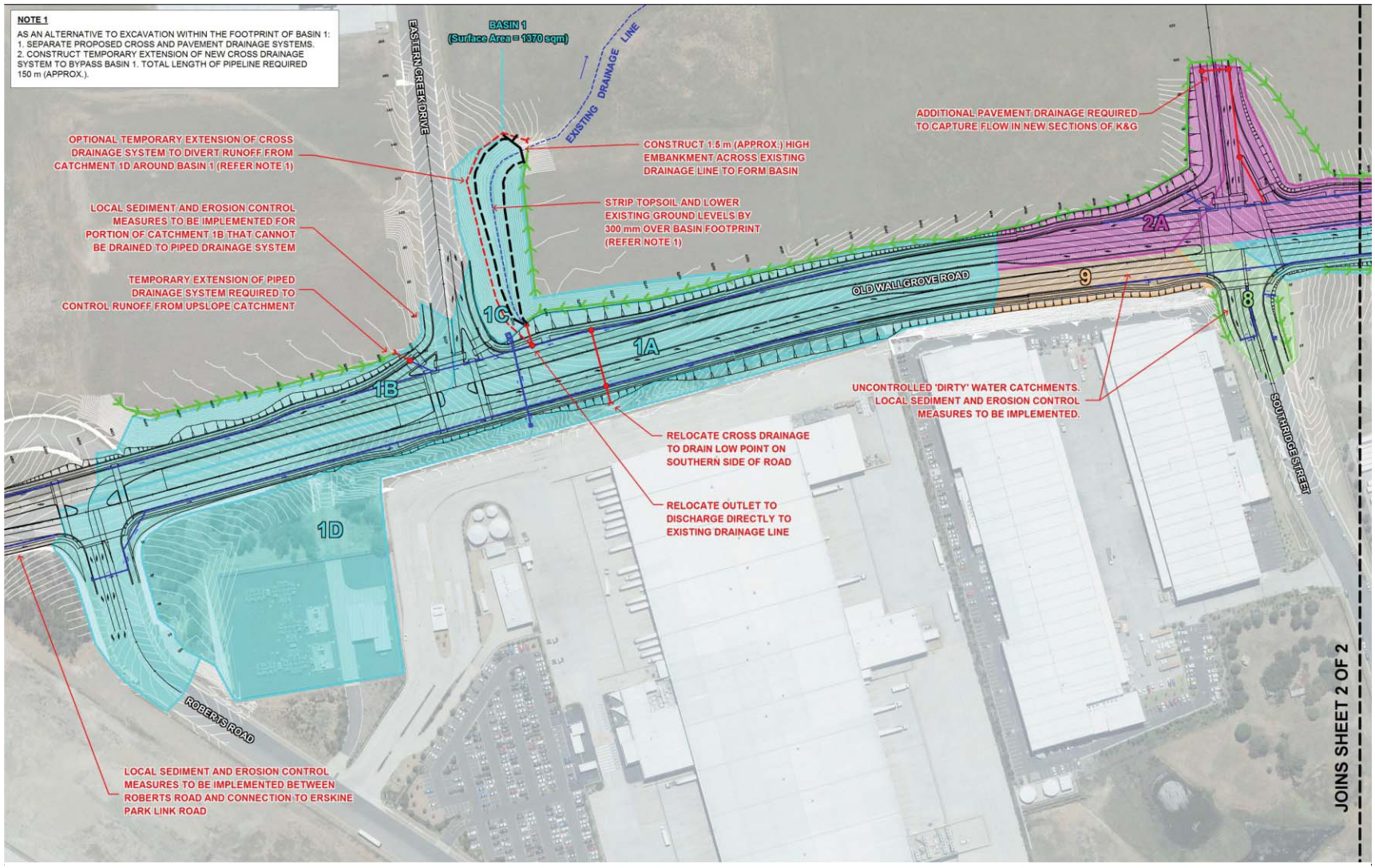
Source: Lyall & Associates Concept Drainage Strategy, Drainage Investigation - May 2012

FIGURE 3-6: Concept drainage strategy



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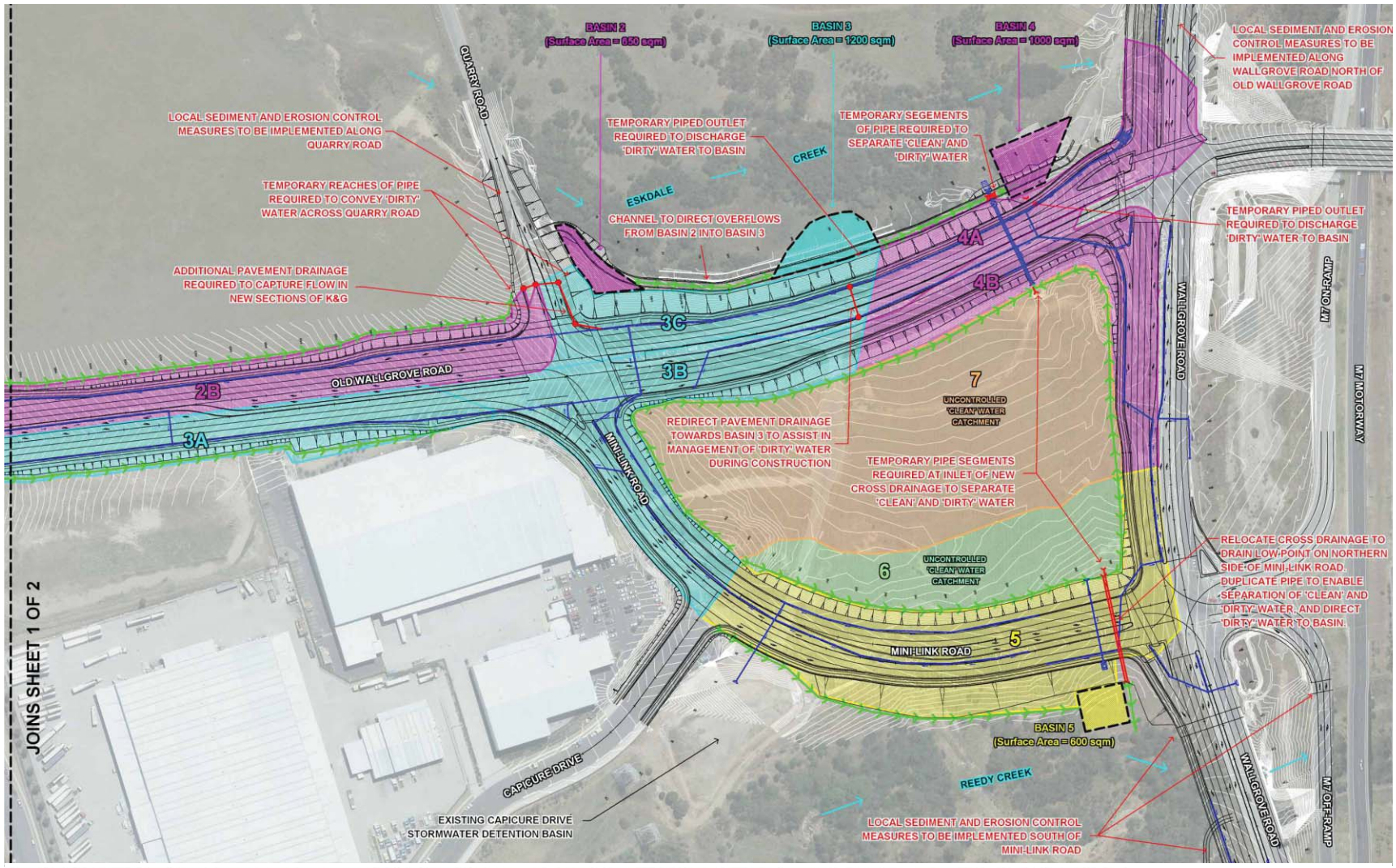
Old Wallgrove Road **REF**

FIGURE 3-7a: Construction sedimentation basins



LEGEND

- Extent of Catchment Draining to Temporary Sediment Retention Basin (refer also Yellow and Cyan Shaded Areas)
- Approximate Footprint of Temporary Sediment Retention Basin (refer also Yellow and Cyan Shaded Areas)
- Temporary Diversion Channels and Earth Bunding
- Proposed Drainage System as per Current Concept Design
- Recommended Modifications/Additions to Proposed Drainage System (Permanent)
- Recommended Modifications/Additions to Proposed Drainage System (Temporary)

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Old Wallgrove Road **REF**

FIGURE 3-7b: Construction sedimentation basins

3.4 Construction activities

The proposal would be constructed using conventional methods generally employed on road projects. These methods may be modified to address site specific environmental or engineering constraints. A summary of the typical construction activities for the proposal is provided in Section 3.4.1. These activities are not necessarily in the order of construction, as that would depend on the delivery method adopted and staging of the works. Activities may occur concurrently or in a different sequence as required to suit the particular upgrade.

3.4.1 Work methodology

The proposal would be constructed in stages and the following broadly outlines the likely staging of major parts of the works:

- Stage 1 - Construction of the mini-link road including the intersection works at the mini-link road and Wallgrove Road. This would enable diverting traffic to and from Wallgrove Road on to the mini-link road and Capicure Drive and Old Wallgrove east of the intersection with Quarry Road/mini-link road.
- Stage 2 - The above Stage would free up the eastern section of Old Wallgrove Road between the mini-link road and Wallgrove Road. This would enable works to be undertaken at the two bridge sites on Wallgrove Road and majority of road and drainage works along the stretch of Old Wallgrove Road between the mini-link road and Wallgrove Road.
- Stage 3 - The western section of Old Wallgrove Road between the mini-link road and Erskine Park Link Road could be constructed in further stages while maintaining traffic on the road.

A detailed construction staging plan would be prepared by the construction contractor to suit site conditions

Table 3-3 shows the general construction activities and phases. This work methodology would be formalised at detailed design.

Table 3-3: Indicative construction activities for the proposal

Phase	Typical activities
Pre-construction works	• Property adjustments. • Adjustment and / or relocation of utilities.
Site establishment	• Site establishment and set up of construction compound including stockpile site. • Temporary traffic management arrangements. • Progressive installation of site environmental controls including temporary or permanent fencing. • Construction of diversion and catch drains along the formation and sedimentation control basins or swales (where required). • Clearing of vegetation.
Bulk earthworks	• Implementation and construction of local road works and intersections. • Stripping of topsoil and stockpiling for re-use in landscaping. • Excavation of road formation, including the stockpiling or haulage of material and stabilisation treatments of batters. • Construction of embankments, including drainage.
Drainage and structures	• Installation of cross drainage, including culverts and inlet / outlet works including scour protection works. • Construction of subsurface drainage. • Installation of longitudinal and vertical drainage in cuttings and embankments.
Bridge construction over Reedy and Eskdale creeks	• Installation of bridge foundations (bored piles, pile caps and pad footings). • Construction of bridge abutments and piers. • Construction of bride superstructure including deck and pavement works.

	• Construction of scour protection works where required along the waterway.
Pavement works	• Construction of select fill layers. • Construction of pavement drainage, including kerb and gutter. • Construction of pavement layers. • Construction of shared and pedestrian pathways.
Finishing works	• Installation of pavement markings, traffic signs, safety barriers, street lighting and bus stop signs. • Progressive landscaping and tree planting. • Site clean-up and demobilisation, including the restoration of construction compound.

3.4.2 Construction hours and duration

Construction is anticipated to begin in 2014 (subject to determination of this REF and funding availability) and continue for a period of around 24 months.

The construction activities described in this REF would be undertaken during the following working hours:

- Monday to Friday: 7am to 6pm.
- Saturday: 8am to 1pm.
- Sunday/Public Holidays: No work.

It may be necessary to undertake out of hours work or night works to minimise disruption and disturbance to surrounding land owners and businesses. This could include deliveries; activities that need to be constructed to tie in works adjacent to the existing road network; or emergency works. Any night works would be undertaken in accordance with the RMS *Environmental Noise Management Manual (RTA 2001): Practice Note vii — Road works outside normal working hours*.

The construction workforce would consist of up to 200 on-site workers, with the actual numbers of workers varying depending on the construction activities being undertaken at the time.

3.4.3 Plant and equipment

Plant and equipment used on the proposal would vary depending on the construction activities being undertaken. The indicative plant and equipment that would be used throughout the construction period are outlined in Table 3-4. The plant and equipment to be used during construction would be confirmed by the construction contractor.

Table 3-4: Indicative plant and equipment

Indicative plant and equipment for use in construction	
• Front end loaders.	• Road trucks.
• Bulldozers.	• Two tonne road roller.
• Backhoes.	• Vibratory rollers.
• Dump trucks.	• Asphalt/concrete pavers.
• Hand chainsaws.	• Compactors.
• Excavators.	• Graders.
• Mobile cranes.	• Scrapers.
• Water trucks.	• Road sweepers.
• Cherry pickers.	• Concrete saws.
• Generators.	• Concrete trucks.

3.4.4 Earthworks

The proposal has been designed to achieve an overall balance of earthworks to minimise excess spoil and/or the need to import large quantities of fill. The proposal would generate about 63,000 cubic metres of earthworks. Around 62,000 cubic metres would be required for fill embankments. There would be a need to import around 5,000 cubic metres of material (assuming around ten per cent of available earthworks would be unsuitable for use).

In general proposal embankment batters are 1:4. The exception is south of the mini-link road, where 1:2 embankment batters have been adopted to minimise impacts to Reedy Creek and the River Flat Eucalyptus Forest.

All embankments would be located on adjoining properties. This area would not be acquired by RMS.

A stockpile area would be required during construction to stockpile topsoil and unsuitable material and would be situated in the site compound (refer to section 3.5).

3.4.5 Source and quantity of materials

Construction of the proposal would need to import the following materials including:

- Earthworks materials.
- Aggregates for drainage construction.
- Sand for drainage construction.
- Concrete for drainage construction, pavement construction, bridgeworks and miscellaneous works.
- Cement and fly ash.
- Precast concrete elements for culverts and bridge construction.

- Steel for bridge girders, barrier railings and reinforcement in concrete.

Materials that would be required for the proposal would be commercially readily available. All earthworks and aggregate material would be sourced from nearby licensed quarries where practicable.

3.4.6 Traffic management and access

Constructing the proposal in separate stages would minimise the impact on traffic along Old Wallgrove Road. The construction of the mini-link road during stage 1 would enable the switching of traffic from Old Wallgrove Road (between Quarry Road and Wallgrove Road) to the mini-link road. This would enable construction of Old Wallgrove Road between Quarry Road and Wallgrove Road away from traffic. In addition to these major stages, traffic switches and lane closures would be required during drainage and pavement construction, including placement of asphalt, line marking and other ancillary works.

Major works associated with widening along Wallgrove Road including the widening of the bridges would be undertaken while the road is under traffic.

While property accesses (including the property access onto Old Wallgrove Road opposite Roberts Road intersection) and local road access from Old Wallgrove Road would be maintained during construction, some delays may occur.

During construction, a traffic management plan would be put in place to manage impacts to vehicular and pedestrian traffic safely, in particular lane closures and traffic switches.

Potential haulage routes during construction would be via Old Wallgrove Road, Wallgrove Road and the Motorway network or Great Western Highway. Erskine Park Link Road (currently under construction), would also provide an alternative construction access for the proposal. Access onto the site and site compound would be via Old Wallgrove Road.

3.5 Ancillary facilities

A temporary site compound would be established to the west of the proposed alignment on land owned by RMS (refer to Figure 3-1). This land is currently being used as the compound site for the Erskine Park Link Road. This would be accessed via Old Wallgrove Road. This site compound would be required for personnel, material and plant and would include a site office, vehicle parking area, machinery and plant storage area and materials storage area. The site compound location is situated to the west of the proposal tie-in with the Erskine Park Link Road.

A stockpile would be required during construction to stockpile topsoil (estimated around 17,000 cubic metres) and unsuitable earthworks material (around 6,000 cubic metres) prior to placement on median, embankment slopes and batters, or disposal offsite. A stockpile area would be established within the temporary site compound.

Stockpiles would be managed in accordance with RMS Stockpile Site Management Guidelines (2011).

The locations of the temporary site compound and stockpile areas are shown on Figure 3-1. Temporary sediment basins are shown in Figure 3-7.

3.6 Public utility adjustment

There are a number of utility services that are near Old Wallgrove Road and could potentially be impacted by the proposal. The utilities include electrical, telecommunications, water and sewerage services.

A utility relocations strategy has been developed as part of the design. In general:

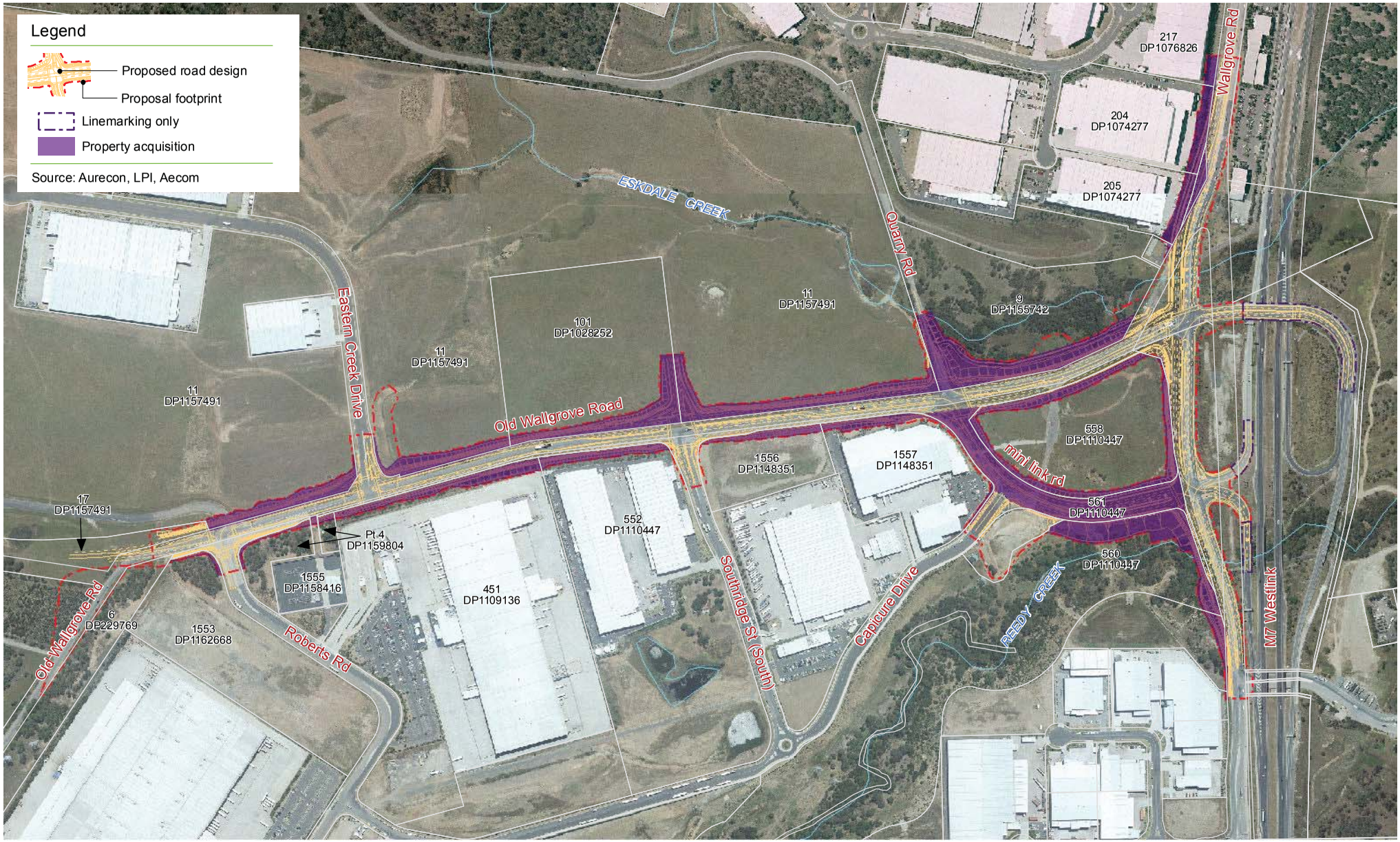
- All existing underground utility services (such as water services) that are currently contained within the existing Old Wallgrove Road reservation would be relocated away from the carriageway, within the proposed road corridor.
- There are 132 kV overhead power lines currently along both sides of the existing road corridor. The southern power lines would remain unchanged. The northern power lines would be relocated further north within the proposed road corridor.
- Two major overhead power stanchions adjacent to Wallgrove Road near its junction with the mini-link road would be relocated.
- All existing underground utility services that are currently to the west of Wallgrove Road within the proposal site would be relocated further west within the proposed road corridor.
- All new utility services would be installed within the proposed road corridor of Old Wallgrove Road, Wallgrove Road and the mini-link road, but away from the road pavement area.

3.7 Property acquisition

The proposal would require strip acquisition of 17 properties. Table 3-5 and Figure 3-8 identify the properties. It is proposed to acquire from the edge of the 20 metre wide existing road reservation to the toe of the batters including the current vacant land required for construction of the mini-link road. Temporary sediment basins required during construction would be located on leased land with agreement by the relevant property owners.

Table 3-5: Property acquisition

Property	
Lot 1553 DP 1162668	Lot 561 DP 1110447
Lot Pt 4 DP 1159804	Lot 51 DP 1127422
Lot 1555 DP 1158416	Lot 11 DP 1157491
Lot 451 DP 1109136	Lot 101 DP 1028252
Lot 552 DP 111447	Lot 9 DP 1155742
Lot 1556 DP1148351	Lot 205 DP 1074277
Lot 1557 DP1148351	Lot 204 DP 1074277
Lot 558 DP1110447	Lot 217 DP 1076926
Lot 560 DP 1110447	



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0 100 200m

Projection: GDA 1994 MGA Zone 56

Old Wallgrove Road **REF**

FIGURE 3-8: Property acquisition

Consistency with the concept plan

Section 4.2 of the *Western Sydney Employment Hub Proposed Erskine Park Link Road Network concept plan environmental assessment* (RTA, 2008) (concept plan environmental assessment) states that the key elements of the EPLRN are:

- An east west route (Erskine Park Link Road as an extension of Lenore Lane) connecting Mamre Road and Erskine Park Road with Old Wallgrove Road/ Wallgrove Road/M7 Motorway interchange.
- Eastern and western north-south link roads (Old Wallgrove Road and N-S Link respectively) connecting Erskine Park Link Road with precincts to the south of the Sydney Water Pipeline.
- A northern access road to Archbold Road connecting the Erskine Park Link Road with the M4 Motorway (at a new interchange with east facing ramps) and the Great Western Highway.

These elements are shown in Figure 2-1.

Chapter 4 of the concept plan environmental assessment also mentions other features of the concept plan:

- An alternate connection to relieve traffic congestion at Old Wallgrove/Wallgrove/M7 interchange. This connection is provided by the mini-link road that would connect Old Wallgrove Road with the M7 northbound on/off ramps at Wallgrove Road.
- A shared pedestrian and cyclist path that would link with the M7 cycleway at the Wallgrove Road/Old Wallgrove Road intersection.
- Bus access on the EPLRN.

The proposal consists of the widening of Old Wallgrove Road, forming part of the east west route of Erskine Park Link Road, which would extend to the Old Wallgrove Road intersection with Wallgrove Road. In addition, a mini-link road would be constructed to connect Old Wallgrove Road to the Wallgrove Road/M7 Motorway northbound ramps. The development of the proposal has been undertaken in accordance with the approved concept plan.

The proposal is generally consistent with the approved concept plan and with strategic planning documents and policies (as outlined in Chapters 2 and 4 of this REF). However, a number of changes were made from the approved EPLRN concept plan. These are outlined in section 2.4 of this REF and are considered to be consistent with the EPLRN concept plan approval.

4 Statutory and planning framework

4.1 State Environmental Planning Policies

4.1.1 State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) aims to facilitate the effective delivery of infrastructure across the State.

Clause 94 of ISEPP permits development on any land for the purpose of a road or road infrastructure facilities to be carried out by or on behalf of a public authority without consent.

As the proposal is for a road and is to be carried out by RMS, it can be assessed under Part 5 of the *Environmental Planning and Assessment Act 1979*. Development consent from council is not required.

The proposal is not located on land reserved under the *National Parks and Wildlife Act 1974* and does not affect land or development regulated by *State Environmental Planning Policy No. 14 - Coastal Wetlands, State Environmental Planning Policy No. 26 - Littoral Rainforests or State Environmental Planning Policy* (State and Regional Development) 2011.

Part 2 of the ISEPP contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development. Consultation, including consultation as required by ISEPP (where applicable), is discussed in chapter 5 of this REF.

4.1.2 SEPP No. 59 – Central Western Sydney Regional open space and residential

SEPP No. 59 was formerly known as the Central Western Sydney Economic and Employment Area and was considered as such in the EPLRN concept plan EA. In 2009 when the *SEPP (Western Sydney Employment Area) 2009* was gazetted, changes were made to SEPP 59, so that it only applies to open space and residential zoned land. As such, this SEPP is no longer applicable to the proposal, as adjacent lands are zoned industrial under SEPP (Western Sydney Employment Area) 2009.

Eastern Creek Precinct Plan

Under the previous SEPP No. 59, precinct plans were prepared for the WSEA, including the Eastern Creek Precinct Plan. As the previous SEPP was applicable to the EPLRN, and this plan is still in force, it is to be considered by the consent authority for any development within the Eastern Creek Precinct. The proposal considered the precinct plan and design elements such as landscaping and stormwater management have been considered appropriately and incorporated into the design.

4.1.3 SEPP (Western Sydney Employment Area) 2009

SEPP (Western Sydney Employment Area) (WSEA) 2009 creates a consistent zoning system and platform for the coordination of employment generating development across the WSEA.

This SEPP applies to WSEA lands within the Penrith, Blacktown, Holroyd and Fairfield LGAs and prevails over local environmental plans that would otherwise apply to the area. The proposal is located mostly within land to which the SEPP applies.

The proposal is mostly located within Precinct 2 Eastern Creek with affected and adjacent lands zoned as IN1 General Industrial. A key objective of this zone is to facilitate road network links to the M4 and M7 motorways. Under this zone, roads are permitted only with consent.

However, Clause 33 of the SEPP provides that the policy does not restrict or prohibit any development by a public authority that is permitted to be carried out without consent under the Infrastructure SEPP. Therefore, development consent is not required for the proposal.

4.1.4 Sydney Regional Environmental Plan No. 20 – Hawkesbury- Nepean River (No 2 – 1997)

Sydney Regional Environmental Plan (SREP) No. 20 – Hawkesbury-Nepean River (No. 2 - 1997) was deemed a state environmental planning policy in July 2009. The SREP applies to certain land in the greater metropolitan area within specified LGAs, including the Penrith and Blacktown LGAs. The proposal area is included within land covered by the SREP.

The SREP aims to protect the environment of the Hawkesbury-Nepean River system by ensuring that the impacts of future land uses are considered in a regional context. The SREP sets out general planning considerations and specific planning policies and considerations that must be taken into consideration by a public authority proposing to undertake an activity within the SREP area. These considerations and policies generally relate to the impacts of a proposal on the environment, which is assessed in chapter 6.

4.2 Local Environmental Plans

4.2.1 Blacktown Local Environmental Plan 1988

Most of the proposal is zoned by the SEPP WSEA and is therefore not zoned under this LEP. However, some works would occur on Wallgrove Road which is not zoned under the SEPP WSEA, but under the Blacktown LEP. It is zoned as 5 (b) Arterial road.

Works which would be undertaken within zone 5 (b) constitute road transport facility which (by virtue of the *Environmental Planning and Assessment Model Provisions 1980*), falls under the definition of public utility undertakings.

Under the Blacktown LEP 1988, public utility undertakings are permissible with consent. However, as the proposal falls under ISEPP, the proposal is permissible without consent. As such, this REF has been prepared to meet the RMS' obligations under Part 5 of the EP&A Act.

4.3 Other relevant legislation

4.3.1 Threatened Species Conservation Act 1995

A species impact statement is required under Sections 109–113 of the TSC Act (terrestrial species) and/or Sections 221J and 221K of the FM Act (aquatic species) for a proposed activity that:

- Would have a significant effect on critical habitat of flora or fauna.
- Would have a significant effect on threatened species, populations or ecological communities or their habitats.

The biodiversity assessment (section 6.3) undertaken for the proposal has identified that there is unlikely to be any significant impact and therefore neither an environmental impact statement nor a species impact statement is required for the proposal.

4.3.2 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act) provides protection for Aboriginal objects (material evidence of indigenous occupation) and Aboriginal places (areas of cultural significance to the Aboriginal community) across NSW.

It is an offence to harm Aboriginal objects or places without a permit authorised by the Director-General of the Office of Environment and Heritage (OEH). This permit is issued under Section 90 of the Act to allow the investigation, impact and/or destruction of Aboriginal objects.

An Aboriginal heritage assessment (refer to section 6.7 of this REF) has been prepared to identify any potential Aboriginal heritage items/ places.

4.4 Commonwealth legislation

4.4.1 Environment Protection and Biodiversity Conservation Act 1999

Under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) a referral is required to the Australian Government for proposed 'actions that have the potential to significantly impact on matters of national environmental significance or the environment of Commonwealth land.' These are considered in Appendix A and chapter 6 of the REF.

The assessment of the proposal's impact on matters of national environmental significance and the environment of Commonwealth land found that there is unlikely to be a significant impact on relevant matters of national environmental significance. Accordingly, the proposal has not been referred to the Australian Government Department of Sustainability, Environment, Water, Population and Communities.

4.5 Confirmation of statutory position

The concept plan approval for the EPLRN (August 2009), clause (b) states that:

> "pursuant to s75 P(1) (b) of the EP&A Act, further environmental assessment requirements for approval to construct components of the concept plan, referred to in Schedule 1 under Part 5 of the EP&A Act (if carried out by or on behalf of a public authority)" (EPLRN 2009).

As such the proposal is to be assessed under Part 5 of the EP&A Act.

5 Stakeholder and community consultation

5.1 Consultation strategy

Consultation regarding the EPLRN began during the design development of the concept design and the concept plan environmental assessment. This process has been carried out by RMS (previously the RTA). As part of that process, consultation was undertaken with local councils, relevant government departments/authorities, utility providers, land owners, operator of the M7 Motorway, potentially affected residents and representatives of the Aboriginal community. A submissions report on the concept plan environmental assessment was prepared (*Western Sydney Employment Hub Proposed Erskine Park Link Road Network Concept Plan Environmental Assessment- submissions report and preferred project report*, RTA, 2009) to address issues raised by the community and stakeholders during the environmental assessment exhibition period. This can be found at http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=201.

The communication strategy (refer to Appendix D) for this proposal focuses on consultation with stakeholders including landowners and utility providers as well as the community. Consultation with stakeholders has already commenced and would be ongoing throughout the proposal planning and construction phase. Consultation activities, such as community updates or other correspondence would be produced as part of the display of this REF. Additionally, information would be published and updated regularly on the RMS website.

The objectives of this strategy are to:

- Work closely with the Department of Planning and Infrastructure.
- Regularly liaise with stakeholders about the proposal and its milestones to ensure they are informed.
- Maintain a good relationship with stakeholders.
- Ensure issues relating to the proposal are identified and effectively managed.
- Record and respond to inquiries and concerns.

5.2 Community involvement

There have been 14 stakeholder meetings and other correspondence during the proposal concept design and development stages of the proposal. The following lists the meetings held with stakeholders.

Table 5-1: Issues raised at stakeholder meetings

Date	Stakeholder	Issues raised	Where addressed?
14.06.2011	Endeavour Energy	Location of the dual 132kV power lines along Old Wallgrove Road corridor from their substation east of Roberts Road to Quarry Road. It was agreed that the power lines along the southern side would be located in the ultimate footpath reservation to the final design levels. However, along the northern side, power poles would be located within the existing road reservation requiring relocation to the ultimate footpath reservation following completion of property acquisition.	Chapter 3
04.08.2011	Utility authorities	Relocation of existing services and proposals for extension of services to serve the new industrial developments.	Chapter 3
24.08.2011	Landowners	The concept design and its impact on adjoining parcels of land. The main items discussed at the meeting were intersections configuration, proposed road corridor, property impacts and drainage strategy.	Chapter 3
01.09.2011	Local Aboriginal Land Council (LALC)	A joint site visit (RMS/LALC) to survey the proposal site as part of Stage 2 Aboriginal heritage investigation.	Section 6.4 and Appendix E.
05.09.2011	Optus	Extension of services along Old Wallgrove Road to serve the new industrial developments.	Chapter 3
27.09.2011	Transgrid	Property impact west of Roberts Road intersection.	Chapter 3
27.09.2011	Blacktown City Council	Water quality and detention design associated with the Old Wallgrove Road concept design. It was agreed that RMS would provide water quality measures as part of the road widening proposal and that the council proposed regional basin downstream and north of the Old Wallgrove Road proposal site would be sized to allow for all run off upstream including run off from the road widening proposal.	Chapter 3
20.10.2011	RMS Motorway Group	Impact of the proposal on the M7 corridor.	Chapter 3
08.11.2011	Local Aboriginal Land Council (LALC)	A follow up site visit (RMS/LALC) to survey the proposal site as part of Stage 2 Aboriginal heritage investigation.	Section 6.4 and Appendix E.
21.11.2011	RMS Motorway Group	A further meeting to discuss the final traffic modelling recommendations for the proposal.	Chapter 3 and Appendix F.
23.01.2012	Jacfin Pty/Ltd.	Maintenance of access to Jacfin site opposite the Roberts Road intersection, property impacts, location of temporary sediment basin and intersections configuration.	Chapter 3 and section 6.7
13.04.2012	Aboriginal groups	Focus group meeting to discuss and agree the proposed methodology for site excavation as part of Stage 3 investigation.	Section 5.3 and Appendix E.
07.05.2012	M7 Operator	Traffic impact of the proposal on the M7 Motorway.	Note; no works, other than line marking on the ramps are proposed in the M7 corridor. Section 6.1 and Appendix F.
09.05.2012	Goodman	The timing for the road widening proposal, the impact of their proposed development in the Oakdale precinct south of the Sydney Water pipelines, on the two lane section of Old Wallgrove Road.	Chapter 1 and section 6.15

Further community consultation would be undertaken during the display of the REF, including the release of a community update.

5.3 Aboriginal community involvement

A "Stage 2" investigation (under the *RMS Procedures for Aboriginal Cultural Heritage Consultation and Investigation* (PACHCI)) was undertaken for the Aboriginal Heritage assessment. As part of the assessment, consultation was undertaken with Aboriginal stakeholders. Steve Randall, a representative of the Deerubbin Local Aboriginal Land Council (DLALC), was present on-site during the Aboriginal heritage walkover of the site. Correspondence received during the assessment (refer to the Aboriginal heritage assessment in Appendix E) indicated that due to the disturbed nature of the site, the DLALC has no objections to the proposal.

A "Stage 3" archaeological investigation was undertaken based on the recommendations of the "Stage 2" assessment. Consultation was undertaken in accordance with the PACHCI document. The consultation consisted of:

- Identifying Aboriginal people / organisations who may hold cultural knowledge relevant to determining the significance of Aboriginal objects and places within the proposal area. This stage was undertaken in November 2011. The following Aboriginal individuals / organisations were identified:
  - Deerubbin LALC;
  - Darug Aboriginal Cultural Heritage Assessments (DACHA);
  - Tocomwall;
  - Darug Custodian Aboriginal Corporation (DCAC);
  - Darug Tribal Aboriginal Corporation (DTAC);
  - Darug Land Observations (DLO); and
  - Gunjeewong Cultural Heritage Aboriginal Corporation.
- Contacting the identified Aboriginal people / organisations to ascertain their interest in the proposal, between December 2011 to February 2012. In addition a newspaper advertisement was placed in the Koori Mail between 30 November and 13 December 2011. The following organisations all registered their interest in the proposal:
  - Deerubbin LALC.
  - Darug Aboriginal Cultural Heritage Assessments.
  - Darug Aboriginal Land Care.
  - Darug Custodian Aboriginal Corporation.
  - Darug Tribal Aboriginal Corporation.
  - Darug Land Observations.
  - Gunjeewong Cultural Heritage Aboriginal Corporation.
  - Tocomwall.
- The Registered Aboriginal Parties were sent a document detailing the proposed assessment methodology (including the test excavations) on 2 April 2012. This document included a detailed description of the proposed development; the contents and findings of the Stage 2 survey report; and the contents, tasks and activities proposed for the Stage 3 report (cultural heritage assessment). A period of 28 days was provided to the parties to provide any comments. RMS held an Aboriginal Focus Group meeting on the 13 April 2012 to discuss the proposal. Representatives of Darug Land Observations and

Tocomwall attended. Background information on the proposal and the information package were discussed.

- Aboriginal representatives of the Parties were present during the test excavations undertaken between 29 and 31 May 2012. Only four of the Parties were able to participate in the test excavations. The following Parties were involved:
  - Deerubbin Local Aboriginal Land Council
  - Darug Custodian Aboriginal Corporation
  - Darug Aboriginal Cultural Heritage Assessments
  - Darug Tribal Aboriginal Corporation
- The Parties were invited and have provided comments on the "Stage 3" report. Two responses were received from the Darug Custodian Aboriginal Corporation and Darug Aboriginal Cultural Heritage Assessments. Both responses endorsed the recommendations outlined in the report.

Additional information on the consultation and results of the "Stage 3" report is provided in Appendix E.

5.4 ISEPP consultation

Clauses 13 to 16 of the ISEPP outline the requirements for Council and government agency consultation when proposing to carry out development without consent. However, due to potential impacts to Council's stormwater system, consultation was undertaken with Blacktown City Council under ISEPP (clause 13). A consultation letter was sent to the Council on 4 November 2011. A response was received from Blacktown City Council on 5 December 2011. Issues raised by the Council are identified in Table 5-2.

Table 5-2: Issues raised by Blacktown City Council

Issues	Where addressed
• Widening of Old Wallgrove Road is urgently required to maintain the safety and serviceability of the EPLRN.	Noted.
• The proposal should be consistent with Council's Precinct Plan and the development already approved and constructed within the precinct.	The proposal has considered the precinct plan and designed intersections and stormwater management in accordance with the precinct plan. Chapter 3.
• The proposal needs to cater for the interim and ultimate traffic volumes.	Section 6.1 and Appendix F.
• The proposal requires an additional intersection at Capicure Drive and the mini-link road.	Chapter 3.
• Stormwater quantity management can be combined with the proposed precinct works subject to appropriate funding. Water quality management would best be delivered as part of the proposed works.	Noted.
• Access to existing stormwater infrastructure and creeks needs to be maintained.	Chapter 3.
• Maintenance access would need to be provided for	Chapter 3.

Issues	Where addressed
any stormwater management measures proposed.	
• Batter slope should be no steeper than 1:4 to enable safe maintenance and be located within the proposed road reserve.	Chapter 3.
• Council should be consulted during the design development process.	Chapter 3.

5.5 Government agency and stakeholder involvement

The following government agencies and stakeholders were consulted during the preparation of the REF and the proposal:

- Department of Planning and Infrastructure (formerly Department of Planning).
- Office of Environment and Heritage.
- Sydney Catchment Authority.
- Fairfield City Council.
- Penrith City Council.
- State and Federal members of Parliament of the area.
- Sydney Water.
- Endeavour Energy (formerly Integral Energy).
- TransGrid.
- Telstra.
- AGL.
- Emergency services.
- Bus services.
- Westlink M7.
- Adjoining land owners and neighbouring businesses.

Consultation letters were sent to government agencies and stakeholders on 12 September 2011, with the consultation period finishing on 5 October 2011.

Responses were received from Penrith City Council, Endeavour Energy, Transgrid, Busways and Westlink M7 and are attached to this REF as Appendix G. Issues raised by these stakeholders are outlined in Table 5-3.

Table 5-3: Issues raised by stakeholders

Stakeholder	Issues	Where addressed
Penrith City Council	• Council considers the proposal to be a critical item of transport infrastructure that would increase economic activity of businesses within the WSEA.	Noted.
Endeavour Energy	• Endeavour Energy would be installing 132kV overhead assets prior to the proposal being constructed. Construction work should be undertaken with care and in accordance with Workcover requirements on safe working distance from overhead live wires. • 132kV underground assets would also be installed near the Roberts Road intersection. Prior to construction, these services should be identified and either	Noted, prior to construction, identification of all services within the proposal area would be undertaken to ensure that there are no impacts to utility services. Appropriate OHS measures would be employed by RMS and the construction contractor during construction.

Stakeholder	Issues	Where addressed
	avoided or protected for the duration of construction in the area.	Chapter 4.
Transgrid	• The proposal does not affect any Transgrid assets. However, Transgrid would like to be kept informed of any further road activities within the area.	Noted.
Busways	• Presents no concerns with regards to current and future proposed bus services in the area. • Bus priority measures at intersections are welcome. These should include connections between Old Wallgrove and Wallgrove Road. • Bus stops should be placed either side of the road with allowance made for bus stops adjacent to any pedestrian laneways or connections to distance streets. Bus stops are generally located about 400 metres apart however could be dependent on topography, intersections and points of pedestrian access. • Indented bays should not be considered at bus stops as they restrict the movement of buses.	Refer to section 3.13.1.
Westlink M7	• Westlink M7 is supportive of the proposal. • Want to know the works required in the M7 corridor to provide and accommodate the widening works. • Impacts of the proposal on M7's demand in the vicinity of Wallgrove Road interchange. • Environmental and drainage impacts during and after construction of the proposal and associated M7 corridor works.	If additional works were required within the M7 corridor on or before the completion of WSEA, a separate approval process would be undertaken for those works. Environmental and drainage impacts are identified in this REF in section 6.

5.6 Ongoing or future consultation

As part of the planning process, this REF will be placed on public display. Submissions would be invited from stakeholders and the community.

Following the display period, RMS would collate submissions and prepare a submissions report to address concerns raised.

RMS would continue to notify stakeholders and the community of progress throughout the detailed design and construction phases. A consultation and communications management plan would be prepared for the construction stage of the proposal and would provide ongoing consultation throughout the construction period. In particular, the community would be informed of the following actions:

- Finalisation of design.
- Staging of works and maintenance of access to properties.
- Construction progress.
- Interface between the construction of the Erskine Park Link Road and this proposal.

6 Environmental assessment

This section of the REF provides a detailed description of the potential environmental impacts associated with the construction and operation of the proposal. All aspects of the environment potentially impacted upon by the proposal are considered. This includes consideration of the factors specified in the guideline: Is an EIS required? (DUAP 1999) as required under clause 228(1) (b) of the Environmental Planning and Assessment Regulation 2000. The factors specified in clause 228(2) of the Environmental Planning and Assessment Regulation 2000 are also considered in Appendix A. Site-specific safeguards are provided to ameliorate the identified potential impacts.

In addition, section 3 of the Part 3A Concept Plan approval for the Erskine Park Link Road Network identifies further assessment requirements which must be considered as part of further environmental assessments for all aspects of this concept plan, including the Old Wallgrove Road upgrade. A table has been prepared outlining these assessment requirements and where these have been addressed in the REF. This table is included in Appendix A.

6.1 Traffic and access

A traffic and transport report was prepared by GHD for RMS (*Old Wallgrove Road Traffic Modelling Study: Traffic and Transport Report, August 2011*). A summary of the report is provided in the following sections, with the report attached to this REF in Appendix F.

6.1.1 Existing environment

Road network

The existing road network in the vicinity of the proposal includes motorways, arterial roads, collector roads and local roads. The arterial roads near the proposal include the M4 Motorway, the M7 Motorway and Wallgrove Road. A review of the main roads in the vicinity of the proposal is identified in Figure 3-4: . Physical features of these roads are also identified in Table 6-1.

Table 6-1: Main roads near the proposal

Road	Description
M4 Motorway	The M4 Motorway provides an intra-regional link connecting Strathfield and Penrith, forming the main east-west route across Sydney. The M4 Motorway near the proposal is a six-lane divided carriageway (three lanes each direction) carrying around 100,000 vehicles per day. The M4 Motorway is located to the north of the proposal.
M7 Motorway	The M7 Motorway is a high capacity road of national significance constructed for future freight growth. It links the M2 and M5 motorways (connecting to the north and the south respectively). The M7 Motorway near the proposal is a 4-lane divided carriageway carrying around 70,000 vehicles per day. The Light Horse interchange forms the connection between the M7 and M4 motorways. The M7 Motorway is adjacent to Wallgrove Road, east of the proposal.
Wallgrove Road	Wallgrove Road is a four lane, two-way road which connects Elizabeth Drive and the Great Western Highway. Wallgrove Road runs parallel to the M7 and directly connects to the M7 and M4 motorways. It also intersects with Old Wallgrove Road. The road has divided carriageway to the north and is undivided to the south of Old Wallgrove Road. The road carries around 30,000 vehicles per day.
Old Wallgrove	Old Wallgrove Road is a collector road connecting Eastern Creek to

Road	Description
Road	Wallgrove Road and the M7 Motorway southbound on and off ramps. The carriageway is around 15 metres wide, with two 3.5 metre wide lanes in each direction from Wallgrove Road to Quarry Road. West from the intersection with Quarry Road, the road is around 7 metres wide with one 3.5 metre lane in each direction. The road carries around 9,400 vehicles per day.
Roberts Road	Roberts Road is a local road with one lane in each direction. It intersects with Old Wallgrove Road ata T-intersection. To the south, it intersects with Capicure Drive. Roberts Road provides access to the areas in the Eastern Creek precinct in the WSEA.
Eastern Creek Drive	Eastern Creek Drive intersects with Old Wallgrove Road on the northern side. It is a local two lane road (one in each direction). Eastern Creek Drive is a short road ending in a cul-de-sac. It provides access to development in the northern section of the Eastern Creek precinct of the WSEA.
Southridge Street	Southridge Street is a local road with one lane in each direction. It intersects with Old Wallgrove Road to the north and Capicure Drive to south at a roundabout, solely providing access to the WSEA.
Quarry Road	Quarry Road is a private, minor local road extending north from Old Wallgrove Road. The road is short and straight, ending in a cul-de-sac.

Public transport, pedestrian and cyclist facilities

The closest rail line is CityRail's Western Line, which runs to the north of the employment area linking Penrith and Richmond with the Sydney CBD and the North Shore. The closest train stations are located some 4 kilometres to the north of the employment area (being Rooty Hill station and Mount Druitt station).

There are a number of bus routes servicing the employment area and operating in the vicinity of Old Wallgrove Road. Busways route 738 (to and from Rooty Hill) travels along Wallgrove, Old Wallgrove and Roberts roads.

There are limited pedestrian and cyclist opportunities in the area. Where opportunities are provided, they are generally non-continuous. Pedestrian facilities are located at Wonderland Drive, Southridge Street, Capicure Drive, Lenore Lane and signalised pedestrian crossings at Wallgrove Road/M7 Motorway intersection and Wonderland Drive/ Wallgrove Road intersection. Cyclist facilities include the shared path along the M7 Motorway and a short section along Wallgrove Road to the south of Old Wallgrove Road. The Erskine Park Link Road which is under construction has a shared path to the north connecting to the existing cyclist facilities along Lenore Lane.

Traffic volumes

The average annual daily traffic volume for Old Wallgrove Road is 9400 vehicles. The AM and PM peak traffic volumes along Old Wallgrove Road and surrounding road network are outlined in Table 6-2.

Table 6-2: Peak hour traffic volumes- 2011 (vehicles per hour)

Road and location	Peak (hr)	Total vehicles (two way)	Heavy and commercial vehicles (%)
Old Wallgrove Road (West of Wallgrove Road)	AM (0800-0900)	694	39
	PM (1400-1500)	778	39
M7 Motorway access (at Old Wallgrove Road)	AM (0700-0800)	4877	18
	PM (1700-1800)	4988	11

Wallgrove Road (north of Old Wallgrove Road)	AM (0800-0900)	2388	15
	PM (1700-1800)	2305	15
Wallgrove Road (south of Old Wallgrove Road)	AM (0700-0800)	1769	10
	PM (1700-1800)	2016	10

As Table 6-2 outlines, the percentage of heavy and commercial vehicle traffic on Old Wallgrove Road is much higher than the surrounding roads due to the industrial nature of development that gains access from Old Wallgrove Road, with fewer non-commercial vehicles travelling on the road.

Travel time

An assessment of existing travel times during peak hours was conducted using the floating car method on the following roads:

- Old Wallgrove Road (from Western Sydney electrical substation to Wallgrove Road).
- Wallgrove Road (from Sydney Water Pipeline to M4 Motorway).
- M7 Motorway (from Sydney Water Pipeline to M4 Motorway).

The assessment indicated that Wallgrove Road experiences delays in the northbound direction during the PM peak (of around three and a half to four minutes), which was identified by the survey team to be directly linked to operational deficiencies at intersections with the M4 Motorway ramps. In the AM peak, delays and capacity issues were identified for the right turn into Old Wallgrove Road at the intersection with Wallgrove Road for a proportion of the peak hour period.

Intersection operations

Intersections along Old Wallgrove Road were assessed to determine their Level of Service (LoS). LoS is the standard measure used to define the operational performance of the network and intersections. There are six levels of service from Los A to LoS F (with A representing best performance and F the worst). An intersection with an exceedance of LoS D (operating near capacity) in this assessment was identified as requiring upgrading or mitigation (as part of the proposal). Table 6-3 identifies the existing level of service at intersections. All intersections are currently operating with a satisfactory Level of Service, with the exception of the AM peak at the Wallgrove Road / Old Wallgrove Road / M7 Motorway intersection and Southridge Street intersection with Old Wallgrove Road.

Table 6-3: Existing intersection level of service

Intersection	AM peak average delay	LoS	PM peak average delay	LoS
Wallgrove Road- Wonderland Drive	26.2	B	12.5	A
Old Wallgrove Road- Wallgrove Road- M7 (Northbound)	45.7	D	16.3	B
Wallgrove Road- M7 (Southbound)	21.4	B	23.4	B
Old Wallgrove Road- Quarry Road	17.3	B	19.0	B
Old Wallgrove Road- Southridge Street	43.7	D	22.4	B
Old Wallgrove Road- Eastern Creek Road	15.8	B	12.1	A
Old Wallgrove Road- Roberts Road	24.1	B	13.8	A

Note: average delay is measured in sec/vehicle

Road safety

On Old Wallgrove Road, there were 20 crashes over a four year period (between 2007 and 2010), with 50 per cent recording an injury. Ninety per cent of accidents occurred on a weekday. A high proportion of these crashes involved heavy vehicles, peak traffic periods and collisions at intersections.

6.1.2 Potential impacts

Methodology

Future traffic modelling was undertaken for the years 2021 and 2031. These dates correspond to the initial and ultimate upgrades of the proposal.

The increase in capacity of Old Wallgrove Road is required to accommodate the increase in industrial development proposed in the area. As the WSEA is developed, heavy vehicles and commercial traffic numbers are anticipated to increase. The proposal has been designed to cater for heavy vehicle movements, including turning movements at intersections. Future traffic modelling took into consideration the proposed gradual development of WSEA on Old Wallgrove Road. The staging of development for employment lands (as identified in section 2.1) was adopted for the traffic assessment.

This REF only considers the 2021 traffic levels for this proposal, but the traffic assessment modelled each intersection to ensure that there would be sufficient capacity to accommodate the 2031 traffic levels. Assessment of both the year 2021 and 2031 are in Appendix F.

The proposal would facilitate the projected traffic demand generated by the development of the WSEA. The road corridor adopted in the proposal aims to cater for the full development of the WSEA while specifically addressing the traffic needs for the future year 2021. Assumptions with regard to development potential of various precincts in the WSEA for the future year 2021 would include 100 per cent of the Eastern Creek precinct and Erskine Park Employment Area; 67 per cent of the Ropes Creek Precinct and 53 per cent of the lands south of the Sydney Water Pipelines. The proposal has a widened median west of Southridge Street to allow for future upgrading to six lanes (three lanes in each direction) when the WSEA is 100 per cent developed or due to increased traffic demands.

For each of the WSEA precincts, the following trip generations were adopted for a two hour peak period:

- Eastern Creek Precinct: 21 trips per hectare.
- Ropes Creek Precinct: 10 trips per hectare.
- Erskine Park Employment Area: 10 trips per hectare.
- Lands south of Sydney Water Pipeline: 21 trips per hectare.

Traffic modelling considered:

- Provision of an orderly and legible road network.
- Provision of adequate capacity on the higher order road network to cater for predicted traffic.
- Minimise impacts on the operation of adjacent M4 and M7 motorways.
- Minimise queue length spillback impacts along the Old Wallgrove Road and Wallgrove Road corridors.

- Provision of optimum intersection configurations accounting for physical constraints and land ownership.
- Provision for future bus priority measures along the Old Wallgrove Road corridor.

Traffic modelling was undertaken based on RMS strategic model developed by EMME software. Proposal specific models used include:

- Strategic modelling using a sub-area model in EMME.
- Micro-simulation model of the corridor using Paramics.
- Intersection modelling of key intersections using SIDRA software.

Construction impacts

Traffic generation

The main activities, which would generate traffic during the construction period, include:

- Delivery of materials.
- Removal of spoil and waste.
- Delivery/removal of construction equipment and machinery.
- Movement of construction personnel, including contractors, site labour force and specialist supervisory personnel.

There are a number of different haulage routes that could be used for the delivery of materials and equipment and removal of spoil and waste during construction. The use of haulage routes would depend on the location from where materials, equipment and plant are sourced. Regional routes include the M4 and M7 motorways, Great Western Highway, Wallgrove Road and Old Wallgrove Road. Haulage routes would be decided during detailed design and prior to consultation.

Light vehicle traffic generation would be associated with staff movements to site. Over the construction period, it is estimated that there would be a maximum number of 200 people on site. Staff arriving on site is predicted to arrive between 6.30 am and 7.00 am and depart between 5.00 pm and 5.30 pm. However, depending on the construction period, the construction peak hours could occur outside the existing road peak hours. It is estimated, that allowing for some car sharing, around 184 individual trips would be generated per day. Assuming that around 80 per cent of vehicles would arrive/ depart during the AM and PM peak, construction would result in an increase in 148 vehicles during those peak periods.

It is estimated that around 62 individual truck trips per day are required to achieve the construction program. Overall, including light vehicle traffic, there would be 246 individual vehicle trips a day. This would equate to about 150 individual vehicle trips per day during the peak periods.

The proposal would generate an extra 150 trips during peak hour (outbound/inbound). The impacts are minor as the existing motorways and main arterial roads already carry large volumes of traffic (refer to Table 6-1). Movement of material would be managed through the scheduling of deliveries to minimise the number of haulage and delivery vehicles required during peak hours.

Impacts from construction traffic on road operations

Construction would likely be completed in stages (refer to section 3.4.6). The staging would result in works being predominantly undertaken off line, away from live traffic roads. The nearness of the construction site to Old Wallgrove Road and Wallgrove Road could see a reduction in the speed limit for the extent of the construction area. This would result in localised temporary traffic delays along affected roads.

If the mini-link road is constructed as part of stage 1 and opened to live traffic, this would allow some traffic to be diverted to this road and Capicure Road, which would potentially reduce the traffic on Old Wallgrove Road throughout the remainder of construction. In addition, some traffic switches and lane closures may be required during drainage and pavement works, line marking and other ancillary works.

Public transport, pedestrian and cyclist movements

Public transport on Old Wallgrove Road and Wallgrove Road would be subject to the same impacts as for other traffic on the road including localised delays. There are only informal bus stops along Old Wallgrove Road, with bus passenger activities at these locations being disrupted. Currently there are no formal facilities for pedestrian or cyclist movements along Old Wallgrove Road, so there would be no impacts during construction. However, off-road cyclist facilities to the west of Wallgrove Road would be disrupted during works including the widening of Wallgrove Road and connection of the mini link road to Wallgrove Road. The signalised pedestrian crossing facilities at the Old Wallgrove Road / Wallgrove Road intersection would remain operational during construction.

Property access

During construction the existing property access off Old Wallgrove Road, opposite the Roberts Road intersection, may be subject to temporary closures or delays. Consideration would need to be given to the staging of works as part of the planned construction program. The strategy should be produced that identifies access routes to existing development areas during each construction stage for the project and is expected to be produced at the detailed design stage.

Operation

Future road network performance

The annual daily traffic volumes along Old Wallgrove Road are estimated to be in excess of 25,000 by 2021. This represents an increase of over 400% of existing traffic (2011).

The review of the existing road network identified delays along Wallgrove Road during the PM peak period, highlighting that road capacity improvements are required across the wider road network to support the development of the WSEA.

In assessing the existing road network under future (ie 2021) traffic conditions, the following was found:

- Wallgrove Road presents capacity issues between Old Wallgrove Road and the M4 Motorway during 2021 peak periods.
- Old Wallgrove Road needs to be widened at Wallgrove Road to cater for traffic demand pressures from the M7 Motorway approaches by 2021.

- Mini-link road is required by 2021 under the predicted traffic demand and would allow Old Wallgrove Road to operate as the primary gateway for the WSEA from the M7 Motorway and Wallgrove Road for the medium term.
- The M7 and M4 motorway ramps and carriageways in the peak direction perform close to capacity during both peaks by 2021.

As such, the following enhancements to the lane configurations of the proposal were incorporated into the design to ensure the road network operates efficiently at least up to 2021 (refer to Figure 3-2):

- The implementation of three traffic lanes in each direction between Wallgrove Road and Southridge Street intersection.
- The implementation of two traffic lanes in each direction between Southridge Street intersection and the new Erskine Park Link Road.
- The implementation of the mini-link road connection between the intersections of Old Wallgrove Road with Quarry Road (in the north) and Wallgrove Road with the M7 Motorway northbound on/off ramps with two traffic lanes in each direction and a new limited movement intersection (left in and left out) with Capicure Drive.
- Widening of the western side of Wallgrove Road between Old Wallgrove Road and the mini-link road to accommodate additional turning lanes.

The proposal was then assessed to identify the performance of the proposed intersection arrangement for the 2021 scenario (refer to Figure 3-2). Table 6-4 outlines the Level of Service (LoS) for the proposal during the AM and PM Peak. The proposal design criteria for intersection performance were to have a LoS of D (or better).

Table 6-4: 2021 intersection layout performance

Intersection	2021	
	AM peak	PM peak
Wallgrove Rd / Wonderland Dr	B	A
Wallgrove Rd / Old Wallgrove Rd	C	B
Wallgrove Rd/M7 Northbound ramp/ mini-link	D	D
Old Wallgrove Rd/ Mini-Link	D	C
Old Wallgrove Rd/ Southridge St	B	C
Old Wallgrove Rd/ Eastern Creek Dr	B	B
Old Wallgrove Rd/ Roberts Rd	B	A

The results of the assessment indicated that with the proposed changes to lane configurations, all intersections,would operate within the intersection threshold (LoS D or better) under future traffic conditions(refer to Table 6-3),.

Public transport, pedestrian and cyclist movements

The proposal would not hinder existing bus routes that operate on Old Wallgrove Road or surrounding roads. Rather, the inclusion of bus dedicated facilities along the widened Old Wallgrove Road would provide an opportunity for extending some bus routes and potentially new bus services to the WSEA. This includes bus route numbers 738, 739 and 779, which currently offer services that run into or near WSEA from transport interchanges and centres at Penrith, Mt Druitt, Rooty Hill and

Blacktown.

The development of Old Wallgrove Road in conjunction with the construction of Erskine Park Link Road provides an opportunity to introduce a strategic bus corridor through the WSEA.

Pedestrian and cyclist movement along Old Wallgrove Road would be improved by the proposal through the provision of a shared path to the north of the road and pedestrian crossing facilities at intersections. The shared path would connect to the shared path proposed to be constructed as part of the Erskine Park Link Road and to the M7 Motorway network of shared paths. This would improve regional pedestrian and cyclist movements.

Property access

There is an existing property access off Old Wallgrove Road, opposite the Roberts Road intersection. As there would not be any direct property access onto Old Wallgrove Road or the mini-link road, this property access would be removed.

6.1.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Resource use and traffic minimisation	• Earthworks quantities would be balanced as far as practicable during detailed design to ensure that the transfer of material along the external road network is minimised.	RMS	Pre-Construction
Construction traffic impacts	• Prior to construction, a traffic management plan would be prepared to outline management measures during construction. These measures describe how: – Traffic control would be provided to manage and regulate traffic movements during construction. – To notify road users about traffic conditions/ disruptions. – To consult with property owners on property access disruptions. – Disruption to all road users during construction would be kept to a minimum. – Construction and delivery vehicles entering or leaving the site compound and/or stockpile sites would use designated haulage routes identified in the plan under traffic control. These movements would be restricted to non-peak traffic periods as specified in the plan to minimise movements on adjacent roads during construction. • Appropriate traffic management measures would be implemented that could see a reduction in the speed limit for the extent of the construction site and localised temporary delays along Old Wallgrove Road and local road intersections.	Construction contractor	Pre-construction
Local road access	• Property access to Old Wallgrove Road, via the Roberts Road intersection for the property north	RMS	Pre-Construction

Impact	Environmental safeguards	Responsibility	Timing
impacts	of the proposal that is losing its direct access, would be considered as part of detailed design. If any changes are made to the proposal, RMS Environment Officer would be consulted to identify any further environmental assessment that may be required for any changes.'		
	• Existing connecting streets would have their accesses maintained during construction. However, should accesses need to be obstructed, alternatives would be put in place for the duration of the disruption.	Construction contractor	Construction
Access impacts	• Consultation would be undertaken with the property owners to minimise any access impacts.	Construction contractor	Construction
Closure of existing property access onto Old Wallgrove Road	• RMS would continue to consult with the relevant landowner of the timing of closure of the access onto Old Wallgrove Road	Construction contractor	Construction
Public transport	• Consultation would be undertaken with Westbus to temporarily relocate the bus stops during construction.	Construction contractor	Construction

6.1.4 Consistency with the concept plan

The alignment of the proposal has not altered since approval of the concept plan. However, more detailed traffic modelling has been undertaken that has resulted in changes to intersection arrangements and the required number of turning lanes. This has improved the functionality of those intersections from the concept plan. The corridor identified for concept plan was sufficient for the proposed turning lanes and intersection arrangements. The proposal is therefore consistent with the concept design.

6.2 Biodiversity

A biodiversity study was undertaken as part of the REF and is attached at Appendix H (Aurecon, 2012).

6.2.1 Existing environment

The study area encompasses the entire proposal area within the construction footprint and surrounding areas, which may be indirectly impacted shown in Figure 6-1. To the south of Old Wallgrove Road, there is industrial development, while to the north of the site, there is vacant grassed lands, for future industrial development. There are two creeklines (Eskdale and Reedy creeks) that run parallel to Old Wallgrove Road. Eskdale Creek is to the north of Old Wallgrove Road, passing under Quarry Road via a culvert. To the north east of the proposal, the creek is associated with a stand of casuarina grove prior to passing under Wallgrove Road and the M7 Motorway that are bridged across the creek. Reedy Creek is to the south of Old Wallgrove Road and is associated with the riparian vegetation of River Flat Eucalyptus Forest. Wallgrove Road and the M7 Motorway also pass over this creek via bridges.

Threatened flora and fauna species

A list of threatened species that could occur on the site was identified through database searches within 1 kilometre of the proposal (NSW Threatened Species website, EPBC Act Protected Matters search). The search results are summarised in Table 6-5).

Table 6-5: Threatened flora and fauna species potentially occurring in the study area

Class/scientific name	Common name	Status	
		TSC Act	EPBC Act
Flora			
Cynanchum elegans	White-flowered Wax Plant	E	E
Pimelea curviflora var. curviflora		V	V
Pomaderris brunnea	Rufous Pomaderris	Not Listed	V
Pterostylis gibbosa	Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood	Not Listed	E
Pterostylis saxicola	Sydney Plains Greenhood	E	E
Birds			
Anthochaera phrygia	Regent Honeyeater	CE	E
Botaurus poiciloptilus	Australasian Bittern	Not listed	E
Lathamus discolor	Swift Parrot	E	E
Rostratula australis	Australian Painted Snipe	E	V
Fish			
Macquaria australasica	Macquarie Perch	E	E
Prototroctes maraena	Australian Grayling	V	V
Frogs			
Litoria aurea	Green and Golden Bell Frog	E	V
Mammals			
Chalinolobus dwyeri	Large-eared Pied Bat, Large Pied Bat	N/A	V
Dasyurus maculatus (SE mainland population)	Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (south-eastern mainland population)	V	E
Petrogale penicillata	Brush-tailed Rock-wallaby	N/A	V
Potorous tridactylus	Long-nosed Potoroo (SE mainland population)	N/A	V
Pseudomys novaehollandiae	New Holland Mouse	N/A	V
Pteropus poliocephalus	Grey-headed Flying-fox	V	V
Reptilia			

Class/scientific name	Common name	Status	
		TSC Act	EPBC Act
Hoplocephalus bungaroides	Broad-headed Snake	E	V
Migratory Marine Birds			
Apus pacificus	Fork-tailed Swift	Not listed	M
Ardea alba	Great Egret, White Egret	Not listed	M
Ardea ibis	Cattle Egret	Not listed	M
Migratory Terrestrial Species			
Haliaeetus leucogaster	White-bellied Sea-Eagle	Not listed	M
Hirundapus caudacutus	White-throated Needletail	Not listed	M
Merops ornatus	Rainbow Bee-eater	Not listed	M
Monarcha melanopsis	Black-faced Monarch	Not listed	M
Myiagra cyanoleuca	Satin Flycatcher	Not listed	M
Rhipidura rufifrons	Rufous Fantail	Not listed	M
Xanthomyza phrygia	Regent Honeyeater	E	E
Migratory Wetlands Species			
Apus pacificus	Fork-tailed Swift	Not listed	M
Ardea alba	Great Egret, White Egret	Not listed	M
Ardea ibis	Cattle Egret	Not listed	M
Gallinago hardwickii	Latham's Snipe, Japanese Snipe	Not listed	M
Haliaeetus leucogaster	White-bellied Sea-Eagle	Not listed	M
Hirundapus caudacutus	*White-throated Needletail*	Not listed	M
Lathamus discolor	*Swift Parrot*	Not listed	E
Merops ornatus	*Rainbow Bee-eater*	Not listed	M
Monarcha melanopsis	*Black-faced Monarch*	Not listed	M
Myiagra cyanoleuca	*Satin Flycatcher*	Not listed	M
Rhipidura rufifrons	*Rufous Fantail*	Not listed	M
Rostratula benghalensis s. lat.	*Painted Snipe*	Not listed	V

Note: CE = Critically Endangered; E = Endangered; V = Vulnerable; M = listed migratory species; N/A = species not expected to occur.

The field survey confirmed that there was no suitable habitat present for any of the threatened species in the study area, nor were the species identified on site. As such, it was unlikely that any of these species would be present in the study area.

Field survey

The field survey was conducted on 16 August 2011, within the detection window for most species listed under both the EPBC Act and the TSC Act. The field survey focused on vegetation mapping, recording any fauna sighting. In addition, the field survey included the specific identification and mapping of trees with a diameter at

breast height (DBH) of more than 80 centimetres, or hollow bearing trees that could provide habitat for species.

The field survey consisted of a physical inspection of the entire proposal boundary using both random meander and targeted inspections. During the field survey, the small size of the remnant patches of vegetation allowed for areas of remnant vegetation to be inspected, and a direct inventory of all species compiled. This assessment also allowed for an assessment of structure of the woodland patches and estimates of their contribution towards the ecological function of the study area. Vegetation mapping was prepared prior to the field investigations and updated during the field survey (refer to Figure 6-1). As part of this field survey, Cumberland Plain Woodland Critically Endangered Community was found on-site south along Old Wallgrove Road between Roberts Road and Southridge Street.

Subsequent to this field survey, the installation of 132kV overhead power lines south of Old Wallgrove Road by Endeavour Energy, resulted in the removal of mature Cumberland Plain Woodland. A follow up inspection of the altered site was conducted in January 2012 to check the extent, if any, of remaining Cumberland Plain Woodland. The inspection found that the remaining vegetation no longer met the definition of Cumberland Plain Woodland Critically Endangered Community. The vegetation type became the unlisted Cumberland Dry Sclerophyll Forest, which is not threatened or protected under the TSC Act or EPBC Act.

The study area consists of remnant vegetation, planted vegetation and grassed lands awaiting development. Heavily cleared grasslands that have been sown with non-native pasture grass species or have been developed dominate the surrounding environments. As a result the overall landscape context of the remnant vegetation patches is a series of 'islands' in a heavily disturbed landscape.

Remnant vegetation patches within the study area consist of:

- Cumberland Dry Sclerophyll Forest.
- Casuarina Grove.
- River Flat Eucalyptus (listed as threatened ecological community in the TSC Act).

These vegetation patches are shown in Figure 6-1.

Cumberland Dry Sclerophyll Forest

The patches of remnant woodland adjacent to the proposal have limited overstorey, but a dense shrub layer dominated by native species, with almost no invasion of non-native species beyond the edges of the patches. Species include Parramatta Wattle (*Acacia parramatensis*), Black Wattle (*A. decurrens*), Hickory Wattle (*A. implexa*), White Sallow Wattle (*A. floribunda*), Wedge-leaf Hop Bush (*Dodonaea viscosa subsp.cuneata*), Austral Indigo (*Indigo australis*) and a native pea (*Dillwynia sieberi*).

Towards the western portion of remnant patches, the shrub and grassy understorey is no longer present, but there was no evidence of weed invasion during the field investigation.

Towards the disturbed edges of the patches, particularly in the drainage lines, there are dense colonies of invasive weed Rhodes Grass (*Chloris gayana*) however; this has not invaded the woodland portions to any significant degree. The disturbed edges of the vegetation patches are showing active colonisation by native species, particularly by Native Sarsparilla, Twining Glycine and Austral Indigo.

In a pre-cleared landscape this community would have provided a transition between the drier Cumberland Dry Sclerophyll Forest communities and riparian vegetation.

Casuarina grove

Another patch of vegetation within the study area is a grove of Swamp Oak (*Casuarina glauca*) associated with Eskdale Creek to the north-east of the study area. The area fringing the grove of trees is characterised by dense planting of introduced Couch Grass (*Cynodon dactylon*). There has been extensive illegal rubbish dumping throughout this area, and there is a generally high level of disturbance and weed invasion.

The vegetation in the area does not form any listed ecological community; however, several Cumberland Plain Land Snails (*Meridolum corneovirens*) were detected in this area during initial environmental surveys (SKM 2008, p.43). The species is closely associated with forested areas, and was not found in any cleared areas. As a result the species can reasonably be expected to be confined to these zones and the tree line of this patch of vegetation can be assumed to define the potential Cumberland Plain Land Snail population.

River Flat Eucalyptus Forest

There is a section of River Flat Eucalypt Forest adjacent to the south-east of the study area. The River Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South-East Corner Bioregions is listed as a threatened ecological community under the TSC Act. The ecological community is characterised by an open forest structure on river flats, consisting of mixed Eucalypt and Casuarina overstorey with a diverse shrub and grass/forb layer. The threatened ecological community has highly disturbed edges, however the riparian community appears to be substantially intact in the sections of riverbank close to the proposed works.

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0 100 200m

Projection: GDA 1994 MGA Zone 56

Old Wallgrove Road **REF**

FIGURE 6-1: Vegetation map

Weed species

During the field survey, two weed species were identified on site. These were Rhodes Grass (*Chloris gayana*) and Couch Grass (*Cynodon dactylon*). A search of the Department of Primary Industry noxious weed database identified a number of noxious weed species in the Blacktown City local government area (refer to Table 6-6)

Table 6-6: Noxious weed species in Blacktown City local government area

Weed	Class
African boxthorn [*Lycium ferocissimum*]	4
African olive [*Olea europaea* subspecies *cuspidata*]	4
Alligator weed [*Alternanthera philoxeroides*]	3
Bathurst/Noogoora/Hunter/South American/Californian/cockle burr [*Xanthium* species]	4
Boneseed [*Chrysanthemoides monilifera* subspecies *monilifera*]	4
Bridal creeper [*Asparagus asparagoides*]	4
Chilean needle grass [*Nassella neesiana*]	4
Columbus grass [*Sorghum* x *almum*]	4
Crofton weed [*Ageratina adenophora*]	4
East Indian hygrophila [*Hygrophila polysperma*]	4
Giant Parramatta grass [*Sporobolus fertilis*]	3
Golden dodder [*Cuscuta campestris*]	4
Gorse [*Ulex europaeus*]	3
Green cestrum [*Cestrum parqui*]	3
Hygro [*Hygrophila polysperma*]	
Hygrophila [*Hygrophila costata*]	2
Johnson grass [*Sorghum halepense*]	4
Lantana [*Lantana* species]	4
Long-leaf willow primrose [*Ludwigia longifolia*]	3
Ludwigia [*Ludwigia peruviana*]	3
Mother-of-millions [*Bryophyllum* species]	3
Pampas grass [*Cortaderia species*]	3
Paterson's curse, Vipers bugloss, Italian bugloss [*Echium* species]	4
Pellitory [*Parietaria judaica*]	4
Privet (Broad-leaf) [*Ligustrum lucidum*]	4
Privet (Narrow-leaf/Chinese) [*Ligustrum sinense*]	4
Salvinia [*Salvinia molesta*]	3
Serrated tussock [*Nassella trichotoma*]	4
Spiny burrgrass [*Cenchrus incertus*]	4
Spiny burrgrass [*Cenchrus longispinus*]	4
St. John's wort [*Hypericum perforatum*]	4
Tropical soda apple [*Solanum viarum*]	2
Water hyacinth [*Eichhornia crassipes*]	3

Aquatic fauna habitat

There are also two named creeks (Eskdale and Reedy creeks) that cross the construction footprint. These creeks run parallel to Old Wallgrove Road to the north and the south respectively, crossing under Wallgrove Road. Reedy Creek is considered to be a Class 2 waterway (moderate fish habitat) and Eskdale Creek, a Class 3 waterway (minimal fish habitat). The main areas of permanent water in these waterways (and therefore fish habitat) are downstream of the proposal.

A number of other small drainage lines cross under Old Wallgrove Road, with no provision for fish movement. However, these are classed as Class 4 waterways and are unlikely to contain fish habitat.

6.2.2 Potential impacts

The proposal is predominantly carried out on cleared land, with only a small area of vegetation, less than one hectare, proposed to be disturbed. The disturbed areas are mostly on the edges of remnant vegetation patches. Vegetation proposed for removal (based on vegetation mapping from LPI) includes around 0.3 hectares of Casuarina grove, around 0.4 hectares of Cumberland Dry Sclerophyll Forest and 0.2 hectares of River Flat Eucalyptus. An additional 0.3 hectares of planted pine trees screening a warehouse building from Wallgrove Road in the north of the study area would also be disturbed. Due to the limited ecological value of the vegetation to be removed and the already highly disturbed vegetation character of the area the environment impact as a result of vegetation removal would be minimal.

The proposal would impact on 0.3 hectares of casuarina grove located to the north-east of the study area. This is from LPI vegetation mapping, however, 2010 aerial photography shows that there are few trees in this area. Due to the proximity of the trees there may be indirect impacts from the construction through intrusion by vehicles.

A batter slope is proposed for the section opposite the Eastern Creek Drive intersection, resulting in a minor encroachment into the roadside vegetation (0.4 hectares of Cumberland Dry Sclerophyll Forest), consisting of shrubs, grasses and forbs. The roadside vegetation is already disturbed, with no hollow bearing trees. The existing vegetation provides only a small area of foraging habitat, as such there would be negligible impacts on fauna habitat.

The proposal embankment to the south of the mini link road would require the removal of a number of trees located on the edge of the mapped River flat eucalyptus forest ecological community located to the south east of the study area. As this is listed as a threatened ecological community listed under the *Threatened Species Conversation Act 1995*, a seven part test (significance test) has been prepared (refer to Appendix H) and no impacts to the habitat function of this vegetation is anticipated as a result of the proposal. The seven part test found that there were a number of trees to the edge of the River Flat Eucalypt Forest within the footprint of the works and minimal clearing of riparian vegetation would be undertaken. The area impacted by the proposal is heavily disturbed and contains a mixture of native and exotic grass species, with few trees. The test concluded that the proposed works would not result in a significant impact to the community.

During construction, there is the potential for vehicle encroachment and other indirect impacts to occur. The potential indirect impacts to adjoining vegetation include:

- Construction traffic encroaching on vegetated areas.
- Construction of bridge footings impacting on creeklines.
- Accidental spill of fuels, oils and other pollutants running off site into adjoining land and waterways/drainage lines.
- Spread of weeds common to the Blacktown LGA area.
- Litter and pollution.

Fauna species identified around the site are predominantly bird species which use the remnant vegetation surrounding the site for food and habitat resources. The only fauna population identified close to the site is a small population of Cumberland Plain Land Snail (listed as endangered under the *Threatened Species Conservation Act*

1995) that has been identified within the section of Casuarinas in the north-eastern portion of the study area. Field investigations undertaken in 2011 did not identify any snails within the proposal footprint. The area to be impacted by the proposal is heavily disturbed, invaded by couch grass and subject to rubbish dumping. However, they are assumed to still occur within the stand of Casuarinas. As the design would minimise the impact on Casuarinas, impacts on Cumberland Plain Land Snail would be minimal. While no direct impacts would occur, potential indirect impacts on individuals could occur through vehicle access during construction. However, due to the potential impact to Cumberland Plain Land Snail habitat, a seven part test (significance test) has been prepared for the snail species (refer to Appendix H).The seven part test found that the proposal would not result in the removal of any known habitat and would not impact on the species.

There are two creeks adjoining the study area that could be impacted by construction of the proposal. The works on the bridges over the Eskdale and Reedy creeks, have been designed so that proposed footings and piers are outside the creeks and areas of riparian vegetation to avoid any direct impacts to any aquatic habitat. However, as construction would be undertaken over and near the creeks, there could be indirect impacts to aquatic habitat including sedimentation and scouring, resulting in increasing turbidity and suspended solids in the creeks. Erosion and sedimentation impacts are further discussed in Sections 6.6 and 6.7.

With the implementation of the identified mitigation measures, potential impacts from construction are not considered to be significant.

6.2.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Impacts to Cumberland Plain Land Snail	• Prior to construction, a qualified ecologist is to undertake a targeted survey of Cumberland Plain Land Snail (*Meridolum corneovirens*), and if present, a translocation plan would be prepared, in consultation with Office of Environment and Heritage.	Construction contractor	Pre-construction
Construction impacts to native vegetation in and outside the proposal footprint.	• Exclusion fencing would be established around areas of vegetation outside of the approved clearing areas (including the area of River Flat Eucalyptus and Casuarina grove) for the duration of construction. Fences would be maintained at all times, and construction staff would be advised of their purpose and instructed to stay out of these areas.	Construction contractor	Construction
	• Parking and vehicular access off existing roads would only be in designated areas and away from mature trees.	Construction contractor	Construction
	• Vegetation removal would be minimised where possible.	Construction contractor	Construction
Impacts to fauna	• Any native vegetation clearing would be supervised by an experienced ecologist to avoid impacts on fauna.	Construction contractor	Construction
	• Any incident involving fauna would be reported to WIRES.	Construction contractor	Construction
Impacts to	• Appropriate erosion and sedimentation	Construction	Construction

Impact	Environmental safeguards	Responsibility	Timing
waterways	controls would be installed prior to any vegetation removal or earthworks near Reedy and Eskdale creeks, with exclusion zones established to prevent parking or other vehicle movement inside the riparian vegetation.	contractor	
	• All cleared areas would be progressively stabilised.	Construction contractor	Construction
Spread of weeds	• All vehicles and equipment would be cleared of soil and vegetation when leaving the site to avoid transfer of weeds and soil borne diseases.	Construction contractor	Construction

6.2.4 Consistency with concept plan

Due to the recent change in the existing environment, the proposal would not impact on Cumberland Plain Woodland as was identified in the EPLRN concept plan environmental assessment.

The biodiversity assessment undertaken as part of this REF identified that the potential impacts to threatened species would not be significant and therefore no species impact statement or referral would be required.

6.3 Noise and vibration

6.3.1 Existing environment

The existing land use adjacent to Old Wallgrove Road is predominantly industrial, with some vacant land to the north, where future industrial development is proposed as part of the WSEA.

There is a high level of existing noise in the study area. This is from the surrounding industrial development and road traffic noise, particularly heavy vehicles.

Sensitive receivers

Due to the vacant and industrial nature of land uses surrounding the proposal, there are few sensitive receivers. The closest sensitive receiver is a proposed child care centre that recently received development approval from Blacktown City Council. This child care centre is located in Southridge Street around 250 metres from Old Wallgrove Road.

As the child care centre was approved after the EPLRN project, it needed to consider operational noise generated from the approved EPLRN project (and surrounding industrial development). The centre would need to meet the internal noise goals in *Development near rail corridors and busy roads- interim guideline* (DoP, 2008), including where necessary any mitigation measures.

In reviewing the plans for the child care centre, the design of the facility appears to have considered the Department of Planning and Infrastructure document *Development near rail corridors and busy roads- interim guideline* (DoP, 2008). The child care centre would be situated behind a large warehouse building, which would screen noise from Old Wallgrove Road. The building is also set back from Southridge Street to minimise any traffic generated noise impacts.

Other sensitive receivers are over one kilometre away, in Erskine Park, Horsley Park and Minchinbury. The proposal would not result in significant noise impacts to these residences due to the distance from the proposal as well as there being other noise sources closer, particularly roads, including Mamre Road and Erskine Park Link Road; Wallgrove Road and the M4 and M7 motorways.

6.3.2 Construction noise criteria

The NSW Environment Protection Authority provides guidance for assessing construction noise impacts in the document *Interim Construction Noise Guideline* (DECC 2009). The closest receiver is a proposed child care centre that received planning approval from Blacktown City Council in December 2011. The child care centre is located in Southridge Street around 250 metres from Old Wallgrove Road.

The applicable noise management level during construction for the childcare centre is identified in Table 6-7.

Table 6-7: Construction noise assessment objectives for a child care centre

Land use	Management level $LAeq_{(15min)}$ (when properties are being used)	$LAeq_{(15min)}$ Daytime
Classrooms at schools and other educational institutions	Internal noise level 45 dB(A)	55 dB(A)*

* External noise level (as per section 4.1.2 of the *Interim Construction Noise Guideline*).

The proposal would only be constructed during standard working hours in the daytime period:

- Monday to Friday: 7am to 6pm.
- Saturday: 8am to 1pm.
- No works Sundays or public holidays.

6.3.3 Operational noise criteria

Operational road noise is assessed under the NSW *Road Noise Policy* (OEH, 2010). All road projects need to assess noise impacts on sensitive receivers up to 600 metres away. The proposal consists of the redevelopment of the road (works to Old Wallgrove Road and Wallgrove Road) as well as the construction of a new road (mini- link road).

Sensitive receivers are identified as residences, hospitals, school and child care facilities and places of worship. There is no residential development within the study area, with the closest areas of residences to the west in Erskine Park and St Clair (over one kilometre away). The criteria for the childcare centre (for both a road redevelopment or a new road) are provided in Table 6-8 from the *NSW Road Noise Policy*.

Table 6-8: Road traffic noise assessment criteria for non-residential land uses

Sensitive land use	Assessment criteria – dB(A)		Additional considerations
	Day (7am–10pm)	Night (10pm–7am)	
Childcare facilities	Sleeping rooms LAeq, (1 hour) 35 (internal) Indoor play areas LAeq, (1 hour) 40 (internal) Outdoor play areas LAeq, (1 hour) 55 (external)	–	Multi-purpose spaces, eg shared indoor play/sleeping rooms should meet the lower of the respective criteria. Measurements for sleeping rooms should be taken during designated sleeping times for the facility, or if these are not known, during the highest hourly traffic noise level during the opening hours of the facility.

6.3.4 Construction vibration criteria

Maximum allowable magnitudes of building vibration with respect to human response are shown in Table 6-9 below.

Table 6-9: Criteria for continuous and impulsive vibration acceleration 1-80 Hz (m/s^2)

Time of space occupancy	Time of Day	Preferred values		Maximum values	
		Z-axis	x & y axis	Z-axis	x & y axis
Continuous vibration					
Offices, schools, educational institutions & places of worship	Day or night	0.020	0.014	0.040	0.028
Impulsive vibration					
Offices, schools, educational institutions, places of worship or workshops	Day or night	0.64	1.28	0.46	0.92

The vibration criteria for human comfort are detailed in BS6472:1992 '*Guide to evaluation of human exposure to vibration in buildings (1 Hz to 80Hz)*'. The criteria are shown in Table 6-10.

Table 6-10: Acceptable values for intermittent vibration ($m/s^{1.75}$)

Location	Daytime values		Night-time values	
	Z-axis	x & y axis	Z-axis	x & y axis
Offices, schools, educational institutions & places of worship	0.40	0.80	0.40	0.80

Source: Assessing Vibration: A Technical Guideline (DEC, 2006)

6.3.5 Potential impacts

Construction noise sources

As the construction program and details of delivery have not yet been determined, this assessment provides a preliminary overview of potential construction noise and vibration impacts. The work methodology during construction is identified in Table 6-11.

Table 6-11: Work methodology

Activity	Description
Fencing	• Installation of fence on the perimeter of the road boundary
Clearing and grubbing	• Felling of trees and shrubs • Removal of built structures • Removal of stumps, roots and general vegetation
Compound set-up	• Administrative and maintenance area • Increased vehicle movements • Workshop activities
Utility relocations including street lighting	• Utility relocations include electrical, telecommunications and water.
Stormwater drainage installation	• Excavation for drainage
Carriageway construction and sealing on Old Wallgrove Road, Wallgrove Road and mini-link road	• Bulk earthworks including topsoil stripping • Cut and fill • Excavation for culverts and sedimentation basins • Construction of batters and landscaping • Construction of shared and pedestrian pathways • Removal of spoil • Construction base including pouring of concrete base and sub-base • Application of sprayed bitumen seals • Laying of asphalt • Finishing open drains • Installation of road furniture and medians • Linemarking and signposting
Rehabilitation of the site	• Demobilisation of work compound and site equipment

Construction plant

Construction plant to be used during construction is identified in Table 6-12. Typical sound power levels have been referenced from the Australian Standard AS2436.

Table 6-12: Likely construction plant

Construction stage	Likely construction plant	Estimated number	Sound power level dB(A)
Fencing	• Truck	1	107
Clearing and grubbing	• Excavator	1	118
	• Truck	1	107
Compound set-up	• Truck	1	107
	• Excavator	1	118
	• Compactor	1	113
Utility relocation	• Excavator	1	118
	• Truck	1	107
Stormwater drainage installation	• Excavator	1	118
	• Truck	1	107
Carriageway construction and sealing	• Compactor	1	113
	• Bulldozer 100–200 kW	1	118
	• Scraper 200 kW	1	117
	• Excavator	1	118
	• Vibratory roller	1	104
	• Water cart	1	108
	• Grader 100 kW	1	118
	• Truck	1	107
	• Front end loader	1	120
	• Generator	1	111
	• Bitumen sprayer	1	110
	• Spreader	1	108
	• Pneumatic tyre roller	1	111
Rehabilitation of the site	• Truck	1	107
	• Compactor	1	113
	• Excavator	1	118

Construction noise impacts

Noise generated by construction of the proposal is likely to vary during construction, due to the linear nature of the proposal. The noise levels likely to be experienced at the identified sensitive receiver would depend on the type of construction activities that are being undertaken and equipment being used.

Vibrations from construction activities have the potential to impact human comfort and the integrity of structures where located near the proposal corridor. There would be buffer zones of more than 10 metres between the compactor and commercial premises and the childcare centre. Blasting, piling and hydraulic hammering all generate high levels of vibration when undertaken close to sensitive receivers. Any hydraulic hammering would need to have a buffer zone of 10 metres to prevent damaging commercial buildings.

There would be no blasting undertaken as part of the proposal and only low level vibrations from the use of heavy vehicles and vibratory rollers may be experienced. As such, the risk of significant human comfort impacts is considered low. The risk of vibration-induced damage to most building structures is also considered to be low.

The construction plant identified in the table is indicative of the type of construction activities and plant that would be used during construction. The actual noise sources would be identified by the construction contractor who would prepare a construction noise and vibration management plan for the proposal.

Based on the sound power levels of likely construction plant, predicted sound pressure levels have been calculated at the child care centre, using RMS construction noise calculation spreadsheet. Predicted noise levels have been compared with OEH construction noise criteria to determine the potential impact and to develop a mitigation management framework. The predicted noise levels are shown in Table 6-13.

Table 6-13: Construction noise predictions

Receiver location	Child care centre
Distance from works	250 m
Criteria – standard hours	55dBA
Construction activities	
Fencing	41 dBA
Clearing and grubbing	52 dBA
Utility relocations including street lighting	52 dBA
Stormwater drainage installation	52 dBA
Carriageway construction and sealing on Old Wallgrove Road, Wallgrove Road and mini-link road	58 dBA
Rehabilitation of the site	53 dBA

Note: the child care centre is behind a brick building providing at least a 10dBA attenuation to generated construction noise. This 10dBA noise reduction is included in the predictions above.

The above predicted noise levels are indicative only and are based on source levels that have been referenced from Australian Standard 2436.

The predicted construction noise emission levels in the above table are representative of indicative noise levels for plant items for each estimated stage of

work. This assessment has shown that there would be one exceedance of noise level, during carriageway construction. However, due to the varying distances of the linear construction to the child care centre, this noise level would not be experienced for the entire construction period. No assessment has been carried out on noise levels from the site compound as it is located over 650 metres away from the child care centre with little noise impact on the child care centre.

While the child care centre has been approved, it is unknown whether it would be operational during the construction of the proposal.

Operational noise impacts

The qualitative operational noise assessment has been undertaken for one sensitive receiver that is within 600 metres of the proposal. However the EPLRN (including the proposal) was approved in 2009, with the child care centre being submitted for approval to Blacktown City Council in 2011. The RMS document *Environmental Noise Management Manual* (2001) states:

> "Developers, and not the RTA, are responsible for providing noise treatment(s) for all noise-sensitive developments proposed after a new road development or upgrading has been approved, and also where existing road traffic noise is a problem."

As such, while an assessment has been carried out on the sensitive receiver, there is no requirement for RMS to develop operational noise management measures for the sensitive receiver. This responsibility rests with the developer / owner of the facility.

As the proposal would increase the capacity of the road, there would be an increase in traffic noise. As part of the Development Application the child care centre has been planned to minimise any potential noise impacts from existing sources including traffic noise and surrounding noise from industrial development.

Noise assessment undertaken for the adjacent Erskine Park Link Road (Parsons Brinckerhoff, 2010) identified that an industrial property on the corner of Old Wallgrove Road and Roberts Road would experience noise levels of 56dBA during the day when the Erskine Park Link Road is opened and 54dBA at night. It is assumed that these noise levels would be similar to those experienced along Old Wallgrove Road.

As the child care centre is located 250 metres away from Old Wallgrove Road, noise levels are expected to be less than those at the edge of the road. The child care centre may also be sheltered from the noise, by the warehouse building between the child care centre and Old Wallgrove Road. Therefore, assuming a noise level of 56 dBA at the edge of the proposal, minus 10 dBA attenuation from the industrial structure in front of the child care centre, operational noise impacts during the day would be less than 46 dBA, below the noise criteria for childcare facilities. Night operation noise has not been considered as this is outside of childcare operation hours.

While some noise impacts may be expected, under the RMS' *Environmental Noise Management Manual* (RTA, 2001), developers are responsible for the provision of any noise mitigation measures after a road project has been approved. The concept plan approval for the EPLRN was issued in August 2009. The development application for the child care centre was later approved by Blacktown City Council in 2011. As such, the developer would have considered the need for noise mitigation measures for the child care centre.

6.3.6 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Construction noise and vibration impacts	• Should the child care centre be operational during construction of the proposal, prior notice of the construction program would be given, kept informed throughout the construction period, and provided with a name and contact number for construction noise information and complaints. Noise complaints would be dealt with promptly.	Construction contractor	Construction
	• Construction would be confined to approved construction hours, as specified in an approved construction noise and vibration management plan.	Construction contractor	Construction
	• Mobile equipment would be fitted with noise control equipment, where possible.	Construction contractor	Construction
	• A construction noise and vibration management plan would be prepared prior to construction works. This plan would include construction hours and measures to minimise noise impacts to sensitive receivers.	Construction contractor	Construction

6.3.7 Consistency with concept plan

A qualitative assessment of noise impacts was undertaken as part of the concept plan environmental assessment and identified noise impacts that would likely occur during construction from the operation of plant and during operation from the introduced source of road traffic.

A number of mitigation measures were recommended for implementation during the construction period. These have generally been incorporated into the safeguards and management measures. The need for further assessment of operational traffic noise impacts was also identified. However, as there is only one sensitive receiver within the study area that has been recently approved, a quantitative assessment has not been undertaken. As the concept plan was approved prior to the child care centre approval, the proponent of that development must meet internal noise goals in terms of the Infrastructure SEPP for sensitive developments near busy roads.

6.4 Aboriginal heritage

An Aboriginal heritage study was undertaken as part of the REF and is attached at Appendix E (AHMS, 2012).

6.4.1 Existing environment

The Darug people are the traditional owners of the Eastern Creek area. The Darug are part of a broad language group that originally extended from the eastern suburbs of Sydney as far south as La Perouse, west as far as Bathurst and north as far as the Hawkesbury River (Eades, 1976).

The relative scarcity of resources in the hinterland and the increased work associated

with procuring terrestrial foods through hunting meant that the hinterland was more thinly populated than the coast. A recent study of early historical sources regarding the Cumberland Plain has suggested that there was a minimum population density of 0.5 persons per square kilometre (Attenbrow, 2002).

Based on these accounts, it is considered that the Eastern Creek area was probably only utilised ephemerally with preference of activity and occupation closer to the coast in the east and/or the Hawkesbury River in the west. However, several of the larger creeks in the region, Eastern Creek and Ropes Creek for example, connect with the Hawkesbury River, and probably formed travel routes and access ways into the Cumberland Plain.

Previous studies

Numerous archaeological studies have been undertaken in the local area since the early 1980s with recent studies being undertaken for otherdevelopments and widening of local roadways. Previous findings in relation to Aboriginal heritage near the proposal are detailed in Table 6-14.

Table 6-14: Previous Aboriginal heritage studies

Area	Study	Findings
Surplus Land adjoining (former) Australia's Wonderland theme park	Archaeological Management Consulting Group (AMCG) 1997.	Seven artefact scatters and eight isolated finds identified, consisting of red silcrete flakes, flaked pieces and possible quartz manuports. Sites have low to moderate archaeological integrity due to historical disturbance. The results reflect sporadic use by people moving between Eastern and Ropes creeks.
	Dominic Steele Consulting Archaeology, 2002.	Test excavations in 2003 focused on five artefact scatters, two isolated finds, a potentially modified tree and an area of Potential Archaeological Deposit. A total of 38 artefacts were recovered (33 collected from the surface and five from sub-surface excavation) and consisted of six artefacts, one potential edge ground axe and 29 manuports. The results reflect sporadic use of the area.
	Jo McDonald (JMCHM), 2006.	Investigations focused on a PAD and seven artefact(s) (scatters and isolated finds). PAD excavations revealed that the site was relatively undisturbed, but had been truncated by natural erosion activity. 1,550 Aboriginal objects were recovered. The results showed that the area was used intermittently.
Erskine Park Link Road Network	Navin Officer Heritage Consultants Pty Ltd, 2008.	The review identified that no known Aboriginal sites would be impacted by the proposed EPLRN, however, certain areas were considered to have potential archaeological sensitivity. The survey identified two sites: a recommended Conservation Area identified as a PAD site, and a PAD site with artefact scatter. Aboriginal community representatives indicated the EPLRN would not impact on any site or place of significant cultural heritage value. However, areas may contain as yet unknown archaeological sites, which may be of Aboriginal cultural significance.
Link Road, Eastern Creek	Comber Consultants, 2008. Oliver Brown Consulting Archaeologist, 2010.	Although no Aboriginal sites were found, Comber recommended that subsurface testing be undertaken prior to construction due to the presence of Aboriginal archaeological sites in the vicinity of the study area. Test excavations of the Link Road PAD, adjacent to Quarry Road were undertaken in 2010. No Aboriginal archaeological material was discovered and the area was found to be heavily disturbed due to the construction of the existing road.

A review of previous archaeological reports of the study area has revealed two Potential Archaeological Deposit (PAD) sites in the vicinity of the proposal study area however these sites were not registered on the AHIMS database. These sites were the conservation area PAD and EPLR2. An AHIMS site (#45-5-0439) is located within the conservation area curtilage.

The conservation area PAD site is located north of Old Wallgrove Road and adjacent to Eskdale Creek. The area is considered to be part of a group of representative samples of archaeologically sensitive landforms in the Eastern Creek Business Park area.

EPLR2 consisted of two artefacts within a shallow vehicle track exposure in an overhead transmission line easement, within 100 metres of Reedy Creek.

AHIMS database search

An extensive search of the Aboriginal Heritage Information Management System (AHIMS) database undertaken on 29 June 2011 showed that 72 registered Aboriginal heritage sites exist at, or within 1 kilometre of the study area.

The registered Aboriginal sites comprise of one art (pigment or engraved), sixty one artefact(s), one artefact with potential archaeological deposit (PAD), two modified trees (scarred or carved), one modified tree with artefact(s) and six PADs. There are sixteen sites located within 500 metres of the study area. These are detailed in Table 6-15.

Table 6-15: AHIMS sites within 500 metres of the study area

AHIMS Site ID Number	Site name	Site type	Within study area
45-5-0439	Eastern Creek W1	Artefact	No – outside proposed areas of impact.
45-5-0558	Blacktown Southwest 5 Eastern Creek	Artefact	No – outside proposed areas of impact.
45-5-0588	Blacktown Southwest 1 Eastern Creek	Artefact	No – outside proposed areas of impact.
45-5-2797	WSO-OS-8	Artefact	No – outside proposed areas of impact.
45-5-2822	WBP 1	Modified Tree	No – outside proposed areas of impact.
45-5-2827	AWL 4	Artefact	No – outside proposed areas of impact.
45-5-2828	AWL 6	Artefact	No – outside proposed areas of impact.
45-5-2836	IF:7	Artefact	No – outside proposed areas of impact
45-5-2837	IF:8	Artefact	No – outside proposed areas of impact.
45-5-2974	Lucan Park PAD	PAD	No – outside proposed areas of impact.
45-5-3076	Austral 4	Artefact and PAD	Yes – previously destroyed
45-5-3206	ISF11	Artefact	No – outside proposed areas of impact.
45-5-3286	ISF2 Jacfin	Artefact	No – outside proposed areas of impact.
45-5-3434	Parramatta SWC PAD	PAD	No – outside proposed areas of impact.
45-5-3779	Link Road PAD	PAD	Yes – previously destroyed
45-5-3842	EPLR1	Artefact	No – outside proposed areas of impact.

Three registered Aboriginal sites are within or near the study area (#45-5-3076, #45-5-3779 and #45-5-0439). Two of these sites had permits issued by EPA (#45-5-3076 and #45-5-3779) and appear to have been destroyed.

"Stage 2 Archaeological Survey report" site walkover

A site walkover was undertaken on 1 September 2011 as part of Stage 2 of RMS *Procedure for Aboriginal Cultural Heritage Consultation and Investigation* (PACHCI) guidelines (RTA, 2008). The site walkover covered most of the study area with the assistance of an Aboriginal representative from the Deerubbin LALC, with the remainder of the study area investigated on 8 November 2011. In general, the study area appeared heavily disturbed due to surrounding land uses such as the Old Wallgrove Road and several surrounding industrial developments.

Background reviews identified two areas noted for further investigation during the site inspection (refer Figure 6-2). One was the conservation area PAD, and the area surrounding EPLR2 near Reedy Creek.

The conservation area PAD located between Old Wallgrove Road, Wallgrove Road and Quarry Road, was noted to contain low slopes and low-lying landforms encompassing Eskdale Creek. The creek is defined by dense stands of Casuarina sp. trees with the surrounding areas covered in dense low-lying grasses. Visibility was low and there was evidence of previous disturbance between Old Wallgrove Road and the south side of Eskdale Creek. Areas closer to the M7 Motorway appeared quite disturbed due to the construction of infrastructure, including a bitumen road running across the creek and a Sydney Water compound to the north of the creek. It was considered that areas close to the creek on either side may retain some sub-surface integrity.

Based on desktop research, the area surrounding EPLR2 was initially believed to retain high potential for archaeological deposits. The site inspection demonstrated that the entire area had been extensively modified by heavy machinery. The undulating nature of the area, frequent exposure of truncated clay and bedrock, and excavator tracks all indicated that sub-surface deposits in this area would be unlikely. A large sub-surface pipeline and large transmission line were also present in this area, both of which would have caused extensive ground disturbance during construction. It was considered that only areas in very close proximity to the creek (to the south) and outside of the proposed area of impact would retain any sub-surface integrity. However, due to the relatively dense vegetation and poor visibility across the EPLR2 area, it could not be concluded that the previously identified Aboriginal artefacts, EPLR2, or other unidentified artefacts were present.

Test excavations

Test excavations of the Conservation Area PAD consisted of 39 test pits distributed across the PAD/artefact scatter in the northeast of the study area (refer to Figure 5 in Appendix E). The test excavations revealed that the Conservation Area PAD was composed of a shallow texture contrast soil that contained a low density of Aboriginal objects ($4/m^2$).

The excavations recovered 40 Aboriginal objects. Test pits A1 and C2 (refer to Appendix E) contained the highest number of artefacts (4 and 14, respectively). However test pit C2 revealed significant disturbance of a wheel rut or narrow drainage channel. The high number of Aboriginal objects recovered from this test pit is considered to reflect the fracturing/smashing of a lesser number of artefacts, or the introduction of artefacts. However, these artefacts did not appear to extend greater than 10 metres away from the test pit.

Most artefacts were recovered from a 50 metre stretch of Eskdale Creek (test pits A7, C2, D1-D3, C4–C6). The Aboriginal objects were dominated by various types of silcrete (n=30) and contained several broken backed artefacts. The assemblage's appearance generally suggested ephemeral occupation of the area probably in the last few thousand years. However, given the disturbed, shallow and active nature of the soil profile, it seems more likely the assemblage was formed in only the last few hundred years.

EPLR2 and Conservation Area PAD/artefact scatter are low-density artefact scatters located on lower slopes adjacent to minor watercourses. The nature of the artefacts recovered from test excavations indicates that the occupation represented by the sites was relatively short term and/or ephemeral. As such, the sites appear to be largely characteristic of the known archaeology of the region, and are therefore not rare.

Based on the information obtained in the "Stage 2" and "Stage 3" assessments, it is considered that the research potential (and therefore the scientific significance) of the Conservation Area PAD and the Erskine Park Link Road 2 site is low.

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0 100 200m

Projection: GDA 1994 MGA Zone 56

FIGURE 6-2: Locations of Aboriginal heritage items

6.4.2 Potential impacts

There are two locations considered to retain Aboriginal objects that would be affected by the proposal. They are EPLR2, a disturbed artefact scatter within the proposed mini-link road footprint, and the conservation area PAD located around Eskdale Creek.

The proposal would extend up to 30 metres into the Conservation Zone PAD / artefact scatter, with partial impacts to the site. However due to the findings of the test excavations showing that there is a low scientific significance, the proposal would have a minor impact on the significance of the site.

The area around EPLR2 was identified as an area of potential Aboriginal significance. However, the area encompassing the mini link road was found to be heavily impacted. It appears that extensive earthworks have completely removed the upper part of the soil profile in most areas. As such, it could not be conclusively determined whether or not EPLR2 or other disturbed Aboriginal objects were present. While the proposal would impact on this area and the potential for sub-surface deposits is unlikely, the EPLR2 site may still be present within the mini-link road footprint and would therefore be impacted by the proposal.

However, no further archaeological investigation is necessary for the EPLR2 and Conservation Area PAD/artefact scatter. A section 90 Aboriginal Heritage Impact Permit for the disturbance of the site would be sought prior to construction.

6.4.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Impacts to known Aboriginal heritage sites	• An Aboriginal Site Impact Recording form should be completed and lodged with the AHIMS registrar, detailing the test excavations undertaken within the Conservation Area PAD/artefact scatter.	RMS	Pre- construction
	• Due to the low significance of the artefacts recovered in the test excavations, it is unlikely to be suitable for lodgement with the Australian Museum. AHMS will, therefore, ask registered Aboriginal parties if they would like to take control and care of the artefact. If no agreement is reached, the artefacts would be returned to RMS, with recommendation that they be re-buried within the subject area following completion of the works.	RMS	Pre- construction
	• The section 90 Aboriginal Heritage Impact Permit should be sought.	RMS	Pre- construction
Impact to unknown/ undiscovered Aboriginal heritage sites or change to impacts	• If the boundaries of the proposal are revised to include areas not investigated as part of the AHMS cultural heritage assessment, Advice would be sought from RMS Environmental Officer on the need for further assessment of the impacts.	RMS	Pre- construction
	• In the event that previously undiscovered Aboriginal objects, sites or places (or	Construction contractor and RMS	Construction

Impact	Environmental safeguards	Responsibility	Timing
	potential Aboriginal objects, sites or places) are discovered during construction, all works in the vicinity of the find should cease and RMS should implement their *Standard Management Procedure: Unexpected Archaeological Finds* (July, 2012) for addressing un-identified Aboriginal objects.		
Ongoing consultation with the Aboriginal community	• RMS would continue to notify registered Aboriginal parties of the progress of the proposal.	RMS	Construction
Construction management of heritage sites	• RMS would advise all on-site construction personnel and contractors, of the relevant heritage legislative requirements.	Construction contractor and RMS	Construction
Impacts on human remains	• Should suspected human skeletal material be identified, all works should cease and RMS should implement their *Standard Management Procedure: Unexpected Archaeological Finds* (November, 2011) for managing human skeletal remains.	Construction contractor and RMS	Construction

6.4.4 Consistency with concept plan

The concept plan environmental assessment identified that the concept plan was designed to avoid areas of known and/or potential archaeological significance and that more detailed investigations would be undertaken during the proposal approval stage.

A detailed Aboriginal heritage assessment has been undertaken and is consistent with the findings of the Aboriginal heritage assessment undertaken for the concept plan.

6.5 Non-Aboriginal heritage

6.5.1 Existing environment

Settlement to the west of Parramatta began around 1792 with expansion to Windsor and Richmond. This western movement was further encouraged by the 1815 crossing of the Blue Mountains and the construction of the Great Western Road (now highway).

Around this time, Governor Macquarie issued pastoral and agricultural land grants. Estates granted near the proposal included Kings Gift (later Horsley Park), Erskine Park, Mt Vernon, Minchinbury and Lockwood. The main early activities in the area were pastoral, agricultural and timber getting which preceded any other activity.

In more recent times, the pastoral nature has increasingly been converted to industrial uses.

Old Wallgrove Road was originally a private right of way to the Lockwood Estate. It was surveyed in 1880, with survey marks cut on trees (no longer on site). Old Wallgrove Road became a public road in 1885 prior to becoming a government road. Recently, the responsibility of Old Wallgrove Road changed to RMS from Blacktown City Council.

History of activities around the proposal:

- Prospect reservoir opened in 1888. The current water supply pipelines situated to the south of the study area were constructed between 1950 and 1969 to transport water between Warragamba Dam and Prospect reservoir. The Prospect reservoir is located around two kilometres to the east of the proposal.
- A quarry to the north of Old Wallgrove Road was established in 1955 with access from Old Wallgrove Road. Quarry Road is still present.
- Australia's Wonderland, Sydney opened on Wonderland Drive in 1986 and closed in 2004. After 2004 this area has been replaced with industrial/ warehouse developments.
- Eastern Creek Raceway held its first race in 1990 and continues to be used for this purpose. The raceway is located over one kilometre to the east of the study area.

Searches of heritage registers were undertaken to determine the presence of any non-Aboriginal heritage items within the study area. The registers searched were:

- Blacktown Local Environmental Plan 1988.
- Sydney Catchment Authority draft Section 170 Heritage and Conservation register.
- RMS Section 170 Heritage and Conservation Register
- State heritage register.
- World and National heritage places (EPBC Act).
- Australian heritage places inventory.

The results of the above searches identified two listed properties (refer to Figure 6-3) near the proposal alignment including:

- Warragamba Prospect Pipelines 1 and 2 listed under the Sydney Catchment Authority draft Section 170 Register.
- Southridge House, Old Wallgrove Road, Eastern Creek, listed under the Blacktown Local Environmental Plan 1988.

Other unlisted non- Aboriginal heritage items[1] (refer to Figure 6-3) in and around the study area include:

- Mount Capicure homestead at the corner of Southridge Street and Old Wallgrove Road.
- Lucan Park/Roberts homestead located adjacent to Wallgrove Road to the south of Old Wallgrove Road.

[1] These sites were identified in the SEPP 59 Western Sydney Employment Area Eastern Creek Precinct Plan (Blacktown City Council, 2005).

- A worker's cottage on the Coles Myer distribution centre property to the south.

Mount Capicure homestead and the worker's cottage were subject to an excavation permit in 2006 as part of the adjacent Coles Myer Distribution Centre project. The excavation did not find any substantial remains, with the area of excavation considered sufficient to detect any remains. As such, these sites are assumed to have been destroyed and it is not anticipated that any remains are present.

6.5.2 Potential impacts

No listed heritage items would be impacted by the proposal.

Lucan Park/Roberts homestead is located to the east of Wallgrove Road. However, its assumed location is currently being used as a water quality control basin. The proposal would use this basin during construction. No works would be conducted within this area and as such, no impacts are anticipated.

The heritage assessment undertaken for the Erskine Park Link Road identified that there would be limited potential for subsurface material. Due to the close proximity of this proposal to the Erskine Park Link Road and the level of development that has occurred along Old Wallgrove Road, it is anticipated that there would be limited potential for subsurface evidence of historical uses in this study area.

However, appropriate safeguards have been developed, in case any potential historical finds are found on site during construction.

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0 200 400m

Projection: GDA 1994 MGA Zone 56

Old Wallgrove Road **REF**

FIGURE 6-3: Locations of non-Aboriginal heritage items

6.5.3 Safeguard and management measures

Impact	Environmental safeguards	Responsibility	Timing
Non Aboriginal heritage impacts	• If any unknown non-Aboriginal heritage items are encountered during construction, work would cease in the area of the find and RMS would implement their unexpected finds procedures. Works in the area would not recommence until the appropriate approvals or clearances have been obtained.	Construction contractor	Construction

6.5.4 Consistency with the concept plan

A non-Aboriginal heritage assessment was undertaken as part of the concept plan environmental assessment. The assessment indicated that the EPLRN alignment avoided listed non-Aboriginal heritage items and that more detailed investigations would be undertaken during the project approval.

The desktop non-Aboriginal heritage assessment undertaken for the proposal is consistent with this finding, with few non Aboriginal heritage sites identified near the construction footprint and no known material would be impacted.

6.6 Landforms, geology and soils

6.6.1 Existing environment

Soil

The study area is located within the Hawkesbury Nepean soil landscapes. More specifically, the soil types within the study area include Blacktown, South Creek and Seconds Ponds Creek. Blacktown soil landscape is located on the western half of the study area and consists of gently undulating to undulating low hills and rises on Wianamatta Group shales (Ashfield and Bringelly shales) and associated Minchinbury sandstone. Second Ponds Creek soil landscape is located in the eastern half of the study area and consists of gently inclined footslopes on Wianamatta shale within the Cumberland Plain Physiographic region. Surrounding Reedy Creek to the south, the soil landscape is the South Creek landscape consisting of flat to gently undulating floodplains, valley flats and drainage depressions draining Wianamatta shale in the Cumberland Plain (CSIRO, Australian Soil Resource information System (ASRIS)).

Information obtained from the ASRIS, shows that there is an extremely low probability of actual or potential acid sulfate soils within the study area.

In 2002, the former Department of Infrastructure Planning and Natural Resources mapped the Salinity Potential of Western Sydney. This mapping indicates that the study area is situated in an area of moderate probability, with high probability potential of salinity along Eskdale Creek and Reedy Creek.

The concept design report (RMS, 2012), indicates that the soils are classified as silty clay and siltstone under Old Wallgrove Road with clay to the south of the road. The soil under Wallgrove Road is classified as silty clay.

Contaminated lands

A search of the Environment Protection Authority Contaminated Land Register was undertaken for the Blacktown City Council LGA, with three notices relating to two sites identified (refer Table 6-16). None of the identified sites are located in or near the proposal.

Table 6-16: Contaminated Land Register results

Suburb	Address	Site Name	Notices related to this site
Kings Park	21 Tattersall Road	Former Dow Corning Sealants Factory	1 current
Seven Hills	27 Powers Road	Ma-Refine Oils Seven Hills	2 current

There was no fill material sighted in the study area during the site inspection on 9 June 2011.

6.6.2 Potential impacts

Soil

Potential soil impacts from the proposal may include:

- Erosion of soils.
- Exposure of acid sulfate soils.
- Exposure of saline soils.

The proposal would require removal of vegetation, excavation and movement of soils to stockpile sites or to other areas of the proposal to create fill embankments. The proposal would excavate an estimated 63,000 cubic metres of earthworks and remove an additional 17,000 cubic metres of topsoil. These activities result in exposure of soils which creates a risk of soil erosion. A high potential for erosion and sedimentation exists. Without effective construction site management, the erosion of soils could lead to transport of sediment into nearby waterways. Scour issues could also arise at the point where a drainage line becomes a culvert. Further details on the potential effects of soil erosion and sedimentation on water quality are provided in Section 6.7.

Acidic runoff has a high potential to cause pollution, particularly if allowed to enter nearby watercourses as well as being harmful to humans. However, there is a low probability of acid sulfate soils in the study area and is not expected to be encountered.

The proposal could impact on potential saline soils. Earthworks could expose saline soils and transfer soil. This could be moved into nearby watercourses or closer to the soil surface and affect water quality or vegetation growth.

Contaminated land

While there are no records of contaminating land uses or contaminated material in the study area, there is a minor potential that areas of agricultural land uses, industrial development and the Western Sydney electrical substation near the proposal site could contain contaminated material. However, it is unlikely that the proposal would impact on contaminated lands. Should any contaminated material be uncovered, it could be managed during construction of the proposal through implementation of appropriate safeguards.

6.6.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Managing contaminated lands	• Appropriate measures would be implemented as part of the CEMP to manage saline soils and minimise any impacts associated with contaminated soils.	Construction contractor	Pre-construction
Road runoff detention	• Detailed design would incorporate drainage design to contain and manage the quality of road runoff.	RMS	Pre-construction
Identification of contaminated water	• Should any de-watering be required, water would be tested for contaminants. If found, appropriate management measures would be employed.	Construction contractor	Construction
Erosion and sediment control during construction	• The construction site compound would be restored with suitable native vegetation species once construction is complete.	Construction contractor	Construction
	• Erosion and sedimentation control plans would be developed in accordance with the Managing Urban Stormwater (Landcom 2004) and Managing Urban Stormwater: Soils and Construction, Volume 2D, Main Road Construction (DECC 2008). The plan is to be done using the staging plan and would include (but not limited to) the following information: – Construction catchments – Water flow paths for the construction area and adjacent property – The likely run-off from each road sub-catchment – Controls or diversion to minimise the off-site mixing with on-site water. – The locations and sizing of sediment basins. – The direction of runoff and drainage points during each stage of construction. – Calculation of work area and soil loss. Construction Basin location and measures to direct on site runoff into the basin – Basin calculation. – Standard drawings for sediment controls such as sand bags and batter shoots. – Proposed staging plans for the project to ensure appropriate erosion and sediment control is possible. – Construction staging and soil opened/exposed during construction would be limited to the	Construction contractor	Construction

Impact	Environmental safeguards	Responsibility	Timing
	capacity of the construction sediment basin for that area, in accordance with Blue Book (Landcon 2004, Volume 2D).		
Maintaining water quality during operation	• Water quality basins and structures would be appropriately cleared and maintained during the operation of the road.	RMS	Operation

6.6.4 Consistency with the concept plan

The concept plan environmental assessment provided recommended management measures for construction including the installation of silt fencing, maintenance of buffer zones at watercourses, revegetation of exposed areas and restriction of construction vehicles and equipment. These measures have generally been incorporated into the safeguards and management measures.

6.7 Water quality and hydrology

6.7.1 Existing environment

Within the study area, there are two creeklines that cross under Wallgrove Road in the proposal area. These are Reedy Creek (to the south of the proposed mini-link road) and Eskdale Creek, situated north of Old Wallgrove Road. These creeks fall within the Hawkesbury-Nepean South Creek sub-catchment. The South Creek sub-catchment is highly degraded due to vegetation clearance and urbanisation (Hawkesbury Nepean Catchment Management Authority, 2007). Both Reedy and Eskdale creeks are tributaries of Eastern Creek, with a confluence around 1.5 kilometres downstream of Wallgrove Road and M7 Motorway bridges.

Eskdale Creek has a catchment area upstream of Wallgrove Road of around 190 hectares, comprising of land within the Eastern Creek Precinct of the WSEA. The catchment is currently in the process of being developed to industrial development. A 100 year ARI (Annual Recurrence Interval) flood event causes localised flooding in and around the proposal area bounded by Old Wallgrove Road and Wallgrove Road. However, there are no impacts to any structures. The elevation of peak flows is around 52.49 metres AHD (Australian Height Datum).

Blacktown City Council has ranked Eskdale Creek as having the second worst waterway condition in the local government area (Blacktown City Council, 2005 *Eskdale Creek Management Plan*). Downstream reaches (to the east of Quarry Road and M7 Motorway) of the creek have retained a high level of vegetation and in-stream integrity.

The Reedy Creek catchment consists of 940 hectares of industrial, quarrying, urban and rural land uses.. Part of the catchment consists of vacant land to the north of Old Wallgrove Road, which is going to be developed into warehouse/industrial facilities. As with Eskdale Creek, an 100 year ARI flood event causes localised flooding around the proposal area, but does not impact on structures. The elevation of peak flows is around 53 metres AHD.

There is currently no formal drainage system along the entire length of Old Wallgrove Road, with drainage systems present only at the recently completed Roberts Road intersection and Wallgrove Road intersection. In a number of locations, there is evidence of scour at cut batters.

6.7.2 Potential impacts

The main potential impact to water quality during construction would be sedimentation from land disturbance and earthworks. Exposed soils would be subject to wind and water erosion and could be transported to nearby drainage lines and Eskdale and Reedy creeks. Sedimentation in these creeklines would affect the water quality and could increase levels of nutrients and other potential contaminants.

Other impacts to water quality could include spills and leaks from construction vehicles such as oil and greases or spills of fuels/ chemicals stored on site. The construction compound site is situated over 500 metres from any creekline, however, there is a potential that any spills into drainage lines could reach the creeklines. Appropriate management measures would be implemented for the storage of materials on site.

Areas of highest risk to water quality include construction of the mini-link road and the bridges over Eskdale and Reedy creeks. The mini link road would be a new road constructed on grassed land, with substantial earthworks required close to Reedy Creek. This would result in large areas of exposed soil which could be subject to wind or rain erosion. If not managed correctly, the movement of sediments could increase turbidity in Reedy Creek. The bridges over Eskdale and Reedy creeks would require earthworks and construction of concrete piles and piers to hold up the bridge deck in proximity to the creeklines. As well as the release of sediment into the creeklines, there is the potential for a spill or leak of materials into the creeklines, adversely affecting the water quality. Works within the creeks would be limited.

Five temporary sedimentation basins would be constructed during construction. These are shown in Figure 3-7a and Figure 3-7b. The purpose of these basins is to provide temporary storage of dirty water for sufficient time to allow settling of fine particles from suspension. Treated water can then be released from the basins into the receiving drainage lines.

Once complete, the proposal would result in an increase in the impervious surface and could result in an increase in the amount of polluted stormwater runoff. Stormwater pollutants could include:

- Litter from passing motorists.
- Sediments from pavement and vehicles wear.
- Metals from vehicle wear and tear.
- Petroleum hydrocarbons from vehicle spills and leaks.

The severity of these impacts would be greatest during a rainfall event after a period of dry weather. These sediments and pollutants could be washed off the road and into the creeklines.

The proposal would direct surface runoff into six permanent detention basins (refer to Figure 3-6), prior to release into any creekline or waterway to minimise water quality impacts. This would provide a formal drainage system and improve the current situation, where road runoff is currently directed to the edge of the road and adjoining land or creeklines.

There is the potential that the increase in embankments for the bridge structures surrounding both creeks could result in an increase in flood levels. Flood modelling

undertaken as part of the concept design has shown that there would only be minor changes to flooding extents. The impact of the construction of the new Eskdale Creek bridge, would result in a slight increase in flooding extents, however this would be confined immediately north of Old Wallgrove Road. The impacts of the widening of the bridge over Reedy Creek would cause an increase of flood levels by 0.03 metres immediately upstream. Due to the minimal changes in the flooding regime and no impacts to developable land or infrastructure, no management measures are proposed.

6.7.3 Safeguard and management measures

Impact	Environmental safeguards	Responsibility	Timing
Spill procedures	• Emergency spill kits would be kept on site at all times. All staff would be made aware of the location of the spill kit and trained in its use.	Construction contractor	Construction
	• If a spill occurs, the RMS' Environmental Incident Classification and Management Procedure would be followed and the RMS Contract Manager notified as soon as practicable.	Construction contractor	Construction
	• Any refuelling of vehicles and equipment on site would be undertaken on an impermeable surface, within a bunded area located at least 40 metres away from water bodies and surface water drains. Any fuel, oils or other liquids stored on site would be stored in an appropriately bunded area away from water bodies.	Construction contractor	Construction
	• Minor repairs or servicing for machinery and equipment on-site may be necessary; however, significant repairs or servicing would take place off site.	Construction contractor	Construction
Impacts to watercourses	• All refuelling or minor repairs to be undertaken on-site are to occur within an impermeable, bunded area at least 40 m from any watercourse or drainage line.	Construction contractor	Construction
Water quality from erosion and sedimentation	• The area to be cleared for the construction would be minimised as far as practicable, particularly around Reedy and Eskdale creeks to minimise the potential for erosion and sedimentation. Appropriate erosion and sedimentation controls would be put in place to also minimise impacts to the creeks.	Construction contractor	Construction
	• Erosion and sedimentation control plans would be developed in accordance with the Managing Urban Stormwater (Landcom 2004) and Managing Urban Stormwater: Soils and Construction, Volume 2D, Main Road Construction (DECC 2008) to minimise water quality impacts.	Construction contractor	Construction
	• Construction staging and soil opened/exposed during construction would be limited to the capacity of the construction sediment basin for that area,	Construction contractor	Construction

Impact	Environmental safeguards	Responsibility	Timing
	in accordance with Blue Book (Landcon 2004, Volume 2D).		

6.7.4 Consistency with concept plan

The concept plan environmental assessment identified mitigation and management measures to ameliorate construction impacts to water quality. This assessment is consistent with the environmental assessment, having incorporated these measures.

6.8 Land use

6.8.1 Existing environment

Current land use

The proposed road corridor passes through the North-West Precinct of the WSEA within the Blacktown LGA.

Land use to the south of Old Wallgrove Road is predominantly industrial . To the north, the land is predominantly grassed vacant land. To the south west of the proposal, Transgrid's Western Sydney electrical substation is located.

Due to previous agricultural land uses, the surrounding vacant land is significantly modified with little vegetation. There are some areas of remnant vegetation including Cumberland Dry Sclerophyll Forest to the south of Old Wallgrove Road, River Flat Eucalyptus Forest occurs along Reedy Creek and Casuarina Grove vegetation is present adjacent to Eskdale Creek.

Properties adjacent to the proposal are predominantly privately owned, with the exception of a Transgrid owned substation to the south west.

There is no residential development within the study area, with the closest areas of residences to the west in Erskine Park and St Clair. Further north, across the M4 Motorway, there are additional residential areas of Minchinbury and Mt Druitt. To the south, beyond the industrial development, the Sydney Water Supply Pipeline traverses east to west, with rural and residential properties situated further south.

Old Wallgrove Road connects to the sub-arterial road of Wallgrove Road and the M4 and M7 motorways.

Future land use

The majority of the WSEA is zoned as industrial development (under SEPP (Western Sydney Employment Area) 2009) (refer to Figure 1-2). However, there are also areas zoned for environmental conservation. All land adjoining Old Wallgrove Road are zoned as industrial. Areas to the north of Old Wallgrove Road are currently in the process of gaining approval for subdividing to industrial lots. To the south of Old Wallgrove Road/ Wallgrove Road intersection, a service station is proposed.

6.8.2 Potential impacts

The proposal would require the strip acquisition of 17 properties. Figure 3-8 identifies the properties and proposed area of acquisition. Acquisition would consist of strip acquisition of properties and be undertaken in consultation with each property owner. Only the road formation would be acquired, with batters remaining in the adjoining property, and not being acquired. The batters would be maintained by Blacktown City Council. Temporary sediment basins required during construction would be located on land to be leased for the duration of construction.

The surrounding land use would not be adversely affected by the proposal. Construction of the proposal would increase the capacity of Old Wallgrove Road, providing better connection to the M4 and M7 motorways, facilitating the future growth of the WSEA.

6.8.3 Safeguards and management measures

Impact	Environmental safeguards	Responsibility	Timing
Property acquisition	• Ongoing consultation with directly affected landowners would occur throughout the detailed design phase.	RMS	Pre-construction
	• Land acquisition would be carried out in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991*.	RMS	Pre-construction
Construction property impacts	• On completion of construction activities, land used for temporary construction sites, stockpiles and sedimentation basins would be revegetated and left in a stable condition.	Construction contractor	Construction

6.8.4 Consistency with concept plan

The proposal is consistent with the concept plan however, more detailed design work has provided an understanding of earthworks (including batters) required for the proposal. This has resulted in the width of the road corridor not changing, but batters will be located in adjoining properties.

In addition, the number of properties impacted has changed around the area where Wallgrove Road would be widened.

6.9 Air quality

6.9.1 Existing environment

Air quality in the area is considered to be typical for an industrial area. Near the proposal, air quality is dominated by vehicular traffic particularly from the M4 and M7 motorways and Wallgrove Road. Along Old Wallgrove Road, as well as vehicular emissions, the other main air pollutant is localised dust, generated from the unsealed shoulders of the road.

Data obtained from the Environment Protection Authority (EPA) on air quality in Western Sydney, included data from monitoring at Prospect and St Marys air quality monitoring stations. The averages of monitored pollutants at the two air quality monitoring stations for the year 2010 are outlined in Table 6-17.

Table 6-17: Air quality pollutant daily averages for 2010

Station name	NO_2 annual average [µg/m³]	CO annual average [µg/m³]	Ozone annual average [mg/m³]	PM_{10} annual average [µg/m³]
St Marys	11.28		33.32	15.1
Prospect	22.56	0.46	31.36	15.4

There were a limited number of exceedances at the two stations during the year. Prospect station had two daily exceedances of ozone and one exceedance for visibility. St Marys station had two daily exceedances of visibility. Neither station had any annual exceedances.

6.9.2 Criteria

NSW ambient air quality goals are provided in the DEC (now EPA) document: *Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW* (DEC 2005). The adopted air quality goals/standards for this qualitative assessment are presented in Table 6-18.

Table 6-18: Adopted ambient air quality goals/standards

Pollutant	Averaging period	Goal[1]
Nitrogen dioxide (NO_2)	1 hour maximum	246 µg/m^3
	Annual mean	62 µg/m^3
Carbon monoxide (CO)	15 minute maximum	100,000 µg/m^3
	1 hour maximum	30,000 µg/m^3
	8 hour maximum	10,000 µg/m^3
PM_{10}[2]	24 hour	50 µg/m^3
	annual	30 µg/m^3
Benzene	1 hour	29 µg/m^3

Notes
[1]: µg/m^3 = micrograms per cubic metre, mg/m3 = milligrams per cubic metre
[2]: PM_{10} = Particulate matter ≤ 10 microns in aerodynamic diameter

6.9.3 Potential impacts

Construction

The main air quality issues during construction would be associated with particulate matter and vehicular emissions. Particulate matter would be generated from dust sources including traffic on paved and unpaved roads, aggregate storage piles, clearing of groundcover and topsoil, earthmoving activities, and the transporting or stockpiling of spoil and construction materials. Vehicular emissions would be due to

on site machinery, idling equipment, vehicles transporting materials or personnel vehicles travelling to and from site.

The site is within an industrial and rural setting, with industrial development occurring adjacent to the proposal. There is only one sensitive receiver (the child care centre) around 250 metres from the proposal, adjacent to existing industrial development. Due to the proximity of the works to nearby land uses, there may be some particulate matter impacts during construction. However, due to the temporary and transient nature of the construction, and proposed mitigation measures, any air quality impacts would be minimised.

Operation

The proposal would improve air quality through the provision of paved shoulders. Currently, there are no paved shoulders on Old Wallgrove Road, that result in the collection of fine sediment by traffic (ie through vehicles pulling off the side of the road or trucks turning onto Old Wallgrove Road and passing onto the shoulder).

However, some air quality impacts during operation would occur due to increased vehicles and therefore emissions, with the main pollutants expected to be hydrocarbons, carbon monoxide, nitrogen dioxide and particulates as a result of fuel combustion, fluid evaporation, brake and tyre wear and re-suspended road dust.

Predicted ambient air quality levels for the proposal are detailed in Table 6-19 and show that air quality criteria would not be exceeded.

Table 6-19: Ambient air quality levels

Location	Pollutant				
	Carbon monoxide (CO) 1 hour (mg/m^3)	Carbon monoxide (CO) 8 hour (mg/m^3)	Nitrogen dioxide (NO_2) 1 hour ($\mu g/m^3$)	Hydrocarbon (Benzene) 1 hour ($\mu g/m^3$)	PM_{10}[2] 1 hour ($\mu g/m^3$)
Wallgrove Road (east) and Old Wallgrove Road (north)	0.78	0.28	133.1	0.017	17.7
Old Wallgrove Road (west) and mini-link road (south)	0.46	0.17	78.3	0.010	10.1
Old Wallgrove Road (east) and west of the Mini Link (south)	0.47	0.17	79.9	0.010	10.6

Source: Erskine Park Link Road Review of Environmental Factors (RTA, 2010)

In addition to improved vehicle efficiency and design, air quality impacts are also a function of traffic flow conditions, vehicle speed, meteorological conditions and existing background air quality levels. The level of service of a road relates to the efficiency of traffic flow on them. As the proposal would improve traffic flow and efficiency, this is likely to provide improved air quality through vehicle emission reductions.

6.9.4 Safeguard and management measures

Impact	Environmental safeguards	Responsibility	Timing
Dust generation	• All disturbed areas would be stabilised as soon as practicable to prevent or minimise windblown dust. This may include progressive hydro-mulching of disturbed areas as works are completed. Revegetation in accordance with an approved landscape concept plan would be required.	Construction contractor	Construction
	• Water sprays, sprinklers and water carts would be employed if needed to adequately dampen work areas and exposed soils to minimise off-site dust emissions.	Construction contractor	Construction
Maintenance and use of construction equipment	• Construction equipment would be kept in a good operating condition. Construction equipment would be properly maintained to ensure exhaust emissions comply with the *Protection of the Environment Operations Act 1997*.	Construction contractor	Construction
	• Vehicle and machinery movements would be restricted to designated areas during construction works.	Construction contractor	Construction
	• Site exit(s) would include controls (eg rumble grids) to remove mud from vehicles.	Construction contractor	Construction
	• Vehicles transporting material to and from the site would be covered immediately after loading to prevent windblown dust emissions and spillages.	Construction contractor	Construction
Stockpile management	• Stockpiles and handling areas would be maintained in accordance with the *RMS Stockpile Site Management Guidelines* (2011).	Construction contractor	Construction
	• Stockpiles would be managed to minimise windblown or traffic generated dust. Areas that may be inaccessible by water carts would be kept in a condition that minimises wind-blown or traffic generated dust using other means such as water cannons, overhead sprinklers, tarpaulins or dust sealants.	Construction contractor	Construction

6.9.5 Consistency with the concept plan

A high level qualitative air quality impact assessment was undertaken as part of the concept plan environmental assessment. This assessment identified dust generation through construction and vehicle emissions during operation as the primary impacts of the EPLRN on air quality. The assessment recommended a number of controls to reduce dust generation. These controls have largely been incorporated into the safeguards and management measures described above.

6.10 Visual amenity and landscape

An urban design report and landscape character and visual impact assessment was undertaken for the proposal (refer to Appendix I). The assessment was undertaken in accordance with the *RMS Environmental Impact Assessment Guidance Note – EIA-*

N04 Guidelines for Landscape Character and Visual Impact Assessment (RMS, 2009).

6.10.1 Existing environment

Landscape character

The landscape character of the proposal is divided into four separate zones:

- Transition/vegetated ridge zone.
- Rural/industrial zone.
- Riparian/industrial zone.
- Transition/bridge zone.

Figure 6-4 shows the location of the zones along the proposal. The landscape character of the area would change as the WSEA is developed.

Transition/vegetated ridge zone

The embankments on the southern side of Old Wallgrove Road confine views to within the road corridor. Lower embankments along the northern edge only partially confine views before the rural nature of the land becomes visible. To the southern side, industrial development is visible.

Distant views to the west to the Blue Mountains and to the east to the Western Sydney Parklands are possible from this zone. Views into the road corridor are limited by large industrial development to the south. The height of the embankment obstructs views into the corridor.

Rural/industrial zone

This zone is characterised by industrial development to the south (and west of the mini-link road) and rural open land use to the north (and east of the mini-link road).

There are few viewing opportunities into this zone from adjoining areas, with views along the road corridor readily visible.

Riparian/rural zone

This landscape character zone is defined by a backdrop of mature trees along the riparian corridors along Eskdale Creek and Reedy Creek. This vegetation encloses the road corridor and contains views. Between Old Wallgrove Road and the mini-link road, there is an area of open grassland designated for future development.

Transition/bridge zone

The character of this zone is dominated by road and creek corridors and drainage features including stormwater detention basins and wetlands. Views to this zone are primarily along the existing road corridor.

6.10.2 Criteria

The landscape character assessment involved assessing impacts on landscape character in terms of the sensitivity of affected areas and the magnitude (scale, character, distance) of the proposal. The assessment criteria are defined as follows:

- Sensitivity – A measure of how sensitive the existing character of the

environment is to the proposed change (eg a pristine natural environment would be more sensitive to change than an industrial area).
- Magnitude – A measure of the degree of intrusion or scale of the proposal (eg a large bridge would have a greater impact on landscape character than a localised road widening).

The landscape character impact is defined from negligible to high and is a product of sensitivity and magnitude.

6.10.3 Potential impacts

Construction impacts

During construction, the potential visual impacts would include:
- Presence of plant and equipment on site.
- Temporary construction compounds and ancillary facilities.
- Temporary stockpiles.
- Vegetation removal.

Construction activities and plant would be visible from surrounding land uses and the road corridor. However, these impacts would be short term during the construction period and would vary due to the linear nature of the proposal. Overall, the impact is considered to be minor due to the adjoining land uses and the transient nature of views from vehicles. In the long term, with the development of surrounding industrial land, the visual impact of the proposal would be negligible.

Operation impacts

The visual impact of the proposal was assessed from five locations along the proposed upgrade (refer to Figure 6-5).

Location 1: Old Wallgrove Road and Roberts Road intersection
Potential views to the proposal would be experienced by the immediate road user in the road corridor and intersecting roads as well as from the broader visual catchment (views back to Old Wallgrove Road ridgeline from Quarry Road).

The sensitivity of the location is low, the magnitude of change is medium, with the overall visual impact rated as minor.

Location 2: Old Wallgrove Road between Eastern Creek Drive and Southridge Street.
Beyond road widening, the adjacent landscape is either open grasslands or grass road verges adjacent to industrial development. Views to the proposal are primarily along the road corridor and intersecting roads. Broader views back to Old Wallgrove Road are possible across open grasslands from Quarry Road.

The sensitivity of the location is negligible. The magnitude of the change is considered to be low with an overall negligible visual impact.

Location 3: Old Wallgrove Road and Eskdale Creek.
Views to the location are predominantly along the road corridor, with views from the north obstructed by riparian vegetation. Some views from the south are available.

The sensitivity of the location and magnitude of the change is low, with the overall rating being either minor or negligible.

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0 100 200m

Projection: GDA 1994 MGA Zone 56

Old Wallgrove Road **REF**

FIGURE 6-4: Landscape character zones

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0 100 200m

Projection: GDA 1994 MGA Zone 56

Old Wallgrove Road **REF**

FIGURE 6-5: Visual Impact Assessment Observer locations

Location 4: Old Wallgrove Road/Wallgrove Road/M7 Motorway intersection
Views to this location are mostly within the road corridor. Limited views from existing industrial development along Old Wallgrove Road are available however, they are over 400 metres away and partially obstructed by vegetation.

The sensitivity of the location is negligible and magnitude of change is low with the overall impact at this location considered negligible.

Location 5: Mini-link road and Capicure Drive
Views are available from adjoining existing warehouse development and from future development to the south of Old Wallgrove Road. Road user views would change as they traverse the road.

The sensitivity of the location is considered to be low, however due to the construction of a new road in vacant land, the magnitude of change is considered to be medium. The overall impact however, is considered to be minor to negligible.

Overall
The overall sensitivity of the environment and magnitude of change of the proposal is assessed, in the short term and long term, to have a minor to negligible impact, primarily due to the area being developed into the WSEA. The proposal also includes a landscape strategy, which as plants begin to be established to reduce the visual impacts further.

6.10.4 Safeguard and management measures

Impact	Environmental safeguards	Responsibility	Timing
Bridge aesthetics	• Bridges over Reedy and Eskdale creeks would be designed to be similar to the existing structures.	RMS	Pre-construction
Planting and landscape strategy	• As much natural vegetation within the study area would be retained as possible.	Construction contractor	Construction
	• Any landscaping would be undertaken with local indigenous plant species as per the indicative planting schedule in the Urban Design Report and Landscape Character and Visual Impact Assessment (AECOM 2012).	Construction contractor	Construction
	• Landscaping would be undertaken progressively as works are completed.	Construction contractor	Construction
	• Riparian corridor restoration around Reedy and Eskdale creeks around the bridge widening would be undertaken.	Construction contractor	Construction
	• Batters would be rounded as much as possible and where practicable vegetated to transition into the adjoining land.	Construction contractor	Construction
Maintainance landscaping	• Monitoring and maintenance of landscaped areas would be undertaken for 12 months.	Construction contractor	Operation

6.10.5 Consistency with concept plan

The concept plan environmental assessment identified that, as road construction would precede the construction of industrial development in the area, there would be a period of time during which road construction would be the major visible feature of

the area. Management measures were identified to ameliorate the visual impacts and these have been incorporated into the safeguards and management measures.

6.11 Socio-economic effects

6.11.1 Existing environment

The proposal is wholly located within the Blacktown LGA. However, with the construction of the Erskine Park Link Road, it will connect Old Wallgrove Road to Penrith LGA.

In the Rooty Hill and Eastern Creek area, in 2006, there were around 12,900 people living in the suburbs, with an average household size of 2.3-2.7 persons[2] (Blacktown City Council, 2011). Most residences are situated within Rooty Hill with few residences in Eastern Creek. The closest residences to the proposal are situated in neighbouring suburbs over one kilometre away: Horsley Park, Erskine Park and Minchinbury. Erskine Park and St Clair are situated at the western end of the Erskine Park Link Road and fall within the Penrith LGA. In 2006, Erskine Park housed 6950 residents, with an additional 20,100 people residing in St Clair[3] .

Most of the workforce in both the Blacktown and Penrith LGA work in other LGAs. Sixty per cent of the workforce work outside the Blacktown LGA with the top two employment areas being Parramatta (10 per cent) and Sydney City (8.9 per cent) (Blacktown City Council, 2011). Fifty three per cent of the workforce in Penrith LGA work outside of the LGA with 13 per cent working in Blacktown LGA and seven per cent in Parramatta.

Within the Blacktown and Penrith LGAs, 44 per cent and 28 per cent of jobs respectively are generated by developed employment lands. Between 2001 and 2006, 8500 new jobs were created in employment lands within the North West subregion, with 6400 of those jobs being created in Blacktown LGA.

In both Blacktown and Penrith LGAs, there are a high percentage of people who travel to work using private vehicles (82 per cent and 85 per cent respectively) with more than half of the workforce travelling outside of the LGA they live in to work. As such, good road infrastructure is important for employment and economic development of the region.

The North West (including Blacktown, Penrith, Blue Mountains, Hawkesbury and Baulkham Hills LGAs) is the largest and fastest growing subregion of Sydney. The subregion is currently home to over 760,000 people (NSW Government, 2010).

It is estimated that the North West subregion would have the highest rate of housing growth in Sydney (23 per cent), with future employment opportunities increasing 24 per cent over the next 25 years. Employment opportunities would be realised through the development of undeveloped employment lands, most of which in the north west subregion are associated with the Western Sydney Employment Area, including parts

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[2] Blacktown City Council Community Profile, http://profile.id.com.au/Default.aspx?id=211, accessed 11 August 2011.

[3] Penrith City Council Community Profile, http://profile.id.com.au/Default.aspx?id=247, accessed 11 August 2011.

of Eastern Creek (419 hectares) and Erskine Park (209 hectares) (Department of Planning and Infrastructure, 2011).

6.11.2 Potential impacts

Potential socio economic impacts as a result of the proposal include:

- Amenity.
- Access and connectivity.
- Business impacts.

Amenity

Amenity impacts can be expected through both the construction and operational phases of the proposal. Amenity impacts would involve noise, air quality, visual and light spill impacts (noise, air quality and visual impacts are discussed in detail elsewhere in this REF). However, there is only one sensitive receiver in the area, with other receivers being transient on the road network. The sensitive receiver is situated over 250 metres away from the proposal and amenity impacts would be negligible.

During construction, the site compound would be lit at night for security purposes. It is possible that lighting for the compound may "spill over" the area to be illuminated. However, there are no sensitive receivers adjacent to the site compound that could be impacted. Street lighting along Old Wallgrove Road and the shared pathway would be installed, but again, due to lack of sensitive receivers, light spill from street lighting is considered to be a minimal impact.

Access and connectivity

The proposal would result in improving access and connectivity through the area by (in conjunction with the Erskine Park Link Road) connecting Erskine Park and Mamre Road to Wallgrove Road and the M7 Motorway. This would provide better access to Sydney by businesses and the workforce. As the WSEA continues to rapidly develop, the proposal would facilitate the growth of the area.

In addition to vehicular traffic, the proposal would also install formal bus stops and provide a shared pathway to the north of Old Wallgrove Road to improve pedestrian/cyclist and commuter traffic around the site. The shared pathway would connect to the shared pathway to be installed as part of the Erskine Park Link Road and connect (via the pedestrian crossing across Wallgrove Road) with the M7 Motorway shared path/cycleway. The formal bus stops and jump start facilities for buses would improve public transport through the Western Sydney Employment Area.

During construction, there is anticipated to be some impacts to traffic along Old Wallgrove Road. While the road would remain operational, some delays may be expected where equipment or vehicles need to access the site or reduced speed limits where construction is occurring alongside the road. However, these would be short term disruptions. Works may also impact on the existing operation of intersections with side streets. It is anticipated that during construction, access to properties and other public and private roads would be maintained.

Business impacts

The construction of the proposal would provide a number of employment opportunities for the 24 months of construction. However, any changes to the existing Old Wallgrove Road operation during construction could temporarily adversely impact on surrounding businesses where access and transportation is important.

Overall the post construction business impacts would be positive as the proposal would improve access to the Western Sydney Employment Area and from the employment area to the regional M7 and M4 motorways.

6.11.3 Safeguard and management measures

The measures proposed to manage amenity related impacts associated with traffic, noise and vibration, visual, air quality and property impacts are addressed in Sections 6.3, 6.4, 6.9 and 6.11, respectively. Safeguards for amenity, access and connectivity, business impacts and property impacts are listed below.

Impact	Environmental safeguards	Responsibility	Timing
Amenity impacts	• The community would be kept informed about the proposal and provided information on construction progress, access and traffic condition changes.	Construction contractor	Pre-construction, construction
Access disruption	• Property access would be maintained for the duration of construction. Should temporary or alternative access be required, this would be provided in consultation with the affected landowner.	Construction contractor	Construction
	• Local road closures would be minimised as much as possible.	Construction contractor	Construction
Traffic disruption	• Where possible, transportation of materials for the proposal would be undertaken outside of peak traffic times.	Construction contractor	Construction
	• Amenity impacts associated with the construction of the proposal would be managed in accordance with the CEMP.	Construction contractor	Construction
	• Construction materials and other products and services would be locally sourced, as far as practicable.	Construction contractor	Construction

6.11.4 Consistency with the concept plan

A socio-economic impact assessment was undertaken as part of the concept plan environmental assessment. This assessment identified the need to assess socio-economic impacts at both the regional and local level.

The proposal would support the existing and future employment lands within the WSEA. Property impacts, along with other impacts were assessed as part of the socio-economic impact assessment for this proposal.

6.12 Waste

6.12.1 Policy setting

Waste disposal in NSW is regulated by the *Protection of the Environment Operations Act 1997* (PoEO Act) and the *Waste Avoidance and Resource Recovery Act 2001* (WARR Act), both of which are administered by the EPA. The purpose of these Acts is to prevent degradation of the environment, eliminate harmful wastes, reduce the amount of waste generated and establish priorities for waste re-use, recovery and recycling.

The WARR Act establishes a waste hierarchy, which comprises the following principles:

- Avoidance
- Reuse
- Disposal

RMS is dedicated to the minimisation of waste and the use of recycled products where possible. RMS contractors are required to propose recycled-content materials where they are cost and performance competitive. In addition, RMS contractors are required to report waste minimisation quantities, initiatives and barriers.

6.12.2 Potential impacts

The majority of waste produced by the proposal is expected during the construction period. Potential waste sources include:

- Green waste resulting from vegetation clearing and grubbing.
- Excess spoil from earthworks (where material excavated from cuttings is not suitable or needed for re-use within the proposal).
- Excess construction materials, including concrete and asphalt.
- Redundant pavement material resulting from restoration or reconstruction of sections of the existing road.
- Scrap metal resulting from reconstruction or replacement of existing road infrastructure, including fencing.
- Small volumes of excess fuel, oils and other chemicals resulting from vehicle maintenance.
- Wastewater generated by stormwater runoff from construction areas.
- Sewage, paper waste, food waste and general rubbish generated by the construction workforce.

Small quantities of waste (including vehicle oils and greases, and green waste) would be generated during operation of the proposal.

6.12.3 Safeguard and management measures

Impact	Environmental safeguards	Responsibility	Timing
Management of construction waste	• Construction waste would be managed through the waste hierarchy established under the WARR Act (refer Section 6.12.1). All waste generated during construction would be disposed of in accordance with the	Construction contractor	Pre-construction

Impact	Environmental safeguards	Responsibility	Timing
	requirements of Waste Classification Guidelines (DECC 2008). Waste management measures would be developed for the proposal and would form part of the overall CEMP.		
	• Site inductions would include training in waste minimisation principles.	Construction contractor	Construction
	• A waste register would be maintained, detailing types of waste collected, amounts, date/time and details of disposal.	Construction contractor	Construction
Identification of recycling and re-use of materials	• Where practical, waste products would be reused on site, including: – Earthworks material as fill embankments. – Sub-grade layers and other material for batter extensions. – Top-soil for landscaping. – Cleared vegetation would be mulched, chipped or composted to be used as sediment filter fences, landscaping or land rehabilitation. – Crushed concrete as roadbase, footings, retaining walls or drainage.	Construction contractor	Construction
	• Regular visual inspections would be conducted to ensure that work sites are kept tidy and to identify opportunities for reuse/recycling.	Construction contractor	Construction
Sourcing of recycled materials	• Where possible and compliant with RMS specifications, secondary waste materials such as fly ash, steel slags and recycled aggregate would be used instead of virgin quarried construction materials. Use of these materials would be dependent on the proximity of the site to sources of recycled materials to avoid excessive transport costs and transport related greenhouse gases.	Construction contractor	Construction
	• RMS contractors would be required to propose recycled-content materials where they are cost and performance competitive.	Construction contractor	Construction
Disposal of waste	• Material not reused on site would be stockpiled in an appropriately bunded area (in accordance with the *RMS Stockpile Site Management Guidelines* (2011) prior to being recycled at appropriate specialised off-site recycling contractors.	Construction contractor	Construction
	• Containers for litter and other wastes would be provided and contents disposed of at a suitable waste disposal station.	Construction contractor	Construction
	• Chemical, fuel and lubricant containers, and solid and liquid wastes would be disposed of in accordance with the requirements of the OEH.	Construction contractor	Construction

6.12.4 Consistency with the concept plan

Waste minimisation and management was not assessed as part of the concept plan environmental assessment. No future assessment requirements for waste minimisation and management were specified in the concept plan approval. However, waste minimisation and management has been considered as part of this proposal.

6.13 Climate change and greenhouse gas emissions

6.13.1 Policy setting

Climate change

The NSW Greenhouse Plan (NSW Greenhouse Office, 2005) sets out actions to minimise the emissions of government's activities as well as the emissions of other stakeholders. The key principles and goals are to:

- Raise awareness of climate issues within the broader community.
- Promote understanding of the likely impacts on NSW and identify adaptation strategies.
- Limit the growth of greenhouse gas emissions and reduce these emissions in NSW.
- Promote climate change partnerships by government, individuals, industry, business and community groups.
- Reduce business uncertainties by establishing carbon constraints in order to promote new investment and innovation.
- Identify strategic areas for cooperative work with other Australian jurisdictions including a national emissions trading scheme.

RMS has prepared a Climate Change Plan[4] which identifies how RMS would:

- Reduce RMS's carbon footprint.
- Help reduce the carbon footprint of road transport.
- Adapt RMS road transport system to the impacts of climate change.
- Manage RMS transition to a low carbon economy.

Greenhouse gas emissions

Greenhouse gases absorb outgoing heat energy that is reflected from the earth. The absorption of this heat warms the air and is known as the greenhouse effect. The primary human produced greenhouse gas is carbon dioxide (CO_2). The following six greenhouse gases are covered under the Kyoto Protocol:

- Carbon dioxide (CO_2).
- Methane (CH_4).
- Nitrous oxide (N_2O).
- Sulphur hexafluoride (SF_6).
- Hydro fluorocarbons (HFCs).
- Perfluorocarbons (PFCs).

Greenhouse gas emissions are categorised into three broad scopes:

- Scope 1: All direct greenhouse gas emissions (including fuel).

[4] http://www.rta.nsw.gov.au/environment/greenhouse/index.html

- Scope 2: Indirect greenhouse gas emissions (typically from the consumption of purchased electricity).
- Scope 3: Other indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by a proposal, electricity-related activities (eg transmission and distribution losses) not covered in Scope 2, outsourced activities and waste disposal.

There are a range of potential impacts which may occur as a result of human induced climate change. The impacts which have been identified by RMS as potentially having an impact on the existing RMS operations include:

- A predicted sea level rise of 0.4 metres above 1990 levels by 2050 and 0.9 metres by 2100.
- More frequent intense low pressure systems off the east coast of Australia, resulting in increased storm surge and heavy rainfall events.
- Increased risk of flooding, inundation of low lying areas, accelerated erosion and threats to infrastructure (Office of Environment and Heritage).

It is, believed that warming within Sydney by 2030 would be between 0.6°C and 1.3°C (CSIRO, 2007). This temperature rise is not expected to have an effect on the proposal. Models show the average number of days over 35°C is likely to increase. This may affect the stability and/or lifespan of the materials used in the construction of the proposal. While all climate models for temperature show increasing trends, the results for rainfall show both increases and decreases for many locations. The change in annual average rainfall for Sydney is projected to be between -9 per cent and +3 per cent for the year 2030. Models show an increase in daily rainfall intensity (rain per rainy day) as well as in the number of dry days. Changes to extreme weather events could increase flood frequency with consequences for water quality, design standards of roads, stormwater and other infrastructure.

6.13.2 Potential impacts

Climate change

While studies indicate the overall mean precipitation would generally decrease, extreme precipitation events would be much more common, which may influence the flooding behaviour of Eskdale and Reedy creeks. Other impacts from climate change could include reduction in pavement life, with increased pavement failure due to increased flooding events and/ or increase in extreme temperatures.

The impact of increased flood events as a result of climate change would need to be considered further during the detailed design of culvert crossings and stormwater drainage systems.

The impacts of climate change may be managed by adopting design standards where considered necessary to reduce the vulnerability of infrastructure to predicted effects. In this case, the design parameters are relatively fixed and guided by the existing infrastructure and its characteristics.

Greenhouse gas emissions

The key greenhouse gas emission sources identified for future construction of the proposal are:

- Vegetation clearing - clearing would free stored CO_2 to the atmosphere and remove the capacity of the vegetation as a carbon sink.
- Operation of construction equipment - greenhouse gas emissions from this source could be reduced through the use of biofuels or the selection of alternative construction methodologies, wherever practicable.
- Using specific construction material - minimise the embodied emissions of materials by selecting lower emission alternatives, where possible, and investigating opportunities to source materials from suppliers located near the proposal.
- Construction transport – transportation of significant quantities of materials and waste (ie haulage) for construction generates greenhouse gas emissions through fuel consumption.
- Electricity usage.

The primary source of greenhouse gas emissions during operation is the use of the road. However, the proposal would provide increased capacity, improve traffic flow and provide a newer road surface, reducing the amount of fuel burned in vehicles and reducing greenhouse gas emissions.

Other greenhouse gas emission sources identified for operation of the proposal are:

- Typically, road upgrade projects lead to reduced fuel consumption and greenhouse gas emissions compared with the existing road.
- Electricity – consumed by street lighting and signals.

6.13.3 Safeguard and management measures

Impact	Environmental safeguards	Responsibility	Timing
Climate change impacts	• The impact of increased intensity flood events and stormwater runoff as a result of climate change would be considered further during the detailed design of culvert crossings and stormwater drainage systems.	RMS	Pre-construction
Improving energy efficiency and sustainability	• Energy (fuel/electrical) efficiency would be considered when selecting equipment.	Construction contractor	Construction
	• Equipment would be regularly maintained to retain fuel efficiency.	Construction contractor	Construction
	• Where feasible, biofuels would be used (biodiesel, ethanol, or blends such as E10 and B80), to reduce greenhouse gas emissions from construction plant and equipment.	Construction contractor	Construction
	• Vegetation clearance would be minimised and revegetation would be undertaken as much as practicable.	Construction contractor	Construction
	• Energy efficient work practices would be adopted to limit energy use, including conducting energy conservation awareness programs for all site personnel and undertaking energy audits to identify and address energy waste.	Construction contractor	Construction
	• Plant and office-based equipment (including lights and computers) would be operated in an efficient manner and would be regularly maintained.	Construction contractor	Construction
	• If available, electrical energy derived from a	Construction	Construction

Impact	Environmental safeguards	Responsibility	Timing
	renewable energy source accredited by the National Green Power Accreditation Steering Group (or equivalent) would be used for the supply of on-site electrical energy required during construction.	contractor	
	• Locally-sourced resources would be used wherever possible, to reduce transport related emissions.	Construction contractor	Construction
	• Recycled materials, such as replacement of cement with fly ash, recycled aggregate, and recycled content in steel, would be used to minimise the lifespan impact of greenhouse gas emissions in production where practicable.	Construction contractor	Construction

6.13.4 Consistency with the concept plan

Climate change and greenhouse gas emissions were not assessed as part of the concept plan environmental assessment. No future assessment requirements for climate change impacts and greenhouse gas emissions were specified in the concept plan approval. However, an assessment of climate change, based on available predictions of future climate changes has been undertaken for the proposal.

6.14 Hazards and risks

6.14.1 Potential impacts

During construction, most hazards and risks are associated with the transport, storage and use of hazardous materials. Dangerous goods and hazardous materials that may be used during construction include fuels, oils, greases and lubricants, bitumen, paints and epoxies, curing compounds and herbicides. If not stored in an appropriate manner, could leak or spill into the surrounding land and watercourses. The storage, handling and use of the materials would be undertaken in accordance with the *Occupational Health and Safety Act 2000* and the WorkCover guideline *Storage and Handling of Dangerous Goods* (WorkCover, 2005).

While the quantities required are not expected to pose a significant off-site risk, occupational health and safety hazards have the potential to occur between the construction workforce and members of the public. In addition, restrictions on the storage of hazardous materials and installation of water quality control features, potential risks would be further mitigated.

During operation contaminants from the road (tyre and brake wear, engine oil leaks, litter), or chemicals from accidental spillages can adversely affect the local environment through road runoff. However, with the addition of a formal drainage system as a result of the proposal, stormwater runoff would be directed to the pavement drainage system and stormwater detention basins. This would improve the current situation where there is no formal drainage. Any impacts would be minor with appropriate management.

Crashes involving vehicles transporting chemicals and/or other dangerous goods would generally affect only a small area, with hazards relating to toxic effects, fire and explosions. Most incidents would have limited potential to affect those not directly involved in a crash or incident due to few sensitive receivers along the proposal corridor.

6.14.2 Safeguard and management measures

Impact	Environmental safeguards	Responsibility	Timing
Procedures for managing hazards and wastes.	• Hazards and risks associated with the construction of the proposal would be identified before construction and management measures would be implemented during construction through a CEMP.	Construction contractor	Pre-construction
	• A site-specific safety management plan would be prepared to manage potential occupational health and safety hazards. The plan would identify hazards on-site and hazard control measures to adequately protect people from risk of injury or illness. This would include: – Procedures for manual handling of heavy loads. – Procedures to comply with legislative and industry standard requirements for the safe handling and storage of hazardous substances and dangerous goods.	Construction contractor	Pre-construction
	• A maintenance and inspection program to maintain and audit construction controls.	Construction contractor	Construction
Storage of materials	• Areas for storage of hazardous liquids to be bunded and secured, with any spills collected and disposed of off-site.	Construction contractor	Construction
	• Minimal amounts of hazardous materials would be stored on site.	Construction contractor	Construction
Hazardous materials	• Potentially hazardous and contaminating activities to be conducted in bunded areas to prevent discharge into watercourses.	Construction contractor	Construction

6.14.3 Consistency with the concept plan

Hazards and risks were not assessed as part of the concept plan environmental assessment. No future assessment requirements were specified in the concept plan approval. However, an assessment of hazards and risks has been undertaken for the proposal.

6.15 Cumulative impacts

6.15.1 Existing environment

Cumulative impacts would result from different actions occurring in close time proximity to the construction of the proposal. The development of land surrounding the proposal will be developed into the WSEA (Eastern Creek Precinct and the precinct south of the Sydney Water). This would consist of numerous warehouse developments (including construction of a childcare centre on the Southridge House property).

Construction timing is unknown at this stage, (with the exception of the warehouses pending Blacktown City Council approval). It is anticipated that these projects could be constructed at or near the same time as the proposal.

6.15.2 Potential impacts

The main impacts from all these projects would be the increase in construction traffic along Old Wallgrove Road. Construction movements from the development could also result in some traffic delays during peak hours on the road. Should the Erskine Park Link Road be opened to traffic prior to this proposal, additional commuter traffic can be expected from Erskine Park and further afield increasing traffic volumes generally on Old Wallgrove Road and construction traffic could result in potential delays during the construction period. However, the proposal would be constructed to minimise construction impacts on surrounding roads and ensuring adequate heavy vehicle access along Old Wallgrove Road during construction.

The increase in construction traffic would also increase traffic noise in the area during construction. However, due to the lack of sensitive receivers at this location, noise is not anticipated to be a significant issue.

The developments near the proposal, are predominantly being undertaken on land which is grassed vacant land. The removal of existing vegetation and the nature of warehouse development would result in an increase in impervious area, which would result in a general increase in stormwater runoff from these areas. There would also be an increase in utility services required in the area.

6.15.3 Safeguards and management measures

No safeguards and management measures are proposed.

6.15.4 Consistency with the concept plan

Cumulative impacts were not assessed as part of the concept plan environmental assessment. No future assessment requirements were specified in the concept plan approval. However, a cumulative impact assessment has been undertaken for the proposal.

6.16 Summary of beneficial effects

The proposal is required to meet the projected traffic demand generated by the Western Sydney Employment Area and the approval conditions for the EPLRN environmental assessment. The Metropolitan Plan has identified that 1,105, 000 jobs would be created in Western Sydney by 2036 representing half of Sydney's population growth. The proposal would assist in achieving these objectives by providing improved access and traffic flow to the WSEA toand from the M7 and M4 motorways. The proposal would also provide a consistent road connecting Erskine Park Road to the motorways.

6.17 Summary of adverse effects

The potential adverse environmental impacts as a result of the proposal include:

- Minor disruption to traffic and accessibility would be experienced during the construction phase of the proposal.
- Impact two Aboriginal heritage items including a disturbed artefact scatter (and associated Potential Archaeological Deposit (PAD) site) that has low scientific significance (and research potential) and an isolated artefact (known as EPLR2) where extensive earthworks have completely removed the upper part of the soil profile in most areas. This proposal would impact on EPLR2

requiring a section 90 Aboriginal Heritage Impact Permit for the disturbance of the site to be sought prior to construction.

- Less than one hectare of vegetation and only 0.2 hectares of the endangered ecological community River Flat Eucalyptus Forest under the threatened Species Conservation Act 1995.

A range of management and mitigation measures have been developed for avoiding, minimising and mitigating potential adverse impacts.

7 Environmental management

This chapter describes how the proposal would be managed to reduce potential environmental impacts throughout detailed design, construction and operation. A framework for managing the potential impacts is provided with reference to environmental management plans and relevant RMS QA specifications. A summary of site-specific environmental safeguards is provided as detailed in Table 7-1 and the licence and/or approval requirements to be obtained prior to construction are also listed.

7.1 Environmental management plan (or system)

A number of safeguards and management measures have been identified in order to minimise adverse environmental impacts, including social impacts, which could potentially arise as a result of the proposal. Should the proposal proceed, these management measures would be incorporated into the detailed design and applied during the construction and operation of the proposal.

A Project Environmental Management Plan (PEMP) and a Construction Environmental Management Plan (CEMP) would be prepared to describe safeguards and management measures identified. These plans would provide a framework for establishing how these measures would be implemented and who would be responsible for their implementation.

The plans would be prepared prior to construction of the proposal and must be reviewed and certified by the RMS Environmental Officer, Sydney, prior to the commencement of any on-site works. The CEMP would be a working document, subject to ongoing change and updated as necessary to respond to specific requirements. The CEMP and PEMP would be developed in accordance with the specifications set out in the *RMS QA Specification G36 – Environmental Protection (Management System), RMS QA Specification G38 – Soil and Water Management (Soil and Water Plan) and the RMS QA Specification G40 – Clearing and Grubbing.*

7.2 Summary of safeguard and management measures

Environmental safeguards outlined in this document would be incorporated into the detailed design phase of the proposal and during construction and operation of the proposal, should it proceed. These safeguards would minimise potential adverse impacts arising from the proposal on the surrounding environment. The safeguards and management measures are summarised in Table 7-1.

Table 7-1: Summary of site specific environmental safeguards

No.	Impact	Environmental safeguards	Responsibility	Timing
1	General	• All environmental safeguards must be incorporated within the following documents: – Project Environmental Management Plan – Detailed design stage – Contract specifications for the proposal – Construction Environmental Management Plan	RMS	Pre-construction
2	General	• A risk assessment must be carried out on the Proposal in accordance with the RMS Audit Pack and OSD risk assessment procedures to determine an audit and inspection program for the works. The recommendations of the risk assessment are to be implemented. • A review of the risk assessment must be undertaken after the initial audit or inspection to evaluate the level of risk chosen for the proposal is appropriate. • Any works resulting from the proposal and as covered by the REF may be subject to environmental audit(s) and/or inspection(s) at any time during their duration.	RMS	Pre-construction After first audit
3	General	• The environmental contract specification [insert name] must be forwarded to the RMS Senior Environmental Officer for review at least 10 working days prior to the tender stage. • A contractual hold point must be maintained until the CEMP is reviewed by the RMS Senior Environmental Officer.	RMS	Pre-construction
4	General	• The RMS Project Manager must notify the RMS Environmental Officer Sydney at least 5 days prior to work commencing.	RMS	Pre-construction
5	General	• All businesses and residences likely to be affected by the proposed works must be notified at least 5 working days prior to the commencement of the proposed activities.	RMS	Pre-construction
6	General	• Environmental awareness training must be provided by the contractor to all field personnel and subcontractors.	Construction contractor	Pre-construction and during construction as required.
7	Utility services	• Prior to construction, existing utilities would be identified and either avoided or protected for the duration of construction	Construction contractor	Pre-construction and during construction

No.	Impact	Environmental safeguards	Responsibility	Timing
8	Resource use and traffic minimisation	• Earthworks quantities would be balanced as far as practicable during detailed design to ensure that the transfer of material along the external road network is minimised.	RMS	Pre-construction
9	Construction traffic impacts	• Prior to construction, a traffic management plan would be prepared to outline management measures during construction. These measures describe how: – Traffic control would be provided to manage and regulate traffic movements during construction. – To notify road users about traffic conditions/ disruptions. – To consult with property owners on property access disruptions. – Disruption to all road users during construction would be kept to a minimum. – Construction and delivery vehicles entering or leaving the site compound and/or stockpile sites would use designated haulage routes identified in the plan under traffic control. These movements would be restricted to non-peak traffic periods as specified in the plan to minimise movements on adjacent roads during construction. • Appropriate traffic management measures would be implemented that could see a reduction in the speed limit for the extent of the construction site and localised temporary delays along Old Wallgrove Road and local road intersections.	Construction contractor	Pre-construction
10	Local road access impacts	• Property access to Old Wallgrove Road, via the Roberts Road intersection for the property north of the proposal that is losing its direct access, would be considered as part of detailed design. If any changes are made to the proposal, RMS Environment Officer would be consulted to identify any further environmental assessment that may be required for any changes.'	RMS	Pre-construction
11		• Existing connecting streets would have their accesses maintained during construction. However, should accesses need to be obstructed, alternatives would be put in place for the duration of the disruption.	Construction contractor	Construction
12	Access impacts	• Consultation would be undertaken with the property owners to minimise any access impacts.	Construction contractor	Construction
13	Closure of existing property access	• RMS will continue to consult with the relevant landowner of the timing of closure of the access onto Old Wallgrove Road	Construction contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
	onto Old Wallgrove Road			
14	Public transport	• Consultation will be undertaken with Westbus to identify informal bus stop locations on Old Wallgrove Road to limit impacts or temporarily relocate the stops during construction.	Construction contractor	Construction
15	Impacts to Cumberland Plain Land Snail	• Prior to construction, a qualified ecologist is to undertake a targeted survey of Cumberland Plain Land Snail (*Meridolum corneovirens*), and if present, a translocation plan would be prepared, in consultation with Office of Environment and Heritage.	Construction contractor	Pre-construction
16	Construction impacts to native vegetation in and outside the proposal footprint.	• Exclusion fencing would be established around areas of vegetation outside of the approved clearing areas (including the area of River Flat Eucalyptus and Casuarina grove) for the duration of construction. Fences would be maintained at all times, and construction staff would be advised of their purpose and instructed to stay out of these areas.	Construction contractor	Construction
17		• Parking and vehicular access off existing roads would only be in designated areas and away from mature trees.	Construction contractor	Construction
18		• Vegetation removal would be minimised where possible.	Construction contractor	Construction
19	Impacts to fauna	• Any native vegetation clearing would be supervised by an experienced ecologist to avoid impacts on fauna.	Construction contractor	Construction
20		• Any incident involving fauna would be reported to WIRES.	Construction contractor	Construction
21	Impacts to waterways	• Appropriate erosion and sedimentation controls would be installed prior to any vegetation removal or earthworks near Reedy and Eskdale creeks, with exclusion zones established to prevent parking or other vehicle movement inside the riparian vegetation.	Construction contractor	Construction
22		• All cleared areas would be progressively stabilised.	Construction contractor	Construction
23	Spread of weeds	• All vehicles and equipment would be cleared of soil and vegetation when leaving the site to avoid transfer of weeds and soil borne diseases.	Construction contractor	Construction
24	Construction noise and vibration	• Should the child care centre be operational during construction of the proposal, prior notice of the construction program would be given, kept informed throughout the construction period, and provided with a name and contact number for construction	Construction contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
	impacts	noise information and complaints. Noise complaints would be dealt with promptly.		
25		• Mobile equipment would be fitted with noise control equipment, where possible	Construction contractor	Construction
26		• A construction noise and vibration management plan would be prepared prior to construction works. This plan would include construction hours and measures to minimise noise impacts to sensitive receivers.	Construction contractor	Construction
27	Impacts to known Aboriginal heritage sites	• An Aboriginal Site Impact Recording form should be completed and lodged with the AHIMS registrar, detailing the test excavations undertaken within the Conservation Area PAD/artefact scatter.	RMS	Pre- construction
28		• Due to the low significance of the artefacts recovered in the test excavations, it is unlikely to be suitable for lodgement with the Australian Museum. AHMS will, therefore, ask registered Aboriginal parties if they would like to take control and care of the artefact. If no agreement is reached, the artefacts would be returned to RMS and recommended that they be re-buried within the subject area following completion of the works.	RMS	Pre- construction
29		• The section 90 Aboriginal Heritage Impact Permit should be sought.	RMS	Pre- construction
30	Impact to unknown/ undiscovered Aboriginal heritage sites or change to impacts	• If the boundaries of the proposal are revised to include areas not investigated as part of the AHMS cultural heritage assessment, Advice would be sort from RMS Environmental Officer on the need for further assessment of the impacts.	RMS	Pre- construction
31		• In the event that previously undiscovered Aboriginal objects, sites or places (or potential Aboriginal objects, sites or places) are discovered during construction, all works in the vicinity of the find should cease and RMS should implement their *Standard Management Procedure: Unexpected Archaeological Finds* (July, 2012) for addressing un-identified Aboriginal objects.	Construction contractor and RMS	Construction
32	Ongoing consultation with the Aboriginal community	• RMS would continue to notify registered Aboriginal parties of the progress of the proposal.	RMS	Construction
33	Construction management of heritage sites	• RMS would advise all on-site construction personnel and contractors, of the relevant heritage legislative requirements.	Construction contractor and RMS	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
34	Impacts on human remains	• Should suspected human skeletal material be identified, all works should cease and RMS should implement their *Standard Management Procedure: Unexpected Archaeological Finds* (November, 2011) for managing human skeletal remains.	Construction contractor and RMS	Construction
35	Non Aboriginal heritage impacts	• If any unknown non-Aboriginal heritage items are encountered during construction, work would cease in the area of the find and RMS would implement their unexpected finds procedures. Works in the area would not recommence until the appropriate approvals or clearances have been obtained.	Construction contractor	Construction
36	Managing contaminated lands	• Appropriate measures would be implemented as part of the CEMP to manage saline soils and minimise any impacts associated with contaminated soils.	Construction contractor	Pre-construction
37	Road runoff detention	• Detailed design would incorporate appropriate techniques to contain and manage the quality of road runoff.	RMS	Pre-construction
38	Identification of contaminated water	• Should any de-watering be required, water would be tested for contaminants. If found, appropriate management measures would be employed.	Construction contractor	Construction
39	Erosion and sediment control during construction	• The construction site compound would be restored with suitable native vegetation species once construction is complete.	Construction contractor	Construction
40		• Erosion and sedimentation control plans would be developed in accordance with the Managing Urban Stormwater (Landcom 2004) and Managing Urban Stormwater: Soils and Construction, Volume 2D, Main Road Construction (DECC 2008). The plan is to be done using the staging plan and would include (but not limited to) the following information: – Construction catchments – Water flow paths for the construction area and adjacent property – The likely run-off from each road sub-catchment – Controls or diversion to minimise the off-site mixing with on-site water. – The locations and sizing of sediment basins. – The direction of runoff and drainage points during each stage of construction. – Calculation of work area and soil loss. Construction Basin location and measures to direct on site runoff into the basin	Construction contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		– Basin calculation. – Standard drawings for sediment controls such as sand bags and batter shoots. – Proposed staging plans for the project to ensure appropriate erosion and sediment control is possible. – Construction staging and soil opened/exposed during construction would be limited to the capacity of the construction sediment basin for that area, in accordance with Blue Book (Landcon 2004, Volume 2D).		
41	Maintaining water quality during operation	• Water quality basins and structures would be appropriately cleared and maintained.	RMS	Operation
42	Spill procedures	• Emergency spill kits would be kept on site at all times. All staff would be made aware of the location of the spill kit and trained in its use.	Construction contractor	Construction
43		• If a spill occurs, the RMS' Environmental Incident Classification and Management Procedure would be followed and the RMS Contract Manager notified as soon as practicable.	Construction contractor	Construction
44		• Any refuelling of vehicles and equipment on site would be undertaken on an impermeable surface, within a bunded area located at least 40 metres away from water bodies and surface water drains. Any fuel, oils or other liquids stored on site would be stored in an appropriately bunded area away from water bodies	Construction contractor	Construction
45		• Minor repairs or servicing for machinery and equipment on-site may be necessary; however, significant repairs or servicing would take place off site.	Construction contractor	Construction
46	Impacts to watercourses	• All refuelling or minor repairs to be undertaken on-site are to occur within an impermeable, bunded area at least 40 m from any watercourse or drainage line.	Construction contractor	Construction
47	Water quality from erosion and sedimentation	• The area to be cleared for the construction would be minimised as far as practicable, particularly around Reedy and Eskdale creeks to minimise the potential for erosion and sedimentation. Appropriate erosion and sedimentation controls would be put into place to also minimise impacts to the creeks.	Construction contractor	Construction
48		• Erosion and sedimentation control plans would be developed in accordance with the Managing Urban Stormwater (Landcom 2004) and Managing Urban Stormwater: Soils	Construction contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		and Construction, Volume 2D, Main Road Construction (DECC 2008) to minimise water quality impacts.		
49		• Construction staging and soil opened/exposed during construction would be limited to the capacity of the construction sediment basin for that area, in accordance with Blue Book (Landcon 2004, Volume 2D).	Construction contractor	Construction
50	Property acquisition	• Ongoing consultation with directly affected landowners would occur throughout the detailed design phase.	RMS	Pre-construction
51		• Land acquisition would be carried out in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991*.	RMS	Pre-construction
52	Construction property impacts	• On completion of construction activities, land used for temporary construction sites, stockpiles and sedimentation basins would be revegetated and left in a stable condition.	Construction contractor	Construction
53	Dust generation	• All disturbed areas would be stabilised as soon as practicable to prevent or minimise windblown dust. This may include progressive hydro-mulching of disturbed areas as works are completed. Revegetation in accordance with an approved landscape concept plan would be required.	Construction contractor	Construction
54		• Water sprays, sprinklers and water carts would be employed if needed to adequately dampen work areas and exposed soils to minimise off-site dust emissions.	Construction contractor	Construction
55	Maintenance and use of construction equipment	• Construction equipment would be kept in a good operating condition. Construction equipment would be properly maintained to ensure exhaust emissions comply with the *Protection of the Environment Operations Act 1997*.	Construction contractor	Construction
56		• Vehicle and machinery movements would be restricted to designated areas during construction works.	Construction contractor	Construction
57		• Site exit(s) would include controls (eg rumble grids) to remove mud from vehicles.	Construction contractor	Construction
58		• Vehicles transporting material to and from the site would be covered immediately after loading to prevent windblown dust emissions and spillages.	Construction contractor	Construction
59	Stockpile management	• Stockpiles and handling areas would be maintained in accordance with the *RMS Stockpile Site Management Guidelines* (2011).	Construction contractor	Construction
60		• Stockpiles would be managed to minimise windblown or traffic generated dust. Areas	Construction contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		that may be inaccessible by water carts would be kept in a condition that minimises windblown or traffic generated dust using other means such as water cannons, overhead sprinklers, tarpaulins or dust sealants.		
61	Bridge aesthetics	• Bridges over Reedy and Eskdale creeks would be designed to be similar to the existing structures.	RMS	Pre-construction
62	Planting and landscape strategy	• As much natural vegetation within the study area would be retained as possible.	Construction contractor	Construction
63		• Any landscaping would be undertaken with local indigenous plant species as per the indicative planting schedule in the Urban Design Report and Landscape Character and Visual Impact Assessment (AECOM 2012).	Construction contractor	Construction
64		• Landscaping would be undertaken progressively as works are completed.	Construction contractor	Construction
65		• Riparian corridor restoration around Reedy and Eskdale creeks around the bridge widening would be undertaken.	Construction contractor	Construction
66		• Batters would be rounded as much as possible and where practicable vegetated to transition into the adjoining land.	Construction contractor	Construction
67	Manage landscaping	• Monitoring and maintenance of landscaped areas would be undertaken for 12 months.	Construction contractor	Operation
68	Amenity impacts	• The community would be kept informed about the proposal and provided information on construction progress, access and traffic condition changes.	Construction contractor	Pre-construction, construction
69	Access disruption	• Property access would be maintained for the duration of construction. Should temporary or alternative access be required, this would be provided in consultation with the affected landowner.	Construction contractor	Construction
70		• Local road closures would be minimised as much as possible.	Construction contractor	Construction
71	Traffic disruption	• Where possible, transportation of materials for the proposal would be undertaken outside of peak traffic times.	Construction contractor	Construction
72		• Amenity impacts associated with the construction of the proposal would be managed in accordance with the CEMP.	Construction contractor	Construction
73		• Construction materials and other products and services would be locally sourced, as far as practicable.	Construction contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
74	Management of construction waste	• Construction waste would be managed through the waste hierarchy established under the WARR Act (refer Section 6.12.1). All waste generated during construction would be disposed of in accordance with the requirements of Waste Classification Guidelines (DECC 2008). Waste management measures would be developed for the proposal and would form part of the overall CEMP.	Construction contractor	Pre-construction
75		• Site inductions would include training in waste minimisation principles.	Construction contractor	Construction
76		• A waste register would be maintained, detailing types of waste collected, amounts, date/time and details of disposal.	Construction contractor	Construction
77	Identification of recycling and re-use of materials	• Where practical, waste products would be reused on site, including: – Earthworks material as fill embankments. – Sub-grade layers and other material for batter extensions. – Top-soil for landscaping. – Cleared vegetation would be mulched, chipped or composted to be used as sediment filter fences, landscaping or land rehabilitation. – Crushed concrete as roadbase, footings, retaining walls or drainage.	Construction contractor	Construction
78		• Regular visual inspections would be conducted to ensure that work sites are kept tidy and to identify opportunities for reuse/recycling.	Construction contractor	Construction
79	Sourcing of recycled materials	• Where possible and compliant with RMS specifications, secondary waste materials such as fly ash, steel slags and recycled aggregate would be used instead of virgin quarried construction materials. Use of these materials would be dependent on the proximity of the site to sources of recycled materials to avoid excessive transport costs and transport related greenhouse gases.	Construction contractor	Construction
80		• RMS contractors would be required to propose recycled-content materials where they are cost and performance competitive.	Construction contractor	Construction
81	Disposal of waste	• Material not reused on site would be stockpiled in an appropriately bunded area (in accordance with the *RMS Stockpile Site Management Guidelines* (2011) prior to being recycled at appropriate specialised off-site recycling contractors.	Construction contractor	Construction
82		• Containers for litter and other wastes would be provided and contents disposed of at a	Construction contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		suitable waste disposal station.		
83		• Chemical, fuel and lubricant containers, and solid and liquid wastes would be disposed of in accordance with the requirements of the OEH.	Construction contractor	Construction
84	Climate change impacts	• The impact of increased intensity flood events and stormwater runoff as a result of climate change would be considered further during the detailed design of culvert crossings and stormwater drainage systems.	RMS	Pre-construction
85	Improving energy efficiency and sustainability	• Energy (fuel/electrical) efficiency would be considered when selecting equipment.	Construction contractor	Construction
86		• Equipment would be regularly maintained to retain fuel efficiency.	Construction contractor	Construction
87		• Where feasible, biofuels would be used (biodiesel, ethanol, or blends such as E10 and B80), to reduce greenhouse gas emissions from construction plant and equipment.	Construction contractor	Construction
88		• Vegetation clearance would be minimised and revegetation would be undertaken as much as practicable.	Construction contractor	Construction
89		• Energy efficient work practices would be adopted to limit energy use, including conducting energy conservation awareness programs for all site personnel and undertaking energy audits to identify and address energy waste.	Construction contractor	Construction
90		• Plant and office-based equipment (including lights and computers) would be operated in an efficient manner and would be regularly maintained.	Construction contractor	Construction
91		• If available, electrical energy derived from a renewable energy source accredited by the National Green Power Accreditation Steering Group (or equivalent) would be used for the supply of on-site electrical energy required during construction.	Construction contractor	Construction
92		• Locally-sourced materials and staff would be used wherever possible, to reduce transport related emissions.	Construction contractor	Construction
93		• Recycled materials, such as replacement of cement with fly ash, recycled aggregate, and recycled content in steel, would be used to minimise the lifespan impact of greenhouse gas emissions in production where practicable.	Construction contractor	Construction
94	Procedures for managing hazards and	• Hazards and risks associated with the construction of the proposal would be identified before construction and management measures would be implemented during construction through a CEMP.	Construction contractor	Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
95	wastes	• A site-specific safety management plan would be prepared to manage potential occupational health and safety hazards. The plan would identify hazards on-site and hazard control measures to adequately protect people from risk of injury or illness. This would include: – Procedures for manual handling of heavy loads. – Procedures to comply with legislative and industry standard requirements for the safe handling and storage of hazardous substances and dangerous goods.	Construction contractor	Pre-construction
96		• A maintenance and inspection program to maintain and audit construction controls.	Construction contractor	Construction
97	Storage of materials	• Areas for storage of hazardous liquids to be bunded and secured, with any spills collected and disposed of off-site.	Construction contractor	Construction
98		• Minimal amounts of hazardous materials would be stored on site.	Construction contractor	Construction
99	Hazardous materials	• Potentially hazardous and contaminating activities to be conducted in bunded areas to prevent discharge into watercourses.	Construction contractor	Construction

7.3 Licensing and approvals

Potential licenses and approvals required prior to construction are identified in Table 7-2.

Table 7-2: Summary of licensing and approvals required

Requirement	Timing
Aboriginal Heritage Impact Permit from OEH to disturb Aboriginal heritage sites and items	Prior to any subsurface investigations prior to work.

8 Conclusion

This chapter provides the justification for the proposal taking into account its biophysical, social and economic impacts, the suitability of the site and whether or not the proposal is in the public interest. The proposal is also considered in the context of the objectives of the EP&A Act, including the principles of ecologically sustainable development as defined in Schedule 2 of the Environmental Planning and Assessment Regulation 2000.

8.1 Justification

In 2010, the *Metropolitan Plan for Sydney 2036* (Metropolitan Plan) was released by the NSW Government and identified that most employment lands are within Western Sydney (including the WSEA). The Metropolitan Plan targeted 1,105,000 jobs being created in Western Sydney by 2036 representing half of Sydney's population growth. The proposal would assist in achieving these targets by providing improved access to the WSEA from the M7 and M4 motorways.

The proposal is required to meet the projected traffic demand generated by the WSEA. Traffic modelling predicts that Old Wallgrove Road to the M7 Motorway would need to be widened to at least four lanes in the short to medium term to serve industrial complexes being rapidly developed adjacent to the road corridor.

While the proposal would have some minor environmental and social impacts, the benefits of the proposal outweigh these impacts.

8.2 Objects of the EP&A Act

Object	Comment
5(a)(i) To encourage the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment.	The proposal would improve access to the Western Sydney Employment Area and from Erskine Park Road / Mamre Road to the M4 and M7 motorways.
5(a)(ii) To encourage the promotion and co-ordination of the orderly economic use and development of land.	The proposal won't change land use in the area, however it would support the planned development in the area.
5(a)(iii) To encourage the protection, provision and co-ordination of communication and utility services.	The proposal would be designed to accommodate utility services within the road corridor.
5(a)(iv) To encourage the provision of land for public purposes.	The proposal would include the provision of a shared pathway to the north of Old Wallgrove Road to connect to the M7 Motorway shared pathway. Bus stops are also proposed along the proposal.
5(a)(v) To encourage the provision and co-ordination of community services and facilities.	Not relevant to the proposal.
5(a)(vi) To encourage the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats.	A biodiversity assessment has been undertaken to determine the level of impacts that may occur from the proposal and to identify any mitigation measures that would reduce the impacts. No significant impacts are predicted to occur and mitigation measures are described in this REF.
5(a)(vii) To encourage ecologically sustainable	Ecologically sustainable development is

Object	Comment
development.	considered in Sections 8.2.1 – 8.2.4 below.
5(a)(viii) To encourage the provision and maintenance of affordable housing.	Not relevant to the proposal.
5(b) To promote the sharing of the responsibility for environmental planning between different levels of government in the State.	Not relevant to the proposal.
5(c) To provide increased opportunity for public involvement and participation in environmental planning and assessment.	RMS has sought comment from a range of stakeholders and government agencies. RMS would continue to consult with stakeholders, the community and property owners throughout the planning process.

8.2.1 The precautionary principle

The precautionary principle has been defined as:

"Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation."

The proposal would result in edge effects on a TSC Act listed threatened ecological community. All necessary measures would be taken to ensure that unnecessary degradation of this River Flat Eucalypt Forest threatened ecological community does not occur. Additionally, all reasonable and feasible measures have been incorporated into the safeguards in this REF to ensure measures are taken to avoid environmental degradation.

8.2.2 Intergenerational equity

Intergenerational equity is a concept that is closely tied with sustainability, ensuring future generations have the resources to support themselves in a manner equal to the present day.

This proposal would benefit both existing and future generations through providing improved access to the area and linking industries to the M4 and M7 motorways. Intergenerational equity has been considered through the ecological and Aboriginal assessments, which have indicated that minimal impact is possible subject to the implementation of the appropriate mitigation measures.

8.2.3 Conservation of biological diversity and ecological integrity

A key objective of the proposal is to minimise adverse impacts on the environmental values of the proposal area. Conservation of biological diversity and ecological integrity has been considered at all stages of concept design development and would be further considered during detailed design. Impacts have been avoided where possible and mitigated where necessary.

8.2.4 Improved valuations, pricing and incentive mechanisms

Environmental and social issues have been considered for this proposal and are detailed within this REF. The value placed on environmental resources is evident in the extent of planning and environmental investigations undertaken for this proposal and in the incorporation of mitigation measures and safeguards.

8.3 Conclusion

The proposed widening of Old Wallgrove Road between Roberts Road and the M7 Motorway is subject to assessment under Part 5 of the EP&A Act. The REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity. This has included consideration of conservation agreements and plans of management under the *National Parks and Wildlife Act 1974*, joint management and biobanking agreements under the *Threatened Species Conservation Act 1995*, wilderness areas, critical habitat, impacts on threatened species, populations and ecological communities and their habitats and other protected fauna and native plants.

A number of potential environmental impacts from the proposal have been avoided or reduced during the concept design development and options assessment. The proposal as described in the REF best meets the proposal objectives. Mitigation measures proposed as detailed in this REF would ameliorate or minimise expected impacts that are considered to be minor. The proposal would improve connectivity and access in the Western Sydney Employment Area. On balance the proposal is considered justified.

The environmental impacts of the proposal are not likely to be significant and therefore it is not necessary for an environmental impact statement to be prepared and approval to be sought for the proposal from the Minister for Planning under Part 5.1 of the EP&A Act. The proposal is unlikely to affect threatened species, populations or ecological communities or their habitats, within the meaning of the *Threatened Species Conservation Act 1995* or *Fisheries Management Act 1994* and therefore a Species Impact Statement is not required. The proposal is also unlikely to affect Commonwealth land or have an impact on any matters of national environmental significance.

9 Certification

This review of environmental factors provides a true and fair review of the proposal in relation to its potential effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the proposal.

Lucia Coletta
Environmental Planner
Aurecon Australia
Date:19/10/12

I have examined this review of environmental factors and the certification by Lucia Coletta from Aurecon Australia and accept the review of environmental factors on behalf of the RMS.

Mathivanar Matty
Old Wallgrove Road Widening project Manager
RMS Parramatta
Date:

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Terms and acronyms used in this REF

CEMP	Construction environmental management plan.
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW). Provides the legislative framework for land use planning and development assessment in NSW.
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth). Provides for the protection of the environment, especially matters of national environmental significance, and provides a national assessment and approval process.
EIS	Environmental Impact Statement.
EPA	Environmental Protection Agency
Erskine Park Link Road.	New four lane road being constructed between Erskine Park Road and Old Wallgrove Road near the intersection with Roberts Road. The Erskine Park Link Road forms part of the Erskine Park Link Road Network concept plan.
EPLRN	Erskine Park Link Road Network. The concept plan was approved in August 2009. Erskine Park Link Road and this proposal form part of this concept plan.
ESD	Ecologically sustainable development. Development which uses, conserves and enhances the resources of the community so that ecological processes on which life depends, are maintained and the total quality of life, now and in the future, can be increased.
FM Act	*Fisheries Management Act 1994* (NSW).
Heritage Act	*Heritage Act 1977* (NSW).
ISEPP	State Environmental Planning Policy (Infrastructure) 2007.
LALC	Local Aboriginal Land Council.
LEP	Local Environmental Plan. A type of planning instrument made under Part 3 of the EP&A Act.
LoS	Level of Service. A qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers.
Metropolitan Plan	*Metropolitan Plan for Sydney 2036*
Metropolitan Strategy	*Metropolitan Strategy City of Cities: A Plan for Sydney's Future*
NES	Matters of national environmental significance under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999.*
NPW Act	*National Parks and Wildlife Act 1974* (NSW).
PAD	Potential Archaeological Deposit
REF	Review of Environmental Factors
RMS	Roads and Maritime Services
SEPP	State Environmental Planning Policy. A type of planning instrument made under Part 3 of the EP&A Act.
SEPP 14	*State Environmental Planning Policy No.14 – Coastal Wetlands.*
The proposal	The Old Wallgrove Road Widening between Roberts Road and M7 Motorway.
TSC Act	*Threatened Species Conservation Act 1995* (NSW).
WSEA	Western Sydney Employment Area.