The Horsley Drive Upgrade - M7 Motorway to Cowpasture Road

Preferred Corridor Option Report

August 2015
THE HORSLEY DRIVE UPGRADE,
M7 MOTORWAY TO
COWPASTURE ROAD

PREFERRED CORRIDOR OPTION REPORT

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Executive summary

Background

Roads and Maritime Services (Roads and Maritime) is planning a 2.3 kilometre upgrade of The Horsley Drive between the M7 Motorway, Horsley Park, and Cowpasture Road, Bossley Park. The start of planning for the upgrade was announced by the NSW Government in March 2015 to address traffic congestion, improve road safety and to meet a predicted increase in traffic volumes due to growth of the Western Sydney Employment Area. The upgrade would see this section of The Horsley Drive converted to a four-lane divided road with provision for a six lane corridor for future traffic needs.

Proposal need

The existing daily traffic volume on The Horsley Drive is between 32,000 and 40,000 vehicles per day, with between 18 and 22 per cent being heavy vehicles. These factors coupled with the existing standard of the road mean that there are high levels of traffic congestion, delays and low levels of travel time reliability. This affects commuters (including those using buses) but it also has broader economic impact by limiting access to the Smithfield / Wetherill Park Industrial area, affecting the movement of freight.

Traffic on The Horsley Drive is expected to grow at an average of 2.5 per cent to 2.8 per cent per annum by 2031, with heavy vehicle numbers in line with overall traffic growth. Traffic analysis indicates that without an upgrade there will be severe capacity issues, long delays and extended queues on The Horsley Drive. It is expected that the provision of four lanes (two lanes in each direction) will adequately address near term demand to 2036. After 2036 six lanes (three lanes in each direction) will be needed.

An upgrade of The Horsley Drive also provides an opportunity to improve road safety by reducing congestion related crashes and bringing the road into line with contemporary design standards. It can also serve as a catalyst for improved pedestrian and cyclist connections within the corridor.

There is also an opportunity to improve the flood immunity of The Horsley Drive near Eastern Creek.

Environmental issues

The study area location and extent is shown in Figure 1-2. A preliminary review of environmental information for the corridor identified the following issues for consideration:

- The proposal area is largely surrounded by Western Sydney Parklands
- The soils types and topography within the study area mean that measures will need to be implemented to address the risk of erosion and sedimentation
- The areas around Eastern Creek (in the western part of the study area) have been mapped as high salinity potential
- A fuel depot was formerly located in the centre of the eastern boundary of Lot 10 DP 879209 (200-212 Cowpasture Road) and the site has been notified to the EPA as a contaminated site. Other potential sources of contamination include agricultural activities (primarily market gardens) (heavy metals, pesticides)
The Horsley Drive at Eastern Creek is identified as being subject to flooding at Eastern Creek.

The State Heritage Register listed Upper Canal System (Pheasants Nest Weir to Prospect Reservoir) traverses The Horsley Drive, east of Ferrers Road.

There are Aboriginal archaeological sites adjacent to the Horsley Drive comprising eight artefact scatters, two isolated artefacts and two potential archaeological deposits (PADs).

Two endangered ecological communities (River-flat Eucalypt Forest and Cumberland Plain Woodland) have been mapped adjacent to The Horsley Drive.

There is a potential for listed threatened flora and fauna to occur adjacent to The Horsley Drive.

Eastern Creek is identified as key fish habitat.

The central and eastern parts of the study area have moderate landscape character sensitivity.

A number of businesses and private properties are situated adjacent to and have direct access to The Horsley Drive.

There are Endeavour Energy, Sydney Water, Jemena and Telstra assets within the study area.

**Corridor options**

For the purposes of option definition and analysis, the study area was divided into the following three sections as shown in Figure 1-3.

- **Western section** - from the M7 Motorway to the bends located west of Ferrers Road.
- **Central section** - around Ferrers Road.
- **Eastern section** - east of the Upper Canal to the Cowpasture Road intersection.

**Western section**

The following options were considered for the western section:

- Widening to the northern side of The Horsley Drive.
- Widening to the southern side of The Horsley Drive.
- Widening on both sides of The Horsley Drive.

**Central section**

For the central section, options to improve the horizontal and vertical alignment to increase the design speed and improve traffic flow, especially for heavy vehicles, were considered. Broadly, this resulted in the development and consideration of:

- Widening along the existing alignment (named Option E).
- New alignment (named Option G).

**Eastern section**

Only one feasible option was available for this section, widening to south. Most of the land on this section of The Horsley Drive is owned by the Western Sydney Parklands Trust. As part of the consultation process with the Western Sydney Parklands Trust, it was noted that
widening to the north would substantially affect the proposed Horsley Drive Business Hub
and a preference for widening on the southern side was expressed.

Corridor options evaluation

The options evaluation process involved iterative design refinements combined with
structured evaluation in workshop settings.

Widening to northern side was confirmed as the preferred corridor option for the western
section, noting the following:

- Although all corridor options would have some impact on artefact scatter sites, widening
to the north would impact on artefact scatter sites with low and moderate levels of
archaeological significance, while widening to the south would affect a larger artefact
scatter site assessed as having a moderate-high level of archaeological significance
- Lower flood impacts compared to the other two options because widening is on
downstream side of the Eastern Creek crossing
- No impacts to Sydney Equestrian Centre venue or emergency exit
- Fewer businesses affected
- Fewer impacts to Endeavour Energy assets, and no impact to 33kv overhead lines
- Lower total property impact, however more private properties are affected when
compared to the widening to south option
- All options would have some impact on River-flat Eucalypt Forest and Cumberland Plain
Woodland endangered ecological communities

The new alignment option (Option G) was confirmed as the preferred corridor option for the
central section, noting the following:

- Option G delivers better travel time savings than the existing alignment (Option E) in
2021, 2026 and 2031
- Option G allows 80 kilometres per hour posted speed, compared to 60 kilometres per
hour for Option E
- Option G a better horizontal alignment, a shorter travel distance and less steep vertical
grades
- Option E only delivers marginal safety improvements compared to Option G which
achieves improved driver sight visibility, a safer alignment in wet conditions and provides
the opportunity to provide safer at-grade crossing for cyclists
- While Option G would involve more sacrificial work than Option E, it would have a lower
impact on traffic during construction with mostly offline construction and fewer traffic
switches
- Both options E and G would have a greater impact on one of the artefact scatter sites
assessed as having a low level of archaeological significance. Option E would affect
another identified site assessed as having a low to moderate level of archaeological
significance
- Both options E and G impact the Westons Tunnel, however Option G would have a
potentially greater impact on Westons Tunnel when compared with Option E because it
introduces a new alignment across the tunnel. Both options would require retaining walls
at the Upper Canal crossing which would result in a degree of visual impact on the State Heritage Register listed item

- Option G has a greater impact on the Western Sydney Parklands (and agricultural leases), but does provide an opportunity to rehabilitate the existing road alignment (which could then become part of the parklands)
- Both options would have some impact on Cumberland Plain Woodland endangered ecological community
- Option G provides better opportunities for improved access to the Water NSW Upper Canal corridor and passive recreation hub to the south of The Horsley Drive.

The preferred corridor option

Based on the option evaluation process and further project development, the preferred corridor option for The Horsley Drive between M7 Motorway and Cowpasture Road is identified as follows.

- Upgrading to a four lane divided road with a six lane corridor
- Providing a third eastbound lane from west of Ferrers Road up to Cowpasture Road utilising the future third eastbound lane in the six lane corridor
- Western section - upgrading on existing alignment and widening on northern side
- Central section - Realign Ferrers Road intersection with a single radius curve and with reduced grades: western approach approximately four per cent and eastern approach approximately six per cent
- Eastern section - upgrading on existing alignment and widening on southern side
- Upgrade Ferrers Road intersection configuration including provision of a cul-de-sac on the new southern leg of The Horsley Drive / Ferrers Road intersection, a short bus priority lane on The Horsley Drive western approach and dedicated bus bays on departure sides in both directions
- Upgrading The Horsley Drive / Cowpasture Road roundabout to an intersection with traffic lights
- Upgrading the turning lanes on The Horsley Drive eastern approach at the M7 interchange and the turning lanes at the Cowpasture Road North intersection
- Provision of new left-in left-out access to the community and passive recreation hub located within the Western Sydney Parklands, to the south of The Horsley Drive
- Maintenance of access to the Upper Canal corridor on both sides of the Horsley Drive
- Upgrading The Horsley Drive eastern approach at the Wallgrove Road intersection
- Reservation of a road corridor west of Wallgrove Road and in the vicinity of the Cowpasture Road (north) intersection are also proposed to meet the future traffic demand.
1. Introduction

1.1 Background

Rods and Maritime Services (Roads and Maritime) is planning a 2.3 kilometre upgrade of The Horsley Drive between the M7 Motorway, Horsley Park, and Cowpasture Road, Bossley Park. The start of planning for the upgrade was announced by the NSW Government in March 2015 to address traffic congestion, improve road safety and to meet a predicted increase in traffic volumes due to growth of the Western Sydney Employment Area. The upgrade would see this section of The Horsley Drive converted to a four-lane divided road with provision for a six lane corridor for future traffic needs.

The Horsley Drive is a 15 kilometre long arterial road which generally runs along an east-west alignment between Carramar and Horsley Park, connecting the Hume Highway to the east with Wallgrove Road to the west. It is a key link in the metropolitan Sydney network catering for the needs of the surrounding communities, commuters and businesses, and serving local freight movements.

The Horsley Drive between the M7 Motorway and Cowpasture Road is the main access into the Smithfield/Wetherill Park industrial area and a strategic freight link to and from the M7. The existing road, between the M7 interchange and Ferrers Road, is a three lane, undivided road with two lanes westbound and one lane eastbound. Between Ferrers Road and Cowpasture Road the road is four lanes and undivided. There is currently no east-west shared path connectivity, however cyclist/pedestrian activated traffic lights connect the Regional Park cycleway across the Horsley Drive east of Ferrers Road.

As part of planning activities for the upgrade, Roads and Maritime developed alignment options for this section of The Horsley Drive and then completed an options evaluation process. This report documents the evaluation process and its findings.

1.2 Purpose of this report

This report documents the option development and evaluation process for the upgrade of The Horsley Drive between the M7 Motorway and Cowpasture Road. The report aims to:

- Explain the strategic context and need for the upgrade
- Establish a study area for the upgrade and present relevant issues and constraints
- Document community and stakeholder involvement
- Describe the corridor options development and assessment process including the methodology for the selection of the preferred option
- Present the preferred corridor option
- Outline selected design options that are being considered for parts of the preferred corridor
- Outline the next steps for proposal development
1.3 Study area

The study area covers a total area of about 112 hectares and extends over a distance of about 2.4 kilometres between the M7 Motorway in the west and Cowpasture Road in the east. It is wholly within the Fairfield local government area and traverses the suburbs of Horsley Park, Abbotsbury, Wetherill Park and Bossley Park. The character of the study area is illustrated by Figure 1-1, while Figure 1-2 shows the study area location and extent.
Figure 1-2

Study Area

Zoning Data: NSW Crown Copyright - Planning and Environment
Waterways, electricity & pipeline data - LPI Digital Topographic Database

Sources: Esri, HERE, Tomtom, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

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Date: 16/08/2015
This section of The Horsley Drive is largely surrounded by the Western Sydney Parklands with the Sydney International Equestrian Centre located on the south west corner. Land-use is predominantly rural acreage, with some small holdings including a service station and a golf driving range located mid-way between the M7 Motorway and Ferrers Road. The Wetherill Park Industrial Area is located at the eastern extent of the study area.

Areas within the Western Sydney Parklands are subject to the provisions of State Environmental Planning Policy (Western Sydney Parklands) 2009. Areas outside the Western Sydney Parklands are variously zoned as follows under the Fairfield Local Environmental Plan 2013 (refer to Figure 1-2):

- SP2 Infrastructure
- RU2 Rural Landscape
- RU4 Primary Production
- RE1 Public Recreation
- B5 Business Development
- IN1 General Industrial
- R2 Low Density Residential
- E2 Environmental Conservation.

The Western Sydney Regional Parkland is under the care and control of Western Sydney Parkland Trust (the Trust). The Western Sydney Parkland Plan of Management 2020 (Western Sydney Parklands Trust, 2011) identifies future developments including industrial and recreation hubs surrounding The Horsley Drive including an Urban Farming precinct (Horsley Park) on the northern side between M7 and the water supply canal (refer to Section 2.3.9). The gateway to the Horsley Park Urban Farming precinct is Ferrers Road.

As noted in Section 1.1, the existing road, between the M7 interchange and Ferrers Road, is a three lane, undivided road with two lanes westbound and one lane eastbound. Between Ferrers Road and Cowpasture Road the road is four lanes and undivided. The key intersections are:

- The Horsley Drive / M7 Motorway. Full grade separated diamond interchange catering for all movements.
- The Horsley Drive / Ferrers Road. T-intersection with traffic lights. Includes a dedicated right turn lane for turning movements from The Horsley Drive to Ferrers Road.
- The Horsley Drive / Cowpasture Road (north), T-intersection with traffic lights. Includes dedicated right-turn and left-turn lanes.
- The Horsley Drive / Cowpasture Road (south). Four legged, dual lane roundabout.

Within the study area, The Horsley Drive crosses Eastern Creek over culvert structures and the Sydney Water Supply Canal over Westons Tunnel. Both Sydney Water Supply Canal and Westons Tunnel are State Heritage Register listed structures. Other infrastructure includes 250 millimetre and 375 millimetre diameter Sydney Water mains, 33kv and 11kv electricity transmission lines and telecommunication services along the corridor and a gas pipeline that follows a north-south alignment just to the east of Eastern Creek.

The topography of the study area is gently undulating. At the M7 interchange the elevation is about 80 metres Australian Height Datum (AHD), rising to about 97 metres AHD at Ferrers Road before dropping to about 60 metres AHD at Cowpasture Road.

Figure 1-3 shows the western, central and eastern sections of the study area.
Figure 1-3

Study Area Sections

- Western Section
- Central Section
- Eastern Section
- Watercourses
2. Project need and strategic context

2.1 Statement of project need

An upgrade of The Horsley Drive from M7 Motorway to Cowpasture Road is required to:

- Address current traffic congestion and improve travel time reliability for both general traffic and buses.
- Address the future transport needs of the surrounding areas.
- Improve safety standards consistent with the role of an urban arterial road
- Provide a more efficient road for freight services and improved access and connectivity to the Smithfield / Wetherill Park Industrial area
- Provide connectivity to local shared path networks and improve accessibility to public transport.

The project need is considered further in the following sections.

2.1.1 Existing traffic congestion

The existing daily traffic volume on The Horsley Drive is between 32,000 and 40,000 vehicles per day, with between 18 and 22 per cent being heavy vehicles. These factors coupled with the existing standard of the road mean that there are high levels of traffic congestion, delays and low levels of travel time reliability. This affects commuters but it also has broader economic impact by limiting access to the Smithfield / Wetherill Park Industrial area, affecting the movement of freight.

The results of traffic modelling (SMEC Australia, 2015) carried out for intersections within the study area show that:

- The Horsley Drive / Cowpasture (south) roundabout currently operates at capacity with an unacceptable level of service (LoS)\(^1\) of F in both AM and PM peak periods
  In the AM and PM peaks long eastbound queues extend back from the roundabout and adversely affect operation of the Cowpasture Road (north) signals. There are also long queues on the Cowpasture Road (south) approach at the roundabout in the AM peak and on The Horsley Drive eastern approach in the PM peak
- The Horsley Drive / Cowpasture Road (north) intersection approaches capacity in both the AM and PM peak periods. This intersection is affected by the poorly performing intersection to the south and also by queues from the northbound dual-lane right turn bay on The Horsley Drive spilling back to the roundabout
- The Horsley Drive/ Ferrers Road intersection has insufficient capacity for the high right turn demand in the AM peak. Queues of right turning vehicles spill back from the right turn bay blocking the adjacent westbound through lane. This is exacerbated by a combination of the steep uphill road gradient (+8.1\%) and the high proportion of heavy vehicles.

\(^1\) A six-point scale (A to F) measuring the extent of delay, with LoS A representing the best operating condition and LoS F the worst.

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In the PM peak there is queuing at this intersection associated with the high left turn demand from Ferrers Road to The Horsley Drive. This traffic (turning from the existing give-way slip left turn lane) is delayed while waiting for available gaps in The Horsley Drive eastbound through traffic flow.

- The Horsley Drive / M7 Motorway interchange operates with high delays and an unacceptable LoS of E in the AM peak. The existing merge section (two eastbound lanes to one eastbound lane) on The Horsley Drive east of M7 Motorway creates delays and long queues particularly on the M7 Motorway southbound off-ramp in the AM peak, hence the need to provide two eastbound lanes throughout.

Table 2-1 provides the results of traffic modelling for intersections within the study area.

### Table 2-1 Existing intersection performance

<table>
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<tr>
<th>Intersection</th>
<th>Peak</th>
<th>DoS¹</th>
<th>Average delay²</th>
<th>LoS</th>
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<tr>
<td>The Horsley Drive / Cowpasture Road (south)</td>
<td>AM</td>
<td>1.05</td>
<td>77</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>PM</td>
<td>1.00</td>
<td>125</td>
<td>F</td>
</tr>
<tr>
<td>The Horsley Drive / Cowpasture Road (north)</td>
<td>AM</td>
<td>0.91</td>
<td>34</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>PM</td>
<td>0.84</td>
<td>39</td>
<td>C</td>
</tr>
<tr>
<td>The Horsley Drive / Ferrers Road</td>
<td>AM</td>
<td>0.98</td>
<td>43</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td>PM</td>
<td>0.78</td>
<td>18</td>
<td>B</td>
</tr>
<tr>
<td>The Horsley Drive / M7 Motorway</td>
<td>AM</td>
<td>1.04</td>
<td>62</td>
<td>E</td>
</tr>
<tr>
<td></td>
<td>PM</td>
<td>0.93</td>
<td>33</td>
<td>C</td>
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<tr>
<td>The Horsley Drive / Wallgrove Road</td>
<td>AM</td>
<td>0.88</td>
<td>38</td>
<td>C</td>
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<tr>
<td></td>
<td>PM</td>
<td>0.74</td>
<td>29</td>
<td>C</td>
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**Notes:**

1. Degree of saturation – intersection demand compared to capacity. DoS 1.00 indicates the intersection is operating at capacity.
2. Average delay – Average additional travel time (in seconds) experienced by a vehicle with reference to a base travel time (e.g. the free-flow travel time).

### 2.1.2 Traffic growth and future road network performance

Roads and Maritime strategic traffic modelling indicates there will be high traffic growth rates on The Horsley Drive in the future. Traffic on The Horsley Drive is expected to grow at an average of 2.5 per cent to 2.8 per cent per annum by 2031. Table 2-2 shows the forecast traffic volumes for 2021, 2026 and 2031.

### Table 2-2 Future daily traffic forecast on The Horsley Drive

<table>
<thead>
<tr>
<th>Road</th>
<th>Section</th>
<th>2021</th>
<th>2026</th>
<th>2031</th>
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<tr>
<td>The Horsley Drive</td>
<td>East of Ferrers Road</td>
<td>52,400</td>
<td>56,700</td>
<td>59,300</td>
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<tr>
<td></td>
<td>East of M7 Motorway</td>
<td>39,300</td>
<td>41,500</td>
<td>45,100</td>
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In line with the overall traffic growth, it can be expected that heavy vehicle volumes will also grow. About 13,000 heavy vehicles per day are forecast to use this section of The Horsley Drive in 2031.
Traffic analysis shows that the current road configuration including existing key intersection layouts on The Horsley Drive between the M7 Motorway and Cowpasture Road do not have sufficient capacity for the projected future traffic volumes.

Table 2-3 summarises the predicted LoS and average delay (seconds) at key intersections within the study area if an upgrade does not proceed.

**Table 2-3 Future intersection performance (without upgrade)**

<table>
<thead>
<tr>
<th>Intersection</th>
<th>AM 2021</th>
<th>PM 2021</th>
<th>AM 2026</th>
<th>PM 2026</th>
<th>AM 2031</th>
<th>PM 2031</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Horsley Drive / Cowpasture Road (south)</td>
<td>151 F</td>
<td>225 F</td>
<td>162 F</td>
<td>197 F</td>
<td>170 F</td>
<td>193 F</td>
</tr>
<tr>
<td>The Horsley Drive / Cowpasture Road (north)</td>
<td>52 D</td>
<td>89 F</td>
<td>35 #</td>
<td>90 F</td>
<td>44 D</td>
<td>95 F</td>
</tr>
<tr>
<td>The Horsley Drive / Ferrers Road</td>
<td>45 F</td>
<td>77 F</td>
<td>57 E</td>
<td>83 F</td>
<td>57 E</td>
<td>88 F</td>
</tr>
<tr>
<td>The Horsley Drive / M7 Motorway</td>
<td>113 F</td>
<td>59 E</td>
<td>130 F</td>
<td>95 F</td>
<td>157 F</td>
<td>114 F</td>
</tr>
</tbody>
</table>

# Lower delays compared to 2021 is a result of reduced traffic throughput at this intersection caused by upstream capacity issues at the adjacent roundabout.

The Table 2-3 results indicate severe capacity issues, long delays and extended queues on The Horsley Drive and this underlines the need for an upgrade. It is also expected that the provision of four lanes (two lanes in each direction) will adequately address near term traffic demand to 2036. After 2036, six lanes (three lanes in each direction) will be needed.

### 2.1.3 Road safety

The crash history for the study area indicates that during the five year period from July 2009 to June 2014 a total of 125 crashes occurred, including one fatal crash and 34 injury crashes.

Most of these crashes occurred close to intersections and heavy vehicle involvement was about 19 per cent. The dominant crash types during the period were rear end and lane changing (46 per cent) which could be related to current congestion on the route.

An upgrade of The Horsley Drive provides an opportunity to improve road safety reducing congestion related crashes and bring the road into line with contemporary design standards.

### 2.1.4 Buses

The following Transit Systems bus routes use Horsley Drive within the study area:

- 813 - Fairfield to Prairiewood via The Horsley Drive (Smithfield). Limited service extends to Bonnyrigg via Horsley Park and Mount Vernon
- 835 - Prairiewood to UWS Penrith.
These services are affected by congestion on The Horsley Drive in a similar way to general traffic. Congestion extends bus travel times but also affects reliability and the ability of these services to run to timetable.

2.1.5  Pedestrians and cyclists

There is currently a foot path along the northern side of The Horsley Drive between the M7 Motorway and Ferrers Road. East of Ferrers Road there is a north-south connection to the Western Sydney Parklands cycleway. East of that cycleway there is no pedestrian or shared path connection to Cowpasture Road.

An upgrade of The Horsley Drive has the potential to serve as a catalyst for improved pedestrian and cyclist connections within the corridor.

2.1.6  Flood immunity

The Horsley Drive at Eastern Creek is identified as being subject to flooding. An upgrade of The Horsley Drive therefore provides an opportunity to improve flood immunity.

2.2  Project objectives

The objectives of the upgrade are as follows:

- Provide a safer road environment for all road users
- Provide road capacity to meet road user demand in 2021 and a road reserve to meet traffic demand in 2036 and contribute to the productivity and liveability in Western Sydney including Western Sydney Employment Area.
- Improve freight access and connectivity to support economic growth in Western Sydney with particular emphasis to Smithfield-Wetherill Park employment area and Western Sydney Employment Area
- Improve amenity along the route, accessibility and efficiency for public transport and facilitate active transport.
- Minimise impacts and sensitively integrate with the environment, including Western Sydney Parklands.
- Minimise “whole of life cost” and provide value for money.

2.3  Strategic planning and policy framework

The following major strategic planning and policy documents provide direction and establish priorities that are relevant to the proposal.

2.3.1  NSW 2021: A plan to make NSW number one

*NSW 2021: A plan to make NSW number one* (NSW 2021) (NSW Government, 2011) sets the NSW Government’s agenda for change in NSW. The 10 year plan establishes strategies and goals to rebuild the economy, return quality services, renovate infrastructure, restore accountability to government, and strengthen local environments and communities.
NSW 2021 places emphasis on investing in and delivering an efficient and effective transport system including delivering road infrastructure that will relieve congestion, improve travel times, improve road safety and enhance and expand capacity on road corridors.

The five core strategies are supported by 32 goals. The proposal contributes directly to four of these goals as follows:

- **Goal 1: Improve the performance of the NSW economy** - The proposal would improve the efficiency of the road network in the Western Sydney. This supports the economy by assisting the movement of people and goods

- **Goal 7: Reduce travel times** - The proposal would reduce congestion by increasing the capacity of The Horsley Drive. This additional capacity would improve traffic flow and reduce travel times

- **Goal 10: Improve road safety** – The proposal would improve road safety by providing a four lane divided carriageway road that meets current design standards and practices. Safety for cyclists would be improved by the provision of dedicated off-road paths and improved on-road facilities, including connectivity to the Western Sydney Parklands Cycleway.

- **Goal 27: Enhance cultural, creative, sporting and recreation opportunities** - The proposal would support this goal by providing improved shared path connections.

### 2.3.2 Rebuilding NSW: State Infrastructure Strategy 2014


*Rebuilding NSW* recognises the costs of congestion and includes an allocation of $1.3 billion to address congestion on Sydney’s roads. The proposal is consistent with the emphasis on congestion reduction, delivering improved traffic flow and reduced travel times.

### 2.3.3 NSW Long Term Transport Master Plan

The *NSW Long Term Transport Master Plan* (Transport for NSW, 2012) establishes the framework to deliver an integrated, modern transport system by identifying NSW’s transport actions and investment priorities over the next 20 years. The plan identifies that over the next 20 years, Sydney’s population is forecast to increase from 4.3 million to 5.6 million. By 2031, the number of trips made around the city each day will increase by 31 per cent from 16 million to 21 million trips, placing greater demands on road, rail and bus networks. Road congestion is currently estimated to have a cost of about $5.1 billion (or nearly $1,100 for every person living in Sydney) each year. By 2020, the costs of congestion are expected to rise to $8.8 billion a year.

The plan proposes a coordinated and integrated approach to meeting these transport challenges. Actions outlined in the plan include a program of work to expand capacity on Sydney’s most congested corridors and a medium to long-term action plan to deliver targeted investment and efficiency improvements on the arterial road network.

The proposal is consistent with the *NSW Long Term Transport Master Plan* because in facilitating improved traffic flow along a strategic transport corridor.
2.3.4  **A Plan for Growing Sydney**

*A Plan for Growing Sydney* (Department of Planning and Environment, 2014a) establishes the NSW Government’s vision for Sydney as “a strong global city, a great place to live.” To achieve this vision, the plan sets the following four goals:

- Goal 1 - a competitive economy with world-class services and transport
- Goal 2 - a city of housing choice with homes that meet our needs and lifestyles
- Goal 3 - a great place to live with communities that are strong, healthy and well connected
- Goal 4 - a sustainable and resilient city that protects the natural environment and has a balanced approach to the use of land and resources.

The proposal supports Goal 1 and Goal 3 by delivering improvements to traffic flow and road safety. Consistent with Goal 4, the proposal would be delivered in a way that minimises environmental impacts.

*A Plan for Growing Sydney* also establishes a framework and priorities for subregional planning that will link growth in population and housing to the infrastructure that supports communities, such as schools, health services, transport, electricity and water projects. The Horsley Drive is within the ‘South West’ subregion. By improving access to the Wetherill Park Industrial Area and the Western Sydney Employment Area, the proposal would help strengthen the subregion’s role in Sydney’s manufacturing, construction and wholesale/logistics industries. This is a stated priority in the plan.

2.3.5  **NSW Road Safety Strategy 2012-2021**

The *NSW Road Safety Strategy 2012-2021* (Transport for NSW, 2012) adopts the ‘Safe System’ approach to improving road safety: safer roads, safer vehicles, safer people, safer speeds and post-crash trauma treatment. By improving the design standard of The Horsley Drive, an upgrade within the study area would directly support the following initiative set out in the strategy.

*Ensure road safety is considered throughout the design, construction, maintenance, operation and audit of the road network for all road users including targeting treatments to address head-on, intersection, run-offroad crashes.*

2.3.6  **NSW Freight and Ports Strategy**

The *NSW Freight and Ports Strategy* (Transport for NSW, 2013a) is a core component of the NSW Government’s overall strategic planning framework. It is consistent with the *NSW Long Term Transport Master Plan* and supports the goals identified in *NSW 2021 – A Plan to Make NSW Number One* (NSW Government, 2011).

The Horsley Drive is classified as a primary freight route. This means it connects regions, and services strategically important ports, airports, industrial areas, freight terminals, intermodal terminals or hubs. It is also an approved 25/26 metre B-Double Route.

Objectives of the *NSW Freight and Ports Strategy* relevant to the proposal include:

- Delivery of a freight network that efficiently supports the projected growth of the NSW economy.
- Balancing freight needs with those of the broader community and the environment.
Actions of the strategy and task actions relevant to the proposal include:

- **Action 1D - Improve productivity of the road freight network**
  - Task 1D-2 Provide necessary infrastructure to support High Productivity Vehicle access
  - Task 1D-3 Improve access for High Productivity Vehicles on State and local roads

- **Action 2B – Develop and maintain capacity for freight on the road network**
  - Task 2B-2 Prioritise road infrastructure investments

- **Action 3B – Manage congestion, noise and emission impacts of freight transport**
  - Task 3B-1 Recognise costs of congestion
  - Task 3B-2 Mitigate noise from freight operations
  - Task 3B-3 Mitigate emissions from freight operations

- **Action 3C – Prioritise safety of freight transport**
  - Task 3C-2 Improve heavy vehicle safety

The proposal is considered consistent with the objectives, actions and tasks referenced above. It would reduce congestion on a primary freight route and includes design features that would better accommodate heavy vehicles and which would enhance safety for all road users.

### 2.3.7 Sydney’s Cycling Future: Cycling for everyday transport

*Sydney’s Cycling Future: Cycling for everyday transport* (Transport for NSW, 2013b) identifies a safe and connected network of bicycle paths as an important part of Sydney’s integrated transport system. It reflects the NSW Government’s intention to make bike riding a convenient and enjoyable option that benefits everyone – by improving access to towns and centres, reducing congestion and increasing capacity on the public transport system.

The objective is to make cycling a safe, convenient and enjoyable transport option for short trips (< 30 minutes).

*Sydney’s Cycling Future* outlines how the NSW Government will coordinate planning and investment to improve the bicycle network and build the needs of bike riders into the planning of new transport and infrastructure projects.

The provision of broad cycle-safe shoulders as part of the proposal and shared paths adjacent to the corridor is strongly aligned with two of the “three pillars” of Sydney’s Cycling Future:

- Pillar 1 - Safe connected networks
- Pillar 3 - Partner with councils to target missing links and problem intersections in local bicycle networks. The proposed off-road provision for cyclists would complement existing and proposed facilities in the Fairfield local government area.
2.3.8 Western Sydney Parklands Plan of Management 2020


The Plan of Management and accompanying Supplement provides the strategic management framework for the Parklands and assists the Western Sydney Parklands Trust in determining actions and priorities. These documents include a land use framework that identifies the various activity hubs, linkages, infrastructure, bushland corridor, and conservation areas (refer to Figure 2-1). Impacts on the Parklands have been a consideration in the corridor identification and evaluation process.
Figure 2-1 Western Sydney Parklands Plan of Management extract
2.3.9 **Horsley Park Precinct – Urban Farming Masterplan**

A key strategic direction of the *Western Sydney Parklands Plan of Management 2020* (Western Sydney Parklands Trust, 2011) is to establish urban farming in the Parklands. The *Western Sydney Parklands Horsley Park Precinct Urban Farming Masterplan* (Western Sydney Parklands Trust, 2012) aims to help deliver the successful roll-out of urban farming in the Precinct.

Figure 2-2 shows the masterplan including a major gateway at Ferrers Road, a minor gateway at the Upper Canal and orchards and groves in the vicinity of The Horsley Drive / Ferrers Road intersection. These elements of the Masterplan have been a consideration in the corridor identification and evaluation process.

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**Figure 2-2 Horsley Park Precinct Urban Farming Masterplan**
3. Community and stakeholder involvement

3.1 Community involvement

In March 2015, the NSW Government announced the start of planning work for the project and this was followed by the release of a Community Update in May 2015 (refer to Appendix A). A project web page was also created.

Community consultation for the preferred alignment corridor is programmed to be in August and September 2015. This consultation will exhibit the preferred corridor option and allow the community to provide comment.

3.2 Government agency and stakeholder involvement

The preferred corridor alignment was developed in close consultation with the following key stakeholders and consultation is ongoing:

- Western Sydney Parkland Trust – Discussions opened opportunities of aligning the road upgrade with the Parkland Plan of Management 2020 where feasible
- Water NSW – Discussions assisted to identify the Water NSW requirements and investigate options of mitigating the impacts on the heritage structures and the accessibility to the Upper Canal corridor
- Sydney International Equestrian Centre - Land ownership of the Sydney Equestrian Centre is with the Trust
- Fairfield City Council and Roads and Maritime Private Motorway operations management section, representing Westlink M7 Motorway, have been part of the project team.

3.3 Aboriginal stakeholder involvement

An upgrade of The Horsley Drive is considered against the requirements of the Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI) (Roads and Maritime Services, 2011). This procedure is generally consistent with the Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 (Department of Environment, Climate Change and Water, 2010). An outline of the procedure is presented in Table 3-1.

Table 3-1 Outline of PACHCI process

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1</td>
<td>Initial Roads and Maritime assessment. Desktop assessment to determine whether a Roads and Maritime project is likely to harm Aboriginal cultural heritage, and whether further assessment or investigation is required.</td>
</tr>
<tr>
<td>Stage 2</td>
<td>Desktop assessment and site survey. Further assessment and a survey with specific Aboriginal stakeholders and an archaeologist to assess whether a project would impact Aboriginal cultural heritage.</td>
</tr>
<tr>
<td>Stage 3</td>
<td>Formal consultation and preparation of cultural heritage assessment report.</td>
</tr>
</tbody>
</table>
Aboriginal parties must be involved in the preparation of these reports in accordance with legislative requirements and the *Aboriginal cultural heritage consultation requirements for proponents 2010* (Department of Environment, Climate Change and Water, 2010).

### Stage 4

Implement project mitigation measures. Undertake salvage and/or project implementation in accordance with an AHIP and/or a Part 5.1/Part 4 approval or Part 5 determination obtained under the *Environmental Planning and Assessment Act 1979*.

A Stage 2 assessment was undertaken in June 2015 and this involved a two day archaeological survey of the study area by a team of archaeologists and representatives from Deerubbin Local Aboriginal Land Council (DLALC). The results of the survey are discussed in Section 4.5.

#### 3.4 Utility authorities

A preliminary utility investigation study has been carried out to inform the option assessment process. Consultation with utility authorities to date has included Endeavour Energy, Sydney Water, Jemena and Telstra. Initial meetings were held with Endeavour Energy and Sydney Water. Consultation with all the utility authorities are ongoing.

#### 3.5 Further consultation

As noted in Section 3.1, Roads and Maritime proposes to seek comment on the preferred alignment corridor. Comments received will be considered as part of the proposal development process. Further consultation will be carried out in future inviting community to provide comments on the concept design and the Review of Environmental Factors.

The following stakeholders have been identified as having a potential interest in the proposal. The list is not exhaustive and should be refined during the course of detailed environmental assessment.

- Western Sydney Parklands Trust
- NSW Planning and Environment
- NSW Office of Water
- Sydney Catchment Authority
- Transport for NSW stakeholders
- Transit Systems
- Fairfield City Council
- Environmental Protection Authority and the Office of Environment and Heritage
- Cumberland Business Chamber
- The local Aboriginal community
- Emergency services
- Endeavour Energy and Jemena
- Optus and Telstra
• Sydney Water
• Horsley Park Public School and Marion Primary School
• Landowners, residents and local businesses.
4. Issues and constraints

4.1 Landform, geology and soils

4.1.1 Landform

As noted in Section 1.3, the topography of the study area is gently undulating, the highest point being near the Ferrers Road intersection. The grades up to Ferrers Road are currently a contributor to traffic congestion (see section 2.1.1). These slopes would also represent a consideration for the management of site water during construction. Map 01 in Appendix B illustrates the topography of the study area.

4.1.2 Geology and soils

The geology of the study area is identified by the Penrith 1:100 000 Geological Sheet 9030, (Clark & Jones, 1991) (refer to map 02 in Appendix B) as follows:

- **Bringelly Shale** - Shale, carbonaceous claystone, claystone, laminate, fine to medium-grained lithic sandstone, rare coal and tuff
- **Fine-grained sand, silt and clay.** Small part of the study area near Eastern Creek.

Bringelly Shale is typically of lower strength and generally weathers to a high plasticity, expansive clay. This can be problematic for ground engineering purposes. The shale and soils are likely to be suitable for use as general fill are unlikely to be suitable for use in the upper parts of the new road formation. Some of the clay soils may be dispersive, requiring attention to the design of sedimentation control. In areas of Bringelly Shale, cutting and embankment batters would likely need to be designed at to 2-Horizontal:1-Vertical or flatter or, if steeper, to have erosion protection and/or engineering support (Roads and Maritime Services, 2015).

Quaternary sediments and fill are likely to have variable composition, engineering properties and depth. Any potential material reuse of these materials would need to be assessed following testing. For any slopes in Quaternary sediments or fill, batters would likely need to be designed at to 3-Horizontal:1-Vertical or flatter or, if steeper or below the water table, to have engineering support (Roads and Maritime Services, 2015).

Soil landscape mapping for the shows that the study area traverses four soil landscapes (refer to map set 03 in Appendix A) (Bannerman & Hazelton, 1990). Those traversed by the study area are as follows:

- **Luddenham** (erosional process) - These soils are red kurosols and chromosols (red podzolic soils) on crests and slopes, red kandosols (red earths) on sandstone members, brown sodosols (yellow solodic soils) on footslopes and lower slopes and brown dermosols on siltstone/mudstone members. Limitations within this soil landscape include high erosion hazard, low to moderate fertility and moderate surface movement potential.
- **Blacktown** (residual process) – These soils are shallow to moderately deep red podzolic soils and brown podzolic soils on crests, upper slopes and well drained areas; yellow podzolic soils and solosols on lower slopes and in drainage depressions. Limitations include moderately reactive (ie changes volume with changes in moisture content), highly plastic subsoils and low soil fertility.
• South Creek (soil landscape group occurs in flood plains, valley flats and drainage depressions or channels on the Cumberland Plain. The soils are often deep, layered sediments overlying bedrock or relict soils. The main limitations of this soil landscape are the risk of erosion and frequent flooding.

• Picton (colluvial process) - These soils are red and brown podzolic soils on upper slopes, Brown and yellow podzolic soils and solots on lower slopes, with red and brown earths on colluvial material. Limitations include extreme erosion hazard, mass movement hazard, steep slopes and occasionally impermeable and reactive plastic subsoils.

4.1.3 Acid sulfate soils

Acid sulfate soils include those where the soil pH is below four (actual acid sulfate soil) and those which may form actual acid sulfate soil when drained or exposed to oxidation processes (ie the exposure of iron sulfate minerals such as pyrite to oxygen). Acid sulfate soil occurs predominantly on coastal lowlands, with elevations generally below five metres.

None of the land within the study area has been mapped as having a risk of acid sulfate soil occurrence

4.1.4 Salinity

Salinity is the accumulation of salts in soil and water to levels that impact on human and natural assets (e.g. plants, animals, aquatic ecosystems, water supplies, agriculture and infrastructure). Salinity occurs where salt in the landscape is mobilised and redistributed closer to the soil surface and/or into waterways by rising groundwater. Rising groundwater is commonly caused by removal of deep-rooted vegetation such as trees and perennial pasture. It is also caused by changes in soil permeability and structure which restrict groundwater movement. Compaction and cut / fill works can be contributors.

The areas around Eastern Creek (in the western part of the study area) have been mapped as high salinity potential (Department of Infrastructure, Planning and Natural Resources, 2003). This means these areas are predisposed to salinity due to soil, geology, topography and groundwater conditions. The remainder of the site has a moderate salinity potential, which means that scattered areas of scalding and indicator vegetation have been noted but concentrations have not been mapped.

4.1.5 Contamination

A search (18 June 2015) of the NSW Environment Protection Authority contaminated land record of notices (NSW Environmental Protection Authority, 2015) for the Fairfield local government area returned 11 notices relating to four sites. None of the sites are within or immediately adjacent to the study area.

A search of the List of NSW contaminated sites notified to EPA (as at 4 May 2015) returned one record near the study area. A fuel depot was formerly located in the centre of the eastern boundary of Lot 10 DP 879209 (200-212 Cowpasture Road) and the site has been notified to the EPA as a contaminated site. The site is not deemed to be significantly contaminated, subject to a management order, subject of an approved voluntary management proposal, or subject to an ongoing management order under the provisions of Contaminated Land Management Act 1997 (WSP, 2012).

Soil and groundwater investigations were conducted in 2009 and 2010 which identified ongoing contaminants across Lot 10 DP 879209 including TPH, saline soils of low yield,
concentrations of heavy metals arsenic, nickel, cadmium, copper and zinc exceeding ANZECC 2000 guidelines. Phase Separated Hydrocarbons (PSH) were identified at the southern boundary of Lot 10 and in the adjoining property (Lot100 DP 879680) (WSP, 2012).

Other potential sources of contamination include agricultural activities (primarily market gardens) (heavy metals, pesticides).

4.2 Hydrology and flooding

The western part of the study area is within the Eastern Creek Catchment. This is part of the South Creek sub catchment of Hawkesbury-Nepean Catchment. Eastern Creek traverses the study area just to the east of the M7 Motorway.

The eastern part of the study area (with Ferrers Road being the catchment boundary) is within the Prospect Creek Catchment, which is part of the Georges River Catchment.

The Rural Area Flood Study - Ropes, Reedy and Eastern Creeks (BMT WBM, 2013) identifies that there is overbank flooding along the length of Eastern Creek in all modelled flood events. The natural creek system has insufficient capacity to convey the flood events that are expected in the catchment, resulting in significant overbank flooding even in relatively frequent flood events (the 20 year ARI flood event). The Horsley Drive at Eastern Creek is identified as being subject to flooding in all modelled flood events. Flood maps from the study are included in Appendix B.

4.3 Biodiversity

4.3.1 Vegetation communities and endangered ecological communities

Much of the study area has been cleared of native vegetation. Table 4-1 lists the vegetation communities mapped within the study area. Refer also to map 04, which is included in Appendix B.

**Table 4-1 Vegetation communities within the study area**

<table>
<thead>
<tr>
<th>Vegetation</th>
<th>Potential endangered ecological community equivalent</th>
<th>TSC Act status</th>
<th>EPBC Act status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shale Plain Woodland</td>
<td>Cumberland Plain Woodland in the Sydney Basin Bioregion</td>
<td>Critically Endangered</td>
<td>Critically Endangered</td>
</tr>
<tr>
<td>Shale Hills Woodland</td>
<td>Cumberland Plain Woodland in the Sydney Basin Bioregion</td>
<td>Critically Endangered</td>
<td>Critically Endangered</td>
</tr>
<tr>
<td>Alluvial Woodland</td>
<td>River-flat eucalypt forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions</td>
<td>Endangered</td>
<td>Not listed</td>
</tr>
</tbody>
</table>


4.3.2 Threatened flora

The study area includes habitat which potentially supports threatened flora species. There are records for the Spiked Rice-flower (*Pimelea spicata*) (TSC Act Endangered; EPBC Act
Endangered) and the Downy Wattle (*Acacia pubescens*) (TSC Act Vulnerable; EPBC Act Vulnerable) to the south of the study area. Refer to map 05 in Appendix B.

A search of the Atlas of NSW Wildlife (conducted 19 July 2015) returned 81 records for six threatened flora species within a 10 km x 10 km search area centred on the study area. The results are provided in Appendix C.

### 4.3.3 Threatened fauna

The study area includes habitat which potentially supports threatened fauna species. There are records for the Cumberland Land Snail (*Meridolum comeovirens*) (TSC Act Endangered) to the south of the study area and there are records for the Grey-headed Flying-fox (*Pteropus poliocephalus*) (TSC Act Vulnerable; EPBC Act Vulnerable) and the Eastern False Pipistrelle (*Falsistrellus tasmaniensis*) (TSC Act Vulnerable) both within and near the study area. Refer to map 05 in Appendix B.

A search of the Atlas of NSW Wildlife (conducted 24 June 2015) returned 269 records for 16 threatened fauna species within a 10 km x 10 km search area centred on the study area. The results are provided in Appendix C.

It is noted that previous (2005) nocturnal surveys have detected the Grey-headed Flying-fox foraging on eucalypt blossoms. These individuals were identified as likely to have dispersed from the Cabramatta Creek Flying-fox camp, this being located approximately nine kilometres south east of the study area. No active or historic Flying-fox camps were recorded within or adjacent to the study area during the 2005 surveys (AES and LesryK, 2005).

### 4.3.4 Migratory species

An EPBC Act protected matters identified ten listed migratory species that are either know or likely to occur in the locality. Refer to Appendix C.

### 4.3.5 Wildlife connectivity

Two fauna corridors have been identified within the study area, these being the woodland that lines Eastern Creek and that which is present within the central portion of the study area (AES and LesryK, 2005). The Eastern Creek link would be the major corridor along which native species are dispersing, this providing connectivity between the Western Sydney Regional Park in the south and Prospect Reservoir to the north. This corridor is recognised by the Western Sydney Parklands Plan of Management (Western Sydney Parklands Trust, 2010).

The Horsley Drive represents a barrier to fauna movement. It has been noted that the only animals expected to be traversing along the identified corridors are flying species, or ground traversing animals that are adaptable to negotiating open space areas and urban infrastructure (AES and LesryK, 2005).

### 4.3.6 Key fish habitat

One of the objectives of the *Fisheries Management Act 1994* is to ‘conserve key fish habitats’ and in 2007 the Department of Primary Industries embarked on a statewide project to define and identify ‘Key Fish Habitats’ – those aquatic habitats that are important to the sustainability of the recreational and commercial fishing industries, the maintenance of fish populations generally and the survival and recovery of threatened aquatic species.
Eastern Creek is identified as key fish habitat. Refer to the key fish habitat map in Appendix B.

4.4 Historic heritage

The only listed heritage item within the study area is the State Heritage Register listed Upper Canal System (Pheasants Nest Weir to Prospect Reservoir) (refer to map 06 in Appendix B). Section 57 of the *Heritage Act 1977* requires approval for development affecting items on the State Heritage Register unless exemptions apply. The potential physical impacts to identified heritage structures were considered during option development processes as summarised in section 6.5.1. The investigations will continue during the concept development process and this will include a heritage impact assessment.

The Bunya Pine located on the north-west corner of The Horsley Drive / Cowpasture Road intersection (north) was listed by the Fairfield Local Environmental Plan 1994. That listing has not been carried through to the Fairfield Local Environmental Plan 2013, but the tree is now listed by State Environmental Planning Policy (Western Sydney Parklands) 2009.

While the tree has heritage significance it has been noted that it is now largely disconnected from its original landscape association with the Horsley Homestead complex (house, outbuildings, garden and farm focused around Jamieson Close two kilometres to the west) that are listed on the State Heritage Register. The view corridor(s) between the homestead and the Bunya Pine that existed during the mid-nineteenth century are now diminished as a result of increased development. The original landscape values of the ‘marker’ pine have also been reduced whereby the tree is now situated in an isolated context (Dominic Steele Consulting Archaeology, 2012).

4.5 Aboriginal heritage

As noted in Section 3.3, a Stage 2 PACHCI assessment, including a field survey, was undertaken in June 2015.

As part of the assessment, ten Aboriginal archaeological sites were identified in the study area. The sites comprised eight artefact scatters and two isolated artefacts. Two potential archaeological deposits (PADs) were also identified.

Four of the identified Aboriginal archaeological sites were assessed as having moderate to high archaeological significance. These sites show a relatively low level of disturbance and are located in spatially significant locations. The archaeology present at each of these locations offers scientific insight into past Aboriginal activities.

The two identified PADs were identified as having moderate archaeological potential.

Six of the identified Aboriginal archaeological sites exhibit low to moderate significance. These sites were found in areas with a high level of disturbance and the spatial relationship between Aboriginal objects has been lost.

The location and archaeological significance of identified Aboriginal sites was considered in the corridor identification and evaluation process.

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4.6 Noise and vibration

There are a number of noise sensitive receivers within and adjacent to the study area that could be affected by a future road upgrade during construction and operation. These receivers include:

- Residential dwellings
- Western Sydney Parklands (open space active and passive use)
- Sharks Golf Driving Range (1647 The Horsley Drive) (open space active use)
- Sydney International Equestrian Centre (open space active use).

State Heritage Register listed Upper Canal System has been identified as vibration sensitive infrastructure requiring further investigation and assessment. Important considerations include potential vibration from construction equipment as well and any changes to traffic volumes / composition travelling over the tunnel.

4.7 Air quality

There is potential for nearby residents and users of open space / recreational facilities to be affected by dust as a result of construction activities.

Operational air quality could be affected by any changes in traffic volumes, speeds, composition and/or the distance from the road to receivers.

4.8 Socio-economic and land use

Potential socio economic and land use issues associated with a future upgrade include

- Construction impacts
- Potential property acquisition
- Potential encroachment on areas identified for urban farming under the Horsley Park Precinct Urban Farming Masterplan (Western Sydney Parklands Trust, RMCG, Planisphere, 2012).
- Adjustments to access for local businesses, parklands and residences (eg change from uncontrolled access to left-in left out only)
- Benefits associated with improved traffic efficiency, road safety and pedestrian / cyclist connectivity.

That part of the Western Sydney Parklands generally in the corridor between Elizabeth Drive in the south and The Horsley Drive in the north is known as the Western Sydney Regional Park and is reserved land under the National Parks and Wildlife Act 1979. Under Section 47ZB of the Act, reservation of land as (or as part of) a regional park is not to be revoked except by an Act of Parliament.

Details of government policy and procedure in relation to revocation / adjustment of NPW Act reserved land is set out in Revocation, Recategorisation and Road Adjustment Policy (National Parks and Wildlife Service, 2014).
4.9 Landscape and visual amenity

To assist the corridor identification and evaluation process, Roads and Maritime commissioned *The Horsley Drive Upgrade M7 to Cowpasture Road Strategic Urban Design Report* (Context Landscape Design, 2015). The report included:

- Analysis of a Zone of Visual Influence to form the basis of a future assessment of the potential impact of the proposed upgrade on key viewpoints
- Analysis of landscape character
- Development of urban design objectives and principles.

4.9.1 Zone of visual influence

The Zone of Visual Influence represents the area from which The Horsley Drive corridor is potentially visible from the surrounding landscape. A map showing the Zone of Visual Influence is included in Appendix B and shows that the locations from which The Horsley Drive can potentially been seen are primarily located within the lower lying central area of the study area. It also highlights the limited visibility of the study area from areas near the M7 Motorway and the ridgeline that runs north-south adjacent the Sydney Water Supply Channel.

4.9.2 Landscape character

Landscape character is the combined quality of the built, natural and cultural aspects that make up an area and provide its unique sense of place. Three landscape character zones were identified within the study area:

- Eastern Creek flats (western part of the study area) – Assessed as having Low sensitivity
- Undulating ridge (central part of the study area) - Assessed as having Moderate sensitivity
- Wetherill Park slopes (eastern part of the study area)- Assessed as having Moderate sensitivity

4.9.3 Urban design vision, objectives and principles

The urban design vision for the corridor was identified as follows:

*The urban design vision for the upgrade of The Horsley Drive is to create a contextually sensitive road corridor that increases road capacity while promoting pedestrian and cycle connectivity along and across the road corridor. In particular, the urban design vision recognises The Horsley Drive’s key location within the Western Sydney Parklands and provides for the development of this region in line with the future vision of Parklands.*

The following project specific urban design objectives and principles have been identified:

- Objective 1 – Provide an upgraded road corridor that is responsive to and integrated within its existing and planned future context
  - Respond to existing landform and development patterns
  - Strengthen the relationship between the road corridor and the adjoining Western Sydney Parklands (refer Objective 2)
- Highlight and celebrate the ecological and heritage values of Eastern Creek and the Sydney Water Supply Channel and emphasise the road corridor’s crossing of these watercourses
- Vary the grading of cut and fill embankments where appropriate to provide natural variation and integrate embankments with local landform.

**Objective 2 – Strengthen The Horsley Drive’s sense of passage through the Western Sydney Parklands**
- Convey the Parklands themes along the length of The Horsley Drive, providing landscape treatments along the road corridor that strengthen the presence of the adjoining Parklands
- Reinforce the road corridor’s entry into the Parklands at The Horsley Drive’s intersections with the M7 Motorway and Cowpasture Road
- Emphasise the entry to the Horsley Park Urban Farm at Ferrers Road
- Ensure the road corridor’s interface with Horsley Park Urban Farm takes account of potential landscape character and visual impacts resulting from future land uses

**Objective 3 – Provide a cohesive and legible pedestrian and cycle network**
- Maintain pedestrian and cycle connectivity across The Horsley Drive to service the Western Sydney Parklands north-south shared path within the Sydney Water Supply Channel easement
- Provide east-west shared path connections along The Horsley Drive (north of road in the western section, south of road in the eastern section) for pedestrians and cyclists to connect with the existing shared path along the M7 Motorway and to existing and future development within the Parklands
- Allow for future pedestrian/cycle connections planned as part of the Horsley Park Urban Farm precinct: a walking/cycling track along the Eastern Creek bushland corridor and a cycle connection along Ferrers Road

**Objective 4 – Enhance the natural systems and cultural and heritage values of the corridor**
- Where appropriate, incorporate in the design species from adjoining natural systems and ecologies including Endangered Ecological Communities
- Where appropriate, recognise Aboriginal and European cultural and heritage values within the design
- Minimise the potential visual impacts of the project.

4.10 Utilities

The study area contains significant utilities including for Sydney Water, Endeavour Energy, Optus and Telstra on both sides of the corridor over the ground and underground. These include:

- Endeavour Energy assets which exist on both side of the road. On southern side, all are overhead, mainly a Transmission line (33kV) and HV feeder (11kV). Mostly distribution assets are on northern side and is a mix of overhead and underground.
- Sydney water - Currently 2/375mm and 1/250mm Trunk mains feed into reservoir and customers. 1/375mm and 250mm water mains are located on the northern side of the carriageway and 1/375mm water main on southern side.
- Jemena – A DN850mm High pressure Trunk main located in a 24 metre wide easement crosses the road corridor east of Eastern Creek. In addition, the high pressure Eastern Gas Pipeline crosses The Horsley Drive at the western end of the study area in the vicinity of Wallgrove Road (refer to Figure 2-1)
- Telstra and other telecommunication lines are present along the corridor on both side of the road.
5. Corridor options

5.1 Corridor options development process

New alignment options (wholly separate to the existing The Horsley Drive) were not considered in detail due to likely impacts on the Western Sydney Parklands (particularly severance and a degradation of park values), cost (property acquisition and construction) and difficulties in connecting a new corridor to the existing road network at the eastern (Cowpasture Road) and western (M7 Motorway) ends. The need to maximise the use of existing infrastructure was also a factor.

A ‘do nothing’ option was considered. However, the ‘do nothing’ option does not meet the proposal objectives or address the identified need and would therefore only be preferred in circumstances where the costs and environmental impacts of proceeding were assessed as outweighing identified benefits. That was not the case and therefore the ‘do nothing’ option was discarded. Section 2.1 explains the traffic and transport implications of not proceeding with an upgrade for this section of The Horsley Drive.

Corridor options within and adjacent to the existing road alignment were then developed. This was an iterative process involving a number of inputs, including preliminary environmental investigations, road design requirements, key stakeholder inputs and technical workshops including a constructability workshop.

For the purposes of option definition and analysis, the study area was divided into the following three sections as shown in Figure 1-3.

- Western section - from the M7 Motorway to the bends located west of Ferrers Road
- Central section - around Ferrers Road
- Eastern section – east of the Upper Canal to the Cowpasture Road intersection.

The options considered for each of these sections are described in Section 5.2 through to Section 5.4 below.

5.2 Western section

The western section of The Horsley Drive in the study area is currently three lanes with a road corridor approximately 18-20 metres wide. A road upgrade in the western section would require widening the road and acquisition of a strip of land along the corridor for road purposes. The following options were considered for the western section:

- Widening to the northern side of The Horsley Drive
- Widening to the southern side of The Horsley Drive
- Widening on both sides of The Horsley Drive.

All western section options included four lanes (with provision for future six lanes), median separation and a shared path on one side. The adopted design speed for all options was 80 kilometres per hour. The options are illustrated in figures 5-1 to 5-3.
Figure 5-1
Western Section - Widening to north

Vegetation Data: NSW Scientific Committee & C. C. Simpson (2008)
Canopy Cover: Tozer (2003)
Aboriginal Site Data: Removed from public documentation.
The Horsley Drive upgrade
M7 Motorway to Cowpasture Road
Preferred Corridor Option Report

Vegetation Data: NSW Scientific Committee & C. C. Simpson (2008)
Canopy Cover: Tozer (2003)
Aboriginal Site Data: Removed from public documents.
5.3 Central section

The central section includes the road section from west of Ferrers Road bends to east of the Upper Canal. The existing horizontal alignment of the road in this section has curves with approaches on either side of the Ferrers Road intersection positioned on an uphill. The posted speed on this section of the road has been reduced from 70 kilometres per hour to 60 kilometres per hour in recognition of the sub-optimum alignment.

This section of the road is largely surrounded by the Western Sydney Parklands. Any upgrade in the central section would require some acquisition for road purposes, although the extent depends on the option. Options to improve the horizontal and vertical alignment to increase the design speed and improve traffic flow, especially for heavy vehicles, were considered. Broadly this resulted in the development and consideration widening along the existing alignment or alternatively establishing a new alignment.

All options included four lanes (with provision for a future six lanes beyond 2036), median separation and a shared path on one side.

All options affect the Westons Tunnel to some extent. A preliminary assessment of the impacts of the road upgrade on the tunnel was conducted and the findings are summarised in Section 6.5.1.

5.3.1 Widening along the existing alignment

The option to widen along the existing alignment necessarily involved a speed restriction of 60 kilometres per hour due to constraints imposed by the horizontal and vertical alignment. This option is known as Option E and is illustrated by Figure 5-4).

5.3.2 New alignment

Various options were initially explored to improve the horizontal alignment and vertical grades of the central section and achieve a design speed of 80 kilometres per hour. This initial exploration resulted in three preliminary options which deviated from the existing alignment (Option A, Option B and Option C). These were then investigated and evaluated in a constructability workshop (refer to Appendix D). The key issues considered included:

- Maintenance of traffic flow during construction
- Ability to construct Ferrers Road intersection
- Extent of sacrificial works
- Construction staging and working under traffic
- Impacts to Parklands and impacts to Westons Tunnel
- Improvement of vertical grades.

Following the constructability workshop, further refinements were made to minimise impacts of the new alignment option and optimise the outcome. A refined option that deviates from the existing alignment was shortlisted for further consideration (known as Option G and illustrated by Figure 5-5). The refined Option G allows construction to occur mostly offline and allows Ferrers Road to remain open during construction. A side track is needed to maintain access to Ferrers Road, but this would largely become the realigned Ferrers Road thereby minimising sacrificial work.
Figure 5-4
Central Section Option E - Existing alignment

Existing Corridor
Corridor Widening
Shale Hills Woodland
Canopy Cover <10pc

Vegetation Data: NSW Scientific Committee & C. C. Simpson (2008)
Canopy Cover: Tozer (2003)
Aboriginal Site Data: Removed from public documents.

The Horsley Drive upgrade
M7 Motorway to Cowpasture Road
Preferred Corridor Option Report
Date: 17/08/2015
Figure 5-5
Central Section Option G - New alignment

- Existing Corridor
- New Alignment
- 9 - Shale Hills Woodland
- Canopy Cover <10pc

Vegetation Data: NSW Scientific Committee & C. C. Simpson (2008)
Canopy Cover: Tozer (2003)
Aboriginal Site Data: Removed from public documents.
5.4 Eastern section

Only one feasible option was available for this section, widening to south. This would require acquisition of a strip of land from the properties along the corridor for road purposes. Most of the land on this section of The Horsley Drive is owned by the Western Sydney Parklands Trust.

As part of the consultation process with the Western Sydney Parklands Trust, it was noted that widening to the north would substantially affect the Horsley Drive Business Hub, which was approved by the Minister for Planning as State Significant Development on 8 January 2013.

In recognition of this constraint, and as preferred by the Western Sydney Parkland Trust, a single eastern section option was developed that involves widening to the south. This option is illustrated by Figure 5-6.
Figure 5-6

Eastern Section - Widening to south

Vegetation Data: NSW Scientific Committee & C. C. Simpson (2008)
Canopy Cover: Tozer (2003)
Aboriginal Site Data: Removed from public documents.
6. Corridor options evaluation

6.1 Options evaluation process

The options evaluation process involved iterative design refinement combined with structured evaluation in workshop settings. The process had six broad stages as illustrated by Figure 6-1.

Figure 6-1 Options evaluation process

6.1.1 April 2015 constructability workshop

In April 2015 a Strategic Constructability Review was undertaken in accordance with Roads and Maritime project management processes. The purpose of the review was to optimise design options to ensure efficient project construction and maintenance, in order to meet project life cycle objectives for cost, time, quality, work health / safety and environmental management. The review consisted of a workshop attended by key project personnel and adopted the following format:

- Briefing of participants on the project description and status
- Presentation of design options for each section of the proposed upgrade (Western, Central and Eastern section), including a preliminary report on the structural options for Westons Tunnel
• Discussion and recording of general constructability issues, any consequential impacts and their relative importance

• Focus session with representatives from Endeavour Energy considering the significant amount of electrical assets that are impacted by the proposed upgrade and the issues currently faced in delivery of similar projects

• Small group breakout session to independently assess each presented option and provide a ranking of the options in regards to the degree of benefit of the option in responding to the following key issues:
  - Traffic Management
  - Staging
  - Global Site Constraints
  - Ease of construction
  - Utilities
  - Environment

The Strategic Constructability Review resulted in no significant change to the short listed western section options. As explained in 5.3.2, the review resulted in the refinement of three preliminary new alignment central section options into a single new alignment option (Option G). A summary of the Strategic Constructability Review evaluation of preliminary new alignment options for the central section is included in Appendix D.

As noted in Section 5.4, only one feasible option was identified for the eastern section and therefore no comparative evaluation was undertaken.

6.1.2 May 2015 Value Management Study

On 7 May 2015 a value management study workshop was undertaken for the proposed upgrade. The workshop utilised a structured process to ensure that key issues were identified and that the option endorsed by the group best meets essential requirements and objectives. The value management processes had the following five phases:

• Information Phase – review of project background and presentation of corridor alignment options.

• Analysis Phase – review of the underlying issues and constraints with the potential to impact the options being considered. This phase enabled participants to clarify objectives, to express concerns and to make suggestions regarding the concept designs presented. The project objectives were also revisited and confirmed during this phase.

• Option Assessment Phase - In this phase of the workshop, the participants were asked to consider each of the available options in more detail in an effort to identify the alignment that best meets project objectives. The group was also asked to consider the advantages and disadvantages of the options under consideration. This was done to assist in identifying the preferred alignment option to be taken forward.

• Creative Phase – This phase involved a general brainstorming of ideas to improve the corridor alignment recommended by the group. The ideas were also aimed at achieving the project objectives bearing in mind the constraints and issues discussed earlier in the workshop.
• **Judgement Phase** - The ideas for option improvement generated in the Creative Phase were assessed by the group in terms of practicality, viability and cost effectiveness. Each idea was discussed and rated using the following criteria.
  - Recommended for implementation;
  - Good Idea - needs further investigation; or
  - Not practical.

The following sections focus on the outcomes of the Options Assessment Phase. *The Horsley Drive Value Management Workshop Report* is included in Appendix E.

### 6.2 Options evaluation – western section

The strategic constructability review ranked widening to both sides as the least preferred option due to the impacts on both sides of the corridor, while the option of widening to northern side was ranked as the better performing option against the assessment criteria as identified in section 6.1.1.

Following the Strategic Constructability Review, all western section options were progressed for further consideration as part of the Value Management Study process. After considering the findings of the Value Management Study, widening to northern side was recommended as the preferred corridor option, noting the following:

- There would be an impact on artefact scatter sites with low and moderate levels of archaeological significance. Although all corridor options would have some impact on artefact scatter sites, widening to northern side would impact on artefact scatter sites with low and moderate levels of archaeological significance, whereas widening to the south would affect a larger artefact scatter site assessed as having a moderate-high level of archaeological significance
- Lower flood impacts compared to the other two options because widening is on downstream side of the Eastern Creek crossing
- No impacts to Sydney Equestrian Centre venue or emergency exit
- Fewer businesses affected
- Fewer impacts to Endeavour Energy assets, and no impact to 33kv overhead lines
- Lower total property impact, however more private properties are affected when compared to the widening to south option
- All options would have some impact on River-flat Eucalypt Forest and Cumberland Plain Woodland endangered ecological communities.

### 6.3 Options evaluation – central section

Following the Strategic Constructability Review, one existing alignment option (Option E) and one new alignment option (Option G) were progressed for further consideration as part of the Value Management Study process. After considering the findings of the Value Management Study, the new alignment option (Option G) was recommended as the preferred corridor option, noting the following:

- Option G delivers better travel time savings than Option E in 2021, 2026 and 2031,
• Option G allows 80 kilometre per hour posted speed, compared to 60 kilometres per hour for Option E
• Option G a better horizontal alignment, a shorter travel distance and less steep vertical grades
• Option E only delivers marginal safety improvements compared to Option G which achieves improved driver sight visibility, a safer alignment in wet conditions and provides the opportunity to provide safer at-grade crossing for cyclists
• While Option G would involve more sacrificial work than Option E, it would have a lower impact on traffic during construction with mostly offline construction and fewer traffic switches
• Both options E and G would have an impact on one of the artefact scatter sites assessed as having a low level of archaeological significance. Option E would also affect another identified site assessed as having a low to moderate level of archaeological significance
• Both options E and G impact the Westons Tunnel, however Option G would have a potentially greater impact on Westons Tunnel when compared with Option E because it introduces a new alignment across the tunnel. Both options would require retaining walls at the tunnel crossing which would result in a degree of visual impact on the State Heritage Register listed item
• Option G has a greater impact on the Western Sydney Parklands (and agricultural leases), but does provide an opportunity to rehabilitate the existing road alignment (which could then become part of the parklands)
• Both options would have some impact on Cumberland Plain Woodland endangered ecological community
• Option G provides better opportunities for improved access to the community and passive recreation hub to the south of The Horsley Drive.

6.4 Option review – eastern section

As noted in Section 5.4, widening to the south was the only available option for the eastern section. This was reconsidered as part of the Value Management Study process and the following key issues were identified and discussed:
• Development approvals on the northern side have resulted in the preference to widen on the southern side
• Other than two private properties, all affected land is under the control of the Western Sydney Parklands Trust
• The design speed within this area is 70 kilometres per hour due to curves and close proximity of intersections
• If it is intended that the speed limit of Cowpasture Road be increased to 80 kilometres per hour then it will be necessary to further assess the horizontal alignment of the eastern section
• There are operational issues associated with the Cowpasture Road roundabout
• Access to the Kennards storage facility and Cowpasture Place
• Pedestrian connectivity.
Following discussion of the key issues outlined above, the group endorsed the single eastern section option as the only viable way to proceed.

6.5 Design options

6.5.1 Upper Canal crossing options (Westons Tunnel)

Recognising the impact of road upgrade on the Westons Tunnel, a visual condition assessment of the tunnel structure and a preliminary impact assessment of the road upgrade (physical impact) on the tunnel were carried out to inform options development.

Westons Tunnel is a brick-lined horse-shoe shaped tunnel that runs beneath the Horsley Drive and which forms part of the State Heritage Register listed Upper Canal. The tunnel is about 134 metres long with internal dimensions of 2.85 metres wide and 2.4 metres high. The obvert (interior top of the tunnel) is at about 7.4 metres below the existing surface at the centre line of the current road alignment. The tunnel was formed by the drill and blast technique through Wianamatta Group shales in the late 1890s and it is lined with three courses of brick.

Preliminary assessment of the potential impacts of an upgrade to the Horsley Drive in this location have focussed on the effect of fill being placed on top of the existing surface above the tunnel to achieve the design levels proposed for the road upgrade options. Other options including protection slabs, arch structures and bridging structures were also proposed and would be investigated as the design development progresses.

The preliminary assessment found that the placing of fill directly over the tunnel may be feasible. However, additional investigations are required to establish ground conditions in the vicinity of the tunnel more accurately, including further assessment of the tunnel lining. This will occur as the design process progresses.

6.5.2 Intersection configuration options

Traffic modelling work has been carried out for both existing and future years 2021, 2026 and 2031 base case (“do nothing”) to assess the network performance and identify the upgrading requirements at the intersections of the core study area. In order to identify the preferred and optimal upgrade option in traffic operation perspective, an iterative modelling procedure was adopted by testing different upgrade solutions at key intersections. The options development also considered matters including local accessibility, connectivity and characteristics of the local transport network. The preferred road configuration option was then modelled in 2036 future year scenario to identify the required configuration in order to preserve the road corridor for future upgrade when the need arises.

The Horsley Drive / M7 Motorway intersection

The Horsley Drive intersection at M7 interchange currently performs at LoS E in the AM peak (deteriorating to LoS F by 2021), due to the single eastbound lane configuration. With the road upgraded to two lanes in each direction, this intersection will provide a level of service D in the AM peak in 2021. Traffic modelling indicates that, to meet the traffic demand in 2026, improvements are required to the turning bays of The Horsley Drive westbound carriageway on approach to M7 interchange and Wallgrove Road.

Given the rapid land use changes in this area and future traffic need, road reservation west of Wallgrove Road is also proposed.
**The Horsley Drive / Ferrers Road intersection**

In addition to the issues previously discussed regarding westbound traffic, it was also identified that the higher proportion of heavy vehicles and road vertical alignment contributes congestion on the western approach to the Horsley Drive / Ferrers Road intersection. The following options were initially explored to improve the traffic performance at the Ferrers Road intersection in addition to the option of upgrading the existing configuration with all turn movements allowed.

- Closing the Ferrers Road at the intersection with The Horsley Drive
- Removing right turn movements and changing the intersection control type from existing traffic signal to left-in left-out priority controlled intersection

The closure of Ferrers Road at the Horsley Drive would have adverse impacts on the surrounding intersections, local accessibly and future access requirements (including as the main gateway into the proposed Horsley Park Urban Farming Precinct). It is anticipated that the majority of right turning traffic from The Horsley Drive to Ferrers Road would use the Cowpasture Road North intersection, which does not have capacity to accommodate this additional traffic demand. Restricting Ferrers Road movements to left-in left-out would have a similar impact on the network.

The above two options were therefore not further progressed and upgrading the existing configuration with all turn movements was modelled to identify the future intersection configuration. In addition to the improvements required for the turning lanes, an additional short through lane to reduce saturation rate of the eastbound traffic flow at the Ferrers Road signals was also recommended.

A short bus priority lane on The Horsley Drive western approach and dedicated bus bays on departure sides in both directions are also proposed.

**The Horsley Drive / Cowpasture Road North intersection**

In addition to the improvements to the turning bays, investigations identified the need for an additional short eastbound through lane on approaches to Cowpasture Road North and continuing on departure side of the intersection. A third eastbound lane from the bends at west of Ferrers Road to Cowpasture Road is therefore proposed. This third lane would form third eastbound lane in the ultimate six lane corridor. In addition, reservation of a road corridor on the eastern side of Cowpasture Road North is proposed to cater for the future traffic demand from Cowpasture Road North onto The Horsley Drive.

**The Horsley Drive / Cowpasture Road intersection**

There are currently issues with the Cowpasture Road south roundabout performance with LoS at F during both the morning and evening peak periods (refer to Section 2.1.1).

Options to improve the performance of the existing roundabout in the interim have been investigated. Traffic modelling indicates that providing additional lanes in the roundabout (left turn slip lanes and a third northbound through lane) along with some modifications at the Cowpasture Road north signalised intersection would improve the traffic performance to LoS B-D in 2021. However, modelling also indicates that this intersection needs further improvement between 2026 and 2031 and this can be achieved with the installation of traffic lights.

Based on the analysis carried out, the installation of traffic lights at The Horsley Drive / Cowpasture Road South intersection is preferred for the following reasons:
6.5.3 Access and shared path connectivity

The proposed upgrade provides for a three metre wide shared path along the corridor located on northern side between the M7 Motorway and Ferrers Road and on southern side between Ferrers Road and Cowpasture Road. Pedestrian crossings would be provided on all legs of the Ferrers Road intersection, with suitable connections to parkland cycleway.

It would also not be feasible to retain the existing left-in left-out access to the Upper Canal corridor due to the upgraded road levels at this location. In consultation with Water NSW and WSPT, new access tracks are proposed by via a south leg at the Ferrers Road intersection and by using a section of the existing road corridor on the northern side. The access track on southern side would also provide access to the Parklands west of the canal.

The proposed upgrade would have some access impacts for the properties along the corridor due to the inclusion of a wide median, preventing right-in right-out movements. Provision of cul-de-sac on the new southern leg of the Ferrers Road intersection would allow eastbound vehicles to make a U-turn and travel west.

6.6 Preferred corridor option

As a result of the options evaluation process described in Sections 6.1 to 6.5, the preferred corridor alignment for The Horsley Drive between M7 Motorway and Cowpasture Road is identified as follows.

- Upgrading to a four lane divided road with a six lane corridor
- Providing a third eastbound lane from west of Ferrers Road up to Cowpasture Road utilising the third eastbound lane in the six lane corridor
- Western section - upgrading on existing alignment and widening on northern side
- Central section - realign Ferrers Road intersection with a single radius curve and with reduced grades: western approach approximately four per cent and eastern approach approximately six per cent
- Eastern section - upgrading on existing alignment and widening on southern side
- Upgrade Ferrers Road intersection configuration including provision of a cul-de-sac on the new southern leg of The Horsley Drive / Ferrers Road intersection, a short bus priority lane on The Horsley Drive western approach and dedicated bus bays on departure sides in both directions
- Provision of traffic lights at The Horsley Drive / Cowpasture Road South intersection (refer to Section 6.5.2)
- Upgrading the turning lanes on The Horsley Drive eastern approach at the M7 interchange
- Upgrading the turning lanes at the Cowpasture Road North intersection
- Provision of new left-in left-out access to the community and passive recreation hub located within the Western Sydney Parklands, to the south of The Horsley Drive
- Maintenance of access to the Upper Canal corridor on both sides of The Horsley Drive
- Upgrading The Horsley Drive eastern approach at the Wallgrove Road intersection and reservation of a road corridor west of Wallgrove Road and in the vicinity of the Cowpasture Road (north) intersection are also identified to meet the future traffic demand.

The preferred corridor alignment option is shown by Figure 6-2 while a typical cross section is included in Appendix F.
Figure 6-2 Preferred corridor option
7. Conclusion and next steps

The corridor options evaluation process for The Horsley Drive Upgrade between the M7 Motorway and Cowpasture Road has considered a range of environmental, social and engineering constraints / issues and has involved preliminary consultation with key stakeholders. The preferred corridor option has been identified as:

- Upgrading to a four lane road with a six lane corridor including a third eastbound lane from west of Ferrers Road up to Cowpasture Road
- Western section (M7 Motorway to the bends west of Ferrers Road) - upgrading on existing alignment and widening on northern side
- Central section (from the bends west of Ferrers Road to east of Canal) - Realign Ferrers Road intersection with a single radius curve and with reduced grades: western approach approximately four per cent and eastern approach approximately six per cent
- Eastern section (from east of Canal to Cowpasture Road intersection) - upgrading on existing alignment and widening on southern side
- Upgrading Ferrers Road intersection and improvements to turning lanes on eastern approach at M7 interchange and Cowpasture Road North intersection.

Upgrading The Horsley Drive / Cowpasture Road roundabout to an intersection with traffic lights is also proposed to improve safety, address existing traffic congestion and accommodate predicted future traffic demand. Improvements to The Horsley Drive eastern approach at the Wallgrove Road intersection and reservation of a road corridor west of Wallgrove Road and in the vicinity of the Cowpasture Road (north) intersection are also proposed to meet the future traffic demand.

The next steps of the project are outlined in Figure 7-1. Following public exhibition of the preferred corridor alignment, Roads and Maritime will consider community submissions, and work towards confirmation of a preferred option for the upgrade. This will be followed by development of a concept design and environmental impact assessment to refine the preferred option and to finalise the proposal.

Roads and Maritime will continue stakeholder and community consultation during the next stages of the project. The Roads and Maritime website will be periodically updated with information about the progress of the project.
Figure 7-1 Next steps

* Subject to project approval and funding availability
References


Department of Infrastructure, Planning and Natural Resources, 2003. *Salinity Potential in Western Sydney - Map*, Sydney: Department of Infrastructure, Planning and Natural Resources.


Appendices
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Appendix A May 2015 Community Update
The NSW Government has announced the start of planning for the upgrade of 2.3 kilometres of The Horsley Drive to meet a predicted increase in traffic volumes due to growth of the Western Sydney Employment Area (WSEA).

Roads and Maritime Services has started planning for this future upgrade.

The Horsley Drive is a State Road which generally runs in an east-west direction between Carramar and Horsley Park, connecting the Hume Highway to the east with Wallgrove Road to the west. It is a key link in the metropolitan Sydney network catering for the needs of the surrounding communities, commuters and businesses, and serving local freight movements.

The Horsley Drive between the M7 Motorway and Cowpasture Road provides the main access into the Smithfield/Wetherill Park industrial area and a strategic freight link to and from the M7. The existing road, between the M7 interchange and Ferrers Road, is a three lane, undivided road with two lanes westbound and one lane eastbound. Between Ferrers Road and Cowpasture Road the road is four lanes and undivided.
The Horsley Drive at Ferrers Road intersection looking south

Key
- Upgrade area
We have provided a map to help better explain the proposed upgrade.

**Project benefits**
The main benefits of the proposal include:
- An improved east-west connection from the WSEA and the M7 to the Wetherill Park/Smithfield Industrial area
- Improved access to the Western Sydney Regional Parklands
- Increased capacity along The Horsley Drive, catering for a predicted increase in traffic volumes
- Reduced travel times and lower transport costs
- Improved freight access and efficiency
- Improved road safety for all users
- Improved public transport
- Improved landscaping

**Key features**
The key features of the proposal include:
- Widening and upgrading The Horsley Drive between the M7 and Cowpasture Road to a four lane divided road with a wide central median to allow for six lanes, when required in the future
- Upgrading the Ferrers Road intersection
- Providing a pedestrian and cyclist shared path, connecting to the Parkland cycleway

**What’s happening now?**
The road upgrade is in the option development stage. Roads and Maritime will keep you informed as the project progresses.

**Other projects Roads and Maritime is delivering in the area**

**Old Wallgrove Road Upgrade**
Construction work started on this $95 million upgrade late last year and is expected to be completed in 2017.

**Motorway between the M7 Motorway and The Northern Road**
We have started planning for this motorway which is part of the Western Sydney Infrastructure Plan (WSIP), which is a $3.6 billion, 10 year road investment program jointly funded by the Australian and NSW governments. The WSIP will deliver major road infrastructure upgrades to support an integrated transport solution for the region and will capitalise on the economic benefits from developing the proposed Western Sydney Airport at Badgerys Creek.

**Bringelly Road Upgrade**
Construction work has started on the $509 million upgrade of Bringelly Road between Camden Valley Way, Leppington and The Northern Road, Bringelly. Construction of Stage 1 between Camden Valley Way and King Street is expected to be completed in late 2017.

**Camden Valley Way Upgrade**
Construction is continuing on the final stage of the Camden Valley Way upgrade, between Bringelly Road and Ingleburn Road. This work is expected to be completed in late 2015. Two other stages of Camden Valley Way opened to traffic late last year, ahead of schedule.
What happens next?

- **WE ARE HERE**
  - Corridor Alignment Option Study
- Display of the Upgrade Options – Late 2015
- Confirmation of the Preferred Option – Early 2016
- Concept Design and Environmental Impact Assessment – 2016
- Display of the Review of Environmental Factors – Late 2016
- Approval to Proceed
- Detailed Design*
- Construction*

* Subject to project approval and funding availability

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**For more information**

For further information about The Horsley Drive upgrade contact the project team on 1800 685 212 or email HorsleyDriveUpgrade@rms.nsw.gov.au

Information about the project is also available at [www.rms.nsw.gov.au](http://www.rms.nsw.gov.au)


---

**Translating and Interpreting Service**

If you need an interpreter, please call the Translating and Interpreting Service (TIS National) on 131 450 and ask them to telephone Roads and Maritime Services on 1800 002 930

**Arabic**

إذا كنت بحاجة إلى مترجم، الرجاء الاتصال بخدمة الترجمة (TIS National) على الرقم 131 450. وطلب منهم الاتصال بروادنا على الرقم 1300 862 844.

**Cantonese**

若你需要口譯員，請致電 131 450 聯絡翻譯和口譯服務署 (TIS National)，要求他們致電 1300 862 844 聯絡 Roads and Maritime Services.

**Mandarin**

如果你需要口譯員，請致電 131 450 聯系翻譯和口譯服務署 (TIS National)，要求他們致電 1300 862 844 聯系 Roads and Maritime Services.

**Greek**

Αν χρειάζεστε διερμηνέα, παρακαλείστε να τηλεφωνήσετε στην Υπηρεσία Μετάφρασης και Διερμηνείας (Εθνική Υπηρεσία TIS) στο 131 450 και ζητήστε να τηλεφωνήσουν Roads and Maritime Services στο 1300 862 844.

**Italian**

Se desiderate l’assistenza di un interprete, prego telefonare al Servizio Interprete e Traduttori (TIS National) al 131 450 chiedendo di contattare Roads and Maritime Services al 1300 862 844.

**Korean**

물역사가 필요하시면 번역통역서비스 (TIS National)에 131 450으로 연락하여 이들에게 1300 862 844 번으로 Roads and Maritime Services에 전화하도록 요청하십시오.

**Vietnamese**

Nếu cần thông ngôn viên, xin quý vị gọi cho Dịch Vụ Thông Pháp Dịch (TIS Toán Quốc) qua số 131 450 và nhờ họ gọi cho Roads and Maritime Services qua số 1300 862 844.

---

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---

**ISO**

CERTIFIED AUDIT - CARBON NEUTRAL - FIRST MANAGEMENT USING PROCESSES - AUSTRALIAN MADE - BUSINESS COMFY
Appendix B Issues mapping
The Horsley Drive upgrade
M7 Motorway to Cowpasture Road
Preferred Corridor Report

Topographic Data: LPI Digital Topographic Database

Sources: Esri, HERE, TomTom, Intermap, i-cubed, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand),大队制图, Major Data & Map Content Contributors, and the GIS User Community
The Horsley Drive upgrade
M7 Motorway to Cowpasture Road
Preferred Corridor Report
The Horsley Drive upgrade
M7 Motorway to Cowpasture Road
Preferred Corridor Report

Vegetation Data: NSW Scientific Committee & C. C. Simpson (2008)
Canopy Cover: Tozer (2003)
The Horsley Drive upgrade
M7 Motorway to Cowpasture Road
Preferred Corridor Report

**Flora**
- Acacia pubescens
- Marsdenia viridiflora subsp. viridiflora
- Pimelea spicata

**Fauna**
- Falsistrellus tasmaniensis
- Meridolum corneovirens
- Pteropus poliocephalus

Species Data: OEH Bionet search 24/6/15
The Horsley Drive upgrade
M7 Motorway to Cowpasture Road
Preferred Corridor Report

Sources: Esri, HERE, Arcrium, USGS, Intermap, i-Type, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, ©OpenStreetMap contributors, and the GIS User Community

NSW Crown Copyright - Planning and Environment

Drawn By: Stuart Hill
Prepared for: Roads & Maritime Services
Date: 27/05/2015
Key Fish Habitat

Legend

SydneyKFHFinal

Source: data from the Australian Geoscience, NSW DPI, NSW DECC and NSW LPI
Datum: Geocentric Datum of Australia (GDA)
Grid: Mapping Grid of Australia (MGA94)

The State of New South Wales, the Department of Primary Industries, its employees, officers, agents or servants are not responsible for the result of any actions taken on the basis of the information contained on the map, or for any errors, omissions or inaccuracies that may occur on this map.

Prepared by GIS section, Fisheries Ecosystems Branch, Division of Fisheries, Compliance and Regional Relations, NSW DPI.
BMT WBM endeavours to ensure that the information provided in this map is correct at the time of publication. BMT WBM does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.

Title:
Eastern Creek
50 Year ARI Flood Depth

Legend
Flood Depth (metres)
- 0.00 to 0.15
- 0.15 to 0.25
- 0.25 to 0.50
- 0.50 to 1.00
- 1.00 to 2.00
- 2.00 to 3.00
- 3.00 to 5.00
- greater than 5

Catchment Boundary
Quarries (Mapping Not Shown)
BMT WBM endeavours to ensure that the information provided in this map is correct at the time of publication. BMT WBM does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.

Title: Eastern Creek
100 Year ARI Flood Depth

Legend
Flood Depth (metres)
- 0.00 to 0.15
- 0.15 to 0.25
- 0.25 to 0.50
- 0.50 to 1.00
- 1.00 to 2.00
- 2.00 to 3.00
- 3.00 to 5.00
- greater than 5

Catchment Boundary
Quarries (Mapping Not Shown)
Title: Eastern Creek
500 Year ARI Flood Depth

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Eastern Creek
2000 Year ARI Flood Depth

BMT WBM endeavours to ensure that the information provided in this map is correct at the time of publication. BMT WBM does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.

**Title:** Eastern Creek
**Figure:** 5-17
**Rev:** B

**Legend**
- **Flood Depth (metres)**
  - 0.00 to 0.15
  - 0.15 to 0.25
  - 0.25 to 0.50
  - 0.50 to 1.00
  - 1.00 to 2.00
  - 2.00 to 3.00
  - 3.00 to 5.00
  - greater than 5
- **Catchment Boundary**
- **Quarries (Mapping Not Shown)**
Title:

Eastern Creek
PMP Flood Depth

BMT WBM endeavours to ensure that the information provided in this map is correct at the time of publication. BMT WBM does not warrant, guarantee or make representations regarding the currency and accuracy of information contained in this map.

Legend

Flood Depth (metres)
- 0.00 to 0.15
- 0.15 to 0.25
- 0.25 to 0.50
- 0.50 to 1.00
- 1.00 to 2.00
- 2.00 to 3.00
- 3.00 to 5.00
- greater than 5

Catchment
Boundary
Quarries
(Mapping Not Shown)

Figure: 5-18
Rev: B

Filepath: T:\M7198.MT.Fairfield\MapInfo\Figures\Final_Report\Fig_5-18_Eastern_PMP_RevB.WOR

www.bmtwbm.com.au
Legend:
- Potential Zone of Visual Influence
- High visibility
- Low visibility
- ZVI base points

Aggregate potential Zone of Visual Influence
Appendix C Threatened species records
You are here: Home > Atlas search results

Search results

Which species or group?

- All entities
- Animals
- Plants
- Fungi
- Communities
- Threats
- Endangered populations
- Search for a species or group of species (e.g. birds)

Download records  Save species list  View map

Report generated on 19/07/2015 12:47 PM.

Displaying 1-6 of 6 species below
To map records for individual species, select up to 5 species then click "view map".
To map all records, click on "view map" (without selecting any species first).

<table>
<thead>
<tr>
<th>Common name</th>
<th>Scientific name</th>
<th>Map</th>
<th>NSW status</th>
<th>Comm. status</th>
<th>No. of records</th>
</tr>
</thead>
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<td>Marsdenia viridiflora subsp. viridiflora population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas</td>
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<td>V,P</td>
<td>V</td>
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<td>Grevillea juniperina subsp. juniperina</td>
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<td>V,P</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Nodding Geebung</td>
<td>Persoonia nutans</td>
<td></td>
<td>E1,P</td>
<td>E</td>
<td>2</td>
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<tr>
<td>Spiked Rice-flower</td>
<td>Pimelea spicata</td>
<td></td>
<td>E1,P</td>
<td>E</td>
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Data from the BioNet Atlas of NSW Wildlife website, which holds records from a number of custodial comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive rounded to 0.1°; ^^ rounded to 0.01°). Copyright the State of NSW through the Office of Environment Records of Threatened (listed on TSC Act 1995) or Commonwealth listed Animals in selected area |
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<th>Class</th>
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<td><em>Hieraaetus morphnoides</em></td>
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<td>Animalia</td>
<td>Aves</td>
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<td>0268</td>
<td>^^Callocephalon fimbriatum</td>
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<td>Psittacidae</td>
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<td>0250</td>
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<td><em>Pteropus poliocephalus</em></td>
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<td>Molossidae</td>
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<td><em>Mormopterus norfolkensis</em></td>
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<td>Gastropoda</td>
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<td><em>Meridolum corneovirens</em></td>
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Report generated on 19/07/2015 12:49 PM
ans. The data are only indicative and cannot be considered a
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<th>Common Name</th>
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<th>Comm. status</th>
<th>Records</th>
<th>Info</th>
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<tbody>
<tr>
<td>Green and Golden Bell Frog</td>
<td>E1,P</td>
<td>V</td>
<td>7</td>
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<tr>
<td>Little Eagle</td>
<td>V,P</td>
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<td>Square-tailed Kite</td>
<td>V,P,3</td>
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<td>Gang-gang Cockatoo</td>
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<td>1</td>
<td></td>
</tr>
<tr>
<td>Little Lorikeet</td>
<td>V,P</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Swift Parrot</td>
<td>E1,P,3</td>
<td>E</td>
<td>2</td>
<td></td>
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<tr>
<td>Masked Owl</td>
<td>V,P,3</td>
<td></td>
<td>2</td>
<td></td>
</tr>
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<td>Regent Honeyeater</td>
<td>E4A,P</td>
<td>E</td>
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<td>Varied Sittella</td>
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<td>Grey-headed Flying-fox</td>
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<td>Eastern Freetail-bat</td>
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<td>Cumberland Plain Land Snail</td>
<td>E1</td>
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Appendix D Central section preliminary options
Central section - Preliminary new alignment options
Constructability review impacts ranking

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Option A</th>
<th>Option B</th>
<th>Option C</th>
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<tbody>
<tr>
<td>Sacrificial work</td>
<td>Low</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Impacts to traffic flow</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Construction impacts/ Staging options</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Construction under traffic</td>
<td>Off line construction</td>
<td>Off line construction</td>
</tr>
<tr>
<td></td>
<td>No of traffic switches</td>
<td>Less staging</td>
<td>Less staging</td>
</tr>
<tr>
<td>Impacts to Ferrers Road during</td>
<td>Kept open</td>
<td>Kept open</td>
<td>Need to close</td>
</tr>
<tr>
<td>construction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impacts to Tunnel</td>
<td>Low</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Vertical grades</td>
<td>8.5%, 7%</td>
<td>6%, 6%</td>
<td>4%, 4%</td>
</tr>
</tbody>
</table>
Option A - Western approach of the Ferrers Road intersection realigned while intersection levels and location maintained
Option B - Both sides of the Ferrers Road intersection realigned. Intersection lowered and realigned while maintaining the level of the cross over point of new and existing road.
Option C - Whole section of the road including Ferrers Road intersection lowered and realigned
Appendix E Value Management Study Report
The Horsley Drive Upgrade

Value Management Workshop

Report

Delivering Superior Outcomes through Teamwork and Cooperation

Tierney Page Kirkland Pty Ltd
Leaders in Facilitation
Suite 507, Ashington Court
147 King Street
SYDNEY NSW 2000

Tel 1 1300 TPK TPK (875 875)
Tel 2 (02) 9045 3306
E-Mail info@tpk.com.au
Web www.tpk.com.au

May 2015
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APPENDICES
Appendix 1 List of participants
Appendix 2 Project overview and alignment options
  Devika Sitinamaluwe / Jason Hobart
Executive summary

1.1 Project background

The Horsley Drive is a 15km long State Road providing a strategic east–west link between the M7 Motorway and the Hume Highway. It is a key link in the metropolitan Sydney network catering for the needs of surrounding communities, commuters and businesses, as well as catering for local freight movements. The Horsley Drive between the M7 Motorway and Cowpasture Road, Horsley Park (The Proposal – 2.3km) provides the main access into the Smithfield / Wetherill Park industrial area and a strategic freight link to and from the M7.

The existing road between the M7 interchange and Ferrers Road consists of three undivided lanes - two lanes westbound and one lane eastbound. Between Ferrers Road and Cowpasture Road there are four undivided lanes, two lanes each way. The road does not have shared path connectivity.

In March 2015, The NSW government announced the start of planning for the upgrade of The Horsley Drive between M7 and Cowpasture Road to meet predicted increase in traffic volumes due to growth of the Western Sydney Employment Area.

It is proposed to upgrade the road to a 4 lane road with provision for a 6 lane road corridor for future traffic needs.

As part of planning activities, Roads and Maritime Services (RMS) has developed alignment options for the subject section of the route. A Value Management (VM) workshop was convened involving key project stakeholders to consider and evaluate the available alignment options and recommend a preferred corridor option. It is planned to display the preferred corridor alignment for community consultation in second half of this year.

This strategic design will be further refined as part of the concept design development stage in determining the preferred design. The concept design will be reflected in the Environmental Impact Assessment which is planned to display in late next year.

The session was used to confirm the “non-negotiables” regarding the project. It enabled assumptions to be tested and provided an opportunity for participants to float value enhancement proposals for consideration and assessment by the group as a whole.

The VM workshop was held on Thursday, 7 May 2015, in the Macquarie Room at Parramatta RSL. Declan Tierney of Tierney of Tierney Page Kirkland facilitated the process, with assistance from Robyn Thelander.

1.2 Key outcomes from the Value Management workshop

Having completed the VM process the following outcomes / agreements were confirmed:

➢ The group endorsed widening on the Northern side as the preferred option for the Western section due to the disadvantages and constraints discussed.
The Horsley Drive Upgrade
Value Management Study - Report

- It was recognised that the provision of an underpass in the vicinity of the Weston tunnel would be difficult due to issues associated with differential loading, security, etc.
- It was agreed that on the basis of the advantages and disadvantages associated the options presented for the Central section - Option G should be advanced as the preferred corridor alignment. It was confirmed that an upgrade on the existing alignment would fail to meet project objectives.
- The option presented for the Eastern section, the only viable approach, was endorsed by the group.
- It was agreed that communication would occur regarding the “corner block” involving Council, RMS and the landowner.
- It was agreed that there would be ongoing communication with Western Sydney Parkland Trust (WSPT), Water NSW (WNSW) and Fairfield Council as the design evolves.

In the course of the workshop, the group listed assumptions being made about the project, its inclusions and other matters. These were discussed with many being classified as facts, or in effect - “mini-decisions”. Refer to Section 4.3 for details.

Further, it was recommended that a number of ideas generated during the session be implemented or investigated – see Sections 7.1 / 7.2.
2 Introduction

2.1 Workshop methodology

The workshop utilised a structured process to ensure that key issues were identified and that the option endorsed by the group best meets essential requirements and objectives. The entire session was characterised by a strong commitment to teamwork and cooperation. The process was focussed on establishing common and agreed project objectives and user requirements so that optimum outcomes are achieved.

Central to the success of the session was the inclusion of key project stakeholders. The list of participants is provided in Appendix 1.

The workshop process confirmed the:

- *workshop and project objectives, and*

went on to:

- *test the assumptions being made;*

- *update participants on the current status of the project; and*

- *assess options presented*

The process then enabled participants:

- *to suggest ideas to improve the final outcome;*

- *to create an action plan to ensure that the necessary activities are undertaken in a timely manner; and finally*

- *to confirm a series of recommendations / agreements to enable the project to proceed.*

2.2 Workshop report

The information contained in this report has been distilled from the pre workshop briefings and the data generated during the session. The report seeks to provide an overview of the project and to outline the workshop methodology. It summarises the information presented by the participants and describes the process undertaken to develop the outcomes and recommendations that resulted.

It is anticipated that this document will provide assistance in determining the final project direction, specification and scope and will be a useful reference document as the project / design evolves.
3 Information phase

3.1 Workshop process – Declan Tierney

Declan welcomed the participants to the workshop and acknowledged that time was short and therefore committed to completing the process as efficiently as possible. He outlined the workshop methodology and requested that all involved be open in their thinking in arriving at the preferred bypass alignment.

3.2 Project background – Suresh Surendran

Suresh thanked everyone for committing the necessary time to attend the workshop. He stressed the importance of the session as it enables all associated with the project to have their views and concerns listened to and addressed. He encouraged the group to be open and forthcoming as they contribute to discussions throughout the day.

Suresh went on discuss the background to the project and some of the issues that must be addressed. Following his talk the group identified the following as the key points mentioned:

- Currently there is significant traffic congestion along the route.
- Traffic is overflowing onto the M7 motorway.
- There are many stakeholders that need to be considered, Water NSW, WSPT, property owners, etc.
- There are challenges associated with catering for the high proportion of heavy vehicles on the route as well as access to industrial areas.
- The Water NSW tunnel is a major constraint.
- Initial investigations are being undertaken by RMS.
- This upgrade will meet the short to medium term needs, however, the design will facilitate a long term solution of increasing to six lanes in the future.

3.3 Project overview and alignment options – Devika Sitinamaluwe

Devika used a PowerPoint presentation to update participants on the current status of the project and the alignment options that are being considered. The PowerPoint slides she used may be found in Appendix 2.

At the conclusion of the presentation the group was asked to outline the key messages conveyed, and resultant assumptions are included in Section 4.3.
4 Analysis phase

The “Analysis Phase” of the workshop was used to gain an understanding of the underlying issues and constraints with the potential to impact the options being considered. It enabled participants to clarify objectives, to express concerns and to make suggestions regarding the concept designs presented.

4.1 Workshop objectives

It is important that participants are aligned regarding the purpose of a workshop and activities that will deliver the desired outcomes. This helps to maintain focus during discussions and keep the process on track. Preliminary workshop objectives were circulated prior to the session and these were presented to the group for discussion /endorsement.

It was agreed that the pursuing following goals would help achieve the desired outcome:

- To revisit and confirm the overall objectives underpinning the project;
- To update participants on current status of the project;
- To introduce the options under consideration;
- To test stakeholders’ assumptions;
- To identify issues and concerns;
- To agree a set of selection criteria against which to evaluate the available options where an agreed direction is not obvious;
- To apply weightings to the agreed section criteria (if required)
- To assess the relative merits of the options against the weighted selection criteria
- To generate ideas as to how the preferred options could be improved
- To develop a set of recommendations / agreements
- To generate an action plan to ensure that project milestones are achieved and that workshop outcomes are implemented.

4.2 Project Objectives

In this segment of the workshop, the participants revisited and confirmed the objectives underpinning this upgrade project. Common and agreed objectives greatly enhance the likelihood that the final outcome will meet specific requirements.

The objectives previously agreed were revisited and were confirmed as appropriate and agreed to be as follows:

4.2.1 Broad objectives

- To facilitate current and future traffic demand along the corridor Issues to be addressed.

The group identified the following as the specific objective that need to be met in delivering the upgrade project and in achieving the stated broad objective above.

- To produce an 80km/hr design speed.
- To integrate with the Western Sydney Parkland Plan of Management.
➢ To ensure that all sections along the corridor operate safely.
➢ To deliver a four lane separated route that is upgradable to 6 lanes.
➢ To provide a safer road environment for all road users.
➢ To provide road capacity to meet road user demand in 2021 and road reserve for 2036.
➢ To improve freight access, efficiency and connectivity.
➢ To improve amenity along the route.
➢ To improve accessibility and provision for public transport.
➢ To facilitate for active transport.
➢ To minimise impacts and sensitivity fit with environment including Western Sydney Parkland.
➢ To maintain access for WNSW activities.
➢ To protect the integrity of the Weston tunnel.
➢ To minimise community impacts in terms of delays and disruption.
➢ To ensure the design meets SiD requirements.
➢ To incorporate external stakeholder requirements.
➢ To meet program milestones.
➢ To inform the Environmental Impact Assessment.
➢ To achieve an appropriate urban design outcome.
➢ To minimise and cater for ongoing maintenance.
➢ To improve facilities amenities for pedestrians and cyclists along and across the corridor in line with WSPT plan of management.

4.3 Assumptions

The participants were asked to list any assumptions being made regarding the proposed options and the information derived from the earlier presentations. These were then discussed by the group in detail and each was categorised as being a Fact, a Working Assumption, Questionable or Incorrect.

The results follow:

Facts
➢ The WSPT is responsible for State owned land and the Western Sydney Regional Park.
➢ The required land can be successfully acquired.
➢ The land acquisition process can take up to 18 months.
➢ Negotiations regarding land acquired from WSPT needs to occur with the Trust.
➢ The provision for the extra two lanes will be within the median.
➢ Access for residents and businesses will change as a result of the project.
➢ Access to the route will be left-in left-out only.
➢ Services will be relocated as required.
➢ Provision will be incorporated for ITS.
➢ It will be possible to construct over the Weston tunnel.
Impacts to the natural environment and heritage assets will be considered.
B-double movements will be accommodated at the Ferrers Road intersection.
The key input to develop the design is the forecast growth, sourced from the RMS strategic transport model.
The project as implemented will not preclude the upgrade of future roads accessing this project.
The affected land can be rezoned for road use.
Current access arrangements to the WNSW canal are unsafe.
The design assumes batters are at 4:1 and cuts are 2:1.

Working assumptions
- This project will consider the broader connectivity context associated with industrial areas to the east and north, and Western Sydney employment areas to the west.
- Multiple speed limits along the route will be unacceptable and not achieve project objectives.
- The physical urban design environment will be improved as a result of the project.
- Delays to motorists during construction will be minimised through staging.
- Ferrers Road could be closed during construction.
- The parklands will have improved north / south connectivity following the project.
- Heavy vehicles will find it easier to travel along the route.
- Improvement to grades along the route will be achieved through the adopted option.
- Maintenance access to the equestrian centre will remain in its current location.
- Provision will be made to close a carriageway in each direction to facilitate maintenance.
- Seamless integration of the existing and proposed alignment will be achieved.
- Government agencies will work together in a collaborative manner to achieve the project objectives.
- The golf driving range and the service station are both viable businesses whose access needs must be accommodated.
- The information from the RMS strategic transport model is correct.
- The WNSW canal will remain for up to twenty years. The current endorsed plan for enhancement is to include a pipe within the existing structure.

Questionable
None of the assumptions listed were deemed to be questionable.

Incorrect
None of the assumptions listed were found to be incorrect.

4.4 Stakeholders

The group decided it would be valuable to identify the stakeholders who need to be considered in developing the design for the upgrade. It was felt that this would
provide a useful check list in support of the communications strategy for the project.

The key stakeholders include:

- WSPT;
- WNSW;
- Sydney Equestrian Centre;
- Westlink/M7;
- Service Station (BP, the Operator, and the Landowner);
- Golf Driving Range;
- Function Centre;
- Fairfield Council;
- Cumberland Business Chamber;
- Utility Companies (Endeavour, Sydney Water, Telstra, TransUrban, Jemena);
- Private landowners along the corridor;
- Residents;
- Aboriginal Land Council Representatives;
- DARUG Representatives;
- Transport for NSW;
- Bicycling NSW;
- NSW Fisheries; and
- Heritage Division OEH NSW.
5 Option Assessment

5.1 Description of options

In this phase of the workshop, the participants were asked to consider each of the available options in more detail in an effort to identify the alignment that best meets project objectives. It was agreed that the corridor would be discussed in three sections – Western, Central and Eastern.

Jason Hobart, RMS’s Lead Road Designer for the project, displayed drawings to ensure the workshop attendees had a common understanding of the proposals under consideration for each section. The design information shown may be found in Appendix 2.

5.2 Western section

5.3 Keys issues

When the option had been outlined in some detail, the participants listed the key issues associated with the proposed approach for the upgrade in this section. They were:

- Widening on both the Southern and Northern sides has been assessed.
- Impacts on the golf driving range and services station are important considerations - mainly in relation to access.
- There are potential archaeological deposits (PAD) in the vicinity.
- No adjustments to M7 access arrangements have been contemplated – however, future widening will not be precluded.
- Queues on the M7 ramp in the morning peak extend beyond the ramp.
- 3.5m wide carriageways are proposed.
- Adjustments to the Eastern Creek culvert will be required.
- The existing road level in the vicinity of Eastern Creek is 200mm to 300mm below the 1 in 100 year flood level and this will be addressed through this project.

5.4 Pros and cons

The group was asked to consider the advantages and disadvantages associated with what was being proposed for the various section and the options under consideration. This was done to assist in identifying the preferred alignment option to be taken forward.

5.4.1 Pro and cons – Western section widening on Northern side

Pros

- Avoids impacting the larger PAD site.

Cons

- Four houses impacted.
5.4.2  **Pro and cons - Western section widening on both sides**

**Pros**
- None.

**Cons**
- Narrow construction corridor.
- Strip acquisition of up to 13 private properties including impacts to 4 houses.
- Service station impacted.

5.4.3  **Pro and cons - Western section widening on Southern side**

**Pros**
- None.

**Cons**
- Greater impact on an endangered ecological community.
- Access to the equestrian centre would be impacted.
- High voltage power lines along the southern side.

5.4.4  **Outcome**

Following discussion of the pros and cons associated with the options, there was a consensus view that widening on the Northern side was the superior option.

5.5  **Central section – Option G**

5.6  **Keys issues**

When the options had been described the participants listed the key issues associated with the proposed approach for the upgrade in this section.
- Additional loading on brick tunnel.
- Security issues associated with maintaining the water canal.
- Some PAD sites.
- Existing road alignment is only suitable for 60km/hr at best.
- Level difference between tunnel and finished road level.

5.7  **Pros and cons**

The group was asked to consider the advantages and disadvantages associated with what was being proposed for the various section and the options that are available. This was done to assist in identifying the preferred alignment option to be taken forward.

5.7.1  **Pro and cons – Central Section Option G**

**Pros**
- Better grade.
- Better horizontal alignment.
- Will achieve the 80km/hr design speed.
- The cul-de-sac will improve access for the community to the water canal and potentially to parklands.
Minimises the need for temporary pavement during construction.
Existing road corridor can be returned to WSPT.
The majority of work is constructed offline, reduced impacts on motorists.
Easier to construct because away from existing carriageway.
The temporary construction track will become part of the Ferrers Road intersection – less redundant work.
Safety enhancement to cycle path.
Seamless connection to the M7 cycleway.
Shorter travelling distance due to a straighter line.
Improved driver sight visibility.
Safer in wet conditions.
Safer at-grade crossing for cyclists.
Provides opportunities for views/lookouts.
Minimal vegetation clearing.
Opportunity to create vehicular access into parklands via the cul-de-sac.

**Cons**
- Greater impact on the parklands/agricultural lease.
- The visual impact of the height of the canal retaining wall.
- Design solution required to avoid overloading the tunnel.
- Cycle paths not as direct or level.
- Impacts two of the identified PAD sites.
- Requires one house and large shed demolition

**Pro and cons – Central Section Option E**

**Pros**
- Less land acquisition, impact on parkland.
- Minimal impact on the Weston tunnel.
- Less impact on Ferrers Road.
- House and shed on the northern side are not demolished.

**Cons**
- Only provides a design speed of 60km/hr.
- Does not meet agreed project objectives.
- Requires construction under traffic – partial road closures, nightwork, etc.
- Greater disruption to road users.
- No improvement in maintenance access to the canal.
- Enhanced access to parklands not provided.
- Increased grade on the eastern approach.
- Greater environmental impact on trees to the western end.
- Impact on PAD sites.
- Impact on the front of one house.
5.7.3  **Outcome**

Following discussion of the pros and cons associated with the Central options, Option G was unanimously recommended as the preferred alignment.

5.8  **Eastern section**

5.9  **Keys issues**

When the option had been described the participants listed the key issues associated with the proposed approach for the upgrade in this section

- Development Approvals on the Northern side have resulted in the decision to widen on the southern side.
- Other than two private properties all affected land is under the control of WSPT.
- The design speed within this area is 70km/hr due to curves and close proximity of intersections.
- If it is intended to increase Cowpasture Road to 80km/hr then it will be necessary to further assess the horizontal alignment of the eastern section.
- There are operational issues associated with the Cowpasture Road roundabout.
- Access to storage facility.
- Cowpasture Place.
- Access to the vacant corner block – no direct access from Horsley Drive.
- Pedestrian connectivity.

5.9.1  **Outcome**

Following discussion of the pros and cons the group endorse the option described as the only viable way to proceed.

For the full list of agreements and outcomes, see Section 8.

5.10  **Traffic modelling - Alen Krijlic, SEMEC Australia**

In addition, Alen described in considerable detail the traffic modelling approach that had been adopted by SMEC. The results derived confirm and support the group’s recommendations in relation to the preferred alignment options for the three sections of the upgrade.
6 Creative phase

6.1 Idea generation

Sections 3, 4 and 5 of this report summarise the outcomes of the first three stages of the workshop process - the Information, Analysis and Option Assessment phases. The understandings that were developed and the information shared and discussed provided a platform for a general brainstorming of ideas to improve the alignment recommended by the group. The ideas were also aimed at achieving the project objectives bearing in mind the constraints and issues discussed earlier in the workshop.

The participants were encouraged to come up with ideas as to how problematic issues could be resolved. They were asked to be as wide-ranging as possible in their thought processes to ensure that due consideration was given to improving any aspects of the project.

The goal was to record any idea, regardless of its likelihood of being implemented. In other words, during this phase the objective was to collect as many ideas as possible without subjecting them to any form of screening or judgement. This occurred in the next phase of the workshop, the Judgement Phase.

The ideas generated together with the group’s assessment of each are included below.
Judgement phase

The ideas for option improvement generated in the Creative Phase were assessed by the group in terms of practicality, viability and cost effectiveness. Each idea was discussed and rated using the following criteria.

- Recommended for implementation;
- Good Idea - needs further investigation; or
- Not practical.

Following assessment of the idea, the rationale underpinning the assessment was articulated before the group decided whether immediate action was necessary and if so, who would be responsible.

The results of the discussion follow:

### 7.1 Ideas recommended for implementation

<table>
<thead>
<tr>
<th>“CAN WE....?”</th>
<th>Rationale</th>
<th>Action</th>
<th>Who / when</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design a new access to the parklands off Horsley Drive into Lizard Log.</td>
<td>• This is already under consideration by project team.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 7.2 Ideas to investigate

<table>
<thead>
<tr>
<th>“CAN WE....?”</th>
<th>Rationale</th>
<th>Action</th>
<th>Who / when</th>
</tr>
</thead>
<tbody>
<tr>
<td>Install a signalised intersection at Cowpasture Rd in place of the roundabout.</td>
<td>• Would address safety issues at the roundabout and long-term capacity, increased connectivity.</td>
<td>Consider through the design development process.</td>
<td>Jason Hobart / Alen Krjlic 31 May 15</td>
</tr>
<tr>
<td>Have an underpass adjacent to the canal.</td>
<td>• Necessary to demonstrate the viability or otherwise of the option.</td>
<td>Address through the design development process.</td>
<td>Jason Hobart 31 May 15</td>
</tr>
<tr>
<td>Reduce the vertical alignment in Option G by having a deeper cut.</td>
<td>• Reduce grade, will assist with balancing cut and fill, reduce fill height of the canal.</td>
<td>Investigate as part of concept design.</td>
<td>Devika Sitinamaluwe Ongoing</td>
</tr>
</tbody>
</table>
### “CAN WE....?”

<table>
<thead>
<tr>
<th>“CAN WE....?”</th>
<th>Rationale</th>
<th>Action</th>
<th>Who / when</th>
</tr>
</thead>
<tbody>
<tr>
<td>Include a third lane at the roundabout, e.g. lane separation on the approach.</td>
<td>Would enhance safety, consider investment already made in relation to Lizard Log.</td>
<td>Investigate road safety and pedestrian safety with the interim upgrade option</td>
<td>Jason Hobart 31 May 15</td>
</tr>
<tr>
<td>Provide a U-turn to facilitate access from the eastern side.</td>
<td>Equity of access issue.</td>
<td></td>
<td>Jason Hobart Ongoing</td>
</tr>
<tr>
<td>Establish the future speed environment on Horsley Dr.</td>
<td>Would assist with finalising the horizontal alignment.</td>
<td></td>
<td>Devika Sitinamaluwe 14 May 15</td>
</tr>
<tr>
<td>Establish the likely impacts of stormwater from this project on Council assets.</td>
<td>Part of the concept design process.</td>
<td></td>
<td>Devika Sitinamaluwe Ongoing</td>
</tr>
</tbody>
</table>

### 7.3

#### Ideas deemed to be impractical

<table>
<thead>
<tr>
<th>“CAN WE....?”</th>
<th>Rationale</th>
<th>Action</th>
<th>Who / when</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delete the third northbound lane at the roundabout.</td>
<td>Two lanes would not provide the required level of service.</td>
<td></td>
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</tr>
</tbody>
</table>
8 Workshop outcomes

Having completed the VM process the following outcomes / agreements were confirmed:

- The group endorsed widening on the Northern side as the preferred option for the Western section due to the disadvantages and constraints discussed.
- It was recognised that the provision of an underpass in the vicinity of the Weston tunnel would be difficult due to issues associated with differential loading, security, etc.
- It was agreed that on the basis of the advantages and disadvantages associated the options presented for the Central section - Option G should be advanced as the preferred corridor alignment. It was confirmed that an upgrade on the existing alignment would fail to meet project objectives.
- The option presented for the Eastern section, the only viable approach, was endorsed by the group.
- It was agreed that communication would occur regarding the “corner block” involving Council, RMS and the landowner.
- It was agreed that there would be ongoing communication with Western Sydney Parkland Trust (WSPT), Water NSW (WNSW) and Fairfield Council as the design evolves.

9 Action Plan

In addition to the actions allocated in response to the suggestion put forward in Section 7, the group identified the following as an important task to pursue.

<table>
<thead>
<tr>
<th>Action</th>
<th>Who</th>
<th>When</th>
</tr>
</thead>
<tbody>
<tr>
<td>Convene a meeting with Council, the landowner and RMS regarding the “corner block”</td>
<td>Devika Sitinamaluwe</td>
<td>31 May 15</td>
</tr>
</tbody>
</table>
Appendices
Appendix 1
Participants / apologies
### Attendees

The following personnel attended the workshop.

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Stakeholder</th>
<th>Role on project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roads and Maritime Services</td>
<td>Suresh Surendran</td>
<td>Srn Project Development Manager</td>
</tr>
<tr>
<td></td>
<td>Devika Sitinamaluwe</td>
<td>Project Development Manager</td>
</tr>
<tr>
<td></td>
<td>Jeff Gilham</td>
<td>Project Development Manager, Assurance and Coordination</td>
</tr>
<tr>
<td></td>
<td>Vladmir Shopov</td>
<td>Srn Project Manager</td>
</tr>
<tr>
<td></td>
<td>Tim Hufton</td>
<td>Road Design Manager</td>
</tr>
<tr>
<td></td>
<td>Jason Hobart</td>
<td>Lead Designer Roads</td>
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<tr>
<td></td>
<td>Kiara Brown p/t</td>
<td>Communication &amp; Stakeholder Engagement Officer</td>
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<tr>
<td></td>
<td>Greg Jackson</td>
<td>Urban Design Advisor</td>
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<tr>
<td></td>
<td>Graham Yip</td>
<td>Geotechnical Engineer</td>
</tr>
<tr>
<td></td>
<td>Karina Rubenis</td>
<td>Environment Officer</td>
</tr>
<tr>
<td></td>
<td>Stephen Rixon</td>
<td>Road Corridors Manager</td>
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<tr>
<td></td>
<td>Sayema Huq</td>
<td>Project Engineer, Motorway Operations</td>
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<tr>
<td></td>
<td>Rohana Somaratne</td>
<td>Information Systems Manager, Estimation</td>
</tr>
<tr>
<td></td>
<td>Yaso Tharan</td>
<td>Pavement Engineer</td>
</tr>
<tr>
<td></td>
<td>Than Ha</td>
<td>Senior Utilities Manager</td>
</tr>
<tr>
<td>SEMEC Australia</td>
<td>Alen Krjlic</td>
<td>Associate Traffic and Transport Planner</td>
</tr>
<tr>
<td>Context</td>
<td>Darren Mansfield</td>
<td>Practice Director</td>
</tr>
<tr>
<td>Western Sydney Parklands Trust</td>
<td>Yolanda Gil</td>
<td>Manager, Parklands Development &amp; Strategy</td>
</tr>
<tr>
<td></td>
<td>Joshua French</td>
<td>Principal Program Officer</td>
</tr>
<tr>
<td>Fairfield City Council</td>
<td>Roshan Aryal</td>
<td>Manager Built Systems</td>
</tr>
<tr>
<td></td>
<td>Philip Saverimuttu</td>
<td>Coordinator, Traffic &amp; Transport</td>
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<tr>
<td></td>
<td>Jessica Healey</td>
<td>Place Manager – Parks Area</td>
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<td></td>
<td>Andrew Mooney</td>
<td>A/Manager Strategic Planning</td>
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<tr>
<td></td>
<td>Doru Lungu</td>
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<tr>
<td>Water NSW</td>
<td>Neil Abraham</td>
<td>Senior Environmental Assessment Officer</td>
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<tr>
<td>Tierney Page Kirkland</td>
<td>Declan Tierney</td>
<td>Workshop Facilitator</td>
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<td></td>
<td>Robyn Thelander</td>
<td>Asst Facilitator</td>
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</table>

### Apologises

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Stakeholder</th>
<th>Role on project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roads and Maritime Services</td>
<td>Geoff Cahil</td>
<td>Principal Manager, Project Development</td>
</tr>
<tr>
<td></td>
<td>Joseph Fanous</td>
<td>Srn Environment Officer</td>
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<tr>
<td></td>
<td>Barry Gunther</td>
<td>Srn Advisor Aboriginal Cultural Heritage</td>
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<tr>
<td></td>
<td>John Hart</td>
<td>Leader Network and Corridor Planning</td>
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<tr>
<td></td>
<td>Manjur Rahman</td>
<td>Network Optimisation Planner - Safety</td>
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<td></td>
<td>Chris Zito</td>
<td>Principal Manager, Road Network Analysis</td>
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<td></td>
<td>Jackie Hardy</td>
<td>Communication and Stakeholder Officer</td>
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<td></td>
<td>Henry Larrea</td>
<td>Project Manager Motorway Operations</td>
</tr>
<tr>
<td>Context</td>
<td>Jason Packenham</td>
<td>Project Landscape Architect</td>
</tr>
<tr>
<td>Water NSW</td>
<td>Des Lawrie</td>
<td>Project Manager, Project &amp; Technical Services</td>
</tr>
<tr>
<td>Endeavour Energy</td>
<td>Joe Degabriele</td>
<td>Capacity Planner – Asset and Network Planning</td>
</tr>
<tr>
<td>TfNSW</td>
<td>Bryan Willey</td>
<td>Major Projects Transport Planning</td>
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<tr>
<td>Cumberland Business Chamber</td>
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</tbody>
</table>
Appendix 2

Project overview and alignment options
Devika Sitinamaluwe / Jason Hobart
The Horsley Drive Upgrade M7 to Cowpasture Road

Primary objectives
- Provide a safer road environment for all road users
- Provide road capacity to meet road user demand in 2021 and road reserve for 2036
- Improve freight access and connectivity
- Improve amenity along the route
- Improve accessibility and efficiency for public transport
- Facilitate for active transport

Supporting objectives
- Minimise impacts and sensitively fit with environment including Western Sydney Parkland
- Minimise “whole of life cost” and provide value for money

What happened so far?
- Traffic modeling
- Corridor urban design strategy
- Key stakeholder consultation
- Property ownerships investigation
- Preliminary environmental constraints (from previous study)
- Preliminary geotechnical study
- Preliminary utilities investigations
- Strategic options development
- Westons Tunnel Condition assessment and Preliminary impact assessment
- Constructability workshop

In March 2015, The NSW government announced the commencing of planning work of The Horsley Drive between M7 and Cowpasture Road to a 4 lane road with provision for a 6 lane road into the future.

RMS has developed several upgrade options in close consultation with key stakeholders of the project.

This Value Management workshop is arranged to consider and evaluate the alignment options for the upgrade of The Horsley Drive.
The Horsley Drive Upgrade M7 to Cowpasture Road

Next Steps

- Public display of Road Corridor: 2nd half 2015
- Confirmation of Preferred Corridor: end 2015
- Commence Concept Design / REF: end 2015
- Display REF: end 2016
- REF Determination: mid 2017
- Complete Detailed Design*: TBC
- Commence Construction*: TBC
- Open to traffic*: TBC

* Subject to funding availability and project approval.

Key Issues / Constraints

- Aboriginal Heritage PAD sites
- Upper Canal and Westons Tunnel heritage listed
- Utilities on both sides - underground/ aboveground (power, telecommunications, gas, water)
- Service Station
- Earthworks (sloping terrain)
- Access/ property impacts

Traffic Issues

- Currently 31,000 - 40,000 vehicles per weekday
- Heavy vehicle 20% in am peak hour
- Forecasted increase to 45,000 – 59,000 in 2031

Study area - Crash history last 5yrs

- Total crashes 125
- One fatality, 34 injured
- 45% occur at intersections
- 19% Heavy vehicle involvement
- 46% Rear end/ Lane changing

Project scope

- Upgrading Horsley Drive from east of M7 interchange to Cowpasture Road to 4 lanes divided road with a 6 lane corridor reservation for future needs
- Upgrading Ferrers Road intersection
- Upgrading Cowpasture North and South intersections to improve traffic performance

Access

- All existing access along the upgraded corridor will be made left in left out
- A second left in left out access to Parklands Lizard log from The Horsley Drive is considered
- A new access strategy to Water NSW land is proposed where required to manage level difference
The Horsley Drive Upgrade M7 to Cowpasture Road

**Utilities**

- Preliminary utility investigations have been completed.
- Significant utilities on both sides of the corridor.
- All options impact on utilities, though some are more significant than others.

**Westons Tunnel/Upper Canal**

- Physical impacts to tunnel
  - All options impact the tunnel
  - A preliminary impact assessment of the road upgrade on tunnel performance has been carried out.

**Condition Assessment**

- Existing structure is in a reasonably good condition
- Preliminary Impact assessment
- Analysis indicated that a fill embankment is a feasible option for crossing the tunnel
- Tunnel is stable for the 4m fill being considered
- Preliminary analysis is based on limited information and further detailed investigations and studies are required

**Tunnel Crossing Options**

- Several tunnel crossing structural options have been proposed in addition to fill embankment option
- These options will be further investigated during design development stage and is not part of this workshop

**Constructability/Safety in Design**

- Key items noted
  - Ferrers Road intersection - constructability
  - Horizontal/Vertical alignment improvements
  - Deep cuts/Fills
  - Road constantly under traffic/Traffic flow maintenance
  - Construction staging/Temporary work
  - Service Station/Property impacts
  - Impacts to Tunnel
  - Tree clearing/PAD sites

**Land Impacts**

- The surrounding land except middle section (between M7 and Ferrers Rd) and Water NSW land to be controlled under Parkland Plan of Management in future.
- An Act of Parliament is required for acquiring all Parklands – a lengthy process
- Potential integration of road upgrade with Parklands’ future land use has been considered in option development
The Horsley Drive Upgrade M7 to Cowpasture Rd

Corridor widening options

Road divided to three sections for the purpose of Options development

Corridor widening options

Western section (design speed 80 km/h)

Widening to
• North
• South
• Both sides

Preliminary option analysis finding - Widening to north provides better outcome over other two.

Corridor widening options – Eastern section

Eastern section (design speed 80-70 km/h)

Widening to southern side

• Widening to northern side was not considered at this stage following the discussion with WSPT

Corridor widening options – Central section

Options – Changes to alignment (design speed 80 km/h)

Existing alignment

Approach
Gradient
Western 4.4% (400m)
Eastern 8.1% (185m)

Ferrers Rd intersection is on a crest

Option A – Maintain Ferrers road levels (western approach – higher grade 8%)
Option B – Lowering Ferrers Road intersection. Maintain cross over point level. (western approach – higher grade 6%)
Option C – Lowering Ferrers Road intersection (Grades improved. Ferrers Road need closing during construction)

Corridor widening options – Central section

Options – Changes to alignment

Considering the issues raised at the constructability workshop, a new option developed

Options G

• Gradients improved on both approaches (4% and 6%)
• Ferrers Road traffic maintained during construction stage
The Horsley Drive Upgrade M7 to Cowpasture Rd
Corridor widening options – Central section

Short listed options – Central Section

Option G - Change to alignment
 (design speed 80 km/h)

Option E - Upgrading existing alignment
 (design speed 60km/h)
The Horsley Drive upgrade from the M7 to Cowpasture Road - Road upgrade options
Design issues and utility and property impacts associated with the options considered

Key Points
The Horsley Drive and M7 are both B-Double routes.

1. WESTERN SECTION - between the M7 and bends to the west of Ferrers Road
Three options considered. Widening to both sides, southern or northern side.

Widening on the northern side of The Horsley Drive
- Downstream widening of the culvert over Eastern Creek - likely to have less flooding impacts.
- No impacts to equestrian centre
- No impacts to high voltage overhead transmission
- No impact on service station
- A total of 8 private properties require strip acquisitions, including 4 houses impacted. There will also be some impact on the golf driving range parking facilities. This will need further investigation.
- Underground electricity, two water mains and Telstra line are located on the northern side of the carriageway – may need relocation.

Widening on the southern side of The Horsley Drive
- Northern kerb alignment and existing footway remain
- Impacts to the equestrian centre access
- Widening down stream may impact on existing flood levels. Additional culvert work may be required.
- The shared path is identified to be located on the northern side of the carriageway. This would require reconstruction of the existing footway.
- A water main will more than likely need to be relocated
- Electricity high voltage overhead transmission power lines may need to be relocated
- A total of 5 private properties require strip acquisitions including impacts to 2 houses.
- There may be major impact on the service station (it is possible that the service station require demolition). This will need further investigation.

Widening on both sides of The Horsley Drive
- Service station may not require demolition, however grading from the service station will be difficult. This will need further investigation. The locations of the fuel tanks are unknown.
- Little or no impact on the parking facilities for the golf driving range
- Reconstruction of both sides of the carriageway including kerb and gutter, footways and both utility corridors.
- Requires the most amount of utility adjustments on both sides of the carriageway.
- A total of 13 private properties require strip acquisition, including impacts to 4 houses.
- Difficult to construct as this requires narrow widths of widening on both sides of the corridor.

2. CENTRAL SECTION - around Ferrers Road
- Impacts on existing utilities for all upgrade options
- All upgrade options would require some type of supporting structure over the Weston Canal.
**Option E - Widening along existing alignment - Design speed 60km/h**

- Maximises usage of existing road pavement. Minimal acquisition required compared to option G.
- Minimal impact on Ferrers Road.
- Complicated staging/traffic management issues.
- Reduced fill area (level difference) over the Weston Canal.
- More direct access for Water NSW access entering from The Horsley Drive, however travelling north/south along the corridor is not as direct when compared to Sketch G.
- Require demolition of one house.
- Maintains tight horizontal and vertical curves. No reduction in existing grades.
- Does not meet the project objectives by providing an 80km/k design speed zone.

**Option G New alignment with Ferrers Road realigned - Design speed 80 km/h**

- Meets the project brief by providing a 80km/h design speed.
- Provides a smoother horizontal alignment using a single radius 2225m curve with reduced grades.
- Works can be constructed largely off line. Less complicated traffic staging and less impact on traffic during construction.
- Potentially safer access for Water NSW to access the water canal.
- Requires more acquisition.
- Requires realignment of Ferrers Road.
- Requires the demolition of one house and depending on batter slopes used the demolition of one large shed may also be required.
- Separate access track will be required for Water NSW to access the water canal. This will add to the overall road cross section.

3. EASTERN SECTION – East of Canal to Cowpasture Road (including interim upgrade to roundabout)

- A development approval on an area of land on the northern side of The Horsley Drive. As discussed with Western Sydney Parkland Trust, it is not proposed to undertake any widening on the northern side of The Horsley Drive.
- Acquisition from Western Sydney Parkland Trust and private property.
- There is a level difference with Cowpasture place about 1.5m – 2m below The Horsley Drive.
- Slip lane entrance from The Horsley Drive to the vacant land just east of the Cowpasture Road / The Horsley Drive roundabout is impacted.
- Interaction with 2 major intersections. Will be difficult to construct.
- Impacts to utilities
Appendix F Typical cross section

![Typical Mid Block Cross Section Diagram](image)
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