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The Northern Road Upgrade

Glenmore Parkway, Glenmore Park to Jamison Road, South Penrith

Submissions Report

January 2017



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Roads and Maritime Services

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Prepared by Roads and Maritime Services

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Approval and authorisation

Title	The Northern Road Upgrade, Glenmore Parkway, Glenmore Park to Jamison Road, South Penrith Submission Report
Accepted on behalf of Roads and Maritime NSW by	V. Stanton
Signed	
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Executive summary

Roads and Maritime Services (Roads and Maritime) proposes to upgrade a four kilometre section of The Northern Road between Glenmore Parkway, Glenmore Park and Jamison Road, South Penrith (the proposal), including an upgrade of the M4 Motorway interchange.

The key features of the proposal are as outlined in the Review of Environmental Factors (REF). Changes to the proposal since the REF display are outlined in Section 1.1 of this report.

The REF was publicly displayed from 10 October 2016 to 4 November 2016 at Penrith City Library. The REF was placed on the Roads and Maritime website and four community information sessions were held as detailed in Section 1.2 of this report.

Roads and Maritime received 41 submissions in response to the REF including four submissions from government agencies (NSW Police, NSW Ambulance Service, Penrith City Council and Nepean Hospital). About 83% of submissions indicated support for the proposal and the road safety improvements.

The main comments made by the respondents related to:

- Concerns about proposed left-in left-out traffic arrangements at some intersections
- Requests to change intersection treatments (e.g. removal of traffic lights) at some locations
- Concerns about changes to private property access, including loss of access for certain vehicles and the loss of kerbside parking
- Concerns about construction noise and amenity impacts to surrounding residents
- Concerns about the impacts of increased traffic on The Northern Road and the capacity of the road network to accommodate such growth (e.g. the M4 Motorway interchange)
- Requests for further information about proposed noise and vibration mitigation measures, including requests for additional noise barriers and/or at-property treatments to be provided
- Concerns about the loss of established vegetation along property boundaries
- Concerns about the proposed acquisition of private property
- Suggestions to remove kerbside parking between Jamison Road and the Great Western Highway.

Roads and Maritime has considered all issues raised in the submissions received and responses to the issues forms Section 2 of this report.

In considering the submissions received, three improvements to the proposal have been made:

- Removing the raised median island south of Glenmore Parkway to provide a right turn entry lane for properties on the western side of The Northern Road until construction of The Northern Road progresses further south to Bradley Street
- Removing all kerbside parking between Stafford Street and the Great Western Highway to provide six continuous travel lanes along The Northern Road
- Installing a new retaining wall on the eastern side of The Northern Road near Penrith Christian School.

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1 Introduction and background

1.1 The proposal

Roads and Maritime Services (Roads and Maritime) proposes to upgrade a four kilometre section of The Northern Road between Glenmore Parkway, Glenmore Park and Jamison Road, South Penrith (the proposal), including an upgrade of the M4 Motorway interchange.

The Northern Road is located about 45 kilometres west of the Sydney central business district. It is a key north–south road between Narellan and Richmond, connecting the North West Priority Growth Area and the South West Priority Land Release Area. The corridor intersects with a number of regional motorway, arterial and collector roads such as (from south to north) Camden Valley Way, Bringelly Road, Elizabeth Drive, M4 Motorway, Great Western Highway and Richmond Road.

The key features of the proposal would include:

- Widening The Northern Road to provide a divided road with three general traffic lanes and a kerbside bus lane in each direction
- Upgrading the M4 Motorway interchange. This work would include:
 - Replacing the existing bridge over the M4 Motorway with a new, wider bridge
 - Realigning and widening the motorway entry and exit ramps to allow for future M4 Smart Motorway upgrades
 - Replacing the two sets of existing traffic lights with one set of traffic lights controlling all movements through the interchange
- Replacing the existing roundabout at Glenmore Parkway / Wentworth Road with a four-way intersection and a set of traffic lights
- Providing additional turning lanes at the following intersections:
 - Maxwell Street / Bringelly Road
 - Smith Street
 - Jamison Road
- Removing all right-turns into and out of Homestead Road and Castle Road, with these roads to become left-in, left-out only
- Providing traffic lights at the Frogmore Road / Tukara Road intersection
- Realigning sections of Aspen Street and Hilliger Road to allow a proposed four-way roundabout at Maxwell Street. This roundabout would include a traffic light on the approach from Aspen Street only, to control the flow of traffic into Maxwell Street
- Upgrading Cross Road and extending it south to connect to an existing roundabout on Wentworth Road, creating a through connection between Homestead Road and Wentworth Road
- Providing a new roundabout and entry to the Penrith Christian School from Frogmore Road, about 85 metres west of Simeon Road
- Providing a new service road for access to Penrith Golf and Recreation Club
- Providing new U-turn facilities for eastbound and westbound traffic on Glenmore Parkway via a new roundabout west of the proposed golf course access
- Providing retaining walls at the following locations:
 - On the eastern side of The Northern Road, south of Homestead Road
 - On either side of the M4 Motorway beneath the proposed bridge (reinforced soil walls)
 - On the western side of The Northern Road, south of Tukara Road
 - On the eastern side of The Northern Road, south of Bringelly Road
 - On the eastern and western side of The Northern Road at numerous locations between Maxwell Street / Bringelly Road and Smith Street
 - On the eastern and western side of The Northern Road at numerous locations between Smith Street and Jamison Road

- On the northern side of the M4 Motorway eastbound on-ramp, towards the eastern end of the ramp
- On the southern side of Smith Street, west of the intersection with The Northern Road
- On the eastern side of The Northern Road adjacent to the Flower Power Garden Centre, south of Castle Road
- Providing a shared path on the western side of The Northern Road, between Glenmore Parkway and Jamison Road; and on the eastern side between Wentworth Road and Bringelly Road
- Upgrading the footpath on the eastern side of The Northern Road, between Bringelly Road and Jamison Road
- Providing noise barriers at the following locations:
 - On the northern side of the M4 Motorway eastbound exit ramp, and extending north along the western side of The Northern Road between the M4 Motorway and Tukara Road
 - On the western side of The Northern Road between Tukara Road and Aspen Street
- Upgrading road drainage along the route (such as detention basins, where required)
- Moving utilities, such as pipes and cables
- Providing new bus stops, and relocating some existing bus stops where necessary
- Upgrading street lighting
- Providing landscaping along the length of the route
- Changing entries to private property (this would include changes to driveways) to suit the changed road alignment
- Partially acquiring a number of properties to accommodate the wider road corridor.

The proposal is shown in Figure 1-1 and Figure 1-2. A more detailed description of the proposal is found in Section 3 of The Northern Road Upgrade Glenmore Parkway, Glenmore Park to Jamison Road, South Penrith Review of Environmental Factors displayed by Roads and Maritime in October 2016.

In addition to the description above and in Section 3 of the REF, the proposal now includes:

- Removing the raised median island south of Glenmore Parkway to provide a right turn entry lane for properties on the western side of The Northern Road until construction of The Northern Road progresses further south to Bradley Street
- Removing all kerbside parking between Stafford Street and the Great Western Highway to provide six continuous travel lanes
- Installing a new retaining wall on the eastern side of The Northern Road near Penrith Christian School.

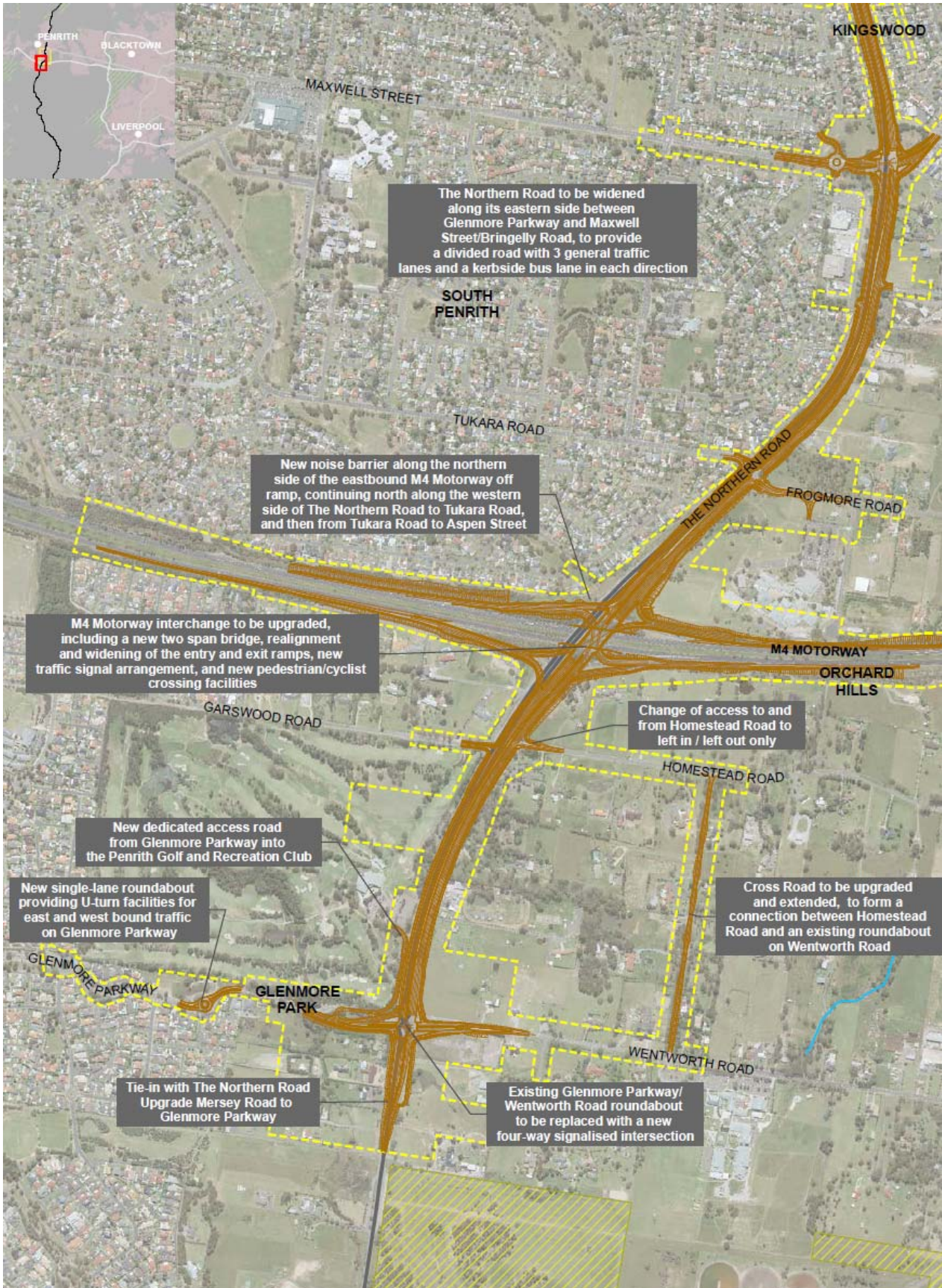


Figure 1-1 Key features of the proposal (Page 1 of 2)

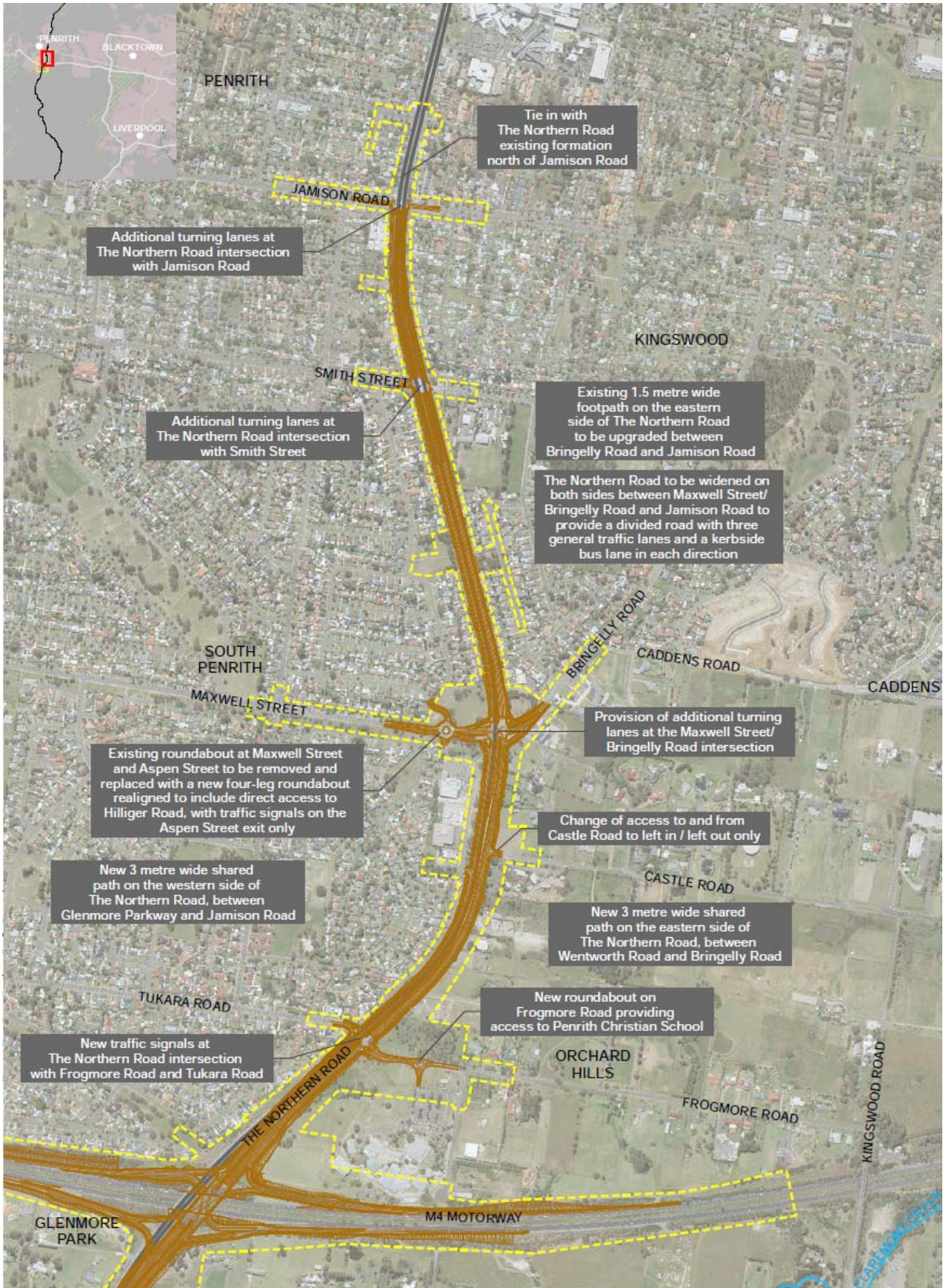


Figure 1-2 Key features of the proposal (Page 2 of 2)

1.2 REF display

Roads and Maritime prepared a review of environmental factors to assess the environmental impacts of the proposed works. The Review of Environmental Factors (REF) was publicly displayed for 26 days between Monday 10 October 2016 and Friday 4 November 2016 at Penrith City Library as detailed in **Table 1-1**. The review of environmental factors was placed on the Roads and Maritime project website and made available for download. The display locations and website link were advertised in the Penrith City Gazette, Penrith Press and Western Sydney Weekender.

In addition to the above public display, a number of notifications about the proposed upgrade were sent which are listed in Table 1-1.

Table 1-1: Consultation activities during the public display period

Activity	Details
Community information sessions	Four community consultation sessions held: Wednesday 19 October 2016 at Penrith South Public School Saturday 22 October 2016 at Kingswood Neighbourhood Centre Tuesday 25 October 2016 at Penrith South Public School Saturday 29 October 2016 at Kingswood Neighbourhood Centre
Community update newsletter (Appendix A) and letterbox drop distribution (Appendix B)	A community update newsletter was produced including key features of the proposal and further details on the community information sessions and how to provide feedback. The community update newsletters were letterbox dropped to about 11,000 properties. The newsletter was also available on the Roads and Maritime website and was given out at community information sessions.
Doorknocks	194 doorknocks along The Northern Road, Cross Road, and sections of local roads.
Sorry we missed you flyer (Appendix C)	Where the property owner/occupant was door knocked but not home, a 'Sorry we missed you' flyer was left informing the property owner/occupant that someone from the project team had tried to make contact. 116 properties door knocked were left a 'Sorry we missed you' flyer as we were unable to speak with anyone at the property.
Meetings	36 meetings were held with key stakeholders about the proposed upgrade Meetings included: <ul style="list-style-type: none"> • The Hon Tanya Davis, Member for Mulgoa on 21 October 2016 • The Hon Stuart Ayres, Member for Penrith on 24 October 2016 • Penrith City Council on 31 October 2016 • 32 directly impacted property owners in October and November 2016.
Media release (Appendix D)	A media release was distributed to all major Sydney metropolitan and western Sydney publications on 11 October 2016. It was titled <i>Have your say: The Northern Road concept design on display</i> and it encouraged local community members and stakeholders to get involved in the consultation process. This resulted in coverage in the Western Sydney Weekender on 26 October 2016.

Activity	Details
Email notifications	<p>Direct emails were sent from Roads and Maritime to 1168 stakeholders (community members and groups), local Members of Parliament (MPs) and other government stakeholders to announce the REF display and raise awareness of the consultation and information sessions.</p> <p>A reminder email noting the consultation would close on 4 November was sent to 234 stakeholders.</p>
Text message notifications	SMS text messages were sent to stakeholders from an existing stakeholder and community database at the start of consultation to 94 contacts and a reminder text message before the last information session was sent to 95 contacts.
Newspaper Advertisement (Appendix D)	<p>Advertisements appeared in three local newspapers between 13 and 21 October to raise awareness of the consultation and information sessions. Publications included:</p> <ul style="list-style-type: none"> • Penrith Press (13 and 20 October 2016) • Penrith Gazette (13 and 20 October 2016) • Western Sydney Weekender (14 and 21 October 2016).
Signposting	Three variable message signs were placed along The Northern Road during the public display
Website	The project webpage was updated on 11 October 2016 with the latest project information including the community update newsletter, REF and how to submit feedback. A total of 1128 unique page visits were recorded during the consultation period www.rms.nsw.gov.au/thenorthernroad
WSIP portal	The Western Sydney Infrastructure Plan (WSIP) interactive web portal was updated with a new video and information on the proposal. There were a total of 475 unique visits during the consultation period www.communityanalytics.com.au/wsip

Table 1-2: Display location of the REF

Location	Address
Penrith City Library	601 High Street, Penrith NSW 2750

1.3 Purpose of the report

This submissions report relates to the Review of Environmental Factors (REF) prepared for The Northern Road Upgrade, Glenmore Parkway to Jamison Road, and should be read in conjunction with that document.

The REF was placed on public display and submissions relating to the proposal and the REF were received by Roads and Maritime. This submissions report summarises the issues raised and provides responses to each issue (Chapter 2). It details investigations carried out since finalisation of the REF (Chapter 3), describes and assesses the environmental impact of changes to the proposal (Chapter 4) and identifies new or revised environmental management measures (Chapter 5).

2 Response to issues

Roads and Maritime Services received 41 submissions up until Friday 4 November 2016. **Table 2.1** lists the respondents and each respondent's allocated submission number. The table also indicates where the issues from each submission have been addressed in this chapter.

Table 2.1: Respondents

Respondent	Submission No.	Section number where issues are addressed
Business (Flower Power)	1	2.2.2, 2.2.4
Individual	2	2.5.2
Individual	3	2.5.2
Individual	4	2.6
Individual	5	2.5.2
Individual	6	2.2.4, 2.5.2
Individual	7	2.5.2, 2.7
Individual	8	2.4.2
Individual	9	2.4.3, 2.8
Individual	10	2.2.2, 2.2.3, 2.4.1, 2.4.9, 2.8
Individual	11	2.3.1, 2.3.5, 2.5.2
Individual	12	2.4.1
Individual	13	2.4.1, 2.4.3
Individual	14	2.8
Individual	15	2.2.4, 2.4.1, 2.4.2, 2.4.4, 2.4.7, 2.4.12, 2.5.2
Individual	16	2.2.2, 2.2.3
Individual	17	2.8
Individual	18	2.2.4, 2.3.1, 2.4.3, 2.4.8, 2.5.1, 2.5.2
Individual	19	2.3.1, 2.3.4, 2.4.2, 2.4.8, 2.5.2, 2.6
Individual	20	2.3.2, 2.3.3, 2.5.2
Individual	21	2.3.4, 2.4.6
Individual	22	2.4.3, 2.5.2, 2.7
Individual	23	2.2.4, 2.3.2, 2.3.3, 2.5.2
Individual	24	2.4.5, 2.4.6

Respondent	Submission No.	Section number where issues are addressed
Individual	25	2.2.4, 2.4.3
Individual	26	2.3.3, 2.4.6, 2.4.8, 2.4.11
Individual	27	2.2.2, 2.2.3
Individual	28	2.2.4, 2.4.5
Individual	29	2.6
Business (Penrith Golf Club)	30	2.3.1
Individual	31	2.5.2
Individual	32	2.5.2
Individual	33	2.4.3
Individual	34	2.4.10
Individual	35	2.5.2
Organisation (Nepean Hospital)	36	2.3.1, 2.7
Organisation (NSW Police)	37	2.4.10, 2.7
Organisation (Penrith City Council)	38	2.2.2, 2.2.3, 2.2.4, 2.3.4, 2.3.5, 2.3.6, 2.4.1, 2.4.3, 2.4.5, 2.4.7, 2.4.8, 2.4.9, 2.4.10, 2.5.2, 2.5.3, 2.7
Business (Medical & Fitness Centre)	39	2.2.1
Organisation (NSW Ambulance)	40	2.3.1, 2.3.3, 2.7
Individual	41	2.4.10, 2.5.2, 2.5.3

2.1 Overview of issues raised

A total of 41 submissions were received in response to the display of the REF. This included submissions from four government agencies and 37 from the community.

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

About 83 per cent of submissions indicated support for the proposal, or specific elements of the proposal. The remaining submissions did not oppose the proposal however several points were raised including:

- Suggestions to improve the left turn movement out of Garswood Road
- Suggestions to further increase the length of turning lanes at the M4 Motorway Interchange
- Concern regarding changed property access
- Concern regarding the extent of construction impacts, particularly north of Maxwell Street/Bringelly Road
- Requests for information for the proposed noise and vibration mitigation measures
- Requests for additional noise mitigation barriers along the corridor.

The submission from Penrith City Council expressed support for the proposal in particular for the proposed work to improve traffic flow along the corridor and at the M4 Motorway Interchange. The submission provided a number of comments for consideration, including:

- Construction traffic management
- Urban design and landscaping
- Public and active transport provisions
- Speed limit during construction.

The submission from NSW Police expressed support for the proposal in particular for the proposed work to improve traffic flow and road safety along the corridor. The submission requested consideration of crime prevention principles in designing the upgrade.

The submissions from Nepean Hospital and the NSW Ambulance Service expressed support for the proposal in particular for the proposed work to improve traffic flow and road safety along the corridor. The submissions provided comments about construction impacts, particularly related to construction traffic management and access to Nepean Hospital for emergency vehicles.

2.2 Access

2.2.1 Bringelly Road

Submission number(s)

39

Issue description

A respondent requested a right turn bay to be provided for entry into their property on Bringelly Road

Response

The proposed upgrade includes a raised median along Bringelly Road to control access into properties near The Northern Road intersection. The extent of the median has been determined to ensure traffic flows consistently near the Maxwell Street/Bringelly Road intersection. The introduction of a dedicated right turn bay to the east of the intersection would require the two eastbound lanes on Bringelly Road to merge suddenly. This would reduce the operating speed and create driver hesitation and result in queuing and a reduction in efficiency along Bringelly Road. For these reasons, a dedicated right turn bay would not be provided east of The Northern Road on Bringelly Road. Traffic accessing this property would be able to utilise Smith Street and turn right onto Bringelly Road or alternatively perform a U-turn at the planned roundabout at Bringelly Road/Caddens Road which is expected to be completed in the second half of 2017.

2.2.2 Castle Road

Submission number(s)

1

Issue description

A respondent was opposed to the removal of the right turn movements at Castle Road

Response

Four alternate options for the Castle Road/The Northern Road intersection have been assessed. These were included in Section 2.7 of the Review of Environmental Factors. The removal of the right turn movement is required to ensure road safety and to prevent the frequent occurrence of illegal U-turn movements at the intersection. Alternate access would be provided via the routes outlined in Section 6.1 of the REF. The alternate detour routes do not pose significant impacts and are considered reasonable. For these reasons, the right turn movements at Castle Road are proposed to be removed.

2.2.3 Garswood Road

Submission number(s)

10, 16, 27, 38

Issue description

A respondent requested U-turn movements be provided at the Glenmore Parkway/Wentworth Road intersection to allow traffic to return north to Garswood Road

A number of respondents also requested traffic lights to assist with access to and from Garswood Road in peak periods

Response

Provision of U-turn movements at the proposed traffic lights at The Northern Road/Glenmore Parkway intersection would not be permitted under NSW Road Rules. For this reason, the project team has not examined this option.

Two intersection options were considered for Garswood Road and Homestead Road as part of developing the design of the proposed upgrade. These are included in Section 2.10.3 of the REF. One of those options included permitting right turn access into Garswood Road using traffic lights. This option resulted in impacts to the efficiency and operation of the M4 Motorway Interchange. Likewise, the use of traffic lights to assist the left turn out movement during peak periods would also interfere with the operation of the M4 Motorway Interchange since it would require northbound traffic to stop on approach to the M4 Motorway Interchange. The use of traffic lights at this location is limited by the close proximity of Garswood Road to the M4 Motorway interchange.

It is recognised during peak periods that the left turn out movement is difficult, particularly during the morning peak period. During detailed design, signposting and linemarking options would be considered to ensure traffic can manoeuvre safely out of Garswood Road and into the right turn bay of the M4 Motorway interchange.

2.2.4 Property Access

Submission number(s)

1, 6, 15, 18, 23, 25, 38

Issue description

A number of respondents expressed concern about changes to their driveway and vehicle access into and out of their driveway following widening of The Northern Road and removal of the informal verge area between Maxwell Street and Smith Street.

Another requested signposting during and after construction for new access routes to businesses.

It was also suggested the Penrith Golf Club entrance should remain on The Northern Road.

Requested an alternate access arrangement to provide right turn access for properties along The Northern Road, south of Glenmore Parkway until the next stage of The Northern Road upgrade is complete.

Response

A traffic assessment has been undertaken and is included in Section 6.1 of the REF. The assessment identifies a loss of amenity with the removal of the informal roadside verge area which is currently utilised by properties between Maxwell Street/Bringelly Road and Smith Street. Further assessment of property access would be undertaken during detailed design. This may involve adjustments to front yards to enable the safe movement of vehicles within properties. All property adjustments including driveways would be carried out in consultation with property owners and in accordance with Penrith City Council requirements.

In addition, the proposed kerbside bus lanes would enable improved access and egress by separating residential traffic from general traffic when turning into and out of driveways along The Northern Road. Under NSW road rules, a vehicle is permitted to travel in a bus lane for up to 100 metres when entering or exiting a driveway or road.

During construction, access to properties and local roads would be maintained. Signposting and electronic message boards would be used to assist road users travelling along The Northern Road understand traffic changes. Permanent changes to access would not be introduced until alternate access routes are open to traffic. Upon completion of the proposed upgrade, permanent signposting along The Northern Road would be installed in accordance with Roads and Maritime's Signposting Guidelines. Generally, this would not include signposting of access to properties.

The Penrith Golf Club entrance is being relocated onto Glenmore Parkway to suit the proposed upgrade and improve safety. The existing golf club entrance is similar to other private property entrances along The Northern Road however the volume of traffic using this entrance and the grade of the entrance driveway would result in slow turn movements and a higher likelihood of rear end crashes.

The proposed upgrade has removed this issue from The Northern Road with access to/from the Penrith Golf Club made available using the proposed service road connecting to Glenmore Parkway. The proposed entrance to the golf club is a suitable distance west of The Northern Road to ensure queued traffic on Glenmore Parkway does not interfere with access to the golf club.

The design of the proposed upgrade has been amended to avoid constructing a raised median south of Glenmore Parkway until the next stage of The Northern Road Upgrade starts construction and a U-turn facility can be provided at Bradley Street. The removal of a short section of raised median is required to ensure a reasonable form of access for several properties south of Glenmore Parkway can be maintained. Discussion of the median island removal and changed access arrangement is included in Section 4.1 of this report.

2.3 Construction

2.3.1 Access

Submission number(s)

11, 18, 19, 30, 36, 40

Issue description

A number of respondents expressed concern about the loss of access to their property during construction

Nepean Hospital requested consideration of emergency vehicle and aircraft access during construction

Response

Access to properties would generally be maintained throughout construction of the proposed upgrade. Temporary changes to property access would be required during different stages of construction. As outlined in Section 3.3.6 of the REF, a Traffic Management Plan would be developed during detailed design to manage temporary changes to access during construction. Changes to property access would be discussed with affected property owners prior to any changes taking place.

Construction staging of the proposed upgrade is described in Section 3.3 of the REF. Construction would not involve removing the existing lane capacity during peak periods. Notifications would be provided to Nepean Hospital and NSW Ambulance at least five business days prior to the planned traffic changes. Access for emergency vehicles is expected to improve as construction of the upgrade progresses and more lanes are opened to traffic, particularly the kerbside bus lanes.

Prior to the use of any cranes during construction which extend above adjacent low rise housing, the construction contractor would consult with Nepean Hospital to ensure there is no disruption to the hospital's flight path and emergency aircraft access.

2.3.2 Pre-Construction Surveys

Submission number(s)

20, 23

Issue description

Suggested pre-construction condition surveys are undertaken for private properties near the proposed works

Response

The construction contractor would undertake pre-construction condition surveys for properties and structures near to or likely to be affected by the proposed works. A copy of the survey report would be provided to the property owner before construction starts.

2.3.3 Duration

Submission number(s)

20, 23, 26

Issue description

A number of respondents sought clarification about the overall duration of construction

Response

Construction of the proposed upgrade is scheduled to start in the first half of 2017 and be open to traffic by 2020. Weather permitting, there is about 30 months of construction planned. Opportunities to minimise the overall duration of construction would continue to be explored during detailed design and construction of the upgrade.

2.3.4 Noise Impacts

Submission number(s)

19, 21, 38

Issue description

A number of respondents expressed concern about the proposed construction hours and noise causing sleep disturbance

Response

Construction hours are outlined in section 3.3.2 of the REF. Construction would generally occur between 7am and 6pm, Monday to Friday and between 8am and 1pm on Saturdays. Work outside these times may occur, subject to separate Environment Protection Authority (EPA) approval. Any work undertaken outside these hours would be subject to further environmental restrictions and requirements to mitigate noise impacts for residents. These additional noise mitigation measures would be defined with a Construction Noise Management Plan and approved prior to the planned out of hours work. Notifications would be provided to all affected receivers at least five business days prior to any work outside the standard hours listed above. Opportunities to reduce the need for night work and potential sleep disturbance impacts would be explored during detailed design in consultation with affected receivers.

2.3.5 Vegetation Loss

Submission number(s)

11, 38

Issue description

A respondent expressed concern about the potential loss of vegetation within private property during construction of the proposed upgrade

Another also expressed concern about significant removal of existing vegetation at proposed construction compound sites.

Response

The proposed upgrade requires property adjustment work to be carried out within some private properties to suit the proposed road widening and/or changes to the road level. Avoidance of impacts on private property particularly the survival of specific vegetation is not guaranteed because of the close proximity of construction. The loss of such vegetation is considered in Section 6.3 of the REF.

Impacts within private property would be minimised and avoided where possible. Impacts on private property would be addressed and similar vegetation replaced where practicable by the construction contractor. Specific issues would be discussed with affected property owners prior to and during construction.

The removal of vegetation is required to facilitate construction of the proposed upgrade. The extent of vegetation removal is outlined in Section 6.3 of the REF. Generally, compound site locations were selected to minimise environmental impacts, including the loss of vegetation. Opportunities to minimise the loss of existing vegetation within proposed compound sites would continue to be explored during detailed design.

2.3.6 Speed Limits

Submission number(s)

38

Issue description

A respondent requested periods of reduced speed limits on the M4 Motorway are minimised

Response

Construction of the proposed upgrade is expected to take about 30 months to complete, weather permitting. During construction, speed limits would be reduced to enable construction work to be

carried out safely for road users and workers. It's expected the speed limit on the M4 Motorway would be reduced to 80km/h where construction is carried out along the motorway. Opportunities to minimise the period of speed limit reductions on the M4 Motorway and The Northern Road would continue to be explored during detailed design and construction.

2.4 Design

2.4.1 Active Transport Facilities

Submission number(s)

10, 12, 13, 15, 38

Issue description

Respondents requested a dedicated cyclist lane along The Northern Road and cyclist paths across the proposed bridge over the M4 Motorway.

Other respondents also suggested:

- The proposed shared path should pass behind any bus shelters
- The shared path is designed to allow cyclists to ride across intersections
- An underpass or overpass across The Northern Road is provided for pedestrians and cyclists near the Bringelly Road/Maxwell Street intersection.

Response

The proposed upgrade includes a three metre wide shared pedestrian and cyclist path along The Northern Road for off-road cyclists. Under NSW Road Rules, the proposed kerbside bus lanes can be used by on-road cyclists. These four metre wide kerbside lanes provide separation of cyclists from the majority of general traffic.

Between Glenmore Parkway and Maxwell Street, the proposed upgrade includes a three metre wide shared pedestrian and cyclist path along each side of The Northern Road including across the M4 Motorway.

The proposed shared paths would be designed to avoid or minimise conflicts with bus shelters and passengers.

The proposed shared paths would be designed to allow cyclists to ride across each leg of signalised intersections. The type of road crossings along the shared paths would be determined during detailed design.

Signalised pedestrian crossings have been provided across all four approaches of the Maxwell Street/Bringelly Road intersection to cater for current and future pedestrian volumes. A pedestrian bridge would require extensive lengths of ramps and/or stairs to comply with the required grades. It would also introduce a number of visual impact, security and public safety issues. As a result, pedestrians would be likely to continue to use the at-grade signalised crossings.

The signal-controlled pedestrian crossings do not affect the operation of the traffic lights and provide improved accessibility by crossing all four approaches of the intersection. For these reasons, a pedestrian bridge across The Northern Road has not been included as part of the upgrade.

2.4.2 Drainage

Submission number(s)

8, 15, 19

Issue description

A respondent expressed concern about stormwater flows from The Northern Road entering their property.

A respondent questioned the accuracy of the hydrology and flooding assessment.

Another respondent suggested the drainage easement south of Glenmore Parkway is enclosed.

Response

The proposed upgrade offers significantly improved drainage infrastructure including redesigned footway areas to shed water away from properties along The Northern Road. In other areas this would include drainage channels along the road corridor to capture and control the flow of water before it enters private property.

This assessment has been independently prepared and then reviewed by Roads and Maritime. The assessment has been prepared in accordance with a number of guidelines including Engineers Australia's *Australian Rainfall and Runoff: A Guide to Flood Estimation*. The drainage design has been proposed to cater for stormwater flows across and along the proposed upgrade to ensure the proposed drainage infrastructure is capable of capturing and controlling stormwater up to a 1 in 100 year storm event.

The proposed upgrade includes the upgrade of a number of culverts and the introduction of new road pavement drainage. This is expected to improve the flood immunity of The Northern Road and reduce flooding impacts to some private properties. Additional flood modelling would continue to be undertaken during detailed design to verify the results presented in the REF.

The proposed drainage easement south of Glenmore Parkway is currently an open channel. Options to enclose the easement west of The Northern Road would be considered during detailed design. Enclosure of the easement would be subject to environmental, capacity and constructability constraints.

2.4.3 Intersections

Submission number(s)

9, 13, 18, 22, 25, 33, 38

Issue description

A number of respondents made suggestions, submitted concerns and/or requests about the design of intersections along the proposed upgrade, which included:

- Suggesting northbound traffic is stopped on The Northern Road during peak periods to allow traffic exiting Frogmore Road to merge safely onto the northbound carriageway
- Suggesting the roundabout at The Northern Road/Glenmore Parkway intersection should remain with traffic lights installed
- Suggesting providing 'turn left with care' or 'turn left on red' signposting to improve the left turn efficiency at intersections
- Requesting the phasing of traffic lights is reviewed to reduce wait times for traffic
- Concern about the capacity of Maxwell Street at The Northern Road in the proposed upgrade
- Requesting the removal of all traffic lights along The Northern Road to improve traffic flow
- Suggesting more turning lanes are provided at intersections to improve the capacity of the proposed upgrade

Response

The phasing of traffic lights along the proposed upgrade would be determined during detailed design to ensure safe vehicle movements including the merging of traffic from Frogmore Road with northbound traffic on The Northern Road.

A number of intersection options were considered for the Glenmore Parkway/Wentworth Road roundabout as part of developing the design of the proposed upgrade. These are included in Section 2.10.3 of the REF. An option was considered to increase the capacity of the existing roundabout by adding more lanes to the circulating carriageway. This option did not provide sufficient traffic flow during peak periods. Signalising the roundabout, even with additional lanes, would improve the priority of some movements however would not improve the overall capacity of the roundabout. For these reasons, providing a roundabout with traffic lights at Glenmore Parkway was not considered suitable to support future traffic flows up to 2041.

The proposed upgrade would consider providing 'turn left with care' or 'turn left on red' signposting treatments where possible during detailed design to improve the efficiency of left turn movements onto The Northern Road.

The operation of the traffic lights along The Northern Road would be controlled and managed by the Transport Management Centre (TMC). The TMC would initially undertake a post completion review of traffic light phasing to ensure they are operating efficiently and consistently with adjacent traffic lights. This review would be carried out within 12 months of completing the proposed upgrade.

The Maxwell Street approach to The Northern Road is proposed to be widened to provide two lanes in each direction from about 150 metres west of the new four way Maxwell Street/Aspen Street/Hiliger Road roundabout. The roundabout would also include traffic lights on Aspen Street only, which would restrict the movement of traffic onto Maxwell Street during peak periods. The traffic lights would be coordinated with the Maxwell Street/The Northern Road intersection to give the Maxwell Street traffic priority. It is proposed to widen Maxwell Street between the new roundabout and The Northern Road to provide three right turn lanes, two through lanes to Bringelly Road and a left turn slip lane to reduce queue lengths on Maxwell Street.

A traffic assessment is included in Section 6.1 of the REF. The proposed upgrade was modelled using existing and forecast traffic scenarios up to 2041 to evaluate impacts and suitability of intersection arrangements. The number of turning lanes has been increased to provide reliable and efficient service to traffic flows to 2041. The proposed upgrade offers significantly higher capacity at each intersection of the upgrade with additional turning lanes maximised at most locations to improve traffic flow.

This assessment considers traffic performance of the proposed upgrade to at least 2041. While providing grade separations to remove traffic lights would improve travel times along The Northern Road, it would significantly increase the cost of the upgrade and introduce a number of environmental impacts. The use of grade separated interchanges requires significantly larger amounts of land, restricts property access and does not cater for all types of road users such as pedestrians and cyclists. The removal of traffic lights has not been considered where they have been demonstrated to function adequately up to 2041. As a result, interchanges do not form part of the proposal, except at the M4 Motorway.

2.4.4 Street Lighting

Submission number(s)

15

Issue description

A respondent sought information about the brightness of street lighting along the proposed upgrade

Response

The proposed upgrade would require lighting in accordance with the Australian Standards for road lighting requirements. The placement of lighting columns, the distribution of light and lantern types would be determined during detailed design with the aim of minimising the environmental impacts of lighting on adjacent properties.

2.4.5 Local Road Intersections

Submission number(s)

24, 28, 38

Issue description

A respondent expressed concern about the size of the existing roundabout at Wentworth Road/Cross Road intersection being able to accommodate larger vehicles.

Another requested movement restrictions be introduced at The Northern Road/Stafford Street intersection following the upgrade.

It was also requested to relocate the proposed Frogmore Road roundabout east to coincide with the Simeon Road intersection and minimise school traffic congestion.

Response

The proposed extension of Cross Road would result in a four way intersection between Wentworth Road and Cross Road. The roundabout would be designed to accommodate up to a 19.0m semi-trailer, which is the largest general access vehicle permitted on the NSW road network. The roundabout would be designed to allow a 19.0m semi-trailer to safely manoeuvre into and out of Cross Road.

The Stafford Street/The Northern Road intersection is outside the scope of the current proposal and would not interfere with the operation of the proposed upgrade. However, this comment has been referred to Roads and Maritime's Network and Safety team to review the intersection and traffic volumes. Consideration may be given about restricting movements following this review.

The options considered for the Frogmore Road/Simeon Road roundabout are discussed in Section 2.11 of the REF. An alternative location using the Frogmore Road/Simeon Road intersection was initially considered and displayed to the community in July 2015. Based on community feedback received and safety issues associated with the crest in the road just west of the initial proposed location at Simeon Road, the roundabout was relocated east to its current proposed location. Use of the proposed roundabout by Penrith Christian School would be subject to a traffic management plan being submitted and approved by Roads and Maritime.

2.4.6 M4 Motorway Interchange

Submission number(s)

21, 24, 26

Issue description

A number of respondents expressed concern about the length of the M4 Motorway Interchange ramps being unable to contain peak vehicle queues.

Another respondent suggested increasing the length of the turning lanes along The Northern Road at the M4 Motorway Interchange given the availability of land within the proposed medians.

Response

The proposed M4 Motorway Interchange would improve the capacity and efficiency of the interchange with a new wider bridge, one set of traffic lights and additional turning lanes. The proposed exit ramps onto The Northern Road would be extended by at least another 600 metres in length. The traffic assessment in Section 6.1 of the REF confirms the proposed upgrade has sufficient vehicle storage to prevent traffic queues reaching the M4 Motorway during peak periods.

The proposed lane lengths have been developed using forecast traffic growth and development up to 2041. The traffic information used to develop and assess the proposed design is discussed in Section 6.1 of the REF. The length of turning lanes would be optimised further during detailed design to ensure there is sufficient vehicle storage length.

2.4.7 Other

Submission number(s)

15, 38

Issue description

A respondent expressed concern about the increased maintenance liability of the corridor following completion of the proposed upgrade

Another respondent sought clarification about the likely condition of The Northern Road in the period between completion of this proposed upgrade and the start of further upgrades south of Glenmore Parkway

Response

The proposed upgrade would be delivered using a design and construction contract. During detailed design, Penrith City Council would be involved in the design review of some elements of the proposed upgrade to ensure appropriate maintenance requirements are considered. The construction contractor would also be required to provide 12 months of landscaping maintenance following completion of the proposed upgrade. Following the expiry of the 12 month landscaping maintenance period, maintenance would revert to Penrith City Council and Roads and Maritime as per the existing maintenance arrangement for State Roads within Sydney.

This proposed upgrade would conclude just south of Glenmore Parkway. During the period where both stages of the upgrade of The Northern Road would potentially be carried out at the same time, road safety assessments would be carried out to ensure each stage of construction continues to operate safely and maintain amenity for surrounding properties. A final road safety assessment would be carried out prior to completion and opening of the newly completed road to traffic.

2.4.8 Parking

Submission number(s)

18, 19, 26, 38

Issue description

A respondent expressed concern about the loss of parking between Maxwell Street/Bringelly Road and Smith Street

A number of respondents requested the removal of kerbside parking along The Northern Road between Jamison Road and the Great Western Highway.

Another requested parking be permitted in the kerbside bus lanes outside of peak periods.

Response

A traffic assessment has been undertaken and is included in Section 6.1 of the REF. The assessment identifies a loss of amenity with the removal of the informal roadside verge area which is currently used for parking by properties between Maxwell Street/Bringelly Road and Smith Street. Further assessment of front yard storage would be undertaken during detailed design. This may involve adjustments to front yards to enable the safe storage and movement of vehicles within properties. All property adjustments including driveways would be carried out in consultation with property owners and in accordance with Penrith City Council requirements.

It is now proposed to remove all kerbside parking along The Northern Road between Stafford Street and the Great Western Highway to provide six continuous lanes between Jamison Road and the Great Western Highway. The removal of this parking is assessed in Section 4.3 of this report.

The proposed upgrade includes 24 hour kerbside bus lanes to support reliable public transport in the region. Parking would not be permitted in the kerbside bus lanes. Cars attempting to park may be required to stop and reverse into the parallel kerbside parking spaces. This movement would impact through traffic in the kerbside and the middle traffic lane on The Northern Road. Drivers attempting to enter and exit their parked cars would also be at risk of being struck by passing traffic. For these reasons, it would be inappropriate to permit or provide on road parking as part of the proposed upgrade.

2.4.9 Public Transport Facilities

Submission number(s)

10, 38

Issue description

Respondents made a number of requests related to public transport, including:

- Additional bus stops along The Northern Road, including near Garswood Road
- Input into the design of the bus shelters along The Northern Road
- Further planning to determine the bus route from the proposed upgrade to Penrith Railway Station.

Response

A number of new bus stops are included in the proposed upgrade. The approximate locations are listed in Table 3-4 of the REF. Bus stop locations have been determined based on the location of proposed traffic lights to allow patrons to safely cross The Northern Road. The nearest proposed bus stop to Garswood Road is just north of Glenmore Parkway. The location of this bus stop would be reviewed during detailed design to reduce the distance between Garswood Road and Glenmore Parkway.

The design of the proposed bus shelters would be determined during detailed design in consultation with Penrith City Council and in accordance with Transport for New South Wales' requirements.

The proposed upgrade has been developed to support the provision of public transport and a rapid public transport connection between the proposed western Sydney airport at Badgerys Creek and Penrith Railway Station. Transport for New South Wales is responsible for bus route planning and would liaise with Penrith City Council to determine a suitable bus route from Jamison Road to Penrith Railway Station.

2.4.10 Safety

Submission number(s)

34, 37, 38, 40, 41

Issue description

Respondents, including NSW Police, requested crime prevention principles be considered in the design of the proposed noise barriers

Other respondents requested safety barriers be provided along the central median

NSW Ambulance requested mountable kerbs to support emergency vehicle access to Nepean Hospital

Response

Consultation would be carried out with NSW Police during detailed design to ensure the proposed noise barriers would take into consideration the NSW Police's *Crime Prevention through Environmental Design* guidelines.

The proposed upgrade includes a raised mountable median to control access along The Northern Road. Consideration may be given to providing safety barriers along The Northern Road during detailed design to further improve road safety.

Consideration would be provided to emergency vehicle access and their ability to cross the proposed median. The location of any safety barriers would consider this requirement during detailed design.

2.4.11 Scope of Upgrade

Submission number(s)

26

Issue description

A respondent suggested the proposed upgrade is extended to Bradley Street to address the existing congestion accessing Mulgoa Rise

Response

This proposed upgrade ends just south of Glenmore Parkway. The section of The Northern Road further south of Glenmore Parkway, including Bradley Street, is scheduled to start construction in 2018-19. This planned section involves upgrade of The Northern Road between Mersey Road, Bringelly and Glenmore Parkway, Glenmore Park. An Environmental Impact Statement (EIS) is currently being prepared for this upgrade by Roads and Maritime. The EIS is scheduled to be displayed for community feedback by mid-2017.

2.4.12 Utility Services

Submission number(s)

15

Issue description

Requested the proposed upgrade consider utility relocations

Response

Utility relocations would be carried out in consultation with the relevant utility authorities to suit the proposed upgrade.

2.5 Environmental Impacts

2.5.1 Air Quality

Submission number(s)

18

Issue description

Concerned about air quality impacts following the widening of The Northern Road

Response

An air quality assessment has been undertaken and is included in Section 6.8 of the REF. The assessment identifies some additional concentrations of pollutants along The Northern Road. The increase in pollutants is limited to receivers residing within five metres of the proposed traffic lanes. The proposed upgrade does not result in such a scenario since there are no residences within this envelope. Outside of this envelope, air quality impacts are within relevant guidelines and similar to existing roadside conditions.

2.5.2 Noise

Submission number(s)

2, 3, 5, 6, 7, 11, 15, 18, 19, 20, 22, 23, 31, 32, 35, 38, 41

Issue description

A number of submissions were received in relation to operational noise impacts as a result of the proposed upgrade. These included:

- A request for all buildings on properties to be provided with noise mitigation treatments
- Disagreement with the proposed decision not to provide a noise barrier
- Requests for a noise barrier instead of at-property noise mitigation treatment
- Request for a noise barrier around the playing field at Penrith Christian School
- Concern there would be an increase in road noise associated with the proposed upgrade and suggested noise mitigation treatment should be provided as part of the proposed upgrade
- Requests for additional at property noise mitigation treatment in addition to proposed noise barriers

Response

The REF included a Noise and Vibration Assessment which assessed potential construction and operational noise levels. The assessment has been prepared in accordance with a number of environmental noise policies, which include the NSW EPA's *Road Noise Policy* (2011). The assessment was undertaken by Jacobs Australia, an independent consultant, and reviewed by Roads and Maritime. The assessment identified all noise receivers within about 600 metres of the proposed work. Receivers considered in the assessment have been identified in Appendix B of Appendix E to the REF. Each identified receiver was categorised according to their property use to determine the relevant noise criteria and assess eligibility for noise mitigation treatment.

Some examples of eligible receivers include approved buildings used for residence, places of worship, hospitals and schools. Buildings not approved and utilised for these purposes (such as garden sheds) are typically not eligible for at property noise mitigation treatment.

Six potential locations for noise barriers were assessed along the corridor where more than four adjacent receivers were identified as being eligible for noise mitigation treatment. Four potential barriers would not deliver noise mitigation benefits in accordance with Roads and Maritime's *Noise Mitigation Guidelines* and they were deemed ineffective and unreasonable to build. Many locations were not examined due to driveways accessing The Northern Road preventing the installation of a continuous noise barrier. Properties in these locations would remain eligible for at-property noise mitigation treatment where reasonable and feasible.

A potential noise barrier was assessed along Penrith Christian School's southern boundary. It did not provide sufficient reductions in noise levels for the eight buildings identified as eligible for noise mitigation treatment. The potential noise barrier was not considered further as part of the proposed upgrade. Building usage within Penrith Christian School would be reviewed by Roads and Maritime prior to construction to confirm which buildings would qualify for reasonable and feasible at-property noise mitigation treatment.

The playing field at Penrith Christian School is identified in the REF as being eligible for consideration of reasonable and feasible noise mitigation treatment. The playing field is a large open area which is adjacent to The Northern Road and M4 Motorway Interchange. A noise wall to mitigate noise impacts for the playing field was not proposed in the REF since the size of the required barrier to surround the playing field would be relatively large. The barrier would be several hundred metres in length and up to 8 metres in height. Under the NSW EPA's *Road Noise Policy* a barrier is not considered reasonable or equitable for one noise receiving area. In addition, the barrier would be costly to construct, require ongoing maintenance and introduce undesirable environmental impacts. For these reasons, a noise barrier around the playing field at Penrith Christian School is not considered feasible nor reasonable.

The noise assessment summarised in Section 6.2 of the REF includes monitoring of existing noise levels and development of a noise model to predict changes in road noise levels following completion of the proposed upgrade. The noise model concluded future traffic volume increases would result in increased noise levels for about 265 properties.

The proposed upgrade includes two noise barriers; each about five metres high; one along the M4 Motorway eastbound exit ramp which continues north to Tukara Road and another along the western side of The Northern Road between Tukara Road and Aspen Street. These barriers provide sufficient noise attenuation for about 42 properties. There are 223 remaining properties which are eligible for at property noise mitigation treatment where it is feasible and reasonable. Some of these properties may also benefit from the proposed noise barriers. The properties identified for at property noise mitigation treatment are shown in Figure 6-12 in Section 6.2.4 of the REF.

2.5.3 Urban Design, Visual Impact and Landscaping

Submission number(s)

38, 41

Issue description

A respondent:

- Requested increased vegetation along the corridor, especially around the M4 Motorway
- Expressed concern about the design themes and colours on the proposed noise walls and retaining walls, and;
- Suggested the rowing theme should be retained on throw screen of the proposed bridge

Response

The proposed upgrade includes a landscaping design strategy in Section 6.11 of the REF. The strategy has been developed to complement and support the proposed changes along the road corridor. The proposed upgrade requires widening of the road pavement to provide additional traffic lanes, footpaths and a median. Options to increase landscaping, particularly around the M4 Motorway would be considered during detailed design. Options considered would remain subject to road safety requirements and other engineering constraints such as the availability of land.

The proposed upgrade includes an urban design strategy in Section 6.11 of the REF. The strategy has been developed to complement and support the proposed changes along the road corridor. The proposed upgrade includes a new throw screen on the new bridge over the M4 Motorway. Options to integrate a rowing theme on the throw screen of the new bridge, the appearance of retaining walls and noise walls would be considered during detailed design.

2.6 Property Acquisition

Submission number(s)

4, 19, 29

Issue description

A number of respondents were opposed to the land acquisition required for the proposed road widening and suggested changes to the way compensation is calculated for the acquisition of land

Another respondent requested financial compensation be paid to property owners for potential loss of rental incomes during construction

Response

The proposed upgrade includes widening of The Northern Road between Glenmore Parkway and Jamison Road to accommodate the additional traffic lanes and road infrastructure. The proposed upgrade requires additional land, generally to the east of the existing The Northern Road corridor. The options considered for widening of The Northern Road are compared in Sections 2.5.5 and 2.6 of the REF. All property required for the proposed upgrade has been identified in Section 3.6 of the REF.

Compensation for land required for the proposed upgrade would be offered and negotiated in accordance with the NSW Land Acquisition (Just Terms Compensation) Act 1991. Changes to the way compensation is calculated and offered would require changes to the Land Acquisition (Just Terms Compensation) Act which is outside the scope of this upgrade.

Where a property is adjacent to a new or upgraded road but is not directly impacted by the proposed upgrade, Roads and Maritime does not provide financial compensation for any potential decrease in property value or loss of rental income. However, Roads and Maritime has considered construction impacts during the development of the REF and many impacts have been avoided or minimised where possible. During construction, Roads and Maritime and the construction contractor would continue to consult with affected property owners to further minimise construction impacts.

2.7 Proposal Support

Submission number(s)

7, 22, 36, 37, 38, 40

Issue description

A number of respondents expressed their overall support for the proposal, or for, specific elements of the proposal including support for the M4 Motorway interchange, noise barriers, Maxwell Street and Frogmore Road.

Response

Roads and Maritime acknowledges this support.

2.8 Outside of Scope

Submission number(s)

9, 10, 14, 17

Issue description

A number of respondents made requests and suggestions which were outside the scope of the proposed upgrade, these included:

- A request for a roundabout at the intersection of Jamison Road and Bringelly Road
- A suggestion for additional ramp connections to the M4 Motorway
- Requests for an additional road to cross the M4 Motorway and link Glenmore Park and South Penrith

Response

An upgrade of Bringelly Road and Jamison Road is outside the scope of the proposed upgrade. Bringelly Road and Jamison Road are local roads under the care and control of Penrith City Council. The proposed upgrade is unlikely to influence traffic volumes at this intersection since the upgrade is aiming to improve travel conditions along The Northern Road and may attract traffic away from detouring through Bringelly Road. For these reasons, the proposed upgrade would not include a roundabout at the intersection of Jamison Road and Bringelly Road.

This proposed upgrade aims to significantly improve the arterial road connection to the M4 Motorway at South Penrith. A traffic assessment has been undertaken and is included in Section 6.1 of the REF which confirms significant improvements for traffic at the M4 Motorway Interchange from completion through to at least 2041. A proposal to provide new ramps between Jamisontown, South Penrith and the M4 Motorway is outside the scope of this upgrade.

A proposal to change the access between South Penrith and Glenmore Park is outside the scope of The Northern Road upgrade. While improved access and egress at Glenmore Park would alleviate some congestion at the existing routes, it is not within the scope of this upgrade to consider such a proposal.

3 Additional assessment

3.1 Parking Study – Stafford Street to Great Western Highway

3.1.1 Summary

Roads and Maritime commissioned a parking study to assess the potential impact of removing all existing kerbside parking along The Northern Road between Stafford Street and the Great Western Highway. This study was commissioned in response to a number of submissions requesting the removal of this parking to improve traffic flow along The Northern Road.

The key findings of the parking study are summarised in the following sections and the proposed changes to parking are discussed in Section 4.3 of this report.

The parking assessment monitored available parking capacity and duration over a seven day period in November 2016. The area of assessment is shown in Figure 3-1 and included The Northern Road between Stafford Street and the Great Western Highway and some local roads adjacent to Nepean Hospital.

The length of time cars were parked in the above local roads was monitored to determine whether compensatory or additional parking could be provided. The changes to parking along The Northern Road and other roads are discussed in Section 4.3 and shown in Figure 4-3.

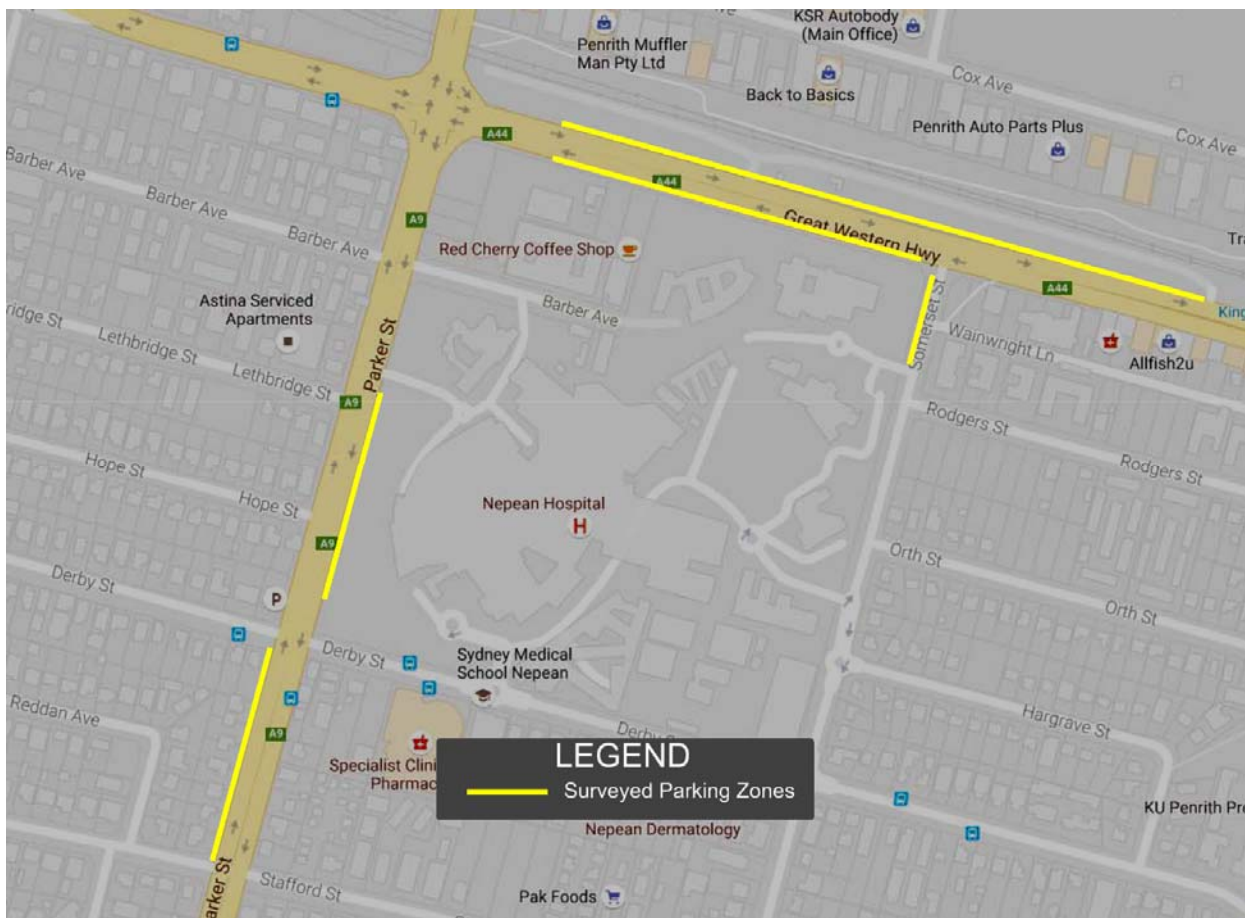


Figure 3-1: Surveyed Parking Zones

There are currently about 33 unrestricted parking spaces available along The Northern Road (Parker Street) between Stafford Street and the Great Western Highway, which include:

- About 24 parking spaces along the southbound carriageway of The Northern Road between the Great Western Highway and Derby Street
- About 9 parking spaces along the northbound carriageway of The Northern Road between Stafford Street and Derby Street

3.1.2 Key Findings

These parking spaces were generally well utilised during the survey period, with the following findings identified:

- The 24 southbound parking spaces are heavily utilised and there are on average less than 3 spaces available at any given time between 8am and 3pm.
- The average duration of parking exceeds six hours
- At least one parking space is occupied from 5:30am with vehicles continuing to remain until 8pm preventing the passage of vehicles in the kerbside lane on weekdays.
- The average manoeuvre time for a driver to reverse into a space exceeds 15 seconds which results in momentary queues and traffic disturbance of up to 100 metres

4 Changes to the proposal

4.1 Replacement of raised central median with a median turning lane south of Glenmore Parkway

4.1.1 Description

In response to feedback received about access to properties south of Glenmore Parkway. The proposed upgrade would be amended to include a southbound right turn entry lane within the central median of The Northern Road to provide access to several properties on the western side of the road corridor. Right turn out access would also be permitted for the three properties on the eastern side of The Northern Road.

The proposed change would provide safe and reasonable form of access until further stages of The Northern Road are constructed to the south including a facility for U-turn movements near Bradley Street. Upon completion of a U-turn facility this proposed median turning lane would be removed and replaced with a central median between Glenmore Parkway and Bradley Street as part of further upgrades along The Northern Road.

Right turn entry movements would not be permitted to properties on the eastern side of The Northern Road and right turn out movement would not be permitted across the median for properties on the western side of The Northern Road. These movements would be catered for by the proposed roundabout in Glenmore Parkway which is assessed in Section 6.1 of the REF.

The proposed change is shown in Figure 4-1.

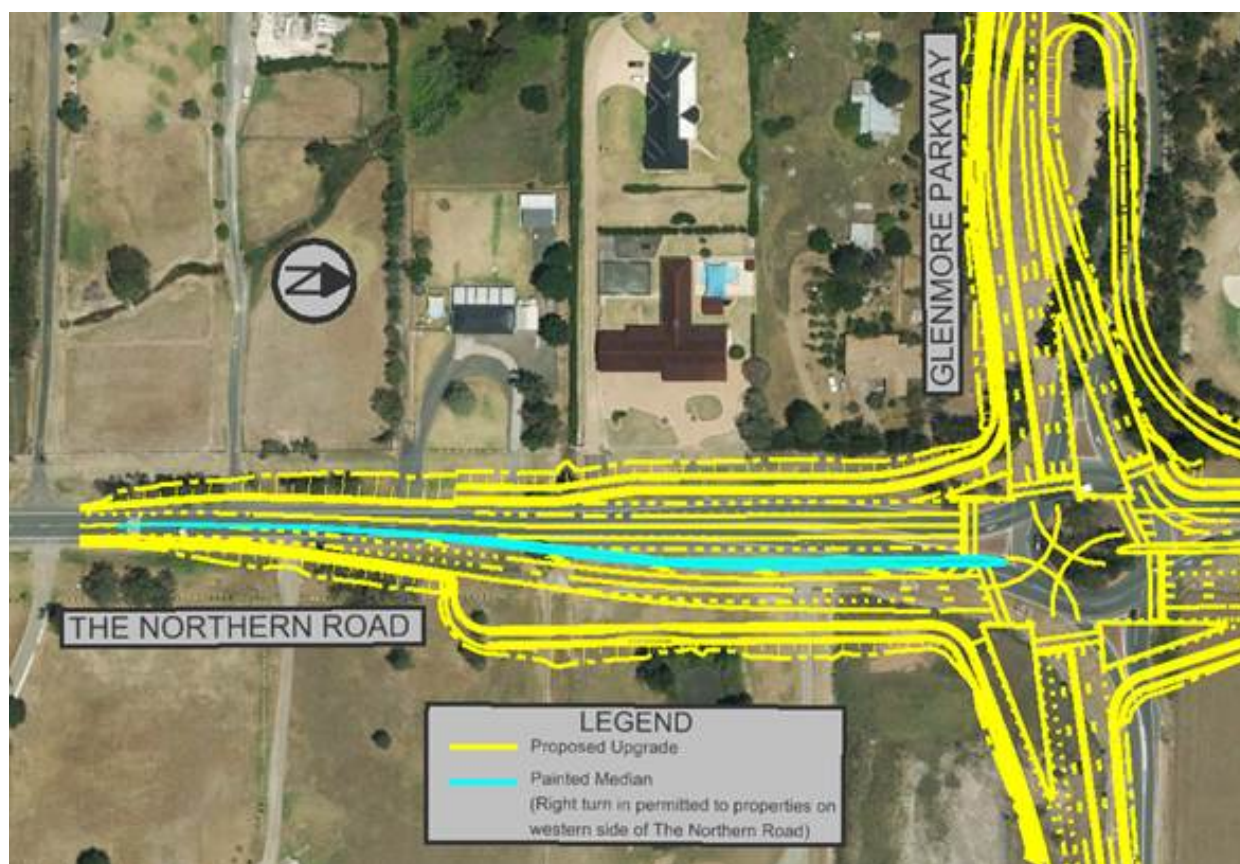


Figure 4-1: Right turn entry lane for properties on western side of The Northern Road

4.1.2 Environmental assessment

Only those environmental impacts relevant to the proposed changes to the proposal are outlined below.

Traffic Impacts

The proposed change includes a right turn entry lane south of Glenmore Parkway to provide access to about four driveways on the western side of The Northern Road. The right turn entry lane would separate right turn entry traffic from through traffic along The Northern Road. This would substantially reduce the risk of rear end crashes.

The right turn entry lane would introduce a road safety risk since it requires traffic entering properties to give way to traffic using The Northern Road. Sufficient sight distance would be provided in accordance with *Austrroads: Guide to Road Design* and the dedicated right turn entry lane would allow traffic to store safely within the median. The proposed arrangement is an improvement compared to the existing conditions and would only be in place until approximately 2019.

4.2 Additional retaining wall north of M4 Motorway Interchange

4.2.1 Description

Following a change to the slope of the batter on the eastern side of The Northern Road to suit soil conditions, the proposed upgrade would be amended to include a retaining wall near the Penrith Christian School playing field. The retaining wall would be located along the bottom of the embankment to limit the width of the embankment and impact on Penrith Christian School. The proposed land acquisition would remain as identified in Section 3.6 of the REF.

The proposed location of the retaining wall is shown in Figure 4-2.

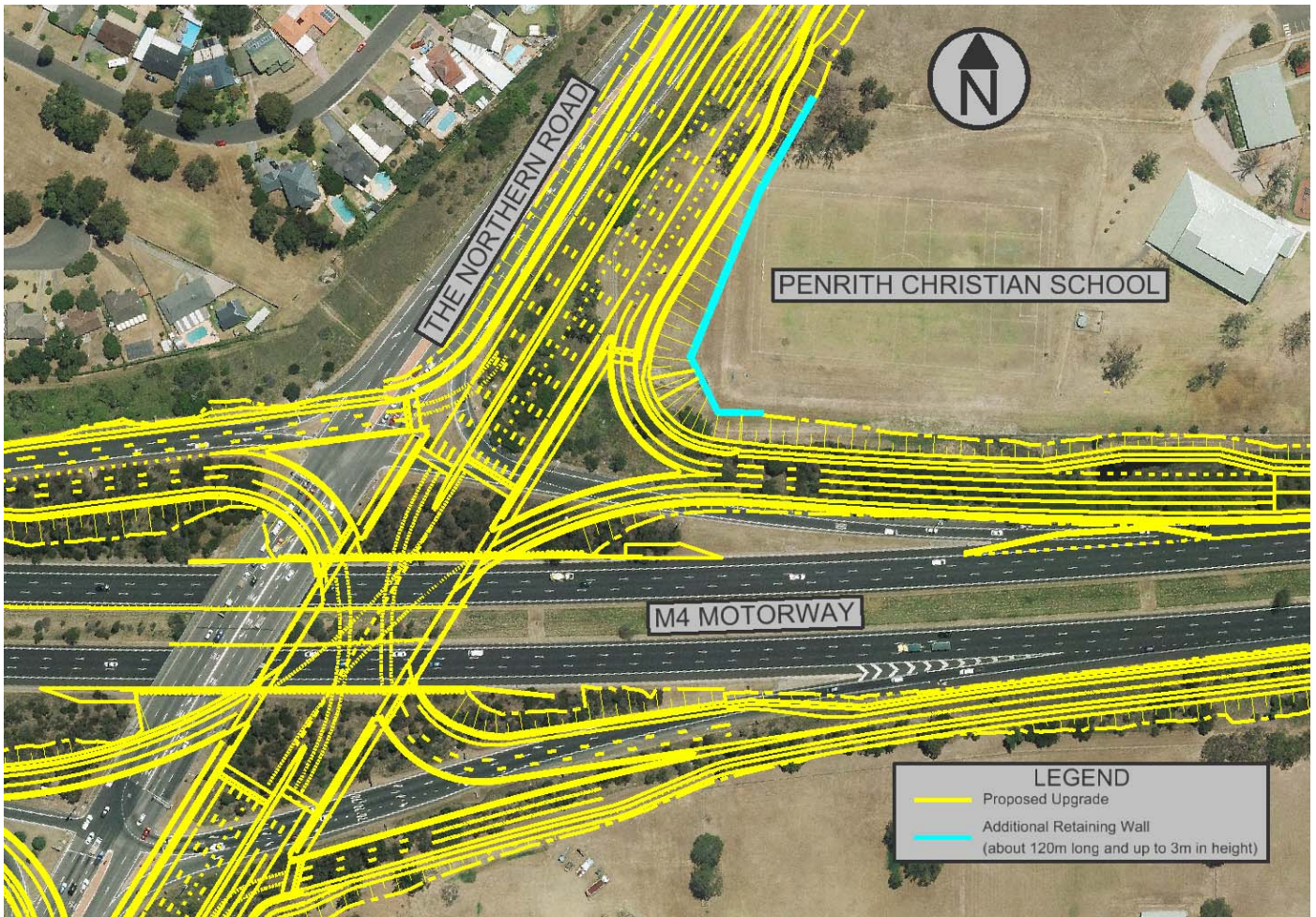


Figure 4-2: Additional retaining wall near Penrith Christian School playing field

4.2.2 Environmental assessment

Only those environmental impacts relevant to the proposed changes to the proposal are outlined below.

Urban Design, Landscaping & Visual Impacts

The proposed change includes a retaining wall at the bottom of the fill embankment which is required to widen The Northern Road to the east. The retaining wall would start at the corner of the M4 Motorway eastbound entry ramp and continues north for about 120 metres. It would be up to three metres in height.

The wall would be designed in accordance with the urban design strategy identified in Section 6.11 of the REF. The wall would include similar textures, colours and profile to those identified in Appendix L of the REF. The visual impact assessment of Viewpoint 8 in Section 6.11.4 of REF notes built structures including retaining walls interrupting the soft landscape. The proposed design remains consistent with this assessment.

Socio-Economic Impacts

The proposed change maintains the existing land acquisition identified in Section 3.6 of the REF and avoids further impacts to property adjustments on the school grounds. The retaining wall would allow disruption of the school's operation to be minimised by reducing the size of the batter. This avoids any further socio-economic impacts to the school during construction of the proposed upgrade.

4.3 Removal of kerbside parking between Stafford Street and Great Western Highway

4.3.1 Description

In response to feedback received requesting the removal of all kerbside parking between Stafford Street and the Great Western Highway. The proposed upgrade now includes removing parking on The Northern Road from Stafford Street to Derby Street which accounts for about 9 parking spaces and from the Great Western Highway to Derby Street which accounts for about 24 parking spaces. This would result in the loss of about 33 unrestricted parking spaces in total.

The parking between Stafford Street and Derby Street is utilised and is adjacent to residential properties which have sufficient front yard vehicle storage. The parking is currently unrestricted and utilised for long durations, often exceeding four hours, which suggests it is utilised by visitors to Nepean Hospital instead of the adjacent residences. Removal of this parking would provide three clear traffic lanes between Jamison Road and Derby Street in both directions and improve road safety.

The removal of parking between the Great Western Highway and Derby Street is limited to the southbound carriageway and would affect about 24 existing parking spaces. The parking spaces are heavily utilised and the average duration exceeds six hours. This parking is utilised by visitors to the adjacent Nepean Hospital. Given the difficulties in parking at Nepean Hospital until further redevelopment of the site is completed alternative parking opportunities would be made available within Somerset Street and the Great Western Highway to offset the removed parking spaces on The Northern Road.

The proposed changes in parking are shown in Figure 4-3.

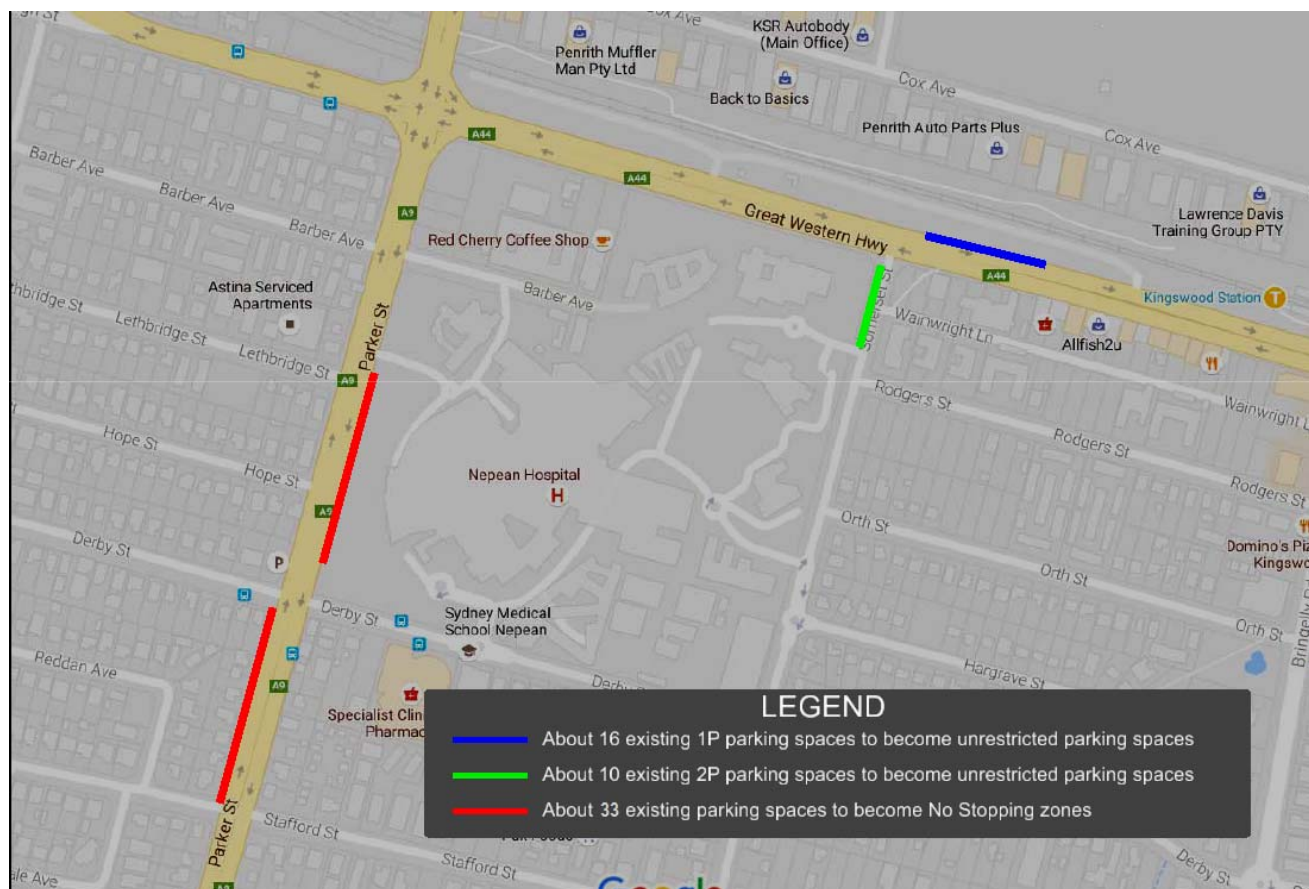


Figure 4-3: Proposed parking changes (Source: Google Maps,)

4.3.2 Environmental assessment

Only those environmental impacts relevant to the proposed changes to the proposal are outlined below.

Traffic Impacts

The proposed change includes removing about 9 parking spaces between Stafford Street and Derby Street without compensatory parking. This parking is currently utilised although results in a number of key issues listed below:

- Increased likelihood of rear end crashes as vehicles stop to reverse into kerbside spaces
- Based on the parking surveys, capacity on The Northern Road is reduced to two lanes consistently between 6am and 7pm on weekdays and 7am and 7pm on weekends. This results in increased congestion and queue lengths
- Limited sight distance for fronting residences due to the accumulation of parked vehicles along the left lane of The Northern Road
- Increased difficulty in entering driveways due to the restriction of turning space due to the close proximity of parked vehicles to driveways
- Increased risk of drivers being struck by passing vehicles when entering/exiting parked vehicles due to the limited clearance between lanes and the high volume of traffic on The Northern Road

The residences between Stafford Street and Derby Street have sufficient setbacks and space within their front yard to accommodate parking. The removal of parking would offer significant improvements to road safety and congestion relief without impacting the residences which do not appear to heavily rely upon the parking and can park within their front yards. For these reasons, it is proposed to remove about 9 parking spaces along The Northern Road between Stafford Street and Derby Street as part of this proposal.

The parking between Derby Street and the Great Western Highway is currently on the southbound carriageway only. All northbound parking has been previously removed by other programs of Roads and Maritime and/or Penrith City Council. There are about 24 parking spaces that remain along the southbound carriageway. These spaces are immediately adjacent to Nepean Hospital and are almost entirely used by visitors to Nepean Hospital.

Based on the findings of the parking survey in Section 3 of this report, it is proposed to introduce the following compensatory parking which is comparable in distance to Nepean Hospital. The compensatory parking changes would include:

- Removal of a section of 2 hour parking along the Great Western Highway eastbound to provide an additional 16 unrestricted parking spaces
- Removal of a section of 1 hour parking along Somerset Street northbound to provide an additional 10 unrestricted parking spaces

This results in about 26 additional unrestricted parking spaces which adequately offsets the removal of parking on The Northern Road.

The proposed changes would address a number of road safety issues and provide improved congestion relief along The Northern Road. The alternate parking locations as shown in Figure 4-3 are away from residences and combined with existing parking areas which would not introduce new road safety issues or disturbances to surrounding receivers.

Socio-Economic Impacts

The proposed change further improves the traffic flow and aligns with proposal objectives. The changes to parking are offset and do not introduce any impacts to adjacent receivers since the proposed parking areas are adjacent to the Western Rail Line and Nepean Hospital.

To avoid impact to unrestricted parking availability near Nepean Hospital existing parking would not be removed until the proposed alternate parking is introduced.

4.3.3 Revised management and mitigation measures

To minimise the extent of parking impacts, the removal of parking would not occur until the compensatory parking changes are made and there are three lanes provided in each direction at the southern approach to Jamison Road. This is reflected in the additional safeguard below.

Impact	Environmental safeguard	Responsibility	Timing
TT8 - Traffic and Transport	The removal of parking between Stafford Street and the Great Western Highway would only be implemented once alternate compensatory parking changes are made on Somerset Street and the Great Western Highway, Kingswood and three lanes of traffic are provided at the southern approach to the Jamison Road intersection	Contractor	Construction

5 Environmental management

The REF for The Northern Road Upgrade, Glenmore Parkway to Jamison Road identified the framework for environmental management, including safeguards and management measures that would be adopted to avoid or reduce environmental impacts (section 7.2 of the REF).

After consideration of the issues raised in community feedback and changes to the proposal, the safeguard and management measures have been revised. Should the proposal proceed, environmental management will be guided by the framework and measures outlined below.

5.1 Environmental management plans (or system)

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

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

The PEMP and CEMP would be prepared prior to construction of the proposal and be reviewed and certified by Roads and Maritime environment staff prior to the commencement of any on-site works. The CEMP would be a working document, subject to ongoing change and updated as necessary to respond to specific requirements. The PEMP and CEMP would be developed in accordance with the specifications set out in the *QA Specification G36 – Environmental Protection (Management System)*, *QA Specification G38 – Soil and Water Management (Soil and Water Plan)*, *QA Specification G40 – Clearing and Grubbing* and *QA Specification G10 - Traffic Management*.

5.2 Summary of safeguards and management measures

The review of environmental factors for The Northern Road Upgrade, Glenmore Parkway to Jamison Road identified a range of environmental outcomes and management measures that would be required to avoid or reduce the environmental impacts.

After consideration of the issues raised in the public submissions, the environmental management measures for the project (refer to Section 7.2 of the REF) have been revised. Should the proposal proceed, the environmental management measures in Table 5.1 will guide the subsequent phases of The Northern Road Upgrade, Glenmore Parkway to Jamison Road. Additional and/or modified environmental safeguards and management measures to those presented in the REF have been bolded in blue and deleted measures, or parts of measures, have been struck out.

Table 5.1: Summary of environmental safeguards and management measures (edits made to those previously outlined in the REF are recorded in **blue and bold**)

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
GEN1	General - minimise environmental impacts during construction	<p>A CEMP will be prepared and submitted for review and endorsement of the Roads and Maritime Environment Manager prior to commencement of the activity.</p> <p>As a minimum, the CEMP will address the following:</p> <ul style="list-style-type: none"> • any requirements associated with statutory approvals • details of how the project will implement the identified safeguards outlined in the REF • issue-specific environmental management plans • roles and responsibilities • communication requirements • induction and training requirements • procedures for monitoring and evaluating environmental performance, and for corrective action • reporting requirements and record-keeping • procedures for emergency and incident management • procedures for audit and review. <p>The endorsed CEMP will be implemented during the undertaking of the activity.</p>	Contractor / Roads and Maritime project manager	Pre-construction / detailed design	Core standard safeguard GEN1
GEN2	General - notification	All businesses, residential properties and other key stakeholders (e.g. schools, local councils) affected by the activity will be notified at least five days prior to commencement of the activity.	Contractor	Pre-construction	Core standard safeguard GEN2
GEN3	General – environmental awareness	All personnel working on site will receive training to ensure awareness of environment protection requirements to be implemented during the project. This will include up-front site	Contractor	Pre-construction / detailed design	Core standard safeguard GEN3

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
		<p>induction and regular "toolbox" style briefings.</p> <p>Site-specific training will be provided to personnel engaged in activities or areas of higher risk. These include: areas of Aboriginal heritage sensitivity non-Aboriginal heritage management including unexpected finds procedures threatened species habitat dust and air quality management.</p> <p>Records of training will be maintained by the contractor, including details of staff attending, dates, nature of training provided, and training provider(s) used.</p>			
GEN4	General – environmental awareness	<p>Standard construction hours: Monday to Friday 7.00 am to 6.00 pm Saturdays 8.00 am to 1.00 pm No construction on Sundays or Public Holidays.</p> <p>Works outside standard construction hours (including those detailed within this REF) will be undertaken in accordance with the management and mitigation measures detailed within the Noise and Vibration Management Plan.</p>	Contractor	Construction	Additional safeguard
GEN5	General – environmental awareness	The RMS Project Manager will notify the RMS Environment Manager at least five days prior to the commencement of the activity. The notification will include a copy of any local community notification undertaken (GEN2).	Contractor	Pre-construction / detailed design	Additional safeguard
GEN6	General – environmental	A risk assessment will be undertaken in accordance with RMS audit, risk and inspection procedures and prior to the activity	Contractor / Roads and Maritime	Pre-construction / detailed design	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
	awareness	commencing to determine an appropriate audit and inspection program to be applied during construction.	project manager		
GEN7	General – environmental awareness	<p>A targeted audit and inspection program will be implemented for the activity, in accordance with the findings of the risk assessment (refer GEN6).</p> <p>A review of the risk assessment will occur following the first audit or inspection to determine if the level of risk assigned to the project remains appropriate.</p>	Contractor / Roads and Maritime project manager	Construction	Additional safeguard
GEN8	General – environmental awareness	Environmental incidents, such as pollution spills and unauthorised vegetation clearing, will be reported and managed in accordance with the RMS Environmental Incident Classification and Reporting Procedure.	Contractor / Roads and Maritime project manager	Construction	Additional safeguard
GEN9	General – environmental awareness	<p>The final locations and configurations of ancillary facilities will be determined by the contractor in consultation with Roads and Maritime’s Senior Environmental Officer to confirm the suitability of the locations and whether any additional environmental assessment is required.</p> <p>Stockpile and compound sites will be located on sites which satisfy the location criteria as follows:</p> <ul style="list-style-type: none"> • Not prone to flash flooding • More than 40 metres from a watercourse, or 50 metres in the case of the tributary of Surveyors Creek at Glenmore Parkway (Type 1 Fish Habitat) • More than 50 metres from the nearest dwelling (where possible, unless otherwise approved by Roads and Maritime) 	Contractor / Roads and Maritime project manager	Pre-construction / detailed design	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
		<ul style="list-style-type: none"> In previously disturbed areas that do not require the clearing of native vegetation In plain view of the public to deter theft and illegal dumping Outside the drip line of trees and on level ground wherever possible Located on relatively level ground and away from areas of heritage conservation value. 			
TT1	Traffic and transport	<p>A Traffic Management Plan (TMP) will be prepared and implemented as part of the CEMP. The TMP will be prepared in accordance with the Roads and Maritime Traffic Control at Work Sites Manual (RTA, 2010) and QA Specification G10 Control of Traffic (Roads and Maritime, 2008). The TMP will include:</p> <ul style="list-style-type: none"> confirmation of haulage routes measures to maintain access to local roads and properties site specific traffic control measures (including signage) to manage and regulate traffic movement measures to maintain pedestrian and cyclist access requirements and methods to consult and inform the local community of impacts on the local road network access to construction sites including entry and exit locations and measures to prevent construction vehicles queuing on public roads. a response plan for any construction traffic incident consideration of other developments that may be under construction to minimise traffic conflict and congestion that may occur due to the cumulative increase in construction vehicle traffic monitoring, review and amendment mechanisms. 	Contractor	Detailed design / Pre-construction	<p>Core standard safeguard TT1</p> <p>Section 4.8 of QA G36 Environment Protection</p>

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
TT2	Traffic and Transport	Consultation will be undertaken with property owners between Maxwell Street / Bringelly Road and Smith Street to review front yard storage and vehicle manoeuvrability.	Contractor	Detailed Design	Additional safeguard
TT3	Traffic and Transport	Requirements for any changes to local traffic and access arrangements will be confirmed during detailed design in consultation with the local road authority and any affected landowners, including any temporary alternative access arrangements as required.	Contractor	Detailed design / Pre-construction	Additional safeguard
TT4	Traffic and Transport	Consultation will be undertaken with potentially affected businesses and residences prior to the commencement of and during work in accordance with Roads and Maritime's Community Involvement and Communications Resource Manual. Consultation will include but not limited to door knocks, newsletters or letterbox drops providing information on the proposed work, working hours and a contact name and number for more information or to register complaints.	Contractor	Pre-construction	Additional safeguard
TT5	Traffic and Transport	Consultation will be carried out with emergency services to ensure adequate emergency vehicle access is provided and maintained at all times for the duration of construction. Notification will be provided to Nepean Hospital and NSW Ambulance about any proposed traffic changes at least 5 working days prior to any changes.	Contractor	Pre-construction and construction	Additional safeguard
TT6	Traffic and Transport	Intersections of The Northern Road with some local roads which are proposed to have changed access conditions would not be altered until proposed alternative access routes are constructed and opened to traffic.	Contractor	Construction	Additional safeguard
TT7	Traffic and	Pedestrian and cyclist access will be maintained throughout	Contractor	Construction	Additional

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
	Transport	construction. Where that is not feasible or necessary, temporary alternative access arrangements will be provided following consultation with affected landowners and the local road authority.			safeguard
TT8	Traffic and Transport	Access for public transport services, including school bus services, will be maintained. The requirements for any temporary changes will be confirmed following consultation with local bus operators and the community.	Contractor	Construction	Additional safeguard
TT9	Traffic and Transport	The removal of parking between Stafford Street and the Great Western Highway would only be implemented once alternate compensatory parking changes are made on Somerset Street and the Great Western Highway, Kingswood and three lanes of traffic are provided at the southern approach to the Jamison Road intersection	Contractor	Construction	Additional safeguard
TT10	Traffic and Transport	<p>During detailed design, specific consideration would be given to:</p> <ul style="list-style-type: none"> The signposting and delineation across the Garswood Road intersection to ensure traffic has safe opportunity to enter The Northern Road Extending the right turn entry lanes on the M4 Motorway to improve queue capability Relocating the northbound bus stop at Glenmore Parkway towards Garswood Road Providing ‘left turn on red’ or ‘turn left with care’ signposting for all left turns where practicable along the proposed upgrade. Only stopping traffic on left turn slip lanes where activated by pedestrians and/or cyclists 	Contractor	Detailed design	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
TT11	Traffic and Transport	<p>Prior to provision of access between the Penrith Christian School carpark and the proposed roundabout on Frogmore Road, a traffic management plan will have to be prepared by Penrith Christian School and submitted for approval to Roads and Maritime's Network Operations section and Penrith City Council for acknowledgement. The traffic management plan will need to include:</p> <ul style="list-style-type: none"> • Requested usage times for the access on Frogmore Road • Consideration about containing traffic within the Penrith Christian School grounds to manage the exit flow of traffic • Proposed traffic routing and movements between Simeon Road, Frogmore Road and the school accesses 	Roads and Maritime	Detailed Design/ Pre-construction	Additional safeguard
NV1	Noise and vibration	<p>A Noise and Vibration Management Plan (NVMP) will be prepared and implemented as part of the CEMP. The NVMP will generally follow the approach in the <i>Interim Construction Noise Guideline</i> (ICNG) (DECC, 2009) and identify:</p> <ul style="list-style-type: none"> • all potential significant noise and vibration generating activities associated with the activity • feasible and reasonable mitigation measures to be implemented, taking into account <i>Beyond the Pavement: urban design policy, process and principles</i> (Roads and Maritime, 2014). • a monitoring program to assess performance against relevant noise and vibration criteria • arrangements for consultation with affected neighbours and sensitive receivers, including notification and complaint handling procedures 	Contractor	Detailed design / pre-construction	<p>Core standard safeguard NV1</p> <p>Section 4.6 of QA G36 <i>Environment Protection</i></p>

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
		<ul style="list-style-type: none"> contingency measures to be implemented in the event of non-compliance with noise and vibration criteria. 			
NV2	Noise and vibration	<p>All sensitive receivers (e.g. schools, local residents) likely to be affected will be notified at least five days prior to commencement of any works associated with the activity that may have an adverse noise or vibration impact. The notification will provide details of:</p> <ul style="list-style-type: none"> the project the construction period and construction hours contact information for project management staff complaint and incident reporting how to obtain further information. 	Contractor	Detailed design / pre-construction	Core standard safeguard NV2
NV3	Noise and vibration	Further assessment of reasonable and feasible operational noise mitigation in the form of noise barriers and at-property treatments would be assessed and determined during detailed design. At-property treatments would be determined and implemented in consultation with impacted property owners.	Contractor	Detailed design / pre-construction	Additional safeguard
NV4	Noise and vibration	Further assessment of Penrith Christian School would be undertaken to confirm which classrooms and buildings would be eligible for at property noise mitigation treatment. determine the most effective noise mitigation option	Roads and Maritime Services	Detailed Design	Additional safeguard
NV5	Noise and vibration	Construction staff will be inducted and educated regarding management of noise impacts.	Contractor	Pre-construction	Additional safeguard
NV6	Noise and vibration	Construction programming would be developed in consultation with the affected community to minimise noise impacts – this	Contractor	Pre-construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
		may include agreement on completing construction in as short a time as possible or implementing time and duration restrictions and respite periods.			
NV7	Noise and vibration	Place as much distance as possible between the plant or equipment and residences and other sensitive land uses, particularly at site compounds.	Contractor	Pre-construction / construction	Additional safeguard
NV8	Noise and vibration	Use temporary site buildings and materials stockpiles as noise barriers (e.g. on site compounds).	Contractor	Pre-construction / construction	Additional safeguard
NV9	Noise and vibration	Schedule construction of any permanent walls so that they can be used as early as possible as noise barriers.	Contractor	Pre-construction / construction	Additional safeguard
NV10	Noise and vibration	Schedule the use of vibration intensive equipment for less sensitive times of the day.	Contractor	Pre-construction / construction	Additional safeguard
NV11	Noise and vibration	Avoid multiple vibration intensive activities occurring at the same time.	Contractor	Pre-construction / construction	Additional safeguard
NV12	Noise and vibration	Selection of ancillary site location should consider the proximity of the site to sensitive receivers. Where compounds are close to residences, additional care should be taken in layout and utilising structures and stockpiles as noise screens.	Contractor	Pre-construction / construction	Additional safeguard
NV13	Noise and vibration	Where possible, works outside of standard construction hours will be planned so that noisier works are carried out in the earlier part of the evening or night time.	Contractor	Pre-construction / construction	Additional safeguard
NV14	Noise and vibration	Examine different types of machines that perform the same function and compare the noise level data to select the least noisy machine. For example, rubber wheeled tractors can be	Contractor	Pre-construction / construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
		less noisy than steel tracked tractors.			
NV15	Noise and vibration	Select appropriately sized equipment for the task rather than using large equipment when not necessary.	Contractor	Pre-construction / construction	Additional safeguard
NV16	Noise and vibration	Reduce throttle setting and turn off equipment when not being used.	Contractor	Construction	Additional safeguard
NV17	Noise and vibration	Regularly inspect and maintain equipment to ensure it is in good working order. Also check the condition of mufflers.	Contractor	Construction	Additional safeguard
NV18	Noise and vibration	Where acceptable from a work health and safety perspective, quieter alternatives to reversing alarms (such as spotters, closed circuit television monitors and 'smart' reversing alarms) would be used particularly during out of hours activities.	Contractor	Construction	Additional safeguard
NV19	Noise and vibration	Noise monitoring will be undertaken to assess compliance with noise management levels (NMLs) and assess the effectiveness of noise mitigation.	Contractor	Construction	Additional safeguard
NV20	Noise and vibration	All noise complaints will be investigated and appropriate mitigation measures implemented where practicable to minimise further impacts.	Contractor	Construction	Additional safeguard
NV21	Noise and vibration	Pre-construction condition surveys will be undertaken for any improvement, building and/or structure likely to be affected by vibration impacts of the construction works. A copy of the condition survey would be provided to the property owner at least two weeks prior to the commencement of construction.	Contractor	Pre-construction	Additional safeguard
B1	Biodiversity	A Flora and Fauna Management Plan will be prepared in	Contractor	Detailed design /	Core standard

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
		<p>accordance with Roads and Maritime's Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects (RTA, 2011) and implemented as part of the CEMP. It will include, but not be limited to:</p> <ul style="list-style-type: none"> Plans showing areas to be cleared and areas to be protected, including exclusion zones, protected habitat features and revegetation areas Requirements set out in the Landscape Guideline (RTA, 2008) Pre-clearing survey requirements Procedures for unexpected threatened species finds and fauna handling Procedures addressing relevant matters specified in the Policy and Guidelines for Fish Habitat Conservation and Management (DPI Fisheries, 2013) Protocols to manage weeds and pathogens. 		pre-construction	<p>safeguard B1</p> <p>Section 4.8 of QA G36 Environment Protection</p>
B2	Biodiversity	Measures to further avoid and minimise the construction footprint and native vegetation or habitat removal will be investigated during detailed design and implemented where practicable and feasible.	Contactors	Detailed design / pre-construction	Core standard safeguard B2
B3	Biodiversity	<p>An experienced ecologist will be engaged to undertake the pre-clearing processes for the proposal and inform the Flora and Fauna Management Plan as required, including the following activities:</p> <ul style="list-style-type: none"> In the weeks prior to commencement of clearing (or demolition in the case of bridges and culverts): Confirm the locations of previously identified biodiversity features (including bridges and culverts as potential habitat for microbats, and hollow bearing trees) 	Contactors	Detailed design / pre-construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
		<ul style="list-style-type: none"> Identify any fauna that have the potential to be disturbed, injured or killed as a result of clearing activities. In the 24 hour period prior to commencement of clearing (or demolishing structures in the case of bridges and culverts), licensed wildlife carers and/or ecologists should: Capture and/or remove and relocate (to previously identified suitable locations) fauna that have the potential to be disturbed, injured or killed as a result of clearing activities Inform clearing contractors of any changes to the sequence of clearing because of fauna present if required. 			
B4	Biodiversity	An ecologist will be engaged to develop and assist in the implementation of a nest box strategy to mitigate impacts from the removal of hollow bearing trees, including nest box monitoring requirements during construction.	Contractor	Detailed design / pre-construction	Additional safeguard
B5	Biodiversity	All personnel working on site will receive training to ensure awareness of requirements of the Flora and Fauna Management Plan and relevant statutory responsibilities. Site-specific training will be given to personnel when working in the vicinity of areas of identified biodiversity value that are to be protected.	Contractor	Detailed design / pre-construction	Additional safeguard
B6	Biodiversity	Best practice methods for aquatic habitat management will be implemented during detailed design and construction including but not limited to: <ul style="list-style-type: none"> design of culverts in accordance with Fish Passage Requirements for Waterway Crossings (Fairfull & Witheridge 2003) minimise instream and riparian disturbance 	Contractor	Pre construction / detailed design	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
		<ul style="list-style-type: none"> develop and implement a water quality monitoring program during construction in and around waterways. 			
B7	Biodiversity	Consistent with the <i>Biodiversity Guidelines – Protecting and Managing Biodiversity on RTA Projects</i> , and any specific requirements of the approved Flora and Fauna Management Plan, locally indigenous plant species will be used during rehabilitation and revegetation.	Contractor	Post-construction / operation	Additional safeguard
B8	Biodiversity	Any soil or other materials imported to the site for use in restoration or rehabilitation will be certified free from weeds and pathogens, or obtained from sources that demonstrate best practice management to minimise weed and pathogen risks.	Contractor	Post-construction / operation	Additional safeguard
B9	Biodiversity	Consistent with any specific requirements of the approved Flora and Fauna Management Plan, a post-construction monitoring program will be implemented to assess effective implementation of the safeguards and mitigation measures, identify any unexpected or inadvertent impacts, and identify recommended revisions or improvements to support the protection of native flora and fauna.	Contractor	Post-construction / operation	Additional safeguard
HF1	Hydrology and flooding	Prior to construction commencing, final flood and hydrology assessments will be undertaken to inform detail design measures to minimise risks to the environment, properties and the project.	Roads and Maritime Services Contractor	Pre-construction	Additional Safeguard
HF2	Hydrology and flooding	The site compound and stockpile sites will be located in areas away from flood flow paths and preferably where peak flood depths and velocities are likely to be low.	Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
HF3	Hydrology and flooding	The two proposed construction ancillary facilities south of Wentworth Road will be laid out to avoid placement of materials where this is a risk of flooding and material removal.	Contractor	Construction	Additional safeguard
HF4	Hydrology and flooding	At detailed design, coupled 1D/2D hydraulic modelling, will be undertaken to provide a more accurate model to describe the interaction of flows between culverts and the impacts of the proposal on the flood conditions. This will help refine the design for flows arriving at the culverts, conveyance through the culverts, and temporary ponding at culvert inlets.	Roads and Maritime Services Contractor	Detailed design	Additional safeguard
HF5	Hydrology and flooding	To protect all culverts (except C8040 under the northern approach to the M4 Motorway bridge and C8960 under The Northern Road near Aspen Street) against scour, a concrete headwall with either a concrete or rock apron will be provided.	Contractor	Detailed design and construction	Additional safeguard
HF6	Hydrology and flooding	Consideration will be given to enclosing the drainage easement south of Glenmore Parkway and west of The Northern Road where reasonable and feasible	Contractor	Detailed design	Additional safeguard
C1	Contaminated land	A Contaminated Land Management Plan will be prepared in accordance with the Guideline for the Management of Contamination (Roads and Maritime, 2013) and implemented as part of the CEMP. The plan will include, but not be limited to: <ul style="list-style-type: none"> capture and management of any surface runoff contaminated by exposure to the contaminated land further investigations required to determine the extent, concentration and type of contamination, as identified in the detailed site investigation (Phase 2) 	Contractor	Detailed design / Pre-construction	Core standard safeguard C1 Section 4.2 of QA G36 Environment Protection

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
		<ul style="list-style-type: none"> management of the remediation and subsequent validation of the contaminated land, including any certification required measures to ensure the safety of site personnel and local communities during construction. 			
C2	Contaminated land	If contaminated areas are encountered during construction, appropriate control measures will be implemented to manage the immediate risks of contamination. All other works that may impact on the contaminated area will cease until the nature and extent of the contamination has been confirmed and any necessary site-specific controls or further actions identified in consultation with the Roads and Maritime Environment Manager and/or EPA.	Contractor	Detailed design / Pre-construction	Core standard safeguard C2 Section 4.2 of QA G36 Environment Protection
C3	Accidental spill	A site specific emergency spill plan will be developed, and include spill management measures in accordance with the Roads and Maritime Code of Practice for Water Management (RTA, 1999) and relevant EPA guidelines. The plan will address measures to be implemented in the event of a spill, including initial response and containment, notification of emergency services and relevant authorities (including Roads and Maritime and EPA officers).	Contractor	Detailed design / Pre-construction	Core standard safeguard C3 Section 4.3 of QA G36 Environment Protection
C4	Contaminated land	Soil within proposed construction footprints adjacent to sites identified as moderate Areas of Environmental Interest (AEIs) during the Phase 1 contamination assessment will be sampled and tested to the maximum depth of excavation planned within these areas. Results of investigations will be incorporated into the Contaminated Land Management Plan.	Contractor	Pre-construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
C5	Asbestos	<p>An Asbestos Management Plan will be developed and implemented. The plan will include:</p> <ul style="list-style-type: none"> • identification of potential asbestos on site • procedures to manage and handle any asbestos • mitigation measures if asbestos is encountered during construction • procedures for disposal of asbestos in accordance with NSW EPA guidelines, Australian Standards and relevant industry codes of practice. 	Contractor	Detailed design / Pre-construction	Additional safeguard
C6	Contaminated land	If potentially contaminated materials are suspected and/or encountered during construction, these will be managed by an unexpected finds protocol incorporated in the CEMP.	Contractor	Construction	Additional safeguard
SW1	Soil and water	A Soil and Water Management Plan (SWMP) will be prepared and implemented as part of the CEMP. The SWMP will identify all reasonably foreseeable risks relating to soil erosion and water pollution and describe how these risks will be addressed during construction.	Contractor	Detailed design / pre-construction	<p>Core standard safeguard SW1</p> <p>Section 2.1 of QA G38 Soil and Water Management</p>
SW2	Soil and water	<p>A site specific Erosion and Sediment Control Plan/s will be prepared and implemented as part of the Soil and Water Management Plan.</p> <p>The Plan will include arrangements for managing wet weather events, including monitoring of potential high risk events (such as storms) and specific controls and follow-up measures to be applied in the event of wet weather.</p>	Contractor	Detailed design / Pre-construction	<p>Core standard safeguard SW2</p> <p>Section 2.2 of QA G38 Soil and Water Management</p>

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
SW3	Soil and water	Soil salinity testing will be carried out prior to construction to further assess these risks and implement appropriate controls.	Contractor	Pre-construction	Additional safeguard
SW4	Soil and water	A comprehensive field aquatic assessment will be carried out to confirm the findings of the preliminary assessment.	Contractor	Pre-construction	Additional safeguard
SW5	Soil and water	Control measures to manage erosion and sedimentation risks will be implemented including: <ul style="list-style-type: none"> • Erosion and sediment controls will be implemented before any construction starts • Sediment basins will be regularly serviced and maintained to comply with water quality and capacity requirements • Vegetation clearing and site stabilisation of disturbed areas will be undertaken progressively to limit the time that disturbed areas are exposed to erosive forces • High risk soil and erosion activities such as earthworks will not be undertaken immediately before or during high rainfall or wind events • Topsoil will be stockpiled separately for potential reuse in landscaping and rehabilitation works • Permanent catch drains will be installed behind cut faces to act as diversion drains during construction • Erosion and sediment control measures will be maintained until the proposal is completely constructed and areas are stabilised by revegetation. 	Contractor	Pre-construction and construction	Additional safeguard
SW6	Soil and water	Control measures to minimise the risk of water pollution will be implemented including: <ul style="list-style-type: none"> • All fuels, chemicals, and liquids will be stored at least 50 metres away from the existing stormwater drainage system and stored in an impervious bunded area within the 	Contractor	Pre-construction and construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
		<p>compound site</p> <ul style="list-style-type: none"> Plant and maintenance machinery will be refuelled in impervious bunded areas in the designated compound area Vehicle washdowns and/or concrete truck washouts would be undertaken within a designated bunded area of an impervious surface or undertaken off-site. 			
AQ1	Air quality	<p>An Air Quality Management Plan (AQMP) will be prepared and implemented as part of the CEMP. The AQMP will include, but not be limited to:</p> <ul style="list-style-type: none"> Identifying potential sources of air pollution Air quality management objectives consistent with any relevant published EPA and/or OEH guidelines Mitigation and suppression measures to be implemented Methods to manage work during strong winds or other adverse weather conditions A progressive rehabilitation strategy for exposed surfaces. 	Contractor	Detailed design / pre-construction	<p>Core standard safeguard AQ1</p> <p>Section 4.4 of QA G36 Environment Protection</p>
AQ2	Air quality	If the alignment in the final design of the proposal results in lanes less than 5 metres from surrounding receivers, further assessment and mitigation of operational air quality impacts will be required.	Contractor	Design / pre-construction	Additional safeguard
AQ3	Air quality	All personnel working on site will receive training to ensure awareness of requirements of the Air Quality Management Plan. Site-specific training will be given to personnel when working near sensitive receivers.	Contractor	Construction	Additional safeguard
AQ4	Air quality	Install depositional dust gauges to quantify dust levels and implement additional mitigation measures as required.	Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
		Gauges will be installed at representative locations along the project alignment to assess potential dust impacts.			
AQ5	Air quality	Construction work will be assessed during strong winds or in weather conditions where high levels of dust or airborne particulates are likely and amended as required to mitigate against adverse dust impacts.	Contractor	Construction	Additional safeguard
AQ6	Air quality	Vehicles transporting waste or other materials that may produce odours or dust are to be covered during transportation.	Contractor	Construction	Additional safeguard
AQ7	Air quality	Vehicles and plant used on site are to be kept in efficient working order. Section 124 of the Protection of the Environment Operations Act 1997 must be complied with in relation to proper and efficient operation and maintenance of plant and machinery.	Contractor	Construction	Additional safeguard
AQ8	Air quality	Truck movements will be restricted to designated access areas.	Contractor	Construction	Additional safeguard
AQ9	Air quality	Work vehicles and machinery will not be left running or idling when not in use.	Contractor	Construction	Additional safeguard
AQ10	Air quality	Any material or exposed areas will be secured during project shutdown periods to prevent any dust emanating.	Contractor	Construction	Additional safeguard
AQ11	Air quality	Post-construction traffic will be measured to verify that traffic volumes and characteristics are not materially different from the forecast numbers considered in the Air Quality Assessment undertaken for the REF.	Contractor	Post-construction / operation	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
AH1	Aboriginal heritage	An Aboriginal Heritage Management Plan (AHMP) will be prepared in accordance with the Procedure for Aboriginal Cultural Heritage Consultation and Investigation (Roads and Maritime, 2012) and Standard Management Procedure – Unexpected Heritage Items (Roads and Maritime, 2015) and implemented as part of the CEMP. It will provide specific guidance on measures and controls to be implemented for managing impacts on Aboriginal heritage. The AHMP will be prepared in consultation with all relevant Aboriginal groups.	Contractor	Detailed design / pre-construction	Core standard safeguard AH1 Section 4.9 of QA G36 Environment Protection
AH2	Aboriginal heritage	The Standard Management Procedure – Unexpected Heritage Items (Roads and Maritime, 2015) will be followed in the event that an unknown or potential Aboriginal object/s, including skeletal remains, is found during construction. This applies where Roads and Maritime does not have approval to disturb the object/s or where a specific safeguard for managing the disturbance (apart from the Procedure) is not in place. Work will only re-commence once the requirements of that Procedure have been satisfied.	Contractor	Detailed design / pre-construction	Core standard safeguard AH2 Section 4.9 of QA G36 Environment Protection
AH3	Aboriginal heritage	All personnel working on site will receive training to ensure awareness of requirements of the Aboriginal Heritage Management Plan and relevant statutory responsibilities. Site-specific training will be given to personnel when working in the vicinity of identified Aboriginal heritage items.	Contractor	Pre-construction	Additional safeguard
AH4	Aboriginal heritage	Roads and Maritime will apply for An AHIP for the proposal area is required under Part 6 of the NPW Act, for all Aboriginal sites that will be directly or indirectly impacted, prior to any construction activities. Construction activities will not commence until the AHIP for the proposal area and the M4MM	Roads and Maritime	Pre-construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
		AHIP are in place.			
H1	Non-Aboriginal heritage	A Non-Aboriginal Heritage Management Plan (NAHMP) will be prepared and implemented as part of the CEMP. It will provide specific guidance on measures and controls to be implemented to avoid and mitigate impacts on non-Aboriginal heritage.	Contractor	Detailed design / pre-construction	Core standard safeguard H1 Section 4.10 of QA G36 Environment Protection
H2	Non-Aboriginal heritage	The Standard Management Procedure – Unexpected Heritage Items (Roads and Maritime, 2015) will be followed in the event that any unexpected heritage items, archaeological remains or potential relics of non-Aboriginal origin are encountered Work will only re-commence once the requirements of that Procedure have been satisfied.	Contractor	Detailed design / pre-construction	Core standard safeguard H2 Section 4.10 of QA G36 Environment Protection
H3	Non-Aboriginal heritage	Non-Aboriginal heritage awareness training must be provided for all contractors and personnel prior to commencement of construction to outline the identification of potential heritage items and associated procedures to be implemented in the event of the discovery of non-Aboriginal heritage materials, features or deposits (that is, unexpected finds), or the discovery of human remains.	Contractor	Pre-construction	Additional safeguard
UD1	Landscape character and visual impact	An Urban Design Plan will be prepared to support the final detailed project design and implemented as part of the CEMP. The Urban Design Plan will present an integrated urban design for the project, providing practical detail on the	Contractor	Detailed design / construction	Core standard safeguard UD1

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
		<p>application of design principles and objectives identified in the environmental assessment. The Plan will include design treatments for:</p> <ul style="list-style-type: none"> location and identification of existing vegetation and proposed landscaped areas, including species to be used built elements including retaining walls, bridges and noise walls pedestrian and cyclist elements including footpath location, paving types and pedestrian crossings fixtures such as seating, lighting, fencing and signs details of the staging of landscape works taking account of related environmental controls such as erosion and sedimentation controls and drainage procedures for monitoring and maintaining landscaped or rehabilitated areas. <p>The Urban Design Plan will be prepared in accordance with relevant guidelines, including:</p> <ul style="list-style-type: none"> • Beyond the Pavement urban design policy, process and principles (Roads and Maritime, 2014) • Landscape Guideline (RTA, 2008) • Bridge Aesthetics (Roads and Maritime 2012) • Noise Wall Design Guidelines (RTA, 2006) • Shotcrete Design Guideline (RTA, 2005). 			
UD2	Landscape design	<p>The Urban Design Plan is to provide details on tree planting with an emphasis on reinstating Cumberland Plain Woodland vegetation character, framing views and providing amenity in public open space. The tree planting/landscape design is to include:</p> <ul style="list-style-type: none"> • Provide strong Reinstating visual buffer planting between 	Contractor	Detailed design	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
		<p>the M4 Motorway and residents on the southern side, including in Homestead Road and South Street</p> <ul style="list-style-type: none"> • Provide strong Reinstating visual buffer planting between the M4 Motorway and the Penrith Christian School • Reviewing tree planting between The Northern Road and the Penrith Christian School, to maintain the existing character of intermittent tree planting with filtered and open views into the landscape east of the corridor • Maximising tree planting in the verges around intersections to maintain or reinstate the character of a road corridor punctuated by landscape nodes • Reinstating Cumberland Plain Woodland cover in all compound sites and temporary work zones • maximise median planting of low shrubs (about up to one metre in height) along The Northern Road to provide headlight glare screening and to visually separate carriageways to create the sense of a landscape corridor 			
UD3	Bridge design	<ul style="list-style-type: none"> • Bridge design is to include throw screens, fences and safety barriers that are transparent and maximise opportunities for views from the bridge along the M4 Motorway and toward the Blue Mountains. • Review the bridge deck height and lower where possible. This has the potential to reduce the visual impact of the bridge itself and of associated batters. It would lessen the impacts on a number of views and LCZs, as well as reduce property impacts. • Consideration would be given to retaining the rowing theme on the new bridge throw screens. 	Contractor	Detailed design	Additional safeguard
UD4	Visual impact of	Detailed design solutions to minimise the visual impacts of	Contractor	Detailed design	Additional

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
	noise walls	noise walls will be developed in consultation with Penrith City Council, and implemented during construction. The design will be prepared in accordance with the RTA Noise wall design guideline.			safeguard
UD5	Visual impact of retaining walls	A consistent design for retaining walls, including surface treatment, colour and detailing will be developed in consultation Penrith City Council, and implemented during construction.	Contractor	Detailed design	Additional safeguard
UD6	Visual impact of work sites	Project work sites, including construction areas and supporting facilities (such as storage compounds and offices) will be managed to minimise visual impacts, including appropriate fencing or screening (e.g. use of shade cloth), storage of equipment, parking, stockpile screening and arrangements for the storage and removal of rubbish and waste materials.	Contractor	Construction	Additional safeguard
UD7	Visual impact of work sites	Compound and ancillary facilities will be decommissioned and the sites rehabilitated to their existing condition or as otherwise agreed with the landowner on completion of works.	Contractor	Construction	Additional safeguard
UD8	Light spill from work sites	Temporary lighting would be sited and designed to avoid light spill into residential properties and identified sensitive receptors	Contractor	Construction	Additional safeguard
UD9	Light spill – operation	Lighting would be designed to minimise light spill into residential properties and sensitive receptors	Contractor	Construction	Additional safeguard
SE1	Socio-economic	A Community and Stakeholder Involvement Plan (CSIP) will be prepared and implemented as part of the CEMP to help provide timely and accurate information to the community during construction. The CSIP will include (as a minimum):	Contacto	Pre-construction	Core standard safeguard SE1

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
		<p>mechanisms to provide details and timing of proposed activities to affected residents, including changed traffic and access conditions, contact name and number for complaints.</p> <p>The CP will be prepared in accordance with the Community Involvement and Communications Resource Manual (RTA, 2008).</p>			
SE2	Socio-economic	A complaint handling procedure and register will be included in the CEMP.	Contacto	Construction	Additional safeguard
SE3	Socio-economic	On-going consultation will be carried out during construction with managers and users of potentially impacted businesses and community facilities regarding the timing, duration and likely impact of construction activities on the use of the facility or business.	Contacto	Construction	Additional safeguard
SE4	Socio-economic	On-going consultation will be carried out with staff of Penrith Christian School and other schools near the construction works about timing of construction activities, to manage potential impacts on exam periods and any temporary access changes	Roads and Maritime Contractor	Construction	Additional safeguard
SE5	Socio-economic	All property acquisition will be carried out in accordance with the Land Acquisition Information Guide (Roads and Maritime, 2012) and the Land Acquisition (Just Terms Compensation) Act 1991.	Roads and Maritime	Pre-construction / detailed design	Core standard safeguard PL1
W1	Waste and resource use	<p>A Waste and resource Management Plan (WMP) will be prepared and implemented as part of the CEMP. The WMP will include but not be limited to:</p> <ul style="list-style-type: none"> measures to avoid and minimise waste associated with the 	Contracto	Pre-construction	<p>Core standard safeguard W1</p> <p>Section 4.2 of QA</p>

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
		<p>project</p> <ul style="list-style-type: none"> • classification of wastes and management options (re-use, recycle, stockpile, disposal) • statutory approvals required for managing both on and off-site waste, or application of any relevant resource recovery exemptions • procedures for storage, transport and disposal • monitoring, record keeping and reporting. • A resource management strategy detailing beneficial reuse options for surplus and/or unsuitable material. <p>The WMP will be prepared taking into account the Environmental Procedure - Management of Wastes on Roads and Maritime Services Land (Roads and Maritime, 2014) and relevant Roads and Maritime Waste Fact Sheets, as well as the adopting the Resources Management Hierarchy principles of the WARR Act.</p>			G36 Environment Protection
W2	Waste and resource use	<p>Prior to land being used for ancillary construction purposes (compounds, storage, parking, etc.) a pre-construction land assessment will be undertaken to identify the presence of any pre-existing wastes.</p> <p>The assessment will be prepared in accordance with the RMS Environmental Procedure - Management of Wastes on Roads and Maritime Services Land. Where the land is privately owned, a copy of the assessment will be provided to the landowner.</p>	Contractor	Pre-construction	Additional safeguard
W3	Waste and resource use	A Spoil Management Strategy would be developed prior to the commencement of construction and implemented during	Contractor	Pre-construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
		construction. The strategy would identify spoil disposal site(s) and describe the management of spoil on-site and during off-site transport.		Construction	
W4	Waste and resource use	Waste materials (such as soils and aggregates) obtained from the project and to be exported for use on another construction site or project will be sampled and managed in accordance with relevant resource recovery orders and exemptions as issued by the NSW EPA.	Contractor	Construction	Additional safeguard
W5	Waste and resource use	Any trees to be removed will be reused as millable timber wherever practicable. Other vegetated material from native species will be mulched and re-use on-site for landscaping or rehabilitation purposes if consistent with the approved Flora and Fauna Management Plan for the project. Weed species, or vegetation not considered appropriate for re-use on-site, will be removed and disposed of to an appropriately licenced facility.	Contractor	Construction	Additional safeguard
W6	Waste and resource use	Effluent produced from on-site amenities, including toilets, bathrooms and kitchens will either be discharged to the local sewerage system, or where septic or portable facilities are provided they will be of sufficient capacity, located away from environmentally sensitive areas, and material will be regularly collected and disposed of to an appropriately licenced facility. Pit toilets are not permitted.	Contractor	Construction	Additional safeguard
W7	Waste and resource use	All wastes, including contaminated wastes and liquid waste, will be identified and classified in accordance with Waste Classification Guidelines (NSW EPA, 2014)	Contractor	Construction	Additional safeguard
W8	Waste and resource	Disposal of waste will be undertaken in accordance with the	Contractor	Construction	Additional

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
	use	POEO Act.			safeguard
W9	Waste and resource use	<p>Asbestos waste will be removed from the site and disposed of to an appropriately licenced facility and in accordance with the Asbestos Management Plan for the project and will be carried out in accordance with:</p> <ul style="list-style-type: none"> • Work Health and Safety Act 2011 • Code of Practice for the Safe Removal of Asbestos 2nd edition (NOHSC, 2005) • Code of Practice for the Management and Control of Asbestos in Workplaces (NOHSC, 2005) • Protection of the Environment Operations (Waste) Regulation 2005 – section 42 special requirements relating to asbestos waste. 	Contractor	Construction	Additional safeguard
W10	Waste and resource use	Demolition work would be carried out in accordance with AS2601:1991 Demolition of Structures.	Contractor	Construction	Additional safeguard
W11	Waste and resource use	Any dewatering activities will be undertaken in accordance with the <i>RTA Technical Guideline: Environmental management of construction site dewatering</i> in a manner that prevents pollution of waters, including appropriate reuse or disposal in accordance with the management options outlined in the approved WMP.	Contractor	Construction	Additional safeguard
W12	Waste and resource use	<p>A post-construction land assessment will be undertaken of land that was used for ancillary construction purposes (compounds, storage, parking, etc.) to determine the suitability for hand-back to the landowner.</p> <p>The assessment will be prepared in accordance with the RMS</p>	Contractor	Post-construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
		<i>Environmental Procedure - Management of Wastes on Roads and Maritime Services Land.</i> Where the land is privately owned, a copy of the assessment will be provided to the landowner.			
CC1	Sustainability, climate change and greenhouse gas	Detailed design will take into consideration the potential effect of climate change on the proposal, including drainage requirements.	Contractor	Design / Pre-construction	Additional safeguard
CC2	Sustainability, climate change and greenhouse gas	A Greenhouse Gas (GHG) Assessment will be carried out for the proposal to determine the likely source of GHG emissions and associated reduction strategies to be investigated.	Contractor	Pre-construction	Additional safeguard
CC3	Sustainability, climate change and greenhouse gas	The use of alternative fuels and power sources for construction plant and equipment will be investigated and implemented, where appropriate.	Contractor	Pre-construction / Construction	Additional safeguard
CC4	Sustainability, climate change and greenhouse gas	Energy efficiency and related carbon emissions will be considered in the selection of vehicle and plant equipment.	Contractor	Pre-construction / Construction	Additional safeguard
CC5	Sustainability, climate change and greenhouse gas	Materials will be delivered as full loads and local suppliers would be used, where possible.	Contractor	Construction	Additional safeguard
CC6	Sustainability, climate change and greenhouse gas	Construction equipment, plant and vehicles will be appropriately sized for the task.	Contractor	Construction	Additional safeguard
CC7	Sustainability, climate change and greenhouse gas	Equipment will be serviced frequently to ensure they are operating efficiently.	Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Standard / additional safeguard
CC8	Sustainability, climate change and greenhouse gas	<p>The following measures will be considered during detailed design and construction, and implemented as appropriate:</p> <ul style="list-style-type: none"> • Use of LED and low energy equipment for traffic lights and signage • Use of modern diesel engine equipment, to ensure highest fuel efficiency ratings • Review of cut and fill balances for earthworks to ensure material is transported the least possible distances • Review of local options for import and export of materials as needed to reduce excess fuel used during transport • Specification of the use of biofuels, or biofuel blends in construction plant and equipment • Specification and certification of steel from recycled sources where suitable for offsetting virgin steel • Specification of materials with low embodied energy / embodied greenhouse gas content, such as: • Replacement of Portland cement in concrete mixes with low carbon alternatives such as fly-ash • Use of warm mix asphalt versus hot mix • Avoid excess clearance of vegetation where feasible by reducing buffer zones and replanting once construction is finished. 	Contractor	Construction	Additional safeguard
CU1	Cumulative impacts from construction of multiple projects	The CEMP will be updated as required to address cumulative impacts as other projects/activities begin. This will include a process to review and update mitigation measures as new work begins or if complaints are received.	Contractor	Pre-construction Construction	Additional safeguard
CU2	Cumulative traffic and access impacts	The Traffic Management Plan will be prepared in consultation with the Transport Management Centre and Penrith City Council.	Contractor	Pre-construction	Additional safeguard

5.3 Licensing and approvals

Before the proposal can proceed, additional licences and/or approvals would be required to be obtained from the relevant authorities, as listed in **Table 5-2**.

Table 5.2: Summary of licensing and approval required

Instrument	Requirement	Timing
<i>Protection of the Environment Operations Act 1997 (s43)</i>	Environment protection licence (EPL) for scheduled activities (road construction) from the EPA.	Prior to start of the activity.
<i>Fisheries Management Act 1994 (s219)</i>	Permit to obstruct the free passage of fish (temporary or permanent) from the Minister for Primary Industries, if required during in stream works at water crossings (refer to REF Section 6.3 Biodiversity) (subject to detailed design).	Prior to start of the activity.
<i>Fisheries Management Act 1994 (s199)</i>	Notification to the Minister for Primary Industries prior to any dredging or reclamation works if required, eg the temporary removal of woody debris and snags during excavation and/or the establishment of a dry area during construction of waterway crossings (refer to REF Section 6.3 Biodiversity) (subject to detailed design).	A minimum of 28 days prior to the start of work.
<i>National Parks and Wildlife Act 1974 (s90)</i>	Aboriginal heritage impact permit (AHIP) from the Chief Executive of OEH, for the M4MM AHIP application area and the AHIP application area for the proposal (refer to REF Section 6.9 Aboriginal Heritage)	Prior to start of the activity.

6 References

NSW EPA 2011, *Road Noise Policy*, Sydney

NSW Police 2011, *Crime Prevention through Environmental Design Principles*, Sydney

Roads and Maritime Services 2016, *The Northern Road Upgrade, Glenmore Parkway, Glenmore Park to Jamison Road, South Penrith*. Sydney.

Appendix A – Community Update Newsletter



Australian Government

BUILDING OUR FUTURE



MAKING IT HAPPEN



Artist's impression: The Northern Road and M4 Motorway interchange, looking north

The Northern Road Upgrade

Between Glenmore Parkway, Glenmore Park and Jamison Road, South Penrith

October 2016

Roads and Maritime Services has developed the concept design and Review of Environmental Factors for The Northern Road Upgrade between Glenmore Parkway, Glenmore Park and Jamison Road, South Penrith and is inviting your feedback until **Friday 4 November 2016**.

The Australian and NSW governments are planning to upgrade The Northern Road as part of the \$3.6 billion Western Sydney Infrastructure Plan to improve safety, reduce congestion and improve travel times now and in the future.

In July 2015, Roads and Maritime Services released a preliminary design and access strategy for The Northern Road Upgrade between Littlefields Road, Luddenham and Jamison Road, South Penrith for community and stakeholder comment.

After reviewing the comments Roads and Maritime have now developed the concept design and Review of Environmental Factors for The Northern Road Upgrade between Glenmore Parkway and Jamison Road.

The proposed 4km upgrade is expected to start construction in the first half of 2017 and be open to traffic by 2020.

Review of Environmental Factors

As part of the proposed concept design, Roads and Maritime has prepared a Review of Environmental Factors (REF). The REF assesses potential environmental impacts and outlines mitigation measures during and after construction of the proposed upgrade including traffic, noise, urban design, landscaping, heritage and biodiversity.

All feedback received during the display of the concept design and REF will be considered by the project team. At the end of the consultation period, a Submissions Report will be prepared that summarises submissions and the intended project response. The Submissions Report will be made available on the Roads and Maritime website in early 2017.

Project benefits

The benefits include:

- Improving travel times by:
 - Increasing the number of lanes along The Northern Road
 - Removing a set of traffic lights at the M4 Motorway interchange and providing a new and wider bridge
 - Providing additional turning lanes at some intersections
- Allowing for reliable public transport by providing a continuous kerbside bus lane in each direction
- Improving safety for pedestrians and cyclists by providing a new shared path
- Improving road safety by:
 - Providing a central median to separate opposing traffic flows
 - Installing new traffic lights at two existing intersections
 - Providing separate turning lanes at some intersections
 - Improving the alignment of the road
- Improving local access by providing an extension of Cross Road to Wentworth Road
- Mitigating traffic noise impacts by providing two new noise barriers
- Reducing flooding impacts to surrounding properties by upgrading cross drainage beneath The Northern Road.

Key features

Key features of the proposed upgrade include:

- Widening The Northern Road to provide four lanes in each direction (three general traffic lanes and a kerbside bus lane)
- Building a new bridge over the M4 Motorway with the existing bridge to be removed
- Installing new traffic lights and turning lanes at some intersections
- Providing continuous bus lanes in each direction
- Installing a central median
- Providing a new shared pedestrian and cyclist path and footpaths
- Installing new street lighting, safety barriers, drainage and landscaping
- Installing new retaining walls
- Installing two new noise barriers.

Background

Roads and Maritime is planning to upgrade around 35km of The Northern Road between The Old Northern Road, Narellan and Jamison Road, South Penrith from a generally two and four lane undivided road to a six and eight lane divided road.

The Northern Road will provide one of the main arterial transport corridors for the South West Priority Land Release Area, the Western Sydney Priority Growth Area and the planned western Sydney airport at Badgerys Creek.

The Northern Road Upgrade was previously divided into four stages (1, 2, 3 and 4) but due to design refinement will now be planned in six sections between:



In construction

- The Old Northern Road, Narellan and Peter Brock Drive, Oran Park (3.3km)



Ready for construction and tender evaluation

- Peter Brock Drive, Oran Park and Mersey Road, Bringelly, including the Bringelly Road Upgrade between The Northern Road, Bringelly and King Street, Rossmore (11.5km)



Preparing concept design and Environmental Impact Statement

- Mersey Road, Bringelly and Eaton Road, Luddenham (5.5km)
- Eaton Road, Luddenham and Littlefields Road, Luddenham (4.5km)
- Littlefields Road, Luddenham and Glenmore Parkway, Glenmore Park (6km)



Display of Concept Design and Review of Environmental Factors

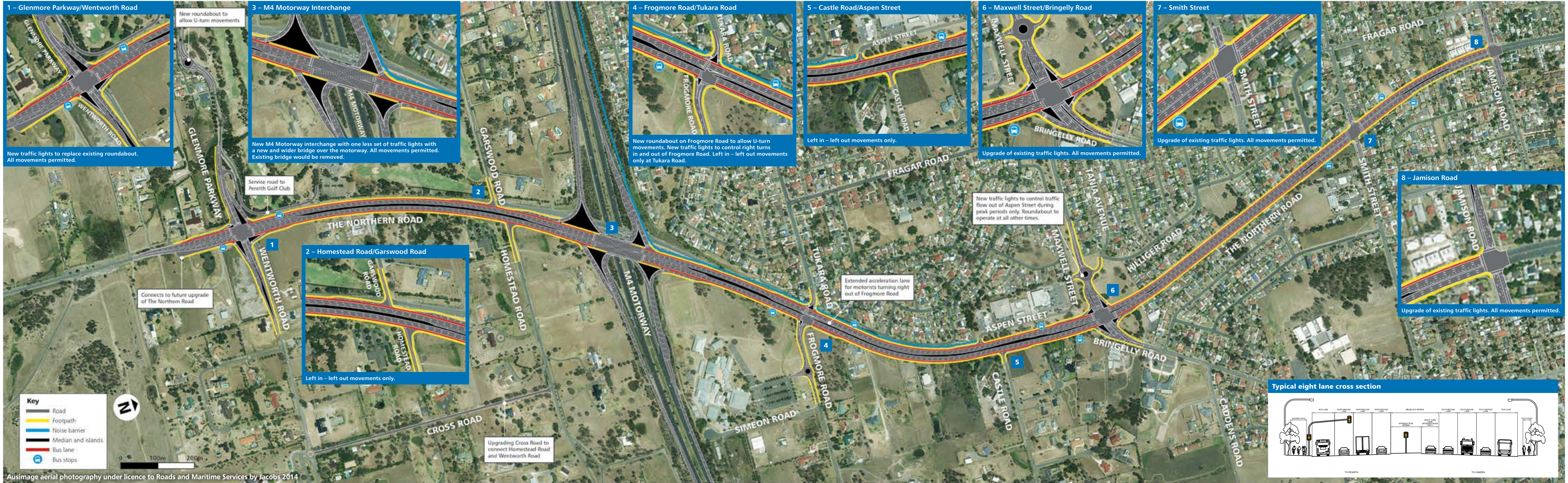
- Glenmore Parkway, Glenmore Park and Jamison Road, South Penrith (4km)

Other stages of The Northern Road Upgrade

Following the announcement of the preliminary design and access strategy for The Northern Road Upgrade between Mersey Road, Bringelly and Glenmore Parkway, Glenmore Park, Roads and Maritime is continuing to plan for this important project. Preparation of an Environmental Impact Statement (EIS) is already underway.

The EIS is expected to be exhibited for community consultation in early 2017.

The Northern Road Upgrade, Glenmore Parkway to Jamison Road



Ausimage aerial photography under licence to Roads and Maritime Services by Jacobs 2014

Have your say

Roads and Maritime welcomes feedback from the community on the concept design and Review of Environmental Factors for The Northern Road Upgrade between Glenmore Parkway and Jamison Road. The Review of Environmental Factors can be viewed at www.rms.nsw.gov.au/thenorthernroad

It is also available to view in hard copy at:

Penrith City Library
601 High Street Penrith

Monday to Friday 9am–8pm
Saturday 9am–5pm
Sunday 10am–5pm

We welcome your comments by **Friday 4 November 2016**.

Email: wsip@rms.nsw.gov.au

Mail: The Northern Road Upgrade
Glenmore Parkway to Jamison Road
Roads and Maritime Services
PO Box 973 Parramatta NSW 2124

Community information sessions

We will host four community information sessions where the project team will be available to answer questions and receive feedback. A formal presentation will not be given so please feel free to drop in at any time during the following sessions:

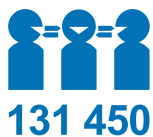
-  **Wednesday 19 October 3:30pm–7pm**
Penrith South Public School,
172–190 Jamison Road, South Penrith
-  **Saturday 22 October 10am–1pm**
Kingswood Neighbourhood Centre,
23–25 Bringelly Road, Kingswood
-  **Tuesday 25 October 3:30pm–7pm**
Penrith South Public School,
172–190 Jamison Road, South Penrith
-  **Saturday 29 October 12pm–3pm**
Kingswood Neighbourhood Centre,
23–25 Bringelly Road, Kingswood

What are the next steps?






How do I get home?

If you live along this route there may be changes to how you access your property. To see these changes, please visit our website at www.rms.nsw.gov.au/wsip and follow the link to the interactive portal, then visit The Northern Road Upgrade area within the portal.



If you need help understanding this information, please contact the Translating and Interpreting Service on 131 450 and ask them to call us on 1800 703 457.

Contact us

 1800 703 457
 wsip@rms.nsw.gov.au
 rms.nsw.gov.au/wsip

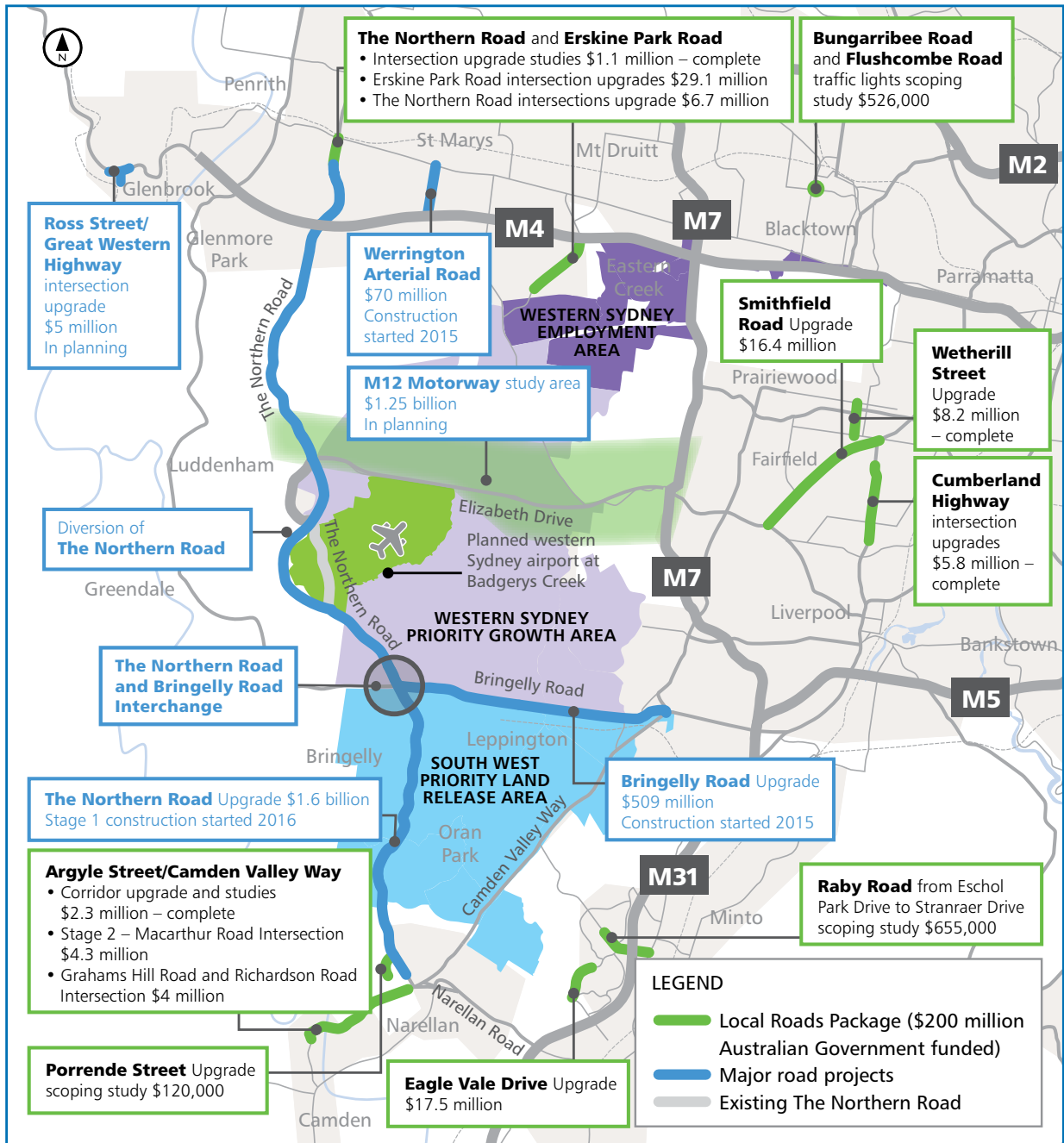


October 2016
RMS 16.456



Privacy Roads and Maritime Services ("RMS") is subject to the Privacy and Personal Information Protection Act 1998 ("PIIP Act") which requires that we comply with the Information Privacy Principles set out in the PIIP Act. All information in correspondence is collected for the sole purpose of assisting in the assessment of this proposal. The information received, including names and addresses of respondents, may be published in subsequent documents unless a clear indication is given in the correspondence that all or part of that information is not to be published. Otherwise RMS will only disclose your personal information, without your consent, if authorised by the law. Your personal information will be held by RMS at 27 Argyle Street, Parramatta NSW 2150. You have the right to access and correct the information if you believe that it is incorrect.

Western Sydney Infrastructure Plan



61km
of new and upgraded roads

Reduced travel times
to Penrith, Liverpool and Campbelltown CBD precincts

\$3.6 billion
investment in major transport infrastructure

4000
direct and indirect jobs
over 10 years

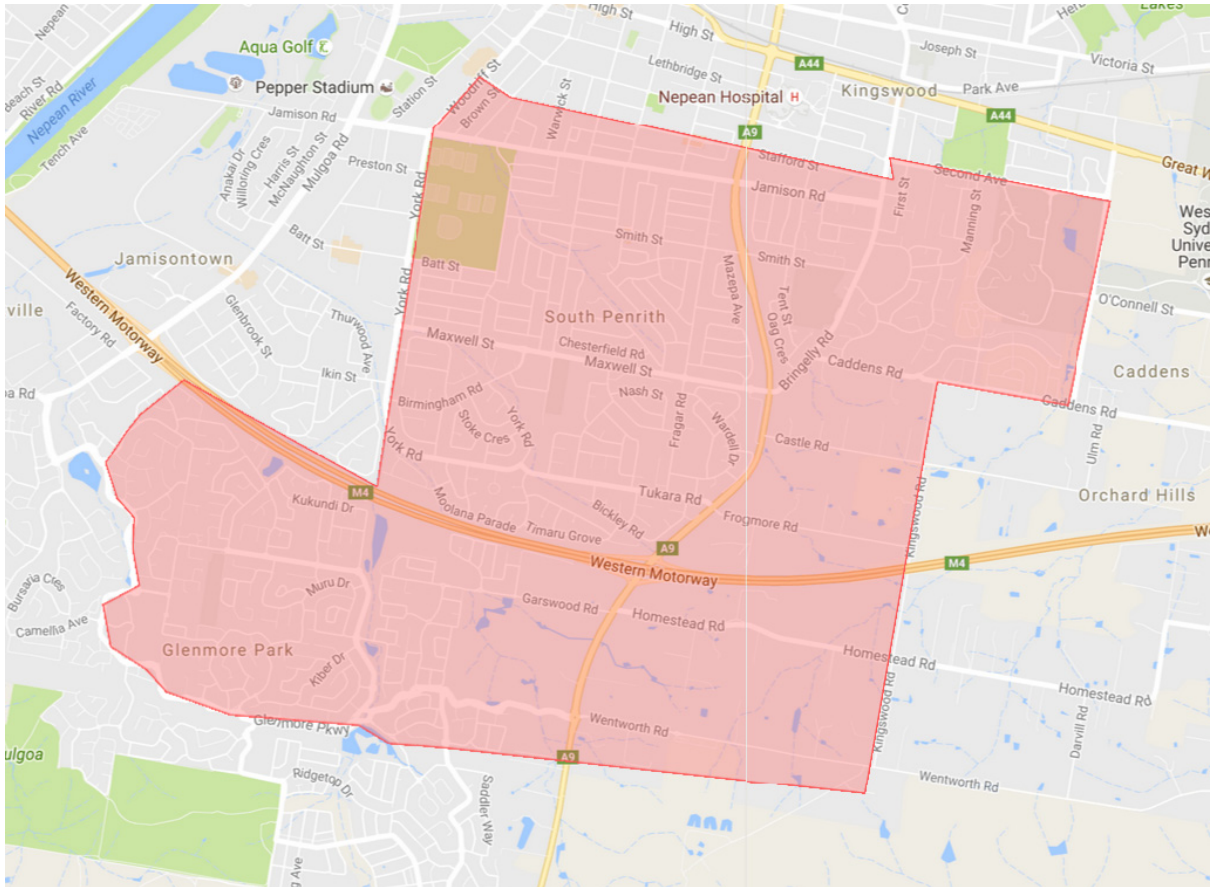
Improve the efficient movement of state and national freight

Provide opportunities for improved public transport

Make western Sydney an even better place to live and do business

Transform the local economy

Appendix B – Distribution Map



Appendix C – Sorry we missed you flyer

11 October 2016

Sorry we missed you

The Australian and NSW governments are planning to upgrade The Northern Road as part of the \$3.6 billion Western Sydney Infrastructure Plan to improve safety, reduce congestion and improve travel times now and in the future.

A representative from Roads and Maritime Services was in the area today to speak to residents about the Northern Road Upgrade between Glenmore Parkway, Glenmore Park and Jamison Road, South Penrith.

The concept design and Review of Environmental Factors is now available for your feedback until **Friday 4 November 2016**.

For more information, please refer to the community update newsletter. The newsletter also contains details on the times and dates of our information sessions where you can speak to a member of the project team and provide feedback.

If you have any questions, please contact the project team by phone or email, or visit the Roads and Maritime website.

Phone: **1800 703 457**

Email: wsip@rms.nsw.gov.au

Web: www.rms.nsw.gov.au/thenorthernroad

Appendix D – Media Release



Paul Fletcher

Minister for Urban Infrastructure



Duncan Gay

NSW Minister for Roads,
Maritime and Freight

Stuart Ayres

Member for Penrith
Minister for Trade, Tourism & Major Events
Minister for Sport

Tanya Davies

Member for Mulgoa
Parliamentary Secretary for Youth Affairs and
Homelessness

Joint Media Statement

11 October 2016

Have your say: The Northern Road concept design on display

The community is invited to have its say on the next stage of the \$1.6 billion upgrade of The Northern Road, with the concept design and Review of Environmental Factors for the four-kilometre section between the Glenmore Parkway and Jamison Road now on display.

Minister for Urban Infrastructure Paul Fletcher said the upgrade of The Northern Road is one of the centrepiece projects in the Australian and New South Wales governments' \$3.6 billion Western Sydney Infrastructure Plan.

“Our plan will provide essential road improvements ahead of the planned Western Sydney Airport opening in the mid-2020s,” Mr Fletcher said.

“The upgrade includes widening 35 kilometres of road between Narellan and Penrith to improve what is a vital north-south connection for Western Sydney.

“The project is part of our commitment to delivering vital, city-transforming infrastructure in Western Sydney in order to unlock the economic and jobs potential of one of the nation’s fastest-growing regions.”

New South Wales Minister for Roads Duncan Gay said features of the upgrade included widening this section of The Northern Road to four lanes in each direction including a kerbside bus lane, improved intersections with new and upgraded traffic lights and turning lanes, as well as noise barriers to minimise impacts on local residents.

“Once complete, this upgrade will deliver plenty of wins for Western Sydney including increased road capacity to cater for future growth in the area; an improved transport corridor between Penrith, the M4 Motorway and the planned airport; better safety for pedestrians and cyclists; and better public transport links,” Mr Gay said.

“Access to the M4 Motorway at Orchard Hills will also be improved to include a new, wider bridge over the M4.”

The concept design and Review of Environmental Factors will remain on display until Friday 4 November with community information sessions scheduled throughout this month.

The information sessions will be held on Wednesday 19 October from 3.30pm to 7pm and on Tuesday 25 October from 3.30pm to 7pm at Penrith South Public School, 172-190 Jamison Road, South Penrith.

Sessions will also be held on Saturday 22 October between 10am and 1pm and Saturday 29 October from 12pm to 3pm at the Kingswood Neighbourhood Centre 23-25 Bringelly Road at Kingswood.

Feedback is invited until Friday 4 November via email wsip@rms.nsw.gov.au, or by mail to The Northern Road Upgrade Glenmore Parkway to Jamison Road, Roads and Maritime Services PO BOX 973 Parramatta NSW 2124.

“We want the community to have its say and all feedback will be considered in further project development ahead of construction starting in the first half of next year,” Mr Ayres said.

“This upgrade is planned to be open to traffic by 2020 and I encourage local residents to be involved in the consultation process,” Mrs Davies said.

To learn more and view an animation of the proposed design, visit the Roads and Maritime website at www.rms.nsw.gov.au/thenorthernroad.

Media Contacts

For Mr Fletcher:	Andrew Blow	0411 403 937
For Mr Gay:	Nina Stevens	0438 401 475
For Mr Ayres:	Stuart Ayres	02 47228660
For Mrs Davies:	Jessica Neale	9834 2966

Appendix E – Newspaper advertisement



Australian Government

BUILDING OUR FUTURE



Transport
Roads & Maritime
Services

Have your say

The Northern Road Upgrade between Glenmore Parkway, Glenmore Park and Jamison Road, South Penrith Review of Environmental Factors

The Australian and NSW governments are planning to upgrade The Northern Road as part of the \$3.6 billion Western Sydney Infrastructure Plan to improve safety, reduce congestion and improve travel times now and in the future.

Roads and Maritime is planning to upgrade 4km of The Northern Road between Glenmore Parkway and Jamison Road. We are now inviting feedback on the Review of Environmental Factors (REF) and concept design until **Friday 4 November 2016**.

You can view a hard copy of the REF at Penrith City Library, 601 High Street, Penrith or it can be downloaded from:
www.rms.nsw.gov.au/thenorthernroad

We encourage you to drop into one of our information sessions to speak to a member of the project team and provide feedback. Sessions will be held at:

Wednesday 19 October, 3.30-7pm

Penrith South Public School, 172-190 Jamison Road, South Penrith

Saturday 22 October, 10am-1pm

Kingswood Neighbourhood Centre, 23-25 Bringelly Road, Kingswood

Tuesday 25 October, 3:30pm-7pm

Penrith South Public School, 172-190 Jamison Road, South Penrith

Saturday 29 October, 12pm-3pm

Kingswood Neighbourhood Centre, 23-25 Bringelly Road, Kingswood

For more information or to provide feedback call: 1800 703 457

Email: wsip@rms.nsw.gov.au

Mail: The Northern Road Upgrade Roads and Maritime Services

PO Box 973 Parramatta NSW 2124 or visit

www.rms.nsw.gov.au/wsip for an interactive digital map and videos of the projects



www.rms.nsw.gov.au/thenorthernroad



wsip@rms.nsw.gov.au



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Glenmore Parkway to Jamison Road
Roads and Maritime Services
PO Box 973
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