Document controls

Approval and authorisation

<table>
<thead>
<tr>
<th>Title</th>
<th>Mulgoa Road upgrade Jeanette Street to Blaikie Road Submissions Report</th>
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</thead>
<tbody>
<tr>
<td>Accepted on behalf of Transport for NSW by:</td>
<td>Peter Williams</td>
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<tr>
<td></td>
<td>Project Director, Western Sydney Project Office</td>
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<tr>
<td>Signed:</td>
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<td>Dated:</td>
<td>November 2019</td>
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Document status

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<th>Document status</th>
<th>Date</th>
<th>Prepared by</th>
<th>Reviewed by</th>
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<tr>
<td>Draft for discussion</td>
<td>November 2018</td>
<td>Lauren Elvidge, Alice Smith</td>
<td>Chris Fay</td>
</tr>
<tr>
<td>Draft for review</td>
<td>September 2019</td>
<td>Jess Massih, Jennifer Chambers</td>
<td>Stuart Hill</td>
</tr>
<tr>
<td>Final for issue</td>
<td>October 2019</td>
<td>Jess Massih</td>
<td>Jennifer Chambers</td>
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</tbody>
</table>
Executive summary

The proposal

Transport for NSW proposes to upgrade a 1.3 kilometre section of Mulgoa Road between Jeanette Street at Regentville and Blaikie Road at Jamisontown (the proposal).

The upgrade would improve traffic flow, travel times and safety for motorists, and provide the needed increase in capacity to support future population and employment growth. In addition, the proposal would encourage active transport use by improving connectivity for cyclists along the corridor and incorporating a shared zone for vehicles and cyclists along Hatchinson Crescent.

The key features of the proposal include:

- Widening a 1.3-kilometre section of Mulgoa Road between Jeanette Street and Blaikie Road (including tie-ins) to allow for three travel lanes in each direction
- Extending the southbound left and right-turn slip lanes on Mulgoa Road entering the M4 Western Motorway
- Interfacing with the M4 Smart Motorway project by providing an upgrade to the exit ramps
- Reducing the width of the embankments supporting the M4 Western Motorway road bridges and installing retaining structures to create space for through-lanes on the outside of the piers
- Removing the grade separated access to the Penrith Homemaker Centre at Wolseley Street by providing dual right-turn lanes
- Making adjustments to lane widths and turning alignments at the Factory Road/Jeanette Street, Wolseley Street, Glenbrook Street and Blaikie Road intersections
- Providing an active transport corridor along the eastern side of Mulgoa Road, including a 3.5 m wide shared use pedestrian and cyclist path
- Connecting Hatchinson Crescent, Huron Place and Peter Court to create a shared transit zone for vehicles and cyclists and providing an adjacent footpath
- Providing bus priority measures at the Blaikie Road, Glenbrook Street and Wolseley Street intersections in the form of bus queue jump lanes
- Upgraded drainage to manage increased surface runoff and flows to local waterways
- A noise wall between Mulgoa Road and Hatchinson Crescent, extending between Glenbrook Street in the north and the M4 Western Motorway eastbound entry ramp in the south
- Tree planting and landscaping to match the vision for the whole of the Mulgoa Road corridor
- Temporary establishment of a construction compound site
- Relocation of underground utilities.

The proposal was subject to assessment under Division 5.1 of the Environment Planning and Assessment Act 1979 (EP&A Act). A review of environmental factors (REF) was prepared for the proposal.

REF Display

Transport prepared an REF for the Mulgoa Road upgrade Jeanette Street to Blaikie Road which was placed on public display for 29 days between 27 August and 21 September 2018. A hard copy of the published REF was available at the Penrith City Library in Penrith, and an electronic copy was available to view online and download from the Transport for NSW project website: [https://www.rms.nsw.gov.au/projects/sydney-west/mulgoa-rd-castlereagh-rd/index.html](https://www.rms.nsw.gov.au/projects/sydney-west/mulgoa-rd-castlereagh-rd/index.html).

A community update detailing the REF display location and website link was issued directly to about 6,200 properties including residences and businesses in Glenmore Park, Regentville and Jamisontown. Transport invited feedback on the proposal from the community, Government agencies and other stakeholders.
Summary of submissions and responses

A total of 84 submissions were received by Transport following the display of the 2018 REF, of which:

- 74 were from community members
- Four were from local businesses
- Three were from organisations or groups (Bicycle NSW, Mulgoa Valley Landcare and Cumberland Land Conservancy)
- Two were from utility companies (Telstra and Sydney Water)
- Two were from Penrith City Council.

Of these submissions about eight per cent of respondents offered some form of the support for the proposal, 63 per cent of respondents raised concerns about the removal of the mature Forest Red Gum trees between Wolseley Street and Blaikie Road and about 34 per cent of respondents were concerned about traffic congestion and efficiency of the road network, including intersection performance. The main issues raised in the submissions fall under the following seven categories relating to the proposal:

- Proposal design
- Forest Red Gum Trees
- Biodiversity
- Property Acquisition and land use
- Traffic, parking and access
- Landscape and Visual
- Noise and Vibration.

Proposal Design

**Issue:** Raised concern that the proposal would not alleviate traffic congestion on Mulgoa Road and the design should include more than two or three lanes in each direction. Concern was also raised that the third lane proposed in each direction under the M4 Western Motorway would cause confusion to motorists due to the split to avoid the bridge piers.

**Response:** Upgrading Mulgoa Road from two lanes to three lanes in each direction would increase capacity, reduce traffic congestion and improve travel times (see Section 6 and Appendix C of the 2018 REF). The proposed upgrade would help alleviate motorist frustration and support a reduction in the number of road crashes.

To avoid re-construction of the M4 Western Motorway bridges, which would result in significant construction traffic impacts and delays, the design proposes an additional lane on either side of the existing piers. Appropriate signage and safety barriers would be in place and Transport for NSW would monitor any safety concerns.

**Issue:** Raised concern that removing the Wolseley Street tunnel would cause a safety issue for pedestrians due to potential for motorists to run through red lights when entering the Penrith Homemaker Centre.

**Response:** The design proposes to remove the Wolseley Street tunnel and replace this with two dedicated right turn lanes into Wolseley Street to minimise property impacts on the eastern side of Mulgoa Road. The dedicated right turn lanes would improve road safety and relieve congestion without affecting network performance. The tunnel is also a maintenance issue due to the flooding that occasionally closes the tunnel to traffic, causing extensive delays to the Mulgoa Road traffic.
Traffic impacts were assessed in Section 6.1 of the 2018 REF and the modelling shows that the upgrade of Mulgoa Road including the modified intersection at Wolseley Street, with two dedicated right turn lanes, performs well.

**Forest Red Gum Trees**

**Issue:** Concerns were raised about the removal of Forest Red Gum trees between Blaikie Road and Wolseley Street and the impact this would have on native fauna that use this habitat for nesting and foraging. Concern was also raised about the loss of hollows and the inadequacy of nest boxes as a safeguard measure. Requests were made to offset the trees that would be removed.

**Response:** To allow for the upgrade of Mulgoa Road, some of the existing vegetation would need to be removed. The proposed design does provide for replanting and replacement of native vegetation as part of the Landscape Character and Visual Impact Assessment and Urban Design Study. Refer to Section 6.7 and Appendix H of the 2018 REF.

The proposal described in the 2018 REF requires the removal of 0.81 ha of Forest Red Gum trees on the western side of Mulgoa Road. The loss of these trees relates to avoiding property acquisition on the eastern side of Mulgoa Road and the clearing required to allow for construction and road widening. Transport for NSW has engaged a suitably qualified arborist to provide arboricultural advice relating to the management of Forest Red Gum trees between Wolseley Street and Blaikie Road, in accordance with AS 4970 Protection of Trees on Development Sites.

The arborist carried out a visual tree assessment, to identify which trees contain hollows, and allocated a retention value based on a combination of the tree's landscape significance (cultural, environmental and aesthetic value) and Useful Life Expectancy (ULE) (growing environment, health, structural condition and site suitability). Note that ULE does not estimate the biological lifespan.

During the detailed design phase, refinements will be made to the utility relocations and opportunities to reduce impacts to the trees will be considered in consultation with the arborist. The arborist will conduct a detailed study on the impact of the upgrade on the trees. The arborist will prepare an Arboricultural Impact Assessment and Tree Protection Plan to outline mitigation measures to protect the retained Forest Red Gum trees. For trees that are impacted, a detailed tree root map (using non-invasive techniques) and a structural analysis of the tree will be carried out. This will allow trees to be categorised according to their retention potential. Refined detailed design options would then be considered to maximise the number of trees to be retained and the long-term viability of retained trees. The Arborist’s scope of work during the detailed design phase will include DNA analysis of the trees.

A biodiversity assessment was carried out as part of the 2018 REF and the potential impacts were assessed in Section 6.3 of the 2018 REF. The 2018 REF outlined the ‘worst-case’ extent of tree impacts assuming removal of the entire 0.81 ha of Forest Red Gum trees. During ongoing design, the proposal will aim to reduce the impact on the Forest Red Gums. The Biodiversity Assessment Report (BAR) confirmed that native bird species (including parrots) use these trees as foraging, breeding and roosting habitat however, the Blue Mountains National Park to the immediate west provide large areas of high-quality habitat for these species.

The BAR has since been updated (August 2019), following additional field investigations conducted by a qualified ecologist, in accordance with best practice methodologies including the Roads and Maritime Services Environmental Impact Assessment Practice Note: Biodiversity Assessment (2015) refer to Appendix C of this report. Additional surveys include microbat ultrasonic surveys, and nocturnal, dusk and dawn fauna.

The additional investigations re-confirmed that the BAR reports on a ‘worst case’ vegetation removal as due to the restricted corridor available for construction and upgrade of Mulgoa Road. The assessment boundary includes areas for property adjustments (such as the relocation of private signs and private service connections) these aspects of the design will be refined during the detailed design phase.
Potential impacts on fauna as a result of the removal of trees and subsequent tree hollows would be mitigated. A Fauna Management Plan will be prepared which will determine the number and extent of fauna mitigation measures required. Mitigation measures such as nest boxes and / or adaptive reuse of existing hollows may be used. In addition, monitoring requirements for mitigation measures would be set. Transport for NSW is undertaking an assessment of the existing tree canopy and working with Council to provide planting along the corridor to mitigate the loss of trees.

Biodiversity

**Issue:** Concern was raised about the lack of community input in relation to the biodiversity assessment and proposed vegetation removal.

**Response:** Consultation has been carried out in accordance with the community and stakeholder engagement plan described in Chapter 5 of the 2018 REF. In line with this, Transport has sought feedback on the specialist studies as part of the REF display period.

The REF that was placed on display outlined the ‘worst-case’ extent of tree impacts. Transport has considered responses received following display of the 2018 REF and has engaged a suitably qualified arborist to conduct an Arboricultural Impact Assessment for the proposal on the trees. Opportunities to reduce impact to the trees will be considered through the detailed design in consultation with the arborist.

The surveys to support the biodiversity assessment for the proposal were carried out by suitably qualified ecologists in accordance with best practice methodologies including the Roads and Maritime Environmental Impact Assessment Practice Note: Biodiversity Assessment (2015). It is not a requirement of Transport policy or legislation to seek feedback on specialist studies until the REF display period. Based on submissions received, Transport engaged ecologists to undertake additional ecology surveys, including microbat ultrasonic surveys, and nocturnal, dusk and dawn fauna. The BAR has since been updated by a qualified ecologist based on additional field investigations that have been carried out. Refer to Section 4 of this report.

Transport will continue to seek feedback from businesses, the local community, and Penrith City Council as the design progresses in accordance with the safeguard commitments described in Chapter 5 of this report.

Property Acquisition and land use

**Issue:** Clarification and rationale was sought on the extent of property acquisition associated with the proposal.

**Response:** Property acquisitions will be finalised during detailed design. Transport will aim to minimise property acquisition where possible. The Transport Personal Manager Acquisitions will be in contact with affected residents to discuss the property acquisition process.

Transport is reviewing the current design and negotiating property adjustments with the owners. The design would be optimised during detailed design to maintain the maximum number of carparking spaces as possible.

Traffic, Access and Parking

**Issue:** Clarification was sought regarding impacts associated with the existing intersection performance and queuing of traffic across intersections. Concern was also raised in relation to the tie-in points (merge lanes) and that they may result in an increase in traffic incidents.

**Response:** Existing traffic congestion and delays along Mulgoa Road are a result of the increasing population and traffic demand in the Penrith LGA. The proposed design retains all existing traffic lights and their phasing and timing would be optimised to support the proposed increase in capacity. These combined measures would reduce traffic congestion and time delays.
Transport would monitor any illegal queuing across affected intersections after the upgrade and if necessary, would consider further measures to address the issue. The project team would review the phasing of the traffic signals to ensure adequate servicing of these road users.

The traffic modelling carried out as part of the 2018 REF considered the tie-ins to the north and the south of the design footprint. The modelling did not identify the merge lanes as potential collision points or that they would cause additional congestion to the south and north of the design footprint (refer to Section 6.1 and Appendix C of the 2018 REF). Therefore, it is not considered that these would cause an increase in traffic incidents.

**Issue:** Concerns were raised relating to the safety of residents and pedestrians with the changes proposed at Peter Court. Sought clarification regarding the potential loss of car parking spaces in Peter Court, including a request for the access from Peter Court to Glenbrook Street to be closed.

**Response:** The design proposes to introduce on-street parking restrictions along Hatchinson Crescent, Huron Place and Peter Court. Transport would continue to consult with residents to identify opportunities to reduce the loss of on-street parking as the detailed design is developed. Further, the design proposes a left-in only arrangement from Glenbrook Street to Peter Court. This would allow service vehicles, such as rubbish trucks, to continue on to Huron Place avoiding dangerous reversing manoeuvres by large vehicles within the confines of a local road. Threshold treatments, such as installing line markings or signs, would be considered during detailed design to introduce traffic calming measures. The existing pedestrian footpath along Hatchinson Crescent, Huron Place and Peter Court would be reinstated and a footpath provided on Peter Court, to maintain the safety of pedestrians.

**Landscape and Visual**

**Issue:** Concern was raised regarding the proposed vegetation removal and the impact this would have on the amenity of the local community such as loss of privacy and increased noise.

**Response:** To allow for the upgrade of Mulgoa Road, some of the existing vegetation will need to be removed. During detailed design, the landscaping strategy will be further developed based on the outcomes of this assessment. However, due to the constrained corridor in Mulgoa Road upgrade - Jeanette Street to Blaikie Road it is likely that the replacement strategy will also need to include future stages of the proposal. The planting approach for the proposal will be further developed as part of the Urban and Landscape Design Strategy in accordance with Transport for NSW guidance document ‘Beyond the Pavement’ and will consider the amenity of the local community.

The 2018 REF notes that the proposal would contribute to cumulative visual amenity impacts during construction due to the overlap with construction of other nearby projects beyond 2020. During operation, the proposal would cumulatively contribute to the urban intensification of the area. The proposed design does provide for replanting and replacement of native vegetation as part of the Landscape Character and Visual Impact Assessment and Urban Design Study. Refer to Section 6.7 and Appendix H of the 2018 REF. Transport is undertaking an assessment of the existing tree canopy and working with Council to provide planting along the corridor to mitigate the loss of trees.

**Noise and Vibration**

**Issue:** Concern was raised about the potential for increased noise impacts for residents next to Mulgoa Road due to the removal of vegetation. One respondent requested that the existing noise wall alongside the M4 Western Motorway eastbound on-ramp be upgraded and extended to Mulgoa Road.

**Response:** The noise modelling completed for the 2018 REF (see Section 6.2 of the 2018 REF) indicated that there would be a negligible increase in road traffic noise as a result of the upgrade and that noise treatment need not be considered. However, noise mitigation has been proposed in some locations to address the existing acute levels experienced at these receivers.
The noise modelling will be reviewed during the detailed design phase to consider the requirement for additional noise mitigation measures if required.

Where possible, noise mitigation measures would be installed during the early stages of construction to provide benefits during construction (eg construction of the permanent noise wall). Regular consultation would occur with affected property owners to ensure they are kept updated about proposed noise mitigation treatments.

Transport for NSW will undertake an operational noise review within six months of the proposal becoming operational to assess the actual noise performance of the project.

A noise and vibration assessment has been conducted for this proposal (Mulgoa Road upgrade – Jeanette Street to Blaikie Road) and appropriate mitigation measures have been recommended. The M4 Smart Motorway (M4SM) entry ramps are outside the scope of this proposal and may be looked at in the future as part of the M4 Smart Motorway on-ramps.

Changes to the REF proposal and Optioneering

Transport has considered the feedback from the submissions received during the display of the REF in 2018.

As part of the feedback, 35 responses raised concern regarding the removal of a number of mature Forest Red Gum trees on the western side of Mulgoa Road, between Blaikie Road and Wolseley Street, Jamistown.

In response to these concerns, Transport developed two extra strategic design options for the road alignment. These alternative options presented two different levels of impact to the Forest Red Gum trees: ‘No impact’ and ‘Reduced impact’. Both options would require further design refinements to determine how the trees would be impacted by the design, including during construction of stormwater and other utilities.

Transport facilitated a series of workshops between PCC, CLC and MLG, these took place over a 5-month period to understand the concerns further.

On 4 June 2019, Transport undertook an options assessment workshop which considered the existing proposal, the ‘no impact’ option and the ‘reduced impact’ option. The outcome of the workshop recommended to proceed with the existing proposal, as displayed in the Review of Environmental Factors, as the options assessment indicated that the existing proposal would provide the best proposal outcome.

As a result of the options assessment process, Transport prepared a briefing note to the Minister for Transport and Roads. The Minister endorsed the existing proposal in September 2019.

Changes to the 2018 REF proposal footprint have been made to accommodate the following:

- Additional space for the M4 Western Motorway westbound entry ramp tie in (contained within existing road reserve)
- Inclusion of additional vegetation close to the proposed works
- Facilitating utilities relocations and diversions (high pressure gas main, sewer rising mains, high and low voltage electrical)
- Inclusion of additional laydown areas on Clyburn Avenue and Warragamba Crescent.

These changes result in the revised REF proposal footprint shown in Figure 1-1 and Figure 1-2 of the Submissions Report. Further detail on these amendments can be found in Section 3 of this Submissions Report.

The REF proposal footprint has been modified to include vegetation near the proposed works at the following locations:

- Factory Road – large tree near the electrical substation
• Jeanette Street – vegetation near the southern corner of Mulgoa Road
• Peter Court – vegetation on the corner of Peter Court and Glenbrook Street.

The changes to work for utilities are summarised as follows:

• Connections to existing electrical substations via trenching at Factory Road, Hatchinson Crescent, and Wolseley Street, and replacement of the electrical substation at the Penrith Homemaker Centre
• Diversions and connections to existing sewer rising mains and existing high-pressure gas infrastructure via trenching at Jeanette Street and the Penrith City Council (PCC) drainage reserve
• Trenchless excavation for the high-pressure gas main and sewer rising main under the M4 Western Motorway
• Use of the PCC drainage reserve at Jeanette Street for a laydown area and entry point during the construction of the high-pressure gas underbore and sewer rising main underbore, and use of Hatchinson Crescent road reserve for the exit pit
• Use of the PCC park (corner of Warragamba Crescent and Glenbrook Street) and the Clyburn Avenue road reserve for a laydown area and site compound for the high-pressure gas main diversion
• Relocation of hydrant booster on the western side of Mulgoa Road outside the Penrith Homemaker Centre.

Further, the following additional works are now included within the previous REF proposal footprint:

• Connection to existing sewer rising main at Glenbrook Street
• Connection to existing high-pressure gas main at Peter Court
• Trenching across Hatchinson Crescent for sewer rising main diversion and high-pressure gas main diversion
• Trenching along Warragamba Crescent and Glenbrook Street for sewer rising main diversion (trenching for the high-pressure gas main was included in the 2018 assessment).

Additional assessments

The following additional environmental assessments have been carried out since the display of the 2018 REF in order to respond to submissions and assess the changes to the revised REF proposal footprint in August 2019:

Biodiversity Assessment Report (BAR): The BAR has been revised to include a detailed assessment of fauna species within the proposal area and the results of further field survey of the Forest Red Gum trees and the M4 Western Motorway bridges.

Visual Tree Assessment: A qualified arborist was engaged to provide Arboricultural advice relating to the management of Forest Red Gum trees between Wolseley Street and Blaikie Road, in accordance with AS 4970 Protection of Trees on Development Sites.

Aboriginal Heritage Assessment: The Aboriginal Heritage assessment has been revised to include a detailed assessment of the proposal study area following the refinements to the REF proposal footprint in August 2019.

Noise and Vibration Assessment: A noise and vibration impact assessment was carried out to assess the additional construction works and determine the potential noise and vibration levels and impacts in accordance with the Transport for NSW Construction Noise and Vibration Guideline and DECC Interim Construction Noise Guideline.

Consistency reviews were conducted for the following remaining environmental disciplines:

• Socio-Economic Impact Assessment
• Traffic and Transport Assessment
• Landscape Character and Visual Impact Assessment.

Safeguards and management measures

The additional assessments associated with the revised utility and revised REF proposal footprint changes have resulted in some refinements to the safeguards and management measures outlined in the 2018 REF. The following safeguards have been added or revised. Refer to Section 5.2 of this Report for the full summary of safeguards and management measures.

Where an environmental safeguard and management measure has been modified, changes are identified using an underline or a strikethrough.

Brief summary of additional environmental safeguards

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<thead>
<tr>
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<th>Responsibility</th>
<th>Timing</th>
<th>Reference</th>
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<tbody>
<tr>
<td>General Consultation with Penrith City Council</td>
<td>Transport will continue to consult with Penrith City Council on the proposed shared transit zone during detailed design. Transport will also consult with Penrith City Council to ensure that the revised REF proposal footprint is reserved under the Penrith LEP 2010.</td>
<td>Transport for NSW</td>
<td>Detailed design</td>
<td>GEN4</td>
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<tr>
<td>General – ongoing community engagement</td>
<td>Transport will visit individual community members upon request to discuss their specific concerns. This will include continued consultation with residents along Hutchinson Crescent, Huron Place and Peter Court to identify opportunities to reduce the loss of on-street parking as detailed design is developed.</td>
<td>Transport for NSW</td>
<td>Detailed design/pre-construction</td>
<td>GEN5</td>
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<tr>
<td>Biodiversity Biodiversity - General</td>
<td>A Flora and Fauna Management Plan (FFMP) will be prepared in accordance with Transport for NSW's Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects (RTA, 2011a) and implemented as part of the CEMP. It would include, but not be limited to: • Vegetation management plans showing areas to be cleared and areas to be protected, including exclusion zones, protected habitat features and revegetation areas Plans showing areas to be cleared and areas to be protected, including exclusion zones, protected habitat features and revegetation areas</td>
<td>Contractor</td>
<td>Detailed design, during construction and post construction</td>
<td>B1</td>
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<td>Biodiversity</td>
<td>Measures to further avoid and minimise the construction footprint and native vegetation (including aquatic plant areas, significant fauna, and wetland habitat) or habitat removal would be investigated during detailed design and implemented where practicable and feasible. Measures to avoid and minimise impacts will be prioritised in the following order: Critical habitat Threatened species, endangered ecological communities or their habitat Native vegetation and habitat supporting flora and fauna connectivity and/or that supports other Environmental objectives such as protecting water quality, hydrology or erosion and sediment controls Native vegetation of higher quality condition Other native vegetation.</td>
<td>Contractor</td>
<td>Detailed design</td>
<td>B11</td>
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<tr>
<td>Removal of native vegetation</td>
<td>Measures to further avoid and minimise the revised REF proposal footprint and native vegetation removal will be investigated further during detailed design and implemented where practicable.</td>
<td>Contractor</td>
<td>Detailed design</td>
<td>B11</td>
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<tr>
<td>Tree loss</td>
<td>An AGF5 qualified arborist will be engaged to undertake a formal assessment of the Forest Red Gum trees and develop an Arboricultural Impact Assessment and tree protection plan prior to construction, to confirm which trees can be retained.</td>
<td>Contractor</td>
<td>Pre-construction</td>
<td>B12</td>
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<tr>
<td>Removal of native vegetation</td>
<td>Vegetation removal will be carried out in accordance with <a href="https://www.rta.nsw.gov.au">Guide 4: Clearing of vegetation and removal of bushrock of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects</a> (RTA 2011). Limit disturbance of vegetation to the minimum necessary to construct works. The boundaries of vegetation removal are to be clearly defined as 'no go zones' clearly signposted and fenced to prevent unauthorised clearing and vehicular and/or foot traffic. No go zones should include any retained trees within the revised REF proposal footprint. Pre-clearing surveys to be conducted by a qualified ecologist or arborist 24 hours before clearing.</td>
<td>Contractor</td>
<td>During construction</td>
<td>B13</td>
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| Hollow-bearing Tree Removal                | The following mitigation measures will be implemented for the removal of the hollow-bearing trees:  
• Marking trees to be removed and preparing an inventory of trees and hollows (if observed) to be removed.  
• Pre-clearance surveys to be completed by an appropriately qualified ecologist or arborist.  
• A qualified ecologist should be present during the removal of hollow-bearing trees to relocate any displaced fauna.  
• If practical removal of hollow-bearing trees should be carried out outside of the breeding period of May – September which is the main breeding season for hollow-dependant fauna. | Contractor     | Construction       | B14       |
| Nest Box Strategy                         | A Nest Box Strategy will be developed in association with Council, the local community and potentially other organisations such as Cumberland Land Conservancy. The Nest Box Strategy will investigate opportunities such as:  
• to relocate and reuse significant hollow-bearing tree features and hollows.  
• Providing species specific nest boxes targeting fauna species recorded;  
• Installing nest boxes in the same habitat type;  
• Nest boxes to be installed pre-clearing  
• Monitoring and replacement of nest boxes where required  
The loss of all hollows observed to be being used will be compensated at a ratio of one nest box for every used hollow lost. | Contractor     | Detailed design, during pre-construction, construction and post construction | B15       |
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<tr>
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<th>Responsibility</th>
<th>Timing</th>
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<tr>
<td>Unexpected Threatened species</td>
<td>The unexpected species find procedure is to be followed under <em>Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects</em> (RTA 2011) if threatened fauna, not assessed in the biodiversity assessment, are identified in the proposal site.</td>
<td>Contractor</td>
<td>During Construction</td>
<td>B16</td>
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<tr>
<td>Erosion and Sediment control</td>
<td>Increased <em>sediment</em> and storm water runoff volume and velocity potentially leading to soil erosion and sedimentation, due to increase in road surface areas. Ensure appropriate erosion and sediment control measures are implemented during the construction-phase to minimise potential indirect and direct impacts.</td>
<td>Contractor</td>
<td>During Construction</td>
<td>B17</td>
</tr>
<tr>
<td>Revegetation</td>
<td>Any exposed soil surfaces post-construction should be revegetated preferably with native species, where such planting does not impede the function of the drainage works.</td>
<td>Contractor</td>
<td>Post Construction</td>
<td>B18</td>
</tr>
<tr>
<td>Injury and mortality of fauna</td>
<td>Fauna will be managed in accordance with <em>Guide 9: Fauna handling of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects</em> (RTA 2011). All fauna captured during clearing is to be relocated. Any fauna injured during clearing should be taken to the closest vet for treatment. All ecologists to have appropriate Lyssavirus vaccinations for the handling of any displaced bats.</td>
<td>Contractor</td>
<td>During construction</td>
<td>B19</td>
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<tr>
<td>Invasion and spread of weeds</td>
<td>Declared priority weeds are to be managed according to requirements under the <em>Biosecurity Act 2015</em> and <em>Guide 6 (Weed Management)</em> of the Transport for NSW Services Biodiversity Guidelines 2011.*</td>
<td>Contractor</td>
<td>Pre-construction and during construction</td>
<td>B20</td>
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<tr>
<td>Soils, geology and contamination</td>
<td></td>
<td>Transport for NSW</td>
<td>Detailed design/pre-construction</td>
<td>SW9</td>
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<tr>
<td>Water sensitive urban design</td>
<td>Transport will consider the requirements of Penrith City Council’s Water Sensitive Urban Design (WSUD) policy during detailed design.</td>
<td>Transport for NSW</td>
<td>Detailed design/pre-construction</td>
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<td>Traffic and Transport</td>
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<td>Threshold treatments</td>
<td>Threshold treatments would be considered during detailed design to provide traffic calming effects such as installing line markings, signage and other traffic calming measures.</td>
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<td>Traffic light phasing</td>
<td>Transport will review the phasing of the traffic lights during detailed design see if there are opportunities to reduce delays and queuing along Glenbrook Street.</td>
<td>Transport for NSW</td>
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<td>TT8</td>
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</table>
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### Executive summary

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1. Introduction and background

1.1 The proposal

Transport proposes to upgrade a 1.3-kilometre section of Mulgoa Road between Jeanette Street at Regentville and Blaikie Road at Jamisontown (the proposal).

The upgrade would improve traffic flow, travel times and safety for motorists, and provide the needed increase in capacity to support future population and employment growth. In addition, the proposal would encourage active transport use by improving connectivity for cyclists along the corridor and incorporating a shared zone for vehicles and cyclists along Hatchinson Crescent.

The key features of the proposal include:

- Widening a 1.3 kilometre section of Mulgoa Road between Jeanette Street and Blaikie Road (including tie-ins) to allow for three travel lanes in each direction
- Extending the southbound left and right-turn slip lanes on Mulgoa Road entering the M4 Western Motorway
- Interfacing with the M4 Smart Motorway project by providing an upgrade to the exit ramps
- Reducing the width of the embankments supporting the M4 Western Motorway road bridges and installing retaining structures to create space for through-lanes on the outside of the piers
- Removing the grade separated access to the Penrith Homemaker Centre at Wolseley Street by providing dual right-turn lanes
- Making adjustments to lane widths and turning alignments at the Factory Road/Jeanette Street, Wolseley Street, Glenbrook Street and Blaikie Road intersections
- Providing an active transport corridor along the eastern side of Mulgoa Road, including a 3.5 m wide shared use pedestrian and cyclist path
- Connecting Hatchinson Crescent, Huron Place and Peter Court to create a shared transit zone for vehicles and cyclists and providing an adjacent footpath
- Providing bus priority measures at the Blaikie Road, Glenbrook Street and Wolseley Street intersections in the form of bus queue jump lanes
- Upgraded drainage to manage increased surface runoff and flows to local waterways
- A noise wall between Mulgoa Road and Hatchinson Crescent, extending between Glenbrook Street in the north and the M4 Western Motorway eastbound entry ramp in the south
- Tree planting and landscaping to match the vision for the whole of the Mulgoa Road corridor
- Temporary establishment of a construction compound site.

A more detailed description of the proposal is found in the Mulgoa Road Upgrade Jeanette Street to Blaikie Road review of environmental factors (REF) published by Roads and Maritime in August 2018.

The location of the proposal is shown in Figure 1-1 and Figure 1-2 and the key features are shown in Figure 1-3 and Figure 1-4.
Figure 1-1: REF proposal footprint against Revised REF proposal footprint
Figure 1-2: Revised REF proposal footprint and design footprint
Figure 1-3: Key features of the proposal (Southern Section)

- Provision of a 3.5m wide shared path for pedestrians and cyclists
- Introduction of left-in only at Factory Road
- Provision of access to Jeanette Street for emergency vehicles
- Interfacing with M4 Smart Motorway Project by providing an upgrade to the exit ramps
- Reducing the width of the embankments supporting the M4 Motorway bridges and installing retaining structures to create space for through-lanes on the outside of the piers
- Extending southbound left- and right-turn lanes entering the M4 Motorway
- Bus priority lane
- Revised REF Proposal Footprint
- Design Footprint

Mulgoa Road upgrade Jeanette Street to Blaikie Road
Submissions report
Figure 1-4: Key features of the proposal (Northern Section)

- Creating a shared transit zone for vehicles and cyclists, and providing an adjacent footpath on Hutchinson Crescent, Huron Place and Peter Court
- Bus priority lane
- Removing the grade separated access to the Penrith Homemaker Centre at Wolseley Street and providing dual right-turn lanes
- Introduction of left-in only at Peter Court
- Introduction of left-turn lane for Glenbrook Street
- Extension of northbound slip lane at Blaikie Road

Mulgoa Road upgrade Jeanette Street to Blaikie Road
Submissions report
1.2 Review of Environmental Factors (REF) display

Transport prepared an REF to assess the potential environmental impacts of the proposed work. The REF was publicly displayed for 29 days between 27 August 2018 and 21 September 2018 at the Penrith City Library, 601 High Street, Penrith and made available for download on the Transport for NSW project website. The display locations and website link were advertised in the Penrith Press and the Western Weekender (refer to Appendix A of this Report).

Transport hosted three consultation and community information sessions during the REF display period (refer to Section 2.5.2 of this Report).

Community members were also encouraged to ask questions, provide feedback and make submissions via the following means:

- **Phone:** 1800 733 084
- **Email:** mulgoaroadupgrade@rms.nsw.gov.au
- **Mail:**
  - Mulgoa Road upgrade – Jeanette Street to Blaikie Road
  - Transport for NSW
  - PO BOX 973
  - Parramatta CBD NSW 2124

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<tr>
<th>Activity</th>
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<tr>
<td>Newspaper advertisement (refer to Appendix A)</td>
<td>As per circulation numbers</td>
<td>Newspaper advertisements appeared in the Penrith Press on 30 August 2018 and the Western Weekender on 31 August 2018 to raise awareness of the consultation and community information sessions.</td>
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<tr>
<td>Community update (refer to Appendix B)</td>
<td>6,200 business and residential addresses</td>
<td>A community update outlining the key features of the proposal, the details of the public display, and how to provide feedback was distributed to residences and businesses in Glenmore Park, Regentville and Jamisontown.</td>
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<tr>
<td>Webpage</td>
<td>1,119 views</td>
<td>The project webpage was updated on 28 August 2018 with the latest project details including: the community update newsletter; REF; and information on how to submit feedback. 1,119-page views were recorded during the consultation period.</td>
</tr>
<tr>
<td>Media release</td>
<td>As per circulation numbers</td>
<td>A media release was issued by Transport on 29 August 2018. It was titled ‘Community invited to have a say on Mulgoa Road Upgrade’ and it encouraged local community members and stakeholders to engage in the consultation process.</td>
</tr>
</tbody>
</table>
| Consultation and community information sessions    | Three                     | Three consultation and community information sessions were held:  
  - Monday 3 September 2018, 5:30-8:30pm  
    Penrith YMCA, 1 Pattys Place, Jamisontown  
  - Saturday 8 September 2018, 10am–12pm |
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<td>Penrith Homemaker Centre, corner of Mulgoa Road and Wolseley Street, Jamisontown</td>
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<td></td>
<td></td>
<td>• Saturday 15 September 2018, 10am–12pm</td>
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<td></td>
<td>Glenmore Park Town Centre, 1 Town Terrace, Glenmore Park.</td>
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<td>Email notifications</td>
<td>443</td>
<td>Emails were sent from Transport to 443 community members and groups, local Members of Parliament and other Government stakeholders on 7 September 2018 to announce the REF display, raise awareness of the start of the consultation period, and provide details of the community information sessions.</td>
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<tr>
<td>Social Media</td>
<td>9,562</td>
<td>Facebook and twitter updates were published online on the following days:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• 30 and 31 August 2018</td>
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<td></td>
<td></td>
<td>• 11, 13, 17 and 20 September 2018</td>
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<tr>
<td></td>
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<td>These updates provided a video of the proposal and a link to where people could make a submission or find out more information. The highest number of views (9,562) of these posts was on 30 August 2018.</td>
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<td>Doorknocking</td>
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<td>Residents in the area around 111 Mulgoa Road were door-knocked. The purpose of this was to notify residents about the adjoining construction compound and provide them with a factsheet.</td>
</tr>
</tbody>
</table>

### 1.3 Purpose of this report

This Submissions Report relates to the 2018 Mulgoa Road upgrade - Jeanette Street to Blaikie Road REF prepared for the proposal and should be read in conjunction with that document. The REF was placed on public display in 2018 and 84 submissions were received by Transport for NSW.

This Submissions Report summarises the issues raised and provides responses to each issue (refer to Chapter 2). The report notes areas where the REF proposal footprint has been amended to accommodate more developed utility designs (refer to Chapter 3) It details additional investigations carried out since finalising the 2018 REF (refer to Chapter 4) and identifies new or revised safeguards and management measures (refer to Chapter 5).
2. Response to issues

Transport received 84 submissions. Table 2-1 lists the respondents and their allocated submission number. The table also indicates where the issues from each submission have been addressed in Chapter 3 of this report.

Table 2-1: Respondents and allocated submission number

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2.1 Overview of issues raised

Eighty-four submissions were received during the display period of the 2018 REF. Figure 2-1 below summarises the percentages of response received:

- 73 were from community members (about 88 per cent)
- Four were from local businesses (about five per cent)
- Three were from organisations or groups (about four per cent, Bicycle NSW, Mulgoa Valley Landcare and Cumberland Land Conservancy)
- Two were from utility companies (Telstra and Sydney Water)
- Two were from Penrith City Council.

![Figure 2-1: Percentage of responses received across the five groups](image)

Each submission was examined individually to understand the issue(s) being raised. The issues were extracted and collated where relevant, and corresponding responses have been provided in Chapter 3. Where similar issues were raised in different submissions, only one response has been provided. Where one submission relates to more than one issue, an appropriate response has been provided.

In summary, of the submissions:

- About seven per cent offered some form of support for the proposal
- About 42 per cent raised concerns about the removal of the mature Forest Red Gum trees between Wolseley Street and Blaikie Road
- About 38 per cent raised concerns about traffic congestion and efficiency of the road network, including intersection performance
• About 32 per cent raised concerns about vegetation removal and the impact of this on the landscape and visual amenity of the area
• About 15 per cent made comments about the active transport provisions included in the proposal
• About eight per cent were specifically concerned about the M4 Western Motorway interchange.

Table 2-2 summarises the main comments or issues raised by the five main respondent groups.

Table 2-2: Summary of the main issues raised by respondent group

<table>
<thead>
<tr>
<th>Respondent group</th>
<th>Main comments, issues or clarifications</th>
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| Community                 | • Concerns about environmental and social impacts, including vegetation removal, biodiversity, noise, amenity and safety  
                             | • Clarification about property acquisition  
                             | • Clarification about proposed access arrangements on local roads  
                             | • Clarification about the following specific design elements: the M4 Western Motorway interchange; traffic lights; active transport provisions; noise walls; and the proposed removal of the grade-separated access to the Penrith Homemaker Centre at Wolseley Street  
                             | • Clarification about the scope of the proposal and staging of future road upgrades.                                                                                     |
| Penrith City Council      | • General support for the proposal to increase the road capacity to three lanes in each direction  
                             | • Request for additional intersection improvements to local streets to support the proposal  
                             | • Request for the design to be consistent with various Council policies  
                             | • Need for further consultation and engagement with Council during the detailed design regarding landscaping, noise walls, light fixtures and signage. |
| Businesses                | • Concern about reducing the capacity of the Penrith Trade Centre car park and how this may impact on businesses.  
                             | • Concern around the change to access arrangements at Factory Road for business and residents  
                             |                                                                                                                                                                          |
| Utility companies         | • Request for Transport to consider impacts on utility assets and to follow reporting protocol through all stages of development  
                             | • Need to consult on any proposed utility adjustments  
                             | • Request for Transport to consider the relevant protocol for shutting down and/or reconnecting live assets.                                                              |
| Community organisations   | • Suggestions to include provision for active transport to improve safety for cyclists  
                             | • Concerns about the removal of Forest Red Gum trees and their associated habitat value.                                                                                 |
2.2 Scope of the proposal and options considered

Submission number(s)
2, 32, 34, 36, 38, 41 and 43

Issue description
Respondents raised the following issues about the proposal’s need and the options considered:

- The scope of the proposal is limited, and it should be extended further south of Jeanette Street, or north to Batt Street and south to Glenmore Parkway
- That further information about the scope and timing of the Stage 2 work (Mulgoa Road upgrade Glenmore Park to Jeanette Street) is provided
- The merge lanes (tie-in lanes) are outside the approved scope of the proposal
- Autonomous cars will negate the need for the proposal in the future
- Suggestion that Transport considers tunnelling underneath Mulgoa Road as an alternative to the proposal.
- Suggestions were made about additional lane capacity to be considered at Glenmore Park.

Response
Transport is planning to upgrade the Mulgoa Road/Castlereagh Road corridor in stages. The Mulgoa Road upgrade Glenmore Parkway to Jeanette Street project has been funded by the NSW Government and any additional information regarding timing will be provided by the Mulgoa Road upgrade Glenmore Parkway to Jeanette Street project team in due course.

The limits of the proposal beyond Jeanette Street and Blaikie Road are needed to tie the new three-lane section back into the existing two-lane sections to the north and to the south. Traffic modelling completed for the 2018 REF did not predict an increase in traffic congestion to the north and south of these tie-in points.

The proposed property acquisitions along the western side of Mulgoa Road to the south of Factory Road are needed for the future Mulgoa Road upgrade – Glenmore Parkway to Jeanette Street. As the acquisition process can take a long time, these properties have been identified for acquisition as part of the current proposal.

Transport did not consider tunnelling to be a feasible design alternative to the proposal due to the increased construction costs and potential risks.

The Glenmore Parkway and Mulgoa Road intersection is outside the scope of this proposal and would be considered as part of the Mulgoa Road upgrade – Glenmore Parkway to Jeanette Street project, which is funded to build and in the concept design phase of development.
2.3 The proposal

2.3.1 Design

**Submission number(s)**
4, 6, 13, 15, 17, 19, 28, 48, 55, 56 and 83

**Issue description**
Respondents raised the following issues about the proposed road design:

- The proposal does not address the traffic congestion on Mulgoa Road
- The proposal would not alleviate traffic congestion along Mulgoa Road and the design should include more than two or three lanes in each direction
- Increasing the capacity of Mulgoa Road may increase congestion and the potential for more road traffic accidents
- Concern that the third lane proposed in each direction under the M4 Western Motorway will cause confusion to motorists due to the split to avoid the bridge piers
- Removing the Wolseley Street tunnel will cause a safety issue for pedestrians due to potential for motorists to run through red lights when entering the Penrith Homemaker Centre
- Requests were made for further information, and one respondent requested specific information about the proposed lane widths and whether these will allow filtering for motorcyclists.

Penrith City Council generally offered its support for the proposal however it identified the following items for Transport to consider during detailed design:

- That the criteria for B-double trucks be increased to 28.5 metres
- The installation of roundabouts at the intersections of Spencer Street/Gibbes Street, Blaikie Road/Pattys Place and Glenbrook Street/Warragamba Crescent
- Council noted that it will only support the proposed changes at Factory Road if intersection improvements are provided at Spencer Street/Gibbes Street
- Council noted that it will only support the proposal to remove the Wolseley Street tunnel if a new roundabout is provided at Blaikie Road/Pattys Place
- Requested that land acquisition for verges is widened to adequately accommodate footpaths, utilities and services.

**Response**
Upgrading Mulgoa Road from two lanes to three lanes in each direction would increase capacity, reduce traffic congestion and improve travel times (see Section 6.1 And Appendix C of the 2018 REF). The proposed upgrade would help alleviate motorist frustration and support a reduction in the number of road crashes.

The design considers the safety of all road users and the Mulgoa Road through-lanes would be 3.5 metres wide, in accordance with the current road standard. The proposed design conforms to Transport and Austroads guidance, and the criteria for B-double trucks are considered sufficient.
Transport will review the detailed design to ensure there is adequate room to accommodate footpaths, utilities and services. The traffic assessment in the 2018 REF (refer Section 6.1 and Appendix C of the 2018 REF) considered the potential impacts on local roads as a result of restricting Factory Road to left-in only access.

The assessment found that although Spencer Street (to the south-west of Factory Road) would be increasingly used to access Mulgoa Road there would be no appreciable improvement in travel time or safety by modifying any of the local road intersections (eg Spencer Street/Gibbes Street).

The design proposes to remove the Wolseley Street tunnel and replace this with two dedicated right turn lanes into Wolseley Street to minimise property impacts on the eastern side of Mulgoa Road. The dedicated right turn lanes would improve road safety and relieve congestion without affecting network performance. The tunnel is also a maintenance issue due to the flooding that occasionally closes the tunnel to traffic, causing extensive delays to the Mulgoa Road traffic. Traffic impacts were assessed in Section 6.1 of the 2018 REF and the modelling shows that the upgrade of Mulgoa Road including the modified intersection at Wolseley Street, with two dedicated right turn lanes, performs well.

The traffic assessment in the 2018 REF (see Section 6.1 and Appendix C of the 2018 REF) considered the provision of a roundabout at the Blaikie Road/Pattys Place intersection. Retaining the existing priority intersection treatment is considered adequate.

Transport acknowledges that a roundabout at the intersection of Glenbrook Street and Warragamba Crescent would provide a potential safety benefit to the local community. Therefore, Transport will contribute to Council constructing a roundabout at this intersection.

2.3.2 Construction

Submission number(s)

7, 8, 15, 37 and 83

Issue description

Respondents raised the following issues about the proposal’s construction:

- Clarification whether the proposal would still go ahead if the Government changes in the upcoming election
- Concern about the proposed construction compound being located close to residents
- Requesting further information about:
  - Working hours at the construction compound
  - Construction scheduling and staging
  - Measures to mitigate noise and dust impacts during construction.

Penrith City Council requested that Transport consult with its Property Development Department to agree the requirements for the temporary construction compound. Furthermore, Council requested that all safeguards and management measures in the 2018 REF are incorporated into the Construction Environmental Management Plan (CEMP).
**Response**

Transport considers that it is unlikely that the project would be stopped at this stage, however, the funding is subject to approval by the Government at the time.

Lot 111 Mulgoa Road is proposed as the temporary site compound for the proposal during construction. Due to its proximity to the design footprint and the lack of suitable alternatives nearby given the highly urbanised environment, locating the construction compound near residents is unavoidable. Nearby residents would be consulted and notified before the site compound is set up. The impacts of the construction compound, including measures to reduce dust and noise, would be managed in accordance with the Construction Environmental Management Plan (CEMP). The standard safeguards implemented as part of the CEMP are proven to be effective at minimising and managing potential impacts. The construction mitigation measures detailed in the REF, would need to be implemented by the successful Contractor when developing the CEMP.

The construction compound would operate between:

- 7am and 6pm Monday to Friday
- 8am to 1pm on Saturday.

If use of the compound is to occur outside of these hours, a notification would be sent to all impacted residents.

Construction staging plans are being developed as part of the detailed design. They would consider the sequencing of construction to minimise disruption to motorists and residents. Once the staging plans are finalised by the Contractor, Transport will consult with affected residents on the proposed work.

Transport will continue to maintain ongoing consultation with Penrith City Council during the detailed design phase.

As the future stages of the Mulgoa Road/Castlereagh Road corridor are progressed, a Traffic Management Plan (TMP) will be prepared and implemented for each stage of the upgrade to minimise the impact on local traffic and residents. During the construction of the Mulgoa Road upgrade – Jeanette Street to Blaikie Road, traffic flow along the corridor will be maintained where possible, and certain work activities will take place at night to minimise any traffic-related impacts.

### 2.3.3 Utilities

**Submission number(s)**

9, 10 and 83

**Issue description**

Sydney Water requested the following from Transport:

- Consultation should be carried out on all proposed utility adjustments and Sydney Water requirements and specifications should be considered where adjustments are proposed
- The Sydney Water discharge protocol should be considered for chlorinated water due to the proposal to shut down and reconnect an active water main.

Telstra requested the following from Transport:
• Potential impacts on all assets should be considered and reporting protocols should be followed during all stages of the proposal.

Penrith City Council requested that the stormwater treatment should be designed to achieve the criteria in Council's Water Sensitive Urban Design (WSUD) policy.

*Response*

Transport will continue to work collaboratively with Sydney Water, Telstra and Penrith City Council to ensure an appropriate outcome for all parties. Transport will consider the requirements of the Sydney Water protocol for chlorinated water discharge when finalising the asset adjustments, ensuring appropriate measures are in place.

Transport will consider the requirements of Penrith City Council’s WSUD policy along with its own Water Sensitive Urban Design Guideline (Transport for NSW, 2017b) during detailed design.

### 2.4 Statutory and planning framework

*Submission number(s)*

83 and 84

*Issue description*

Penrith City Council noted that an amendment to the Penrith Local Environmental Plan 2010 would be needed for all planned land acquisitions to identify changes to land use zonings and the addition of Land Reservation Acquisition parcels.

*Response*

Transport will provide Penrith City Council with the final acquisition details and any appropriate updates to allow it to amend the Local Environmental Plan.

### 2.5 Consultation

2.5.1 REF display

*Submission number(s)*

6

*Issue description*

A respondent suggested that the community consultation carried out for the proposal was inadequate and that not all residents were consulted.

*Response*

The preferred option for the proposal was published in April 2017 along with a community update. A consultation report was then published in April 2018 noting that further consultation would be carried out...
once the 2018 REF and concept design were available. Section 1.2 describes the consultation carried out to support the display of the 2018 REF.

Feedback received following display of the 2018 REF is being considered in this submissions report and as part of the detailed design where appropriate. Furthermore, Transport is carrying out ongoing consultation with directly-affected residents during development of the detailed design. This would include visiting individual community members, upon request, to discuss their specific concerns.

2.5.2 Further consultation post-REF

Submission number(s)
23, 81, 83 and 84

Issue description
The respondents requested that Transport consult with stakeholder groups to identify opportunities for tree retention.

Response
Following the review of the submissions, Transport developed a consultation strategy to engage with Penrith City Council and the community groups. The strategy identified the need to examine options in facilitated workshops with the Mulgoa Valley Landcare Group (MLG), Cumberland Land Conservancy (CLC) and the Penrith City Council (PCC) staff responsible for engineering, environment and landscape.

Transport carried out additional consultation with stakeholder groups at the following meetings:

- 15 November 2018: Meeting with key stakeholder groups (PCC, MLG and CLC)
- 30 November 2018: Meeting with PCC – Council staff identified tree retention options for Transport to consider
- 6 December 2018: Facilitation meeting with stakeholder groups (MLG and CLC) – Transport provided the stakeholder groups the history of the development of the proposal and gave them an opportunity to identify tree retention options for Transport to consider
- 13 December 2018: PCC workshop – Council staff identified additional tree retention options for Transport to consider
- 5 April 2019 - Workshop on cost impacts, to reduce or avoid gum tree impact
- 8 April 2019 - Meeting on-site with both MLG and CLC
- 16 April 2019: Meeting with PCC – Transport presented the current design and two options being considered to reduce impact on Forest Red Gum trees, and presented a summary of additional biodiversity assessment and results
- 30 April 2019: Meeting with PCC – Transport and PCC further discussed options being considered to reduce impact on Forest Red Gum trees, and Transport presented the work completed to date to respond to PCC comments (including additional biodiversity assessment, arborist assessment and options investigations)
- 24 May 2019 - Meeting with both MLG and CLC, to discuss assessment criteria
- 4 June 2019 - RMS Internal options assessment workshop and determination
2.6 Traffic and transport

2.6.1 Traffic congestion

**Submission number(s)**
5, 6, 13, 15, 16, 28, 32, 33, 37, 41, 49, 50, 51, 53, 55, 64, 66 and 83

**Issue description**
Respondents raised the following issues about existing and potential traffic congestion:

- The proposal would not alleviate traffic congestion along Mulgoa Road and specifically that the one-kilometre scope would create additional congestion issues when reducing the number of lanes from three down to two at the tie-in points
- Tie-in points (merge lanes) may result in an increase in traffic incidents
- Potential for the proposal to result in a bottleneck at Batt Street
- Impacts associated with existing intersection performance and the queuing of traffic across intersections
- Existing traffic delays on Mulgoa Road due to buses stopping to pick up and drop off passengers
- Future development, including the proposed apartments on Union Road, may increase traffic congestion.

Suggestions were made to allow left-turn movements on red lights from side streets, and to provide yellow lines to discourage intersection queuing.

Several respondents also believe that the existing traffic congestion along Mulgoa Road is due to the number and phasing of traffic lights and they requested that these are adjusted as part of the proposal.

The following issues were specifically raised about the phasing of the traffic lights:

- The current phasing at Spencer Street allows limited turning time
- The phasing should be extended at the M4 Western Motorway interchange to ease access for cars exiting Factory Road
- Traffic lights should be provided for the emergency vehicles exiting Jeanette Street
- Traffic light phasing should be adjusted for all traffic lights between the M4 Western Motorway and the Great Western Highway to provide better traffic flow
- Traffic light phasing should be adjusted to allow for the continuous flow of pedestrians and cyclists along the shared path.

Penrith City Council supports the proposal’s inclusion of bus queue jump facilities. It also requested that the relocated bus stops comply with the Commonwealth *Disability Discrimination Act 1992* (DDA).

**Response**
Transport considered a new corridor in the strategic assessment phase as an alternative to upgrading Mulgoa Road. The Preferred Options Report published in April 2017 discounted this option as it would require considerable property acquisition and would have the greatest environmental impact. The growth predicted in Penrith would be supported by a number of projects including: The Northern Road upgrade, Mulgoa Road upgrade, Outer Sydney Orbital, GWH and Bells Line of Road. The network upgrades would provide a regional strategy for traffic and transport in the future.
Existing traffic congestion and delays along Mulgoa Road are a result of the increasing population and traffic demand in the Penrith LGA. The proposed design retains all existing traffic lights and their phasing and timing would be optimised to support the proposed increase in capacity. These traffic lights would continue to be monitored and managed by the Sydney Coordinated Adaptive Traffic System (SCATS). improves traffic flow and ensures minimum overall stops and delays for road users. These combined measures would reduce traffic congestion and time delays.

The traffic modelling carried out as part of the 2018 REF (Section 6.1 and Appendix C) considered the tie-ins to the north and the south of the proposal. The modelling did not identify that the merge lanes would cause additional congestion. Appropriate signage would be in place prior to the merge locations and Transport for NSW will monitor any safety concerns.

An objective of the proposal is to consider the needs of other road users including cyclists and pedestrians. As such, Transport has reviewed how the phasing and timing of the traffic lights would be optimised to service these user groups. Transport would monitor any illegal queuing across affected intersections after the upgrade and if necessary, would consider further measures to address any pedestrian and cyclist issues.

The design proposes to maintain the existing exit arrangements for emergency vehicles at Jeanette Street. As such, the current flashing sign, which warns motorists that an emergency vehicle is exiting, would be replaced as part of the proposal.

The suggestion relating to allowing traffic to turn left on a red light at this intersection would increase the likelihood of side-impact crashes. Transport would therefore not implement this change.

The proposal provides additional bus priority lanes (bus queue jump facilities) at intersections. This, in combination with the relocation of the bus stops on Mulgoa Road, would serve to minimise traffic delays caused by buses stopping to drop off and pick up passengers. All relocated bus stops would be DDA compliant and consistent with Transport design standards.

Traffic impacts at Union Road are considered to be part of the Mulgoa Road upgrade, Penrith, Union Road to Museum Drive project and are outside the scope of this proposal.

### 2.6.2 M4 Western Motorway interchange

**Submission number(s)**
1, 21, 27, 29, 35, 45, 51 and 56

**Issue description**
Respondents raised the following issues about traffic congestion at the M4 Western Motorway interchange:

- Turning right onto Mulgoa Road from the M4 Western Motorway westbound off-ramp causing queuing across the interchange and traffic congestion in this section of the proposal
- Traffic lights at this interchange and the build-up of traffic on Mulgoa Road from vehicles wanting to enter the motorway southbound
- Queuing on the M4 Western Motorway shoulder heading west towards Penrith.

Respondents were also concerned that separating the third through-lane to the outside of the piers under the M4 Western Motorway bridges would confuse motorists. One respondent also requested the inclusion of a slip lane to provide access to the M4 Western Motorway westbound from Mulgoa Road to reduce traffic queuing in this location.
Response

The design proposes an additional right turning lane onto the M4 Western Motorway (from Mulgoa Road northbound) and an extended left turn lane onto the M4 Western Motorway (from Mulgoa Road southbound) to improve the performance of these intersections.

Traffic modelling completed for the 2018 REF indicated that the upgrade would cater for predicted traffic growth over the next 20 years. Transport for NSW would monitor any illegal queuing across affected intersections after the upgrade and if necessary, would consider further measures to address the issue. This section of Mulgoa Road and the M4 Western Motorway off-ramps are funded, and they are intended to be built at the same time as the proposal. The purpose of extending the M4 Western Motorway off-ramps is to provide additional storage to minimise congestion and queuing issues at the interchange. The proposed design retains all existing traffic signals but would also increase the capacity of Mulgoa Road while reducing traffic congestion and time delays after the upgrade is completed (refer to the traffic assessment in Section 6.1 and Appendix C of the 2018 REF). The project team would review the phasing of the traffic signals to provide adequate servicing of these road users.

As part of the traffic and transport assessment for the proposal traffic modelling indicated that three lanes in each direction are needed to reduce existing congestion on Mulgoa Road and to cater for predicted future traffic growth. To avoid re-construction of the M4 Western Motorway bridges, which would result in significant construction traffic impacts and delays, the design proposes an additional lane on either side of the existing piers. Appropriate signage and safety barriers would be in place and Transport would monitor any safety concerns.

2.6.3 Local roads and access

Submission number(s)
8, 11, 12, 14, 30, 44, 47, 51, 54 and 66

Issue description

Respondents raised the following issues about the proposal resulting in an increase in traffic on the local road network and the potential amenity and safety impacts on local roads such as Gibbes Street, Tench Avenue, Loftus Street and Spencer Street:

- Traffic on local roads increasing due to the opening of the new boat ramp and restaurants on Tench Avenue
- Heavy vehicles using local roads such as Tench Avenue to minimise delays on Mulgoa Road
- The safety of residents and pedestrians with the changes proposed at Peter Court
- Potential loss of car parking spaces in Peter Court
- Request for access from Peter Court to Glenbrook Street to be closed
- Concern around the change to access arrangement at Factory Road.

Concern was also raised about the volume of traffic using Glenbrook Street to access Mulgoa Road and the associated formation of queues on Glenbrook Street during peak periods once the proposal is built. Several solutions were offered to address this including:

- Providing another dedicated left-turn lane on Glenbrook Street
- Relocating the pedestrian crossing on Mulgoa Road to the northern side of Glenbrook Street.
Response

Upgrading Mulgoa Road from two lanes to three lanes in each direction would increase capacity, reduce traffic congestion and travel times, and support a reduction in the number of road crashes. It would also encourage motorists, including heavy vehicles, to use Mulgoa Road as the preferred route rather than local roads. In addition, as the local roads (eg Glenbrook Street) are managed by Penrith City Council, any corresponding upgrades or introduced safeguards and management measures proposed by Transport would be implemented in cooperation with Penrith City Council.

Transport is concerned with the safety of maintaining the current situation at Factory Road with motorists turning out of Factory Road into the M4 Western Motorway right turn lanes heading to the city, and the proposal restricts the Factory Road intersection to left-in only. Transport would continue to explore options to improve the safety of this intersection during detailed design without compromising the safety of the nearby Mulgoa Road/Spencer Street intersection.

The traffic assessment in the 2018 REF (see Section 6.1 and Appendix C of the 2018 REF) considered the potential impacts on local roads as a result of restricting Factory Road to left-in only access. A number of options were considered for the Spencer Street/Gibbs Street intersection to address the predicted increase in traffic using these local roads to access Mulgoa Road. The traffic assessment recommended maintaining the existing priority intersection treatment and found that there would be no appreciable improvement in travel times or safety by modifying this intersection. Transport would consider threshold treatments during detailed design to provide traffic calming such as, installing line markings, signage and other traffic calming measures.

The design proposes to introduce on-street parking restrictions along Hatchinson Crescent, Huron Place and Peter Court. Transport for NSW will continue to consult with residents to identify opportunities to reduce the loss of on-street parking as the detailed design is developed. Further, the design proposes a left-in only arrangement from Glenbrook Street to Peter Court. This would allow service vehicles, such as rubbish trucks, to continue to Huron Place avoiding dangerous reversing manoeuvres by large vehicles within the confines of a local road. Threshold treatments, such as installing line markings or signs, would be considered during detailed design to introduce traffic calming measures. The existing pedestrian footpath along Hatchinson Crescent, Huron Place and Peter Court would be reinstated and a footpath provided on Peter Court, to maintain the safety of pedestrians.

The Traffic and Transport Assessment indicates that in the AM peak, the delay for the left turn movement from Glenbrook Street to Mulgoa Road is 41 seconds with a queue length of 168 metres, which is an acceptable level of service for this movement. In the PM peak, the model indicates that there would be a delay of 126 seconds with a queue length of 224 metres, which is an unacceptable level of service. Transport for NSW would review the phasing during the detailed design phase and consider the queue length in Glenbrook Street, especially during the PM peak period.

2.6.4 Active transport

Submission number(s)

2, 14, 15, 16, 20, 39, 40 and 83

Issue description

Respondents raised the following issues about the proposed active transport provisions, and more specifically, about the design of the shared path:

- The proposal should include a single safe separate cycleway
• The proposed shared path does not provide adequate safety measures for pedestrians and cyclists due to multiple driveway and local road crossings
• Request that a shared path be provided on both sides of Mulgoa Road, and that where the shared path crosses a local road, facilities are provided to allow cyclists to cross safely
• Request clarification on whether the footpath along Hatchinson Crescent would stay in the same location.

Penrith City Council commented that an application must be made to its Local Traffic Committee for the proposed shared transit zone signage and planned lane marking changes, and that the footpath must be 1.5-metres-wide along Hatchinson Crescent, Huron Place and Peter Court.

**Response**

The proposed design allows for a 3.5-metre-wide shared path on the eastern side and a two-metre-wide footpath on the western side of Mulgoa Road. Where the shared path is proposed, the design includes the provision for it to be widened to 4.5-metres in the future if there is a justified need due to an increase in the number of cyclists and pedestrians. Transport will continue to consult with Penrith City Council on the proposed shared transit zone during detailed design.

Cyclist and pedestrian traffic lights would be provided at crossing points as needed. There is insufficient space to provide a wide shared path on both sides of Mulgoa Road without additional property acquisition.

The design proposes to replace the shared path along Peter Court with a shared transit zone for both vehicles and cyclists with an adjacent footpath.

There is insufficient space to provide a full-width shared use path along Hatchinson Crescent, Huron Place and Peter Court while maintaining local vehicle access for residents and cyclists. This is similar to the existing situation with cyclists directed to a shared zone on Hatchinson Crescent and Huron Place for about 135 metres.

There is insufficient space to provide a segregated cycle path without additional property acquisitions and the proposal maintains the existing active transport provision while maintaining local vehicle access for residents.

Other active transport provisions have been included in the design including reinstating the existing footpath along Hatchinson Crescent and Huron Place and providing a footpath on Peter Court. Additional changes to access arrangements from Glenbrook Street to Peter Court include a 1.2 metre wide footpath. There is insufficient space to provide a 1.5-metre-wide footpath and to safely accommodate the transition of cyclists to share the road with vehicles through this narrow section. Increasing the width of the footpath would require additional property impacts, the 1.2-metre-wide footpath is considered to be sufficient and was not highlighted as a safety concern as part of the traffic assessment completed for the 2018 REF (see Section 6.1 and Appendix C of the 2018 REF).

Transport will submit an application to Penrith City Council Local Traffic Committee for the proposed local road signage.
2.7 Biodiversity

2.7.1 Assessment methodology

**Submission number(s)**
68, 69, 71, 73, 74, 76, 78, 80 and 83

**Issue description**
Respondents raised the following issues about the biodiversity assessment:

- The completed surveys were limited by adverse weather conditions
- The fauna survey effort should include microbat and nocturnal, dusk or dawn surveys
- Cumulative biodiversity impacts were not adequately addressed
- Additional mitigation measures to safeguard existing trees should be identified.

**Response**
The surveys to support the biodiversity assessment for the proposal were carried out by suitably qualified ecologists in accordance with best practice methodologies including the Transport for NSW Environmental Impact Assessment Practice Note: Biodiversity Assessment (2015). It is not a requirement of Roads and Maritime Services policy or legislation to seek feedback on specialist studies until the 2018 REF display period. Based on submissions received, Transport engaged ecologists to carry out additional ecology surveys, including microbat ultrasonic surveys, and nocturnal, dusk and dawn fauna. Assessments of significance were carried out for the recorded species and species with potential habitat in the study area. Where required, additional mitigation measures have been provided. The BAR has since been updated by a qualified ecologist based on additional field investigations that have been carried out. Refer to Section 4 of this report.

Potential impacts on fauna as a result of the removal of trees and subsequent tree hollows will be mitigated. A Fauna Management Plan will be prepared which will determine the number and extent of fauna mitigation measures required. Mitigation measures such as nest boxes and / or adaptive reuse of existing hollows may be used. In addition, monitoring requirements for mitigation measures will be set.

The 2018 REF notes that the proposal would contribute to cumulative visual amenity impacts during construction due to the overlap with construction of other nearby projects beyond 2020. During operation, the proposal would cumulatively contribute to the urban intensification of the area. Mitigation measures to minimise the visual amenity impacts due to vegetation removal include consideration of alternative detailed design options to maximise the number of trees to be retained and replanting and replacement of native vegetation as part of the Landscape Character and Visual Impact Assessment and Urban Design Study. Refer to Section 6.7 and Appendix H of the 2018 REF. The planting approach for the proposal will be further developed as part of the Urban and Landscape Design Strategy in accordance with Roads and Maritime Services guidance document ‘Beyond the Pavement’ and will consider the amenity of the local community.

During the detailed design phase, refinements will be made to the utility relocations and opportunities to reduce impacts to the trees will be considered in consultation with the arborist. The arborist will conduct a detailed study on the impact of the upgrade on the trees. The arborist will prepare an Arboricultural Impact Assessment and Tree Protection Plan to outline mitigation measures to protect the retained Forest Red Gum trees. For trees that are impacted, a detailed tree root map (using non-invasive techniques) and a structural analysis of the tree will be carried out.
This will allow trees to be categorised according to their retention potential. Refined detailed design options will then be considered to maximise the number of trees to be retained and the long-term viability of retained trees. The Arborist’s scope of work during the detailed design phase will include DNA analysis of the trees.

The proposed upgrade provides for replanting and replacement of native vegetation as part of the Landscape Character and Visual Impact Assessment and Urban Design Study. Refer to Section 6.7 and Appendix H of the 2018 REF. In addition, Transport is working with Council to provide planting along the corridor and to mitigate the loss of trees due to the upgrade.

2.7.2 Forest Red Gum trees

Submission number(s)
5, 23, 24, 25, 31, 42, 43, 46, 52, 57, 58, 59, 60, 61, 62, 63, 64, 65, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 83 and 84

Issue description
The greatest number of responses related to concerns about the removal of Forest Red Gum trees between Blaikie Road and Wolseley Street and the impact this would have on native fauna that use this habitat for nesting and foraging. Concern was also raised about the loss of hollows and the inadequacy of nest boxes as a safeguard measure. Requests were made to offset the trees that would be removed.

Response
To allow for the upgrade of Mulgoa Road, some of the existing vegetation would need to be removed. The proposed design does provide for replanting and replacement of native vegetation as part of the Landscape Character and Visual Impact Assessment and Urban Design Study. Refer to Section 6.7 and Appendix H of the 2018 REF.

The proposal described in the 2018 REF requires the removal of 0.81 ha of Forest Red Gum trees on the western side of Mulgoa Road. The loss of these trees relates to avoiding property acquisition on the eastern side of Mulgoa Road and the clearing required to allow for construction and road widening. Transport has engaged a suitably qualified arborist to provide Arboricultural advice relating to the management of Forest Red Gum trees between Wolseley Street and Blaikie Road, in accordance with AS 4970 Protection of Trees on Development Sites.

The arborist has carried out a visual tree assessment, to identify which trees contain hollows, and allocated a retention value based on a combination of the tree’s landscape significance (cultural, environmental and aesthetic value) and Useful Life Expectancy (ULE) (growing environment, health, structural condition and site suitability). Note that ULE does not estimate the biological lifespan.

During the detailed design phase, refinements will be made to the utility relocations and opportunities to reduce impacts to the trees will be considered in consultation with the arborist. The arborist will conduct a detailed study on the impact of the upgrade on the trees. The arborist will prepare an Arboricultural Impact Assessment and Tree Protection Plan to outline mitigation measures to protect the retained Forest Red Gum trees. For trees that are impacted, a detailed tree root map (using non-invasive techniques) and a structural analysis of the tree will be carried out. This will allow trees to be categorised according to their retention potential. Refined detailed design options will then be considered to maximise the number of trees to be retained and the long-term viability of retained trees. The Arborist’s scope of work during the detailed design phase will include DNA analysis of the trees.
Due to the constrained corridor in the Mulgoa Road upgrade - Jeanette Street to Blaikie Road section, it is likely that the landscape replacement strategy would also need to include future stages of the project. The planting approach for the proposal will be further developed as part of the Urban and Landscape Design Strategy in accordance with Transport for NSW guidance document 'Beyond the Pavement' and would consider the amenity of the local community.

A biodiversity assessment was carried out as part of the 2018 REF and the potential impacts were assessed in Section 6.3 of the 2018 REF. The 2018 REF outlined the 'worst-case' extent of tree impacts assuming removal of the entire 0.81 ha of Forest Red Gum trees. During ongoing design, the proposal would aim to reduce the impact on the Forest Red Gums. The BAR confirmed that native bird species (including parrots) use these trees as foraging, breeding and roosting habitat however, the Blue Mountains National Park to the immediate west provide large areas of high-quality habitat for these species.

The BAR has since been updated (August 2019), following additional field investigations conducted by a qualified ecologist, refer to Appendix C of this report.

The additional investigations re-confirmed that the BAR reports on a 'worst case' vegetation removal as due to the restricted corridor available for construction and upgrade of Mulgoa Road. The assessment boundary includes areas for property adjustments (such as the relocation of private signs and private service connections) meaning the boundary cannot be reduced in this area.

The surveys to support the biodiversity assessment for the proposal were carried out by suitably qualified ecologists in accordance with best practice methodologies including the Roads and Maritime Environmental Impact Assessment Practice Note: Biodiversity Assessment (2015). Additional ecology surveys carried out, include microbat ultrasonic surveys, and nocturnal, dusk and dawn fauna.

In order to minimise the impact on native flora and fauna, pre-clearing surveys to identify plants and the presence of wildlife would be conducted during optimal season, and under conditions that would provide the greatest chance of detection. These surveys would be carried out by a qualified ecologist prior to vegetation removal. Appropriate wildlife relocation would occur where required and before vegetation removal. An additional construction safeguard for pre-clearing surveys has since been included in Chapter 5 of this report.

Potential impacts on fauna as a result of the removal of trees and subsequent tree hollows will be mitigated. A Fauna Management Plan will be prepared which will determine the number and extent of fauna mitigation measures required. Mitigation measures such as nest boxes and / or adaptive reuse of existing hollows may be used. In addition, monitoring requirements for mitigation measures would be set. Transport for NSW is undertaking an assessment of the existing tree canopy and working with Council to provide planting along the corridor to mitigate the loss of trees.

The number and location of nest boxes would be determined following the completion of the additional arborist assessment and detailed design work.

2.7.3 Vegetation removal and biodiversity assessment

Submission number(s)
62, 68, 69, 71, 73, 74, 76, 78 and 80

Issue description
Respondents raised issues about the lack of community input in relation to the biodiversity assessment and proposed vegetation removal.
Response
Consultation has been carried out in line with the community and stakeholder engagement plan described in Chapter 5 of the 2018 REF. In line with this, Transport has sought feedback on the specialist studies as part of the REF display period.

The REF that was placed on display outlined the 'worst-case' extent of tree impacts. Transport has considered responses received on the 2018 REF and has engaged a suitably qualified arborist to conduct an Arboricultural Impact Assessment of the proposal on the trees. Opportunities to reduce impact to the trees would be considered through the detailed design in consultation with the arborist.

The surveys to support the biodiversity assessment for the proposal were carried out by suitably qualified ecologists in accordance with best practice methodologies including the Roads and Maritime Environmental Impact Assessment Practice Note: Biodiversity Assessment (2015). It is not a requirement of Roads and Maritime policy or legislation to seek feedback on specialist studies until the REF display period. Based on submissions received, Transport engaged ecologists to undertake additional ecology surveys, including microbat ultrasonic surveys, and nocturnal, dusk and dawn fauna. The BAR has since been updated by a qualified ecologist based on additional field investigations that have been carried out. Refer to Section 4 of this report.

The BAR (see Appendix E of the 2018 REF) recommends a nest box strategy is developed for the proposal during detailed design/construction. During construction, Transport will consult with Penrith City Council, the local community and other organisations, if required. It is not a requirement of Transport for NSW policy or legislation to seek feedback on specialist studies until the REF display period. Based on submissions received, Transport engaged a suitably qualified ecologist to undertake additional ecology surveys, including microbat ultrasonic surveys, and nocturnal, dusk and dawn fauna. Assessments of significance were carried out for the recorded species and species with potential habitat in the study area. Where required, additional mitigation measures have been provided. These findings are provided in the updated BAR attached to this submissions report and summarised in Section 4 of this report.

Transport will continue to seek feedback from businesses, the local community, and Penrith City Council as the design progresses in accordance with the safeguard commitments described in Chapter 5 of this report.

2.8 Landscape and visual

Submission number(s)
2, 6, 15, 24, 31, 59, 61, 67, 68, 69, 70, 71, 73, 74, 76, 77, 78, 79, 80, 83 and 84

Issue description
Respondents raised the following issues about the potential for landscape and visual impacts:

- The proposed vegetation removal and the impact this would have on the amenity of the local community such as loss of privacy and increased noise
- The loss of shade and the effect on local temperatures including the potential for a heat island effect
- The potential for the proposed noise wall to attract crime such as graffiti.

Members of the community made suggestions for Transport to consider replanting as a mitigation measure to minimise effects on local temperatures and climate change.
Penrith City Council was also concerned with the loss of shading, cooling and amenity due to the proposed vegetation removal and made the following comments and requests:

- That a design response is provided against Council strategies relating to the provision of shade and landscaping
- Land acquisition should include sufficient provision for landscaping measures
- That Transport for NSW contributes to street tree planting to mitigate for the loss of existing mature vegetation
- That the heat island effect caused by the tree removal should be assessed
- Reinforcement to green natural corridors should be demonstrated in the detailed design. This is should consider increasing the overall quantity of trees and that the proposed median trees are large and meet design objectives
- That landscape planting should be provided at Surveyors Creek
- Consultation should be carried out with Council regarding light fixtures and promotional signage
- Council should be engaged regarding the urban design solutions for noise and retaining walls
- Landscaping plans should be amended to note where replacement trees would be planted
- Replacement shrubs and groundcover should consider resourcing and safety requirements and the existing understory plantings of low shrubs and grasses is continued in the area of Forest Red Gum trees
- Existing vegetation screening at the M4 Western Motorway off-ramp should be replaced to achieve a similar screening effect
- Trees should be provided at Hatchinson Crescent in consultation with residents
- The shared path should be designed to enable retention of existing trees. The path should be plain concrete for maintenance purposes.

**Response**

To allow for the upgrade of Mulgoa Road, some of the existing vegetation will need to be removed. During detailed design, the landscaping strategy will be further developed based on the outcomes of this assessment. However, due to the constrained corridor in Mulgoa Road upgrade - Jeanette Street to Blaikie Road it is likely that the replacement strategy would also need to include future stages of the project. The planting approach for the proposal will be further developed as part of the Urban and Landscape Design Strategy in accordance with Roads and Maritime guidance document 'Beyond the Pavement' and will consider the amenity of the local community.

The 2018 REF notes that the proposal would contribute to cumulative visual amenity impacts during construction due to the overlap with construction of other nearby projects beyond 2020. During operation, the project would cumulatively contribute to the urban intensification of the area. The proposed design does provide for replanting and replacement of native vegetation as part of the Landscape Character and Visual Impact Assessment and Urban Design Study. Refer to Section 6.7 and Appendix H of the 2018 REF. Transport is undertaking an assessment of the existing tree canopy and working with Council to provide planting along the corridor to mitigate the loss of trees.

As described in Section 2.7, Transport will investigate alternatives during the detailed design to reduce tree and vegetation loss throughout the construction and revised REF proposal footprint, including along the shared transit zone. Transport can confirm that the shared path includes a simple concrete-based design to help with ease of maintenance. During the detailed design phase, the arborist will assess the design plans and determine the impact of the proposed works on the Forest Red Gum trees and prepare an Arboricultural Impact Assessment and Tree Protection Plan for retained trees. The Tree Protection Plan will outline mitigation measures to protect trees during development.
Opportunities to reduce impact to the trees will be considered through the detailed design in consultation with the arborist, including opportunities to reduce the impact on the trees due to the footpath on the western side of Mulgoa Road.

The 2018 REF safeguards (refer to Section 7.2 of the 2018 REF) include: design alternatives to support a green corridor; measures to limit tree loss and reduce associated heat island effect; and provision for native species replanting and revegetation. This includes replacement tree planting and planting at Surveyors Creek. Transport will review the road median planting strategy to ensure that suitable species are chosen.

The proposed noise wall will be designed in accordance with the Urban and Landscape Design Strategy (including noise wall designs), this Strategy includes safety and security provisions consistent with the Crime Prevention through Environmental Design (CPTED) principles. This includes anti-graffiti coatings and the provision of adequate street lighting as described in Section 7.2 of the 2018 REF. The strategy will be further developed during detailed design. Transport will also maintain ongoing consultation with affected residents and Penrith City Council to ensure the detailed design best accommodates the needs of all parties as far as is reasonable and feasible.

Transport aims to minimise property impacts as much as possible and will review the detailed design and ensure there is adequate room to accommodate landscaping, footpath, utilities and services. The planting approach for the proposal will be further developed as part of the Urban and Landscape Design Strategy in accordance with Roads and Maritime guidance document 'Beyond the Pavement' and will consider the amenity of the local community.

Transport has considered alternative design options which are summarised in Chapter 3 of this Submissions Report. Transport will maintain ongoing consultation with Penrith City Council during the detailed design phase. Once the urban design solutions for the detailed design are further progressed, Transport will engage with Council on this.

2.9 Noise and vibration

Submission number(s)
3, 6 and 18

Issue description
Respondents raised issues about the potential for increased noise impacts for residents next to Mulgoa Road due to the removal of vegetation. One respondent requested that the existing noise wall alongside the M4 Western Motorway eastbound on-ramp be upgraded and extended to Mulgoa Road.

Response
The noise modelling completed for the 2018 REF (see Section 6.2 of the 2018 REF) indicated that there would be a negligible increase in road traffic noise as a result of the upgrade and that noise treatment need not be considered. However, noise mitigation has been proposed in some locations to address the existing acute levels experienced at these receivers. The noise modelling will be reviewed during the detailed design phase to consider the requirement for additional noise mitigation measures if required. Where possible, noise mitigation measures would be installed during the early stages of construction to provide benefits during construction (eg construction of the permanent noise wall). Regular consultation would occur with affected property owners to ensure they are kept updated about proposed noise mitigation treatments. Transport will undertake an operational noise review within six months of the proposal becoming operational to assess the actual noise performance of the project.
A noise and vibration assessment has been conducted for this proposal (Mulgoa Road upgrade – Jeanette Street to Blaikie Road) and appropriate mitigation measures have been recommended. The M4 Smart Motorway (M4SM) entry ramps are outside the scope of this proposal and may be looked at in the future as part of the M4 Smart Motorway on-ramps.

### 2.10 Socio-economic

**Submission number(s)**
15, 22, 26, 51 and 82

**Issue description**
Respondents requested further information about the property acquisition process and whether additional land would be needed to service the construction and/or revised REF proposal footprint. Several business owners raised concerns about the removal of car parking provisions at the Penrith Trade Centre and the impact this may have on local businesses.

**Response**
Property acquisitions would be finalised during detailed design. Transport would aim to minimise property acquisition where possible. The Transport for NSW Personal Manager Acquisitions will be in touch with affected residents to discuss the property acquisition process.

Transport is reviewing the current design and negotiating property adjustments with the owners. The design will be optimised during detailed design to maintain the maximum number of carparking spaces as possible.

### 2.11 Soils, geology and contamination

**Submission number(s)**
83

**Issue description**
Penrith City Council requested that an Unexpected Finds Protocol is prepared to support the potential identification of contaminated land during construction, and that should any remediation work be needed, this would require development consent in line with the requirements of State Environmental Planning Policy 55 Remediation of Land (SEPP 55) and Sydney Regional Environmental Plan 20 Hawkesbury Nepean River (SREP 20).

**Response**
The provisions and objectives of both SEPP 55 and SREP 20 have been considered during the preparation of the 2018 REF. For contaminated land matters, Transport is bound by the requirements of the Protection of the Environment Operations Act 1997 and the Contaminated Land Management Act 1997. In accordance with these requirements, Section 6.4 of the 2018 REF recommends that a contaminated land management plan is prepared in accordance with the Guideline for the Management of Contamination (Transport for NSW, 2013) and that if contaminated areas are encountered during construction, appropriate
control measures would be implemented. The plan would outline a ‘stop-work and investigate’ process to be followed should unexpected contamination be discovered.

The plan would require that any necessary site-specific controls or further actions be identified in consultation with the Transport Environment Manager and/or Environmental Protection Authority. As Transport is the determining authority for this work under Division 5.1 of the EP&A Act, there is no need to secure development consent from Council for any remediation work under the provision of SEPP 55.

2.12 Air quality

Submission number(s)

67

Issue description

A respondent raised concerns that building more roads would result in increased air pollution leading to health issues.

Response

Section 6.10 of the 2018 REF considered the proposal’s potential impacts on local air quality. While the road alignment would bring traffic closer to property frontages, leading to reduced air quality, the increase in capacity and associated improved traffic flows would reduce idling. This would correspondingly lead to an improvement in air quality. Overall, the extent of any changes would not be sufficient to have any associated health-impact or benefit.

Potential construction air quality impacts would be managed in accordance with the Contractor’s CEMP. The standard safeguards implemented as part of the CEMP are proven to be effective at avoiding and managing dust and vehicle and equipment emission impacts during construction.
3. Changes to the proposal

The key changes following refinements to the August 2019 REF proposal footprint relate to providing additional space for the M4 Western Motorway westbound entry ramp tie in (contained within existing road reserve), inclusion of additional vegetation close to the proposed works, facilitating utilities relocations and diversions (high pressure gas main, sewer rising mains, high and low voltage electrical) and providing for additional laydown areas on Clyburn Avenue and Warragamba Crescent. These changes result in the revised REF proposal footprint shown in Figure 1-1 and Figure 1-2 of this Submissions Report.

The REF proposal footprint has been modified to include vegetation in proximity to proposed works at the following locations:

- Factory Road – large tree near the electrical substation
- Jeanette Street – vegetation near the southern corner of Mulgoa Road
- Peter Court – vegetation on the corner of Peter Court and Glenbrook Street.

The changes to works for utilities are summarised as follows:

- Connections to existing electrical substations via trenching at Factory Road, Hatchinson Crescent, and Wolseley Street, and replacement of the electrical substation at the Penrith Homemaker Centre
- Diversions and connections to existing sewer rising mains and existing high-pressure gas infrastructure via trenching at Jeanette Street and the Penrith City Council (PCC) drainage reserve
- Trenchless excavation for the high-pressure gas main and sewer rising main under the M4 Western Motorway
- Use of the PCC drainage reserve at Jeanette Street for a laydown area and entry point during the construction of the high-pressure gas underbore and sewer rising main underbore, and use of Hatchinson Crescent road reserve for the exit pit
- Use of the PCC park (corner of Warragamba Crescent and Glenbrook Street) and the Clyburn Avenue road reserve for a laydown area and site compound for the high-pressure gas main diversion
- Relocation of hydrant booster on the western side of Mulgoa Road outside the Penrith Homemaker Centre
- Relocation of an electrical substation into the carpark area at Homemaker Centre, outside Plus Fitness.

Further, the following additional works are included within the previous REF proposal footprint:

- Connection to existing sewer rising mains at Glenbrook Street
- Connection to existing high-pressure gas main at Peter Court
- Trenching across Hatchinson Crescent for sewer rising main diversion and high-pressure gas main diversion
- Trenching along Warragamba Crescent and Glenbrook Street for sewer rising main diversion (trenching for the high-pressure gas main was included in the 2018 assessment).

3.1 Additional Options Assessment

As part of the feedback, 35 responses raised concern regarding the removal of a large number of mature Gum trees on the western side of Mulgoa Road, between Blaikie Road and Wolseley Street, Jamistown.
In response to these concerns, Transport developed two extra strategic design options for the road alignment. These alternative options presented two different levels of impact to the Forest Red Gum trees: ‘No impact’ (refer to Figure 3-1) and ‘Reduced impact’ (refer to Figure 3-2).

Both options would require further design refinements to determine how the trees would be impacted by the design, including during construction of stormwater and other utilities.

### 3.1.1 ‘No Impact’ option

The ‘no impact’ option was developed to avoid impact to the Forest Red Gum trees, by shifting the proposed Mulgoa Road alignment to the east and aligning the existing and proposed western side kerb lines. Refer to Figure 3-1. This option:

- Is intended to avoid the trees by widening Mulgoa Road to the east However, this option may result in some vegetation and tree loss dependant on the further refinement of the design.
- Would reduce property acquisition required on the western side of Mulgoa Road (compared to the existing proposal)
- Would significantly increase property acquisition required on the eastern side of Mulgoa Road (compared to the existing proposal), resulting in full acquisition of an additional two commercial properties and 23 residential properties, and partial acquisition of an additional one commercial property and five residential properties.

### 3.1.2 ‘Reduced Impact’ option

The ‘reduced impact’ option was developed to reduce impact to the gum trees (compared to the existing proposal), by removing design elements aimed at improving the quality of public transport and reducing the space available for construction. Refer to Figure 3-2. This option:

- Would result in a more constrained corridor, greater complexity in constructability and utilities relocations, and a longer construction program (compared to the existing proposal)
- Would result in vegetation and tree loss to allow for the design footprint and construction, and possible root damage to some trees due to excavation required for construction of the proposed road pavement, underground utilities and stormwater
- Would reduce property acquisition required on the western side of Mulgoa Road (compared to the existing proposal)
- Would retain the property acquisition required on the eastern side of Mulgoa Road (as per the existing proposal).

### 3.1.3 Preferred option

On 4 June 2019, Transport undertook an options assessment workshop which considered the existing proposal, the ‘no impact’ option and the ‘reduced impact’ option. The outcome of the workshop recommended to proceed with the existing proposal, as displayed in the Review of Environmental Factors, as the options assessment indicated that the existing proposal would provide the best project outcome.

As a result of the options assessment process, Transport prepared a briefing note to the Minister for Transport and Roads. The Minister endorsed the existing proposal in September 2019.
Figure 3-1: 'No Impact' option
Figure 3-2: 'Reduced Impact' option

Mulgoa Road upgrade Jeanette Street to Blaikie Road
Submissions report
4. Additional Environmental assessment

This section details the additional environmental assessments and consistency reviews carried out for the proposal since display of the REF in 2018. The changes to the proposal are detailed in Section 3 of this Submissions Report and presented on Figure 1-1 and Figure 1-2. The below take into consideration the modified REF proposal footprint, now referred to as the revised REF proposal footprint.

4.1 Biodiversity assessment

Methodology

The additional field surveys within the study area were conducted having considered a number of methodologies as outlined below:

- The Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities Working Draft (DECC 2004) was also considered. Review of these guidelines indicates that for an impact that is likely to impact highly urbanised areas, a modified survey methodology is appropriate
- Review of aerial photographs to assist in stratifying the study area into vegetation types
- Random meanders in accordance with Cropper (1993)
- Assigning vegetation communities, if possible, into Plant Community Types (PCTs) in accordance with the Office of Environment and Heritage VIS classification database version 2.1.

Summary of additional study

A revised Biodiversity Assessment Report (BAR) for the proposal was prepared by Environmental Property Services in August 2019. The revised BAR is summarised below and provided in Appendix C.

The BAR has been revised to include a detailed assessment of fauna species within the proposal area. Additional field surveys were carried out between 5 – 9 November 2018 at the Forest Red Gum trees and the M4 Western Motorway bridges. The field surveys consisted of:

- Microbat ultrasonic survey (Anabat – hand held)
- Survey of nocturnal, dusk and dawn fauna (including arboreal mammals)
- Stagwatching of the largest hollows
- Spotting - carried out in association with the stag watching and hand-held Anabat surveys over the four nights
- Diurnal fauna surveys (focus on morning and afternoon bird surveys, along with any other herpetofauna surveys deemed to be appropriate).

Further surveys were carried out on 2 May 2019 and 19 August 2019 to capture areas included within the revised REF proposal footprint. The field surveys consisted of random meanders, recording all flora species observed within the study area, determining the presence of any threatened ecological communities within the study area, targeting the presence of all threatened flora within the study area and opportunistic fauna observation.

Description of existing environment

The study area occurs within the suburb of Jamisontown and is surrounded entirely by urban development, being located along the existing Mulgoa Road, which has been in existence for over a century.
Vegetation within the study area consists of mainly planted street vegetation, with a remnant but degraded form (essentially trees only) of Forest Red Gum - Rough-barked Apple grassy woodland being located between Wolseley Street and Blaikie Road.

The Nepean River occurs approximately one kilometre to the north west of the study area.

**Potential impacts**

Potential impacts from the proposal during the construction phase may include:

- Vegetation and habitat loss
- Removal of threatened fauna species habitat
- Loss of hollow-bearing trees
- Fauna injury and mortality
- Changes to hydrology
- Spread of weeds
- Noise, vibration and light and
- Impact on key threatening processes.

Potential impacts from the proposal during the operational phase may include:

- Fauna injury and mortality
- Sedimentation and pollution.

**Revised safeguards and management measures**

The following biodiversity safeguards and management measures have been added or revised since the 2018 REF. Refer to Section 5.2 of this Report for the full summary of safeguards and management measures.

Additional and/or modified environmental safeguards and management measures have been underlined, and refined measures, or parts of measures, have been struck out.

**Table 4-1: Additional environmental safeguards for biodiversity**

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<tr>
<th>Impact</th>
<th>Environmental safeguard</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Reference</th>
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<tbody>
<tr>
<td>Biodiversity</td>
<td>A Flora and Fauna Management Plan (FFMP) will be prepared in accordance with Roads and Maritime Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects (RTA, 2011a) and implemented as part of the CEMP. It would include, but not be limited to:</td>
<td>Contractor</td>
<td>Detailed design, during construction and post construction</td>
<td>B1</td>
</tr>
<tr>
<td>Biodiversity - General</td>
<td><em>Vegetation management plans showing areas to be cleared and areas to be protected, including exclusion zones, protected habitat features and revegetation areas. Plans showing areas to be cleared and areas to be protected, including exclusion zones.</em></td>
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</tr>
<tr>
<td>Impact</td>
<td>Environmental safeguard</td>
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|                       | **protected habitat features and revegetation areas**  
|                        | • Requirements set out in the Landscape Guideline (RTA, 2008b; Transport for NSW, 2018a)  
|                        | • 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  
|                        | • Habitat replacement and reinstatement  
|                        | • Handling injured fauna.                                                                                                                                                                                                 | Transport project manager/contractor | Detailed design/pre-construction | B2 State Regional Environmental Plan No.20 (Hawkesbury-Nepean River, No.2 1997, 1997c) |
| Biodiversity           | **Measures to further avoid and minimise the construction footprint and native vegetation (including aquatic plant areas, significant fauna, and wetland habitat) or habitat removal** would be investigated during detailed design and implemented where practicable and feasible. Measures to avoid and minimise impacts will be prioritised in the following order:  
|                        | • Critical habitat  
|                        | • Threatened species, endangered ecological communities or their habitat  
|                        | • Native vegetation and habitat supporting flora and fauna connectivity and/or that supports other  
|                        | • Environmental objectives such as protecting water quality, hydrology or erosion and sediment controls  
|                        | • Native vegetation of higher quality condition  
<p>|                        | • Other native vegetation.                                                                                                                                                                                                | Contractor | Detailed design | B11 |
| Removal of native vegetation | <strong>Measures to further avoid and minimise the revised REF proposal footprint and native vegetation removal will be investigated further during detailed design and implemented where practicable.</strong>                                                                                                                                                                                                                     | Contractor | Detailed design | B11 |
| Tree loss              | <strong>An AGF5 qualified arborist will be engaged to undertake a formal assessment of the</strong>                                                                                                                                                                                        | Contractor | Pre-construction | B12 |</p>
<table>
<thead>
<tr>
<th>Impact</th>
<th>Environmental safeguard</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest Red Gum trees and develop an Arboricultural Impact Assessment and tree protection plan prior to construction, to confirm which trees can be retained.</td>
<td>Contractor</td>
<td>During construction</td>
<td>B13</td>
<td></td>
</tr>
<tr>
<td>Vegetation removal will be carried out in accordance with Guide 4: Clearing of vegetation and removal of bushrock of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA 2011). Limit disturbance of vegetation to the minimum necessary to construct works. The boundaries of vegetation removal are to be clearly defined as 'no go zones' clearly signposted and fenced to prevent unauthorised clearing and vehicular and/or foot traffic. No go zones should include any retained trees within the revised REF proposal footprint. Pre-clearing surveys to be conducted by a qualified ecologist or arborist 24 hours before clearing.</td>
<td>Contractor</td>
<td>Construction</td>
<td>B14</td>
<td></td>
</tr>
<tr>
<td>The following mitigation measures will be implemented for the removal of the hollow-bearing trees: • Marking trees to be removed and preparing an inventory of trees and hollows (if observed) to be removed. • Pre-clearance surveys to be completed by an appropriately qualified ecologist or arborist. • A qualified ecologist should be present during the removal of hollow-bearing trees to relocate any displaced fauna. • If practical removal of hollow-bearing trees should be carried out outside of the breeding period of May – September which is the main breeding season for hollow-dependant fauna.</td>
<td>Contractor</td>
<td>Construction</td>
<td>B15</td>
<td></td>
</tr>
<tr>
<td>A Nest Box Strategy will be developed in association with Council, the local community and potentially other organisations such as Cumberland Land Conservancy. The Nest Box Strategy will investigate opportunities such as; • to relocate and reuse significant hollow-bearing tree features and hollows; • Providing species specific nest boxes targeting fauna species recorded; • Installing nest boxes in the same habitat type;</td>
<td>Contractor</td>
<td>Detailed design, during pre-construction, construction and post construction</td>
<td>B15</td>
<td></td>
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<tr>
<td>Impact</td>
<td>Environmental safeguard</td>
<td>Responsibility</td>
<td>Timing</td>
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<tr>
<td>Nest boxes to be installed pre-clearing</td>
<td>Monitoring and replacement of nest boxes where required. The loss of all hollows observed to be being used will be compensated at a ratio of one nest box for every used hollow lost.</td>
<td>Contractor</td>
<td>During Construction</td>
<td>B16</td>
</tr>
<tr>
<td>Unexpected Threatened species</td>
<td>The unexpected species find procedure is to be followed under <em>Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects</em> (RTA 2011) if threatened fauna, not assessed in the biodiversity assessment, are identified in the proposal site.</td>
<td>Contractor</td>
<td>During Construction</td>
<td>B16</td>
</tr>
<tr>
<td>Erosion and Sediment and erosion control</td>
<td>Increased storm water runoff volume and velocity potentially leading to soil erosion and sedimentation. Increased sediment and erosion due to increase in road surface area. Ensure appropriate erosion and sediment control measures are implemented during the construction-phase to minimise potential indirect and direct impacts.</td>
<td>Contractor</td>
<td>During Construction</td>
<td>B17</td>
</tr>
<tr>
<td>Revegetation</td>
<td>Any exposed soil surfaces post-construction should be revegetated preferably with native species, where such planting does not impede the function of the drainage works.</td>
<td>Contractor</td>
<td>Post Construction</td>
<td>B18</td>
</tr>
<tr>
<td>Injury and mortality of fauna</td>
<td>Fauna will be managed in accordance with <em>Guide 9: Fauna handling of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects</em> (RTA 2011). All fauna captured during clearing is to be relocated. Any fauna injured during clearing should be taken to the closest vet for treatment. All ecologists to have appropriate Lyssavirus vaccinations for the handling of any displaced bats.</td>
<td>Contractor</td>
<td>During construction</td>
<td>B19</td>
</tr>
<tr>
<td>Invasion and spread of weeds</td>
<td>Declared priority weeds are to be managed according to requirements under the <em>Biosecurity Act 2015 and Guide 6 (Weed Management) of the Roads and Maritime Biodiversity Guidelines 2011.</em></td>
<td>Contractor</td>
<td>Pre-construction and during construction</td>
<td>B20</td>
</tr>
</tbody>
</table>
4.2 Visual Tree assessment

**Methodology**

A qualified arborist was engaged to provide Arboricultural advice relating to the management of Forest Red Gum trees between Wolseley Street and Blaikie Road, in accordance with AS 4970 Protection of Trees on Development Sites. The assessment is summarised below and provided in Appendix D of this report.

A comprehensive site inspection was conducted during November 2018. A Visual Tree Assessment was completed from the ground level only. No internal diagnostic testing was carried out as part of this assessment and trees outside of the subject site were assessed from the property boundaries only.

**Summary of additional study**

Tree dimensions, tree locations and tree health were determined, calculated and rated respectively. Tree Protection Zones and Structural Root Zones were calculated in accordance with AS4970-2009 Protection of trees on development sites and their conditions rated. Useful Life Expectancy was used to estimate the longevity of the subject tree(s) in its growing environment. Landscape significance was determined by assessing the combination of the cultural, environmental and aesthetic values of the subject tree(s), providing a relative value of the tree’s Landscape Significance which may aid in determining its Retention Value.

**Description of existing environment**

The study area is located to the west of the existing Mulgoa Road alignment, between Wolseley Street and Blaikie Road, Jamisontown. Arboricultural advice provided relates to the management of a group of 99 Eucalyptus tereticornis (Forest Red Gum) trees. The trees have short (5-15 years) and medium (15-40 years) useful life expectancy ranges and exhibit symptoms of physiological stress such as a reduced crown density, the development of deadwood and production of epicormic shoots. As to be expected with an ageing tree population, many trees contain cavities and have been subject to large diameter branch failures.

**Potential impacts**

An arboricultural impact assessment (including potential root mapping to determine the specific trees that could be retained and a DNA analysis of the trees) would be carried out during the detailed design phase and appropriate mitigation measures will be presented in a Tree Protection Plan for retained Forest Red Gum trees.

4.3 Aboriginal Heritage assessment

**Methodology**

The Aboriginal Heritage assessment has been revised to include a detailed assessment of the proposal study area following the refinements to the REF proposal footprint in August 2019. The assessment is summarised below and provided in Appendix E of this report.

The Aboriginal Heritage Information Management System (AHIMS) is a database operated by the (NSW) Office of Environment and Heritage (OEH) and regulated under section 90(Q) of the (NSW) National Parks and Wildlife Act 1974 (NPW Act). AHIMS contains information and records related to registered Aboriginal archaeological sites (Aboriginal objects, as defined under the NPW Act) and declared Aboriginal places (as defined under the NPW Act) in NSW.
A search of AHIMS was conducted on 16 April 2019 to identify registered (known) Aboriginal sites or declared Aboriginal places within or adjacent to the study area (Client service ID 415455). The search results are attached as Appendix B to the Aboriginal Heritage Technical Memo. As the AHIMS search area from April 2019 extended beyond the study area, it was not deemed necessary to repeat the search following the amendments to the REF proposal footprint, as the newly identified areas were captured in the previous search.

Other sources of information including heritage registers and lists were also searched for known Aboriginal heritage in the vicinity of the study area. These included:

- Penrith Local Environmental Plan 2010
- Transport for NSW Heritage Register
- State Heritage Register and State Heritage Inventory
- Commonwealth Heritage List
- National Heritage List
- Australian Heritage Places Inventory
- Register of the National Estate.

Deerubbin Local Aboriginal Land Council (DLALC) were contacted by KNC at the commencement of the proposal to discuss the proposed works and invited to participate in the archaeological survey. The archaeological survey of the study area was arranged with DLALC for 13 September 2017 and a follow up survey on 20 August 2019. Steve Randall from DLALC participated in all surveys.

Transport also undertook additional Aboriginal heritage investigation and assessment in response to concerns raised in December 2018 from an Aboriginal group regarding potential Aboriginal scar trees and burial sites outside the Grey Gums Hotel. This included the following further site surveys of the old growth trees within the area:

- 22 January 2019 – Matthew Kelleher from Kelleher Nightingale Consulting (refer to Appendix J)
- 29 January 2019 – Steve Randall from DLALC (refer to Appendix K).

Transport responded to the Aboriginal group on 1 February 2019 following the additional site surveys.

**Summary of additional study**

The proposal has been conducted in consultation with the DLALC. No Native Title holders/claimants are currently registered for the study area.

One Aboriginal archaeological site, Manifold Crescent AFT 1 was identified within the study area; however, the site was located on the boundary of a laydown area and the revised REF proposal footprint was adjusted to avoid the site.

No other Aboriginal archaeological objects or potential archaeological deposits were identified within the study area and the area was found to be extensively disturbed by modern land use practices.

No scar trees, burial markers or burial sites were identified during the additional surveys carried out in January 2019 by KNC and DLALC.

**Description of existing environment**

The study area is located within a landscape with moderate to high levels of subsurface disturbance including the construction of roads, the installation of below ground utilities, past rural activities, landscaping and erosion. Within these contexts Aboriginal objects are unlikely to survive in situ and the archaeological potential of such sites is generally low. Conversely, ground surface visibility is often increased by these processes, leading to increased identification of surface artefacts in these areas.
Potential impacts
Provided that the location of Manifold Crescent AFT 1 is avoided, this assessment concludes that the proposed works will not impact on Aboriginal archaeological objects, sites or potential archaeological deposits.

Safeguards and management measures
As the revised REF proposal footprint has been adjusted to avoid Manifold Crescent AFT 1, no further assessment of Aboriginal heritage is warranted for the proposed works and therefore, no additional safeguards or mitigation measures to those presented in the 2018 REF have been proposed. Refer to Section 5.2 of this Report for the full summary of safeguards and management measures.

4.4 Noise and vibration impact assessment

Methodology
A noise and vibration impact assessment of additional construction works was carried out to determine the potential noise and vibration levels and impacts in accordance with the Roads and Maritime Construction Noise and Vibration Guideline and DECC Interim Construction Noise Guideline. The assessment is summarised below and provided in Appendix F of this report.

The additional construction works locations identified as a result of the revised REF proposal footprint would expose new receivers to noise impacts. Construction noise and vibration criteria at these receivers was established and an assessment of these works at worst affected receivers was conducted. A quantitative assessment of additional construction works was carried out by adding additional proposed construction phases and equipment to the original noise model developed for the 2018 REF.

Summary of additional study and Description of existing environment
Additional noise logging was required to characterise the Noise Catchment Areas (NCAs) in these quieter areas. As such, two additional NCAs (3 and 4) were established, and noise monitoring was carried out at two locations which represent the acoustic environment in these NCAs; 8 Warragamba Crescent, Jamistown and 14 School House Road, Regentville.

These background noise levels were used to establish construction Noise Management Levels (NMLs) for the new receivers.

The loudest proposed additional works have been identified as:

- Trenching along Factory Road, Hatchinson Crescent, Wolseley Street, Mulgoa Road, Jeanette Street, Warragamba Crescent, Glenbrook Street and the PCC drainage reserve
- Removal of additional trees on the western side of Mulgoa Road in the vicinity of Penrith Homemaker Centre and at 1 Factory Road, Regentville
- An additional site compound and laydown area located at the PCC drainage reserve
- Excavation of a pit for underbore of the M4 Western Motorway located at the PCC drainage reserve.

The additional works require construction to be carried out further away from Mulgoa Road than originally specified in the 2018 REF NVIA. The noise environment further away from Mulgoa Road within NCA 3 and 4 is less affected from road traffic noise along the main alignment, and ambient noise levels are controlled by intermittent local traffic noise, natural surrounds and the community.
**Potential impacts**

Fifteen representative receivers were selected, both residential and non-residential, to indicate the worst-case noise levels for the additional works.

Noise levels due to the four construction scenarios were predicted and assessed against construction NMLs for standard construction hours and outside of standard hours (day, evening and night).

Results show exceedances of NMLs during standard hours are predicted, with exceedances up to 26 dB predicted at receivers located immediately adjacent to trenching works associated with utilities diversions during standard construction hours. A higher number of residences are predicted to exceed NMLs outside of standard construction hours, compared to the REF NVIA.

It should be noted, similar exceedances of NMLs were predicted for the originally proposed works which involved trenching and excavation, although receivers at local roads further back from Mulgoa Road such as Warragamba Crescent and the southern end of Jeanette Street are now predicted to be exposed to similar noise levels.

Construction traffic is anticipated to generate noise primarily along Jeanette Street, linking Mulgoa Road to the site compound at the PCC drainage reserve, and along Warragamba Crescent. An assessment of noise levels due to construction traffic are predicted to be less than 2dB during peak hours along both Jeanette Street and Warragamba Crescent.

No significant vibration generating activities are proposed as part of the works.

**Safeguards and management measures**

The following noise and vibration mitigation measure has been revised, all other noise mitigation measures remain consistent with those presented in the 2018 REF NVIA and are considered to represent all ‘feasible and reasonable’ mitigation measures suitable for implementation during the additional construction works. Refer to Section 5.2 of this Report for the full summary of safeguards and management measures.

Where an environmental safeguard and management measure has been modified, changes are identified using an underline or a strikethrough.

Table 4-2: Additional environmental safeguards for noise and vibration

<table>
<thead>
<tr>
<th>No.</th>
<th>Impact</th>
<th>Environmental safeguards and management measures</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Reference</th>
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</thead>
<tbody>
<tr>
<td>NV4</td>
<td>Noise and vibration</td>
<td>A sleep disturbance assessment would be carried out before any planned out-of-hours work. The assessment would consider the maximum noise level, and the extent and the number of times that the maximum noise level exceeds the RBL. The assessment would consider the absolute noise level of the activity, exceedances above the existing ambient noise level, and the number of individual noisy events likely to occur per night.</td>
<td>Contractor</td>
<td>Pre-construction/construction</td>
<td>-</td>
</tr>
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</table>
4.5 Socio-economic impact assessment

Methodology

A review of the updated utilities design, construction methodology and revised REF proposal footprint against the 2018 Socio-Economic Impact Assessment (SEIA) has been carried out to verify consistency with the previous assessment. The assessment is summarised below and provided in Appendix G of this report.

Potential impacts

Generally, the main changes to potential impacts associated with the design are as follows:

- General construction impacts associated with noise, vibration, air quality, traffic and visual impacts to residents along Factory Road, Jeanette Street, Hatchinson Crescent, Clyburn Avenue, Warragamba Crescent and Glenbrook Street as a result of connection and diversion of sewer, gas, and electrical infrastructure
- Reduced visual amenity and reduced opportunity for informal recreational use of the PCC drainage reserve as a result of its use as a construction laydown area and entry for the underboring below the M4 Western Motorway
- Reduced visual amenity and reduced opportunity for informal recreational use of the PCC park as a result of the construction laydown area.

Safeguards and management measures

No additional safeguards or mitigation measures to those presented in the 2018 REF have been proposed. Refer to Section 5.2 of this Report for the full summary of safeguards and management measures.

4.6 Traffic and transport assessment

Methodology

A review of the updated utilities design, construction methodology and revised REF proposal footprint against the 2018 Traffic and Transport Assessment has been carried out to verify consistency with the previous assessment. The assessment is summarised below and provided in Appendix H of this report.

The traffic and transport assessment used a microsimulation traffic model to assess the transport impacts associated with the proposed upgrade (The Proposal).

Subsequent to the modelling completed for the 2018 REF assessment, the traffic models have been updated to reflect a number of refinements identified during recent modelling investigations to improve the robustness of the models. These minor refinements include:

- Inclusion of a pedestrian crossing across Mulgoa Road on the northern side of the M4 Western Motorway interchange to represent the potential impacts of this crossing on the M4 Western Motorway exit ramp
- Reduction of the southbound right turn pocket length along Mulgoa Road on the approach to the M4 Western Motorway interchange, to correctly reflect the proposed design
- Adjustments and fixes to reduced speed areas and priority rules in various locations to better represent queue-back and keep-clear behaviour.
Potential impacts
The refined results from the traffic model were generally found to be consistent with the previous findings of the 2018 REF. Some changes to delay and queue lengths were noted for individual movements, but these are not considered to have implications for the design.

Safeguards and management measures
No additional safeguards or mitigation measures to those presented in the 2018 REF have been proposed. Refer to Section 5.2 of this Report for the full summary of safeguards and management measures.

4.7 Landscape character and visual impact assessment

Methodology
A review of the updated utilities design, construction methodology and revised REF proposal footprint against the 2018 LCVIA has been carried out to verify consistency with the previous assessment. The assessment is summarised below and provided in Appendix I of this report.

Potential impacts
Generally, the main changes to potential impacts associated with the updated revised REF proposal footprint are as follows:

- General construction impacts to residents along Jeanette Street, Factory Road and Hutchinson Crescent as a result of connection and diversion of sewer, gas, and electrical infrastructure
- Reduced visual amenity at the PCC drainage reserve during construction as a result of its use for construction laydown area and entry for the under boring below the M4 Western Motorway. Options for planting and reinstatement would be considered through the detailed design process with the aim to return disturbed areas to their existing condition
- Reduced visual amenity at the PCC park (corner of Glenbrook Street and Warragamba Crescent) during construction as a result of its use for construction laydown area. Options for planting and reinstatement would be considered through the detailed design process with the aim to return disturbed areas to their existing condition
- Property owners and residents of dwellings along impacted streets will be engaged to understand potential impacts associated with these works.

In summary, potential impacts arising in addition to the 2018 LCVIA would be localised arising as a result of construction work and vegetation clearance. Vegetation would be retained where possible, however should vegetation be removed for construction works, options for planting and reinstatement would be considered through the detailed design process.

There are no changes to the operation phase impacts discussed in the 2018 LCVIA.

Safeguards and management measures
No additional safeguards or mitigation measures to those presented in the 2018 REF have been proposed. Refer to Section 5.2 of this Report for the full summary of safeguards and management measures.
5. Environmental management

The 2018 REF for the Mulgoa Road upgrade Jeanette Street to Blaikie Road identified the framework for environmental management, including safeguards and management measures that would be adopted to avoid or reduce environmental impacts (Chapter 7 of the 2018 REF).

After consideration of the issues raised in the public submissions and the additional investigations that were carried out, the safeguard and management measures have been revised. Additional safeguard measures have been identified for biodiversity but for all other topics safeguard and management measures remain as set out in the 2018 REF.

Should the proposal proceed, environmental management will be guided by the framework and measures outlined in the following sections.

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) will be prepared to describe safeguards and management measures identified. The PEMP and CEMP will provide a framework for establishing how these measures will be implemented and who would be responsible for their implementation.

The PEMP and CEMP will be prepared prior to construction of the proposal and must be reviewed and certified by Transport for NSW Environment Officer, Western Sydney Project Office prior to the commencement of any on-site works. The CEMP will 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 2018 REF for the Mulgoa Road upgrade Jeanette Street to Blaikie 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 proposal (refer to Chapter 7 of the 2018 REF) have been revised. Should the proposal proceed, the environmental management measures in Table 5-1 will guide the subsequent phases of the proposal. Where an environmental safeguard and management measure has been modified, changes are identified using an underline or a strikethrough.
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<tr>
<th>No.</th>
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</table>
| GEN1 | General - minimise environmental impacts during construction | A CEMP is to be prepared and submitted for review and endorsement of the Transport Environment Manager prior to commencement of any work. As a minimum, the CEMP would address the following:  
- 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.  
The endorsed CEMP would be implemented during the undertaking of the activity. | Contractor/ Transport project manager | Detailed design/pre-construction | - |
<p>| GEN2 | General - notification | All businesses, residential properties and other key stakeholders (eg schools, local councils) affected by the work activity would be notified at least five days prior to commencement of the activity. The notification will include details of: the project; construction period and construction hours; contact information for project management staff; complaint and incident reporting; and how to obtain further information. | Contractor/ Transport project manager | Pre-construction | - |
| GEN3 | General – environmental awareness | All personnel working onsite would receive training to ensure awareness of environment protection requirements to be implemented during the project. This would include up-front site induction and regular &quot;toolbox&quot; | Contractor/ Transport project manager | Detailed design/pre-construction | - |</p>
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<tbody>
<tr>
<td>GEN4</td>
<td>Consultation with Penrith City Council</td>
<td>Transport will continue to consult with Penrith City Council on the proposed shared transit zone during detailed design. Transport will also consult with Penrith City Council to ensure that the revised REF proposal footprint is reserved under the Penrith LEP 2010.</td>
<td>Transport</td>
<td>Detailed design</td>
<td>-</td>
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<tr>
<td>GEN5</td>
<td>General – ongoing community engagement</td>
<td>Transport will visit individual community members upon request to discuss their specific concerns. This will include continued consultation with residents along Hatchinson Crescent, Huron Place and Peter Court to identify opportunities to reduce the loss of on-street parking as detailed design is developed.</td>
<td>Transport</td>
<td>Detailed design/pre-construction</td>
<td>-</td>
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<tr>
<td>Traffic and transport</td>
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</table>
| TT1 | Traffic and transport | 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 (RIA, Roads and Maritime, 2018d) and QA Specification G10 Control of Traffic Traffic Management (Roads and Maritime, 2008/2018c). The TMP will include:  
• Confirmed haulage routes  
• Confirmed temporary diversion routes  
• Road condition and dilapidation surveys pre-and-post construction plus repair commitments for local roads only  
• 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 | Contractor | Detailed design/pre-construction | Section 4.8 of QA G36 Environment Protection |
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<th>No.</th>
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<th>Environmental safeguards and management measures</th>
<th>Responsibility</th>
<th>Timing</th>
<th>Reference</th>
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</table>
|     |                         | • 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  
• Stipulated parking restrictions including not allowing staff, contractors or delivery vehicles to park on public roads. | Transport project manager  | Detailed design/pre-construction | -                     |
<p>| TT2 | Traffic and transport   | Consultation will be carried out with potentially affected residences prior to the commencement of and during works in accordance with the RTA’s Community Involvement and Communications Resource Manual (RTA, 2008a) Roads and Maritime Stakeholder Engagement Toolkit (Transport for NSW, 2017a). Consultation will include but not limited to door knocks, newsletters or letter box drops providing information on the proposed works, working hours and a contact name and number for more information or to register complaints. | Contractor                   | Pre-construction              | -         |
| TT3 | Traffic and transport   | Business needs, including peak customer periods, would be considered within the TMP where feasible and reasonable.                                                                                                                                  | Contractor                   | Pre-construction              | -         |
| TT4 | Access                  | Requirements for any changes to local access arrangements will be confirmed during detailed design in consultation with the local road authority and any affected landowners.                                                                 | Transport project manager    | Construction                  | -         |
| TT5 | Access                  | Disruptions to property access and traffic will be notified to landowners at least five days in accordance with the relevant community consultation processes outlined in the TMP.                                                                 | Contractor                   | Construction                  | -         |
| TT6 | Pedestrian and cyclists  | Pedestrian and cyclist access will be maintained throughout construction. Where that is not feasible or necessary, temporary alternative access                                                                                                                     | Contractor                   | Construction                  | -         |</p>
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<tr>
<th>No.</th>
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<th>Responsibility</th>
<th>Timing</th>
<th>Reference</th>
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<tbody>
<tr>
<td>TT7</td>
<td>Public transport and school buses</td>
<td>arrangements will be provided following consultation with affected landowners and the local road authority.</td>
<td>Contractor</td>
<td>Construction</td>
<td>-</td>
</tr>
<tr>
<td>TT8</td>
<td>Threshold treatments</td>
<td>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.</td>
<td>Transport</td>
<td>Detailed design</td>
<td>-</td>
</tr>
<tr>
<td>TT9</td>
<td>Traffic light phasing</td>
<td>Threshold treatments would be considered during detailed design to provide traffic calming effects such as installing line markings, signage and other traffic calming measures</td>
<td>Transport</td>
<td>Detailed design</td>
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### Noise and vibration

<table>
<thead>
<tr>
<th>NV1</th>
<th>Noise and vibration</th>
<th>A Noise and Vibration Management Plan (NVMP) would be prepared and implemented as part of the CEMP. The NVMP would generally follow the approach in the Interim Construction Noise Guideline (ICNG, DECC, 2009) and identify:</th>
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<tr>
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<td>• All potential significant noise and vibration generating activities associated with the activity</td>
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<td>• Feasible and reasonable mitigation measures to be implemented, taking into account Beyond the Pavement: urban design policy, process and principles (Transport for NSW, 2014a)</td>
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<td>• A monitoring program to assess performance against relevant noise and vibration criteria</td>
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<td>• Arrangements for consultation with affected neighbours and sensitive receivers, including notification and complaint handling procedures</td>
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<td>• Contingency measures to be implemented in the event of non-compliance with noise and vibration criteria.</td>
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<tr>
<td>NV2</td>
<td>Noise and vibration</td>
<td>Work would be generally carried out during normal hours: • 7am to 6pm Monday to Friday • 8am to 1pm Saturdays • No construction on Sundays or Public Holidays.</td>
</tr>
<tr>
<td>NV3</td>
<td>Noise and vibration</td>
<td>Any variations to the standard construction hours will follow the approach in Practice Note VII of the RTA Environmental Noise Management Manual and/or the RTA Environmental Facts Sheet – Noise Management and Night Works, including consultation with the affected local community.</td>
</tr>
<tr>
<td>NV4</td>
<td>Noise and vibration</td>
<td>A sleep disturbance assessment would be carried out before the planned out-of-hours work. The assessment would consider the maximum noise level, and the extent and the number of times that the maximum noise level exceeds the RBL. absolute noise level of the activity, exceedances above the existing ambient noise level, and the number of individual noisy events likely to occur per night.</td>
</tr>
<tr>
<td>NV5</td>
<td>Noise and vibration</td>
<td>Where feasible and reasonable, the permanent noise wall would be built as part of the early works and before the main work.</td>
</tr>
<tr>
<td>NV6</td>
<td>Noise and vibration</td>
<td>All sensitive receivers (eg schools, residents) likely to be affected would be notified at least five days prior to commencement of any work associated with the activity that may have an adverse noise or vibration impact. The notification would provide details of: • The proposal • The construction period and construction hours • Contact information for project management staff • Complaint and incident reporting • How to obtain further information.</td>
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<tr>
<td>NV7</td>
<td>Noise and vibration</td>
<td>All personnel working on site would receive training to provide awareness of requirements of the NVMP. Site-specific training will be given to personnel when working in the vicinity of sensitive receivers.</td>
</tr>
</tbody>
</table>
| NV8 | Noise and vibration     | The following controls would be included in the NVMP:  
  - Where practical, the layout and positioning of noise-producing plant and activities at each work site would be optimised to minimise noise emission levels  
  - Where practical, at the site compound, locate spoil mounds towards the north-west of the site and noisy stationary plant (ie. Generators) behind site offices, hoarding/screens or other spoil mounds to shield receivers  
  - Where practical, equipment would be selected to minimise noise emissions. Equipment would be fitted with appropriate noise control equipment and be in good working order  
  - Where possible, non-beeper reversing movement alarms would be used such as broadband (non-tonal) alarms or ambient noise-sensing alarms. Work sites would also be designed to reduce the need for reversing, potentially minimising the use of reversing beepers  
  - Vehicles, plant and equipment would be regularly inspected and maintained to avoid increased noise levels from rattling hatches, loose fittings etc  
  - All vehicles, plant and equipment would be shut off when not in use  
  - Resilient damping material would be fitted on bin trucks to minimise noise impacts from loading materials  
  - Where feasible and reasonable, localised temporary acoustic hoardings/screens would be installed near high noise-generating activities. Hoardings/screens would be located as close to the noise source as possible, and would be an appropriate height as structurally feasible to minimise noise emissions. | Contactor    | Construction | -         |
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<tr>
<td>NV9</td>
<td>Noise and vibration</td>
<td>Consistent with any specific requirements of the approved NVMP a monitoring program will be implemented during construction for six months or otherwise directed by Transport for NSW to assess effective implementation of noise and vibration safeguards, identify any unexpected or inadvertent impacts, and identify recommended revisions or improvements.</td>
<td>Contactor</td>
<td>Construction</td>
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<tr>
<td>NV10</td>
<td>Noise and vibration</td>
<td>After considering the outcomes and recommendations arising from the monitoring program, and any other relevant information that becomes available during construction, appropriate measures will be implemented to address identified deficiencies or undertake actions needed to address noise and vibration impacts. If necessary, the NVMP will be reviewed and updated to include any additional measures.</td>
<td>Contactor</td>
<td>Construction</td>
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<tr>
<td>NV11</td>
<td>Noise and vibration</td>
<td>Ensure the use of vibratory rollers &lt;100 kN (typically two to four tonnes) and hydraulic hammers 300 kg (five to 12 tonne excavator) are used during construction. Where this is not feasible or reasonable, carry out additional vibration impact assessment and/or pre-conditional surveys on the potentially affected buildings and affected receivers within the associated safe working distances. Carry out additional vibration monitoring during construction as needed to respond to any received complaints, and if needed carry out post-conditional surveys on the potentially affected buildings.</td>
<td>Contactor</td>
<td>Construction</td>
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<tr>
<td>NV12</td>
<td>Noise and vibration</td>
<td>Construction respite periods would be implemented as per Appendix C of the NVMP. In addition, for the key noise-impacting activities, this would be scheduled to be ideally carried out during standard work hours otherwise these activities would be carried out before midnight. Where feasible, these activities should only restart after 7 am the next day.</td>
<td>Contactor</td>
<td>Construction</td>
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<tr>
<td>NV13</td>
<td>Noise and vibration</td>
<td>Within six months of the project becoming operational a noise review will be in accordance with Roads and Maritime Preparing a Post Construction Noise Assessment Brief. The review will generally follow the approach</td>
<td>Transport for NSW project manager</td>
<td>Post-construction/operation</td>
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<td>provided in Practice Note VIII of the RTA Environmental Noise Management Manual, and will:</td>
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<td>• Assess actual noise performance compared to predicted noise performance</td>
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<td>• Assess the performance and effectiveness of noise and vibration mitigation measures</td>
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<td>• Where deficiencies in performance are identified, provide recommendations for additional feasible and reasonable measures in accordance with the NMG.</td>
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<tr>
<td>NV14</td>
<td>Noise and vibration</td>
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<td>Transport project manager</td>
<td>Post-construction/operation</td>
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<td>After considering the outcomes and recommendations arising from the operational noise review, and any other relevant available information (including consultation with sensitive receivers), additional measures may be implemented to ensure adequate management of operational noise impacts.</td>
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<td></td>
<td>Biodiversity</td>
<td>A Flora and Fauna Management Plan (FFMP) will be prepared in accordance with Roads and Maritime Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects (RTA, 2011a) and implemented as part of the CEMP. It would include, but not be limited to:</td>
<td>Transport project manager /contractor</td>
<td>Detailed design/pre-construction</td>
<td>Section 4.8 of QA G36 Environment Protection</td>
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<td>• Vegetation management plans showing areas to be cleared and areas to be protected, including exclusion zones, protected habitat features and revegetation areas</td>
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<td>• Requirements set out in the Landscape Guideline (RTA, 2008bRoads and Maritime, 2018a)</td>
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<td></td>
<td></td>
<td>• Pre-clearing survey requirements</td>
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<td>• Procedures for unexpected threatened species finds and fauna handling</td>
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|     |        | • 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  
• Habitat replacement and reinstatement  
• Handling injured fauna. | Transport project manager /contractor | Detailed design/pre-construction | State Regional Environmental Plan No.20 (Hawkesbury-Nepean River, No.2 1997, 1997c) |
| B2  | Biodiversity | Measures to further avoid and minimise the construction footprint and native vegetation (including aquatic plant areas, significant fauna, and wetland habitat) or habitat removal would be investigated during detailed design and implemented where practicable and feasible. Measures to avoid and minimise impacts will be prioritised in the following order:  
• Critical habitat  
• Threatened species, endangered ecological communities or their habitat  
• Native vegetation and habitat supporting flora and fauna connectivity and/or that supports other  
• Environmental objectives such as protecting water quality, hydrology or erosion and sediment controls  
• Native vegetation of higher quality condition  
• Other native vegetation. | Contractor | Pre-construction | - |
<p>| B3  | Biodiversity | All personnel working on site will receive training to ensure awareness of requirements of the FFMP 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 | Pre-construction/construction | - |
| B4  | Biodiversity | A pre-construction check of native flora and fauna species and habitat would be carried out in accordance with the Biodiversity Guidelines - Protecting and managing biodiversity on RTA projects. Biodiversity management measures identified during the pre-construction check would be included in the FFMP. | Contractor | Pre-construction | - |</p>
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<td>B5</td>
<td>Biodiversity</td>
<td>Consistent with the Biodiversity Guidelines - Protecting and managing biodiversity on RTA projects, and any specific requirements of the approved FFMP, an unexpected finds procedure would be implemented in the event that a threatened species or ecological community that had not been identified and assessed by the REF are unexpectedly encountered during the construction process.</td>
<td>Contractor</td>
<td>Construction</td>
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<td>B6</td>
<td>Biodiversity</td>
<td>Consistent with the approved FFMP:</td>
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<td>• The limits of clearing within the construction site will be delineated using appropriate signage and barriers, identified on site construction drawings and during construction staff induction</td>
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<td>• Vegetation and habitat features to be retained, such as hollow-bearing trees, will be clearly identified and protected by suitable fencing, signage or markings</td>
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<td>• Identified areas containing habitat for hollow-dependent species will not be cleared during the breeding season May to September.</td>
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<td>B7</td>
<td>Weeds and pathogens</td>
<td>Declared noxious weeds and potential pests and pathogens are to be managed according to requirements under the <em>Biosecurity Act 2015</em> and Guide 6 (Weed Management) of the Transport for NSW Services Biodiversity Guidelines 2011 and Guide 7: Pathogen management of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011a). Topsoil from the site that contains or potentially contains weed species or propagules:</td>
<td>Contractor</td>
<td>Construction</td>
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<td>• Will not be reused for future rehabilitation or revegetation works</td>
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<td>• Will be removed from the construction site and disposed of at an appropriately licensed facility</td>
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<td>• Until removal occurs, will be stockpiled in cleared or disturbed areas and managed in accordance with the <em>RTA-Roads and Maritime Stockpile Site Management Guideline</em> (Roads and Maritime, 2015b).</td>
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<td>B8</td>
<td>Biodiversity</td>
<td>Consistent with any specific requirements of the FFMP, a monitoring program will be implemented during construction to ensure effective implementation of the safeguards, identify any unexpected or inadvertent impacts, and identify recommended revisions or improvements to the safeguards. A register of inspections will be established.</td>
<td>Contractor</td>
<td>Construction</td>
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<tr>
<td>B9</td>
<td>Biodiversity</td>
<td>After considering the outcomes and any recommendations arising from the monitoring program, and any other relevant information that becomes available during construction, additional measures may be implemented to ensure adequate protection of native flora and fauna. If necessary, the Flora and Fauna Management Plan will be reviewed and updated to include any additional measures.</td>
<td>Contractor</td>
<td>Construction</td>
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</tr>
<tr>
<td>B10</td>
<td>Biodiversity</td>
<td>The above safeguards would be developed in accordance with the provisions State Regional Environmental Plan No.20 (Hawkesbury-Nepean River, No.2 1997) that are aimed at protected catchment values. Therefore, the mitigation would specifically consider the need to: • Avoid aquatic plant areas, significant fauna and wetland habitat • Re-establish and replant impacted riparian flora and fauna habitat.</td>
<td>Contractor</td>
<td>Construction</td>
<td>State Regional Environmental Plan No.20 (Hawkesbury-Nepean River, No.2 1997, 1997c)</td>
</tr>
<tr>
<td>B11</td>
<td>Removal of native vegetation</td>
<td>Measures to further avoid and minimise the revised REF proposal footprint and native vegetation removal will be investigated further during detailed design and implemented where practicable.</td>
<td>Contractor</td>
<td>Detailed design</td>
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<tr>
<td>B12</td>
<td>Tree loss</td>
<td>An AQF5 qualified arborist will be engaged to undertake a formal assessment of the Forest Red Gum trees and develop an Arboricultural Impact Assessment and tree protection plan prior to construction, to confirm which trees can be retained.</td>
<td>Contractor</td>
<td>Pre-construction</td>
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<tr>
<td>B13</td>
<td>Removal of vegetation</td>
<td>Vegetation removal will be carried out in accordance with Guide 4: Clearing of vegetation and removal of bushrock of the Biodiversity</td>
<td>Contractor</td>
<td>During Construction</td>
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<td><em>Guidelines: Protecting and managing biodiversity on RTA projects (RTA 2011).</em>&lt;br&gt;Limit disturbance of vegetation to the minimum necessary to construct works.&lt;br&gt;The boundaries of vegetation removal are to be clearly defined as ‘no go zones’ clearly signposted and fenced to prevent unauthorised clearing and vehicular and/or foot traffic. No go zones should include any retained trees within the revised REF proposal footprint.&lt;br&gt;Pre-clearing surveys to be conducted by a qualified ecologist or arborist 24 hours before clearing.</td>
<td>Contractor</td>
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<tr>
<td>B14</td>
<td>Hollow-bearing Tree Removal</td>
<td>That the following mitigation measures will be implemented for the removal of the hollow-bearing trees:&lt;br&gt;• Marking trees to be removed and preparing an inventory of trees and hollows (if observed) to be removed.&lt;br&gt;• Pre-clearance surveys to be completed by an appropriately qualified ecologist or arborist.&lt;br&gt;• A qualified ecologist will be present during the removal of hollow-bearing trees to relocate any displaced fauna.&lt;br&gt;• If practical, removal of hollow-bearing trees will be carried out outside of the breeding period of May – September which is the main breeding season for hollow-dependant fauna.</td>
<td>Contractor</td>
<td>Construction</td>
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<tr>
<td>B15</td>
<td>Nest Box Strategy</td>
<td>A Nest Box Strategy will be developed in association with Council, the local community and potentially other organisations such as Cumberland Land Conservancy. The Nest Box Strategy will investigate opportunities such as:&lt;br&gt;• To relocate and reuse significant hollow-bearing tree features and hollows;&lt;br&gt;• Providing species specific nest boxes targeting fauna species recorded;</td>
<td>Contractor</td>
<td>Detailed design, during pre-construction, construction and post construction</td>
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| B16 | Unexpected Threatened species | • Installing nest boxes in the same habitat type;  
• Nest boxes to be installed pre-clearing  
• Monitoring and replacement of nest boxes where required  
The loss of all hollows observed to be being used will be compensated at a ratio of one nest box for every used hollow lost. | Contractor | During Construction | - |
<p>| B17 | Erosion and Sediment and erosion control | Increased storm water runoff volume and velocity potentially leading to soil erosion and sedimentation. Increased sediment and erosion due to increase in road surface. Ensure appropriate erosion and sediment control measures are implemented during the construction-phase to minimise potential indirect and direct impacts. | Contractor | During Construction | - |
| B18 | Revegetation | Any exposed soil surfaces post-construction should be revegetated preferably with native species, where such planting does not impede the function of the drainage works. | Contractor | Post Construction | - |
| B19 | Injury and mortality of fauna | Fauna will be managed in accordance with Guide 9: Fauna handling of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA 2011). All fauna captured during clearing is to be relocated. Any fauna injured during clearing should be taken to closet vet for treatment. All ecologists to have appropriate Lyssavirus vaccinations for the handling of any displaced bats. | Contractor | During construction | - |
| B20 | Invasion and spread of weeds | Declared priority weeds are to be managed according to requirements under the Biosecurity Act 2015 and Guide 6 (Weed Management) of the Roads and Maritime Biodiversity Guidelines 2011.” | Contractor | Pre-construction and during construction | - |</p>
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<tr>
<td>SW1</td>
<td>Soil and water</td>
<td>A Soil and Water Management Plan (SWMP) would be prepared and implemented as part of the CEMP. The SWMP would identify all reasonably foreseeable risks relating to soil erosion and water pollution and describe how these risks would be addressed during construction.</td>
<td>Contractor</td>
<td>Detailed design/pre-construction</td>
<td>Section 2.1 of QA G38 Soil and Water Management</td>
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<td>SW2</td>
<td>Soil and water</td>
<td>A site-specific Erosion and Sediment Control Plan (ESCP) would be prepared and implemented as part of the SWMP. The Plan would 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.</td>
<td>Contractor</td>
<td>Detailed design/pre-construction</td>
<td>Section 2.2 of QA G38 Soil and Water Management State Regional Environmental Plan No.20 (Hawkesbury-Nepean River, No.2 1997, 1997c)</td>
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<td>SW3</td>
<td>Contaminated land</td>
<td>A Contaminated Land Management Plan (CLMP) would be prepared in accordance with the Guideline for the Management of Contamination (Transport for NSW, 2013) and implemented as part of the CEMP. The Plan would include, but not be limited to:</td>
<td>Contractor</td>
<td>Detailed design/pre-construction</td>
<td>Section 4.2 of QA G36 Environment Protection</td>
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<td>• Capture and management of any surface runoff contaminated by exposure to the contaminated land</td>
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<td>• Further investigations required to determine the extent, concentration and type of contamination, as identified in the detailed site investigation (Phase 2)</td>
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<td>• Management of the remediation and subsequent validation of the contaminated land, including any certification required</td>
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<td>• Measures to ensure the safety of site personnel and local communities during construction.</td>
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<td>SW4</td>
<td>Contaminated land</td>
<td>If contaminated areas are encountered during construction, appropriate control measures would be implemented to manage the immediate risks</td>
<td>Contractor</td>
<td>Detailed design/pre-construction</td>
<td>Section 4.2 of QA G36 Environment Protection</td>
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<td>of contamination. Refer to the Unexpected Finds Procedure (Roads and Maritime, 2015). This may include but not be limited to:</td>
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<td>• Diversion of surface runoff</td>
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<td>• Capture of any contaminated runoff</td>
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<td>• Temporary capping.</td>
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<td>All other works that may impact on the contaminated area would 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 Transport Environment Manager and/or EPA.</td>
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<td>SW5</td>
<td>Asbestos</td>
<td>An Asbestos Management Plan will be developed and implemented. The plan will include:</td>
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<td>Pre-construction/ construction</td>
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<td>• Identification of potential asbestos on site</td>
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<td>• Procedures to manage and handle any asbestos</td>
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<td>• Mitigation measures if asbestos is encountered during construction.</td>
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<td></td>
<td>Procedures for disposal of asbestos in accordance with NSW EPA guidelines, Australian Standards and relevant industry codes of practice.</td>
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<tr>
<td>SW6</td>
<td>Soil and water</td>
<td>A Spill Management Plan will be prepared and implemented as part of the CEMP to minimise the risk of pollution arising from spillage or contamination on the site and adjoining areas. The Spill Management Plan will address, but not necessarily be limited to: management of chemicals and potentially polluting materials; any bunding requirements; maintenance of plant and equipment; and emergency management, including notification, response and clean-up procedures.</td>
<td>Contractor</td>
<td>Pre-construction/ construction</td>
<td>-</td>
</tr>
<tr>
<td>SW7</td>
<td>Soil and water</td>
<td>All stockpiles will be designed, established, managed and decommissioned in accordance with the Stockpile Site Management Procedure Guideline (RTA, 2011eTransport for NSW, 2015b).</td>
<td>Contractor</td>
<td>Pre-construction/ construction</td>
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<tr>
<td>SW8</td>
<td>Soil and water</td>
<td>In addition to the implementation of general erosion, sediment and water quality control safeguards (above), any sediment basins, stockpiles, washdowns, batch plants, refuelling and chemical storage sites will be lined and/or bunded.</td>
<td>Contractor</td>
<td>Construction</td>
<td>-</td>
</tr>
<tr>
<td>SW9</td>
<td>Water sensitive urban design</td>
<td>Transport for NSW will consider the requirements of Penrith City Council’s Water Sensitive Urban Design (WSUD) policy during detailed design.</td>
<td>Transport</td>
<td>Detailed design/pre-construction</td>
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### Hydrology and flooding

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<tbody>
<tr>
<td>H1</td>
<td>Hydrology and flooding</td>
<td>Prior to construction commencing, final flood and hydrology assessments will be carried out to inform detail design measures to minimise risks to the environment, properties and the project. If Mulgoa Road is still shown to flood during an extreme event, additional design controls would be included to reduce impacts to acceptable levels.</td>
<td>Transport project manager</td>
<td>Detailed design</td>
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</tbody>
</table>
| H2  | Hydrology and flooding             | A contingency and evacuation plan would be prepared for a potential flood event during construction. The plan would:  
   - Evaluate what flood event would trigger the plan  
   - Include evacuation procedures  
   - Include a map indicating the area that is flood prone and the locations where to evacuate. | Contractor            | Pre-construction/ construction                              | -         |

### Surface and groundwater

- Soil and water | Refer to SW1 to SW9 and H1 to H2. | - | - | - |

### Landscape character and visual impacts

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<tbody>
<tr>
<td>LV1</td>
<td>Landscape character and visual impact</td>
<td>An Urban Design Plan (UDP) would be prepared to support the final detailed project design and implemented as part of the CEMP. The UDP would present an integrated urban design for the project, providing practical detail on the application of design principles and objectives</td>
<td>Transport project manager/ contactor</td>
<td>Detailed design/pre-construction</td>
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<td>Identified in the environmental assessment. The Plan would include design treatments for:</td>
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<td>• Location and identification of existing vegetation and proposed landscaped areas, including species to be used</td>
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<td></td>
<td></td>
<td>• Built elements including retaining walls, bridges and noise walls</td>
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<td></td>
<td>• Pedestrian and cyclist elements including footpath location, paving types and pedestrian crossings</td>
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<td></td>
<td></td>
<td>• Fixtures such as seating, lighting, fencing and signs</td>
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<td></td>
<td>• Details of the staging of landscape works taking account of related environmental controls such as erosion and sedimentation controls and drainage</td>
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<td></td>
<td>• Procedures for monitoring and maintaining landscaped or rehabilitated areas.</td>
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<td></td>
<td>The UDP would be prepared in consultation with Council in accordance with relevant guidelines, including:</td>
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<td>• Beyond the Pavement urban design policy, process and principles (Transport for NSW, 2014a)</td>
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<td></td>
<td></td>
<td>• Landscape Guideline (RTA, 2008b Roads and Maritime, 2018a)</td>
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<td></td>
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<td>• Bridge Aesthetics (Roads and Maritime 2019)</td>
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<td></td>
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<td>• Noise Wall Design Guidelines (RTA, 2006 Roads and Maritime, 2016a)</td>
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<td></td>
<td></td>
<td>• Shotcrete Design Guideline (RTA, 2005 Roads and Maritime, 2016b).</td>
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<tr>
<td>LV2</td>
<td>Landscape character and visual impact</td>
<td>Detailed design solutions to minimise the visual impacts of noise wall along the eastern side of Mulgoa Road will be developed in consultation with property owners, residents and Penrith City Council and implemented during construction. The design will be prepared in accordance with the RTA Roads and Maritime Noise Wall Design Guideline.</td>
<td>Transport project manager</td>
<td>Detailed design</td>
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<tr>
<td>LV3</td>
<td>Landscape character and visual impact</td>
<td>The Landscape Management Plan will be refined to ensure cost effective and consistent management of landscape works will be developed in consultation with property owners, residents and Penrith City Council and implemented during construction. The plan will be prepared in accordance with the Transport for NSW Landscape guideline (RTA, 2008b; Transport for NSW, 2018a).</td>
<td>Transport project manager</td>
<td>Detailed design</td>
<td>-</td>
</tr>
<tr>
<td>LV4</td>
<td>Lighting</td>
<td>A detailed lighting plan will be developed for the proposal in consultation with property owners, residents and Penrith City Council.</td>
<td>Transport project manager</td>
<td>Detailed design</td>
<td>-</td>
</tr>
<tr>
<td>LV5</td>
<td>Landscape character and visual impact</td>
<td>Detailed design solutions to screen properties alongside Mulgoa Road will be developed in consultation with property owners, residents and Penrith City Council and implemented during construction.</td>
<td>Transport project manager</td>
<td>Detailed design</td>
<td>-</td>
</tr>
<tr>
<td>LV6</td>
<td>Tree loss</td>
<td>Measures to reduce the tree loss alongside Mulgoa Road and local roads would be considered in developing the detailed design.</td>
<td>Transport project manager</td>
<td>Detailed design</td>
<td>-</td>
</tr>
<tr>
<td>LV7</td>
<td>Landscape character and visual impact</td>
<td>Project work sites, including construction areas and supporting facilities (such as storage compounds and offices) will be managed to minimise visual impacts, including appropriate storage of equipment, parking, stockpile screening and arrangements for the storage and removal of rubbish and waste materials.</td>
<td>Contractor</td>
<td>Construction</td>
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<tr>
<td>LV8</td>
<td>Lighting impacts</td>
<td>Temporary site lighting will be installed and operated in accordance with AS4282:1997 Control of the Obtrusive Effect of Outdoor Lighting.</td>
<td>Contractor</td>
<td>Pre-construction/construction</td>
<td>-</td>
</tr>
<tr>
<td>AH1</td>
<td>Aboriginal heritage</td>
<td>The Standard Management Procedure - Unexpected Heritage Items (Roads and Maritime, 2015c) will be followed in the event that an unknown or potential Aboriginal object(s), including skeletal remains, is found during construction. This applies where Transport for NSW does not have approval to disturb the object(s) or where a specific safeguard for</td>
<td>Contactor</td>
<td>Detailed design/pre-construction</td>
<td>Section 4.9 of QA G36 Environment Protection</td>
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<td>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.</td>
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<td></td>
<td>Socio-economic</td>
<td>A Communication Plan (CP) would be prepared and implemented as part of the CEMP to help provide timely and accurate information to the community during construction. The CP would include (as a minimum):</td>
<td>Transport project manager/ contractor</td>
<td>Detailed design/pre-construction</td>
<td>-</td>
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</tbody>
</table>
| SE1 | Socio-economic          | • Mechanisms to provide details and timing of proposed activities to affected residents, including changed traffic and access conditions  
• Contact name and number for complaints.  
The CP would be prepared in accordance with the Community Involvement and Communications Resource Manual (RTA, 2008a) Stakeholder Engagement Toolkit (Transport for NSW, 2017a). |                         |                             |           |
<p>|     | Tree loss               | An arborist will be engaged to carry out a detailed tree survey in accordance with AS4970: 2009: Protection of Trees on Development Sites (Standards Australia, 2009). This information would be used to inform the detailed design and reduce tree loss where feasible and reasonable. | Transport project manager/ contractor | Pre-construction/ construction | -         |
| SE2 | Property acquisition    | All property acquisition would be carried out in accordance with the Land Acquisition Information Guide (Roads and Maritime, 2014c), the supporting NSW Government Land Acquisition Reform 2016, and the Land Acquisition (Just Terms Compensation) Act 1991. | Transport project manager | Pre-construction. construction | -         |
|     | Socio-economic          | Consultation will be undertaken with potentially affected residences prior to the commencement of and during works in accordance with the RTA’s Community Involvement and Communications Resource Manual (RTA, 2008a) Roads and Maritime Stakeholder Engagement Toolkit (Transport for NSW, 2017a). Consultation will include but not limited to door knocks, newsletters or letter box drops providing information on the proposed | Transport project manager/ contractor | Pre-construction/ construction | -         |</p>
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<tr>
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<tbody>
<tr>
<td>SE5</td>
<td>Socio-economic</td>
<td>Consultation will be undertaken with all affected property owners during detailed design and construction to develop and implement measures to mitigate impacts on land use viability, infrastructure and severance. This would include but not be limited to the Public School and Penrith City Council about school bus services, access requirements, and any key calendar periods (i.e., exams), and the Rural Fire Service and Fire &amp; Rescue to ensure emergency access to and from Jeanette Street.</td>
<td>Transport project manager/contractor</td>
<td>Pre-construction/construction</td>
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<tr>
<td>SE6</td>
<td>Socio-economic</td>
<td>Consultation will occur with the commercial properties alongside Mulgoa Road to identify appropriate management strategies to avoid or minimise impacts on access and operations, especially during peak customer periods. This will include consideration of measures such as additional signage and alternative access arrangements.</td>
<td>Transport project manager/contractor</td>
<td>Pre-construction/construction</td>
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<tr>
<td>SE7</td>
<td>Tree loss</td>
<td>An arborist will carry out a pre-construction check of the site to confirm that all preserved trees are clearly and effectively marked and suitable protection zones are in place to prevent any impact on the canopy or root zones.</td>
<td>Transport project manager/contractor</td>
<td>Pre-construction/construction</td>
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</tr>
<tr>
<td>SE8</td>
<td>Socio-economic</td>
<td>A complaint handling procedure and register will be included in the CEMP.</td>
<td>Contractor</td>
<td>Construction</td>
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<tr>
<td>SE9</td>
<td>Access</td>
<td>Disruptions to property access and traffic will be notified to landowners at least five days in accordance with the relevant community consultation processes outlined in the TMP.</td>
<td>Contractor</td>
<td>Construction</td>
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</tr>
<tr>
<td>SE10</td>
<td>Socio-economic</td>
<td>Road users and local communities will be provided with timely, accurate, relevant and accessible information about changed traffic arrangements and delays owing to construction activities.</td>
<td>Contractor</td>
<td>Construction</td>
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<tr>
<td>SE11</td>
<td>Access</td>
<td>Access for emergency vehicles would be maintained at all times during construction. Any site-specific requirements will be determined in consultation with the relevant emergency services agency.</td>
<td>Contractor</td>
<td>Construction</td>
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<tr>
<td>SE12</td>
<td>Tree loss</td>
<td>Any tree removal or pruning would be carried out by a qualified specialist and in accordance with AS4970: 2009: Protection of Trees on Development Sites (Standards Australia, 2009) and AS4373:2007: Pruning of Amenity Trees and WorkCover Amenity Tree Industry Code of Practice 1998.</td>
<td>Contractor</td>
<td>Construction</td>
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### Air quality

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<tr>
<th>AQ1</th>
<th>Air quality</th>
<th>An Air Quality Management Plan (AQMP) would be prepared and implemented as part of the CEMP. The AQMP would include, but not be limited to:</th>
<th>Contractor</th>
<th>Detailed design/pre-construction</th>
<th>Section 4.4 of QA G36 Environment Protection</th>
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<tr>
<td></td>
<td>Air quality</td>
<td>• Potential sources of air pollution</td>
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<td></td>
<td>Air quality</td>
<td>• Air quality management objectives consistent with any relevant published EPA and/or OEH guidelines</td>
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<td></td>
<td>Air quality</td>
<td>• Mitigation and suppression measures to be implemented</td>
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<td></td>
<td>Air quality</td>
<td>• Methods to manage work during strong winds or other adverse weather conditions</td>
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<td></td>
<td>Air quality</td>
<td>• A progressive rehabilitation strategy for exposed surfaces.</td>
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<tr>
<th>AQ2</th>
<th>Air quality</th>
<th>All sensitive receivers (eg schools, residents) likely to be affected would be notified at least five days prior to commencement of any works associated with the activity that may have an adverse impact on local air quality. The notification would provide details of:</th>
<th>Contractor</th>
<th>Pre-construction/ construction</th>
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<tr>
<td></td>
<td>Air quality</td>
<td>• The proposal</td>
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<td></td>
<td>Air quality</td>
<td>• The construction period and construction hours</td>
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<td></td>
<td>Air quality</td>
<td>• Contact information for project management staff</td>
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<td></td>
<td>Air quality</td>
<td>• Complaint and incident reporting</td>
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<td></td>
<td>Air quality</td>
<td>• How to obtain further information.</td>
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<td>AQ3</td>
<td>Air quality</td>
<td>All personnel working on site will receive training to ensure awareness of requirements of the AQMP. Site-specific training will be given to personnel when working in the vicinity of sensitive receivers.</td>
<td>Contractor</td>
<td>Pre-construction/ construction</td>
<td>-</td>
</tr>
<tr>
<td>AQ4</td>
<td>Air quality</td>
<td>Consistent with the approved AQMP, mitigation and suppression measures will be implemented to protect local air quality.</td>
<td>Contractor</td>
<td>Construction</td>
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<tr>
<td>AQ5</td>
<td>Air quality</td>
<td>No burning of timber or other materials will occur, other than vegetation debris that is unsuitable for any other purpose, and subject to any necessary approval of Penrith City Council and/or EPA, and provision of any required notification to the Rural Fire Service. No burns will be undertaken during total fire bans.</td>
<td>Contractor</td>
<td>Construction</td>
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</table>

**Non-Aboriginal heritage**

| NA1  | Non-Aboriginal heritage | The Standard Management Procedure - Unexpected Heritage Items (Roads and Maritime, 2015c) 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. | Contactor     | Detailed design/pre-construction | Section 4.10 of QA G36 Environment Protection |

**Waste and resource use**

<table>
<thead>
<tr>
<th>W1</th>
<th>Waste</th>
<th>A Waste Management Plan (WMP) would be prepared and implemented as part of the CEMP. The WMP would include but not be limited to:</th>
<th>Contactor</th>
<th>Detailed design/pre-construction</th>
<th>Section 4.2 of QA G36 Environment Protection</th>
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<td>Environmental safeguards and management measures</td>
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<td></td>
<td>• Monitoring, record keeping and reporting.</td>
<td>The WMP would be prepared taking into account the <em>Environmental Procedure - Management of Wastes on Roads and Maritime Services Land</em> (Roads and Maritime, 2014b) and relevant Roads and Maritime Waste Fact Sheets.</td>
<td>Contractor</td>
<td>Pre-construction</td>
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<tr>
<td>W2</td>
<td>Waste</td>
<td>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. 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.</td>
<td>Contractor</td>
<td>Construction</td>
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<tr>
<td>W3</td>
<td>Waste</td>
<td>Waste materials (such as soils and aggregates) obtained from the project and to be exported to a non-road construction site or project will be sampled and managed in accordance with relevant Roads and Maritime Waste Fact Sheets.</td>
<td>Contractor</td>
<td>Construction</td>
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<tr>
<td>W4</td>
<td>Waste</td>
<td>Any removed trees would be reused as millable timber wherever feasible and reasonable. Other removed vegetated material would be mulched and reused onsite for landscaping, habitat replacement or rehabilitation purposes if consistent with the approved FFMP. Weed species, or vegetation not considered appropriate for reuse onsite, would be removed and disposed of to an appropriately licenced facility.</td>
<td>Contractor</td>
<td>Construction</td>
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</tr>
<tr>
<td>W5</td>
<td>Waste</td>
<td>A post-construction land assessment would be carried out on land used for ancillary construction purposes (compounds, storage, parking, etc) to determine the suitability for hand-back to the landowner. The assessment would be prepared in accordance with the RMS Environmental Procedure - Management of Wastes on Transport for NSW Services Land. Where the land is privately owned, a copy of the assessment will be provided to the landowner.</td>
<td>Transport project manager/ contractor</td>
<td>Post-construction</td>
<td>-</td>
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<td>No.</td>
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<tr>
<td>U1</td>
<td>Utilities</td>
<td>Prior to the commencement of works:</td>
<td>Contactor</td>
<td>Detailed design/pre-construction</td>
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<td>• The location of existing utilities and relocation details would be confirmed following consultation with the affected utility owners</td>
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<td></td>
<td></td>
<td>• If the scope or location of proposed utility relocation works falls outside of the assessed proposal scope and revised REF proposal footprint, further assessment would be undertaken.</td>
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<td></td>
<td></td>
<td><strong>Greenhouse gas and climate change</strong></td>
<td></td>
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</tr>
<tr>
<td>GHG1</td>
<td>Greenhouse gas and climate change</td>
<td>Specific measures would be outlined in the CEMP to ensure that construction minimises any potential impacts on or from climate change including:</td>
<td>Contractor</td>
<td>Pre-construction/ construction</td>
<td>-</td>
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<td></td>
<td></td>
<td>• Energy efficiency and related carbon emissions would be considered during the development of construction methodologies, procurement of low carbon alternatives and the selection of efficient plant vehicles, and equipment</td>
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<td></td>
<td></td>
<td>• Plant, vehicles and machinery must be operated efficiently in accordance with the manufacturers guidelines to ensure optimal performance and be switched off when not in use</td>
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<td></td>
<td></td>
<td>• Procedures would be set out for the management of extreme events including flooding, heatwaves and bushfires.</td>
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<td></td>
<td></td>
<td><strong>Cumulative impacts</strong></td>
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<tr>
<td>C1</td>
<td>Cumulative impacts</td>
<td>Consultation would take with other developers in the area to coordinate traffic management in the wider area, especially during peak periods.</td>
<td>Transport project manager/ contractor</td>
<td>Detailed design/per-construction</td>
<td>-</td>
</tr>
<tr>
<td>CI2</td>
<td>Cumulative impacts</td>
<td>All environmental management plans would be prepared to consider other developments in the area.</td>
<td>Contractor</td>
<td>Pre-construction</td>
<td>-</td>
</tr>
</tbody>
</table>
5.3 Licensing and approvals

Should the proposal proceed, the licenses and approvals as outlined in Table 5-2 may be required prior to the commencement of construction.

Table 5-2: Summary of licensing and approval required

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Requirement</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roads Act 1993</td>
<td>Licence from Penrith City Council and the Transport Management Centre to occupy roads during construction.</td>
<td>Prior to start of the activity requiring road occupancy</td>
</tr>
</tbody>
</table>
6. References


Penrith City Council 2010, *Penrith Local Environmental Plan 2010*.


Roads and Maritime 2018b, Mulgoa Road Upgrade Jeanette Street to Blaikie Road Review of Environmental Factors, August 2018.


Roads and Maritime 2017b, Water sensitive urban design guideline: Applying water sensitive urban design principles to NSW transport projects.


Roads and Maritime 2015a, *Environmental Impact Assessment Practice Note: Biodiversity Assessment*.


Roads and Maritime 2014a, *Beyond the Pavement: urban design procedures and design principles*.


