Great Western Highway East – Katoomba to Blackheath

Submissions report

Dharug Country

Transport for NSW | October 2022

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Transport for NSW | October 2022

Prepared by Aurecon Australasia in association with Mott MacDonald and Transport for NSW
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Approval and authorisation

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Accepted on behalf of Transport for NSW by:	Pete Styles Project Development Manager - Great Western Highway Upgrade Program Infrastructure & Place
Signed:	
Dated:	

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Revision	Date	Prepared by	Reviewed by
A	12/08/2022	Anna Ho, Lachlan Mitchell	Lucia Coletta
B	09/09/2022	Lachlan Mitchell	Lucia Coletta

Executive summary

The proposal

Transport for NSW (Transport) is proposing to widen the Great Western Highway, between Rowan Lane, Katoomba and Tennyson Road, Blackheath from one to two lanes in each direction (the proposal) (refer to Figure 1-1a-b). The proposal is part of the Great Western Highway Upgrade Program which aims to provide a safer, more efficient connection between the Central West region of New South Wales (NSW), the Blue Mountains and Sydney.

Key features of the proposal, as per the design in the *Great Western Highway East – Katoomba to Blackheath REF* (Transport for NSW, April 2022) would include:

- widening of the Great Western Highway to provide a four-lane divided carriageway in two sections:
  - between Rowan Lane, Katoomba and Bellevue Crescent, Medlow Bath (about 3.5 kilometres)
  - between Station Street, Medlow Bath and Tennyson Road, Blackheath (about 1.8 kilometres)
- new concrete twin bridges (about 400 metres long) over the valley from Pulpit Hill near Explorers Road
- upgrades to intersections at Nellies Glen Road, Explorers Road and Foy Avenue
- re-use of redundant sections of the existing highway pavement for new truck stopping areas, local service roads and maintenance areas
- consolidation and improvement of the Pulpit Hill heritage interpretation area on Nellies Glen Road, including improved visitor parking
- adjustment of bus stops on the highway at Bonnie Doon Reserve, Explorers Road and Foy Avenue to provide set down and pick up locations for buses
- installation of 11 water quality basins including biofiltration and on-site detention
- upgrade and enhancement of existing sections and providing new active transport connections along the Great Western Highway, which would form part of the broader Great Blue Mountains Trail to improve active transport connectivity between Katoomba and Blackheath
- construction activities and ancillary work common to both sections, including:
  - relocation of rail infrastructure, maintenance areas, access roads and utilities (including electrical, gas, water and telecommunications)
  - work on associated rail infrastructure including adjustments to power connections and rail corridor fencing
  - civil earthworks, retaining walls, drainage work, water quality controls and tie in work to adjoining sections of the highway
  - new national park, railway, fire trail and utility authority maintenance access tracks to connect with other corridors
  - final roadworks including pavement, kerb and gutters, signs, landscaping lighting and line marking
  - new intelligent transport systems including, but not limited to, closed-circuit television, variable-message signs and variable speed limit signs
  - establishment of temporary ancillary facilities to support construction, including compound sites, site offices, stockpile and laydown locations, temporary access tracks, water quality devices and concrete batching plants.

Display of the Review of Environmental Factors

Transport for NSW prepared a review of environmental factors (REF) for the Great Western Highway East – Katoomba to Blackheath. The REF was publicly displayed between 15 May 2022 and 19 June 2022 at four locations:

- Blaxland Library
- Blue Mountains City Council – Katoomba Council Headquarters

- Glenbrook Customer Service Counter (Glenbrook Visitor Information Centre)
- Katoomba Library.

The REF was also published on the Transport for NSW project website and made available for download.

The REF and concept design consultation was widely promoted within the Blue Mountains, the Central West and Western Sydney through print and radio advertisements, social media, print and electronic newsletters, and static displays. During this time, Transport for NSW invited the public to provide feedback on the proposal. Transport for NSW also met with residents and businesses who would be directly affected by the proposal.

A mix of face to face and virtual community information sessions were held by Transport to provide further information on the proposal, answer questions from the community and encourage the community to provide a formal submission on the REF.

Summary of issues and responses

Public display of the REF and the supporting consultation resulted in a total of 108 submissions, of which 102 were from the general community, one was from Blue Mountains City Council and five were from other government agencies.

Of these submissions, 25 per cent supported part or all of the proposal, 66 per cent did not support the proposal and nine per cent did not offer their position on whether they supported or objected to the proposal.

The five main issues raised during display of the REF were:

- Concern about the design and impacts of the Great Western Highway Medlow Bath Upgrade
- Proposed alternate alignments for the proposal
- The need for an Environmental Impact Statement (EIS) for the entire Great Western Highway Upgrade Program
- The operational landscape character and visual impacts of the proposal
- The impacts of the proposal on biodiversity during construction.

Responses to these issues are summarised below.

Out of scope – Great Western Highway Medlow Bath Upgrade

A number of submissions raised concern about the Great Western Highway Upgrade - Medlow Bath (Medlow Bath Upgrade) and its perceived impacts.

The Medlow Bath Upgrade has been assessed as a separate project in the Great Western Highway Upgrade Medlow Bath REF. That REF assessed the environmental impacts of the project. The REF was placed on public display between 27 July 2021 to 24 August 2021 and feedback sought from the community. Refer to that REF for consideration of impacts of the project.

Transport has considered the feedback from the community to that project and responses have been provided in the Great Western Highway Upgrade Medlow Bath Submissions Report . Refer to that document for consideration of feedback on the Medlow Bath Upgrade.

Proposal need and options

A number of submissions suggested alternate alignments to the proposal. This included suggestions to:

- extend the tunnel from Blackheath to a location to the east of Katoomba or to provide a tunnel under Medlow Bath.
- investigate and cost a bypass of Medlow Bath
- consider alternative surface roads including:
  - Great Western Highway and Bell's Line of Road or the electricity easement.
  - alternate tunnel / surface road design via the Megalong Valley and Kanimbla Valley and utilised as a bypass of Katoomba.
  - alternate route between Sydney and the Central West.

The historical development of the Great Western Highway between Katoomba and Blackheath has long focussed on surface widening. This is because there is no feasible alternate route that can bypass Medlow Bath without impacting the village, national park or the Megalong escarpment. This is reflected in the Local Environmental Plan (LEP) reservations and corridor planning regimes dating back to the 1950's. Duplicating the highway from two lanes to four lanes provides travel time savings for all traffic users for the present and well into the future. Without an upgrade, travel times would worsen and congestion would continue to deteriorate.

The upgrade of 34 kilometres of two-lane highway on the Great Western Highway to dual carriageway can significantly improve safety, reduce congestion and improve overall resilience and provide capacity for future demands. Projected traffic demand for Great Western Highway does not warrant a second route crossing that would impact on the Greater Blue Mountains World Heritage Area. This was one of the design development criteria outlined in Section 2.3.2 of the REF adopted during initial options development for the proposal.

In May 2021, the NSW Government announced that Transport would investigate the feasibility of a tunnel between Blackheath and Little Hartley. Studies have confirmed that two identical (twin) tunnels, one eastbound and one westbound, around 11 kilometres long between Blackheath and Little Hartley is the most viable option and Transport will take this option forward for further development, community consultation and environmental investigation.

The Great Western Highway is being upgraded alongside long-term rail and intermodal options (Transport, 2022b). The Great Western Highway carries around nine million tonnes of road freight each year, with seven million tonnes transported by rail. Upgrading the rail is no substitute for upgrading the highway as both are needed to meet future demand and address issues around safety, congestion and journey reliability.

Environmental assessment process

A number of submissions requested an Environmental Impact Statement (EIS) to be carried out for the entire Great Western Highway Upgrade Program.

The statutory planning pathway for the proposal was established in accordance with the *Environmental Planning and Assessment Act 1979* (EP&A Act) and the State Environmental Planning Policy (Transport and Infrastructure) 2021 (T&ISEPP). Section 2.109 of the T&ISEPP permits development on any land for the purpose of a road or road infrastructure facilities to be carried out by or on behalf of a public authority without consent. As the proposal is for a road upgrade and duplication and is to be carried out by Transport for NSW, it can be assessed under Division 5.1 of the EP&A Act.

This proposal is only one part of the overall Great Western Highway Upgrade Program of works. Other upgrades including the Medlow Bath Upgrade and the Great Western Highway Upgrade Program - Little Hartley to Lithgow (Little Hartley to Lithgow Upgrade) projects have also been subject to assessment in

accordance with the EP&A Act, with the appropriate statutory planning pathway selected as per each project's potential significance of impacts.

It was found that this proposal was unlikely to cause a significant impact on the environment and therefore it was not necessary for an EIS to be prepared and for approval to be sought from the Minister under Division 5.2 of the EP&A Act. For further consideration of community feedback on biodiversity impacts, refer to section 2.3 of this report.

In addition, this proposal was not likely to have an impact on matters of national environmental significance or the environment of Commonwealth land within the meaning of the *Environment Protection and Biodiversity Conservation Act 1999*. A referral to the Australian Government Department of Agriculture, Water and Environment (now the Department of Climate Change, Energy, the Environment and Water) was not required.

Landscape character and visual impacts – operational impacts

A number of submissions raised concern about the operational landscape character and visual impacts of the proposal, including:

- Concern that the visual impact assessment has not assessed the impacts of the twin bridges from Hargraves lookout, Kanangra Walls, the Megalong Valley and the Jenolan Caves Road and impacts of the Pulpit Hill cutting from Wynne's Rock at Mt Wilson and Mount Banks when viewed from a distance
- Concern about visual impact of the elevated nature along Pulpit Hill to Medlow Bath and elevated road alignment when viewed from Explorers Road, Pulpit Hill Road and Ngula Bulgarabang Regional Park
- Concern about other visual impacts, including the Variable Message Signs (VMS) and light spill.

Landscape character and visual impacts are addressed in Section 6.5 and Appendix G of the REF. Transport acknowledges respondents' concerns about the visual impacts of the proposal. During operation, there is potential for visual impacts ranging from low to high along the length of the proposal (refer to Table 6-27 in Section 6.5.3 of the REF).

Aspects of the proposal such as the twin bridges may be partially visible from some north facing receivers on Explorers Road. A viewshed assessment identified that the twin bridges and the existing Great Western Highway would be visible from Hargraves Lookout. The twin bridges are also expected to be visible from a distance from the Megalong Valley. However, in both of these locations, this would form a small proportion of the overall visual catchment and would have a negligible increase in the assessed visual impact. During detailed design, the bridge design and the design of peripheral elements would be refined to reduce its visual impact (Safeguard V3).

Residential receivers near the proposal, including on Foy Avenue, Delmonte Avenue, Coachhouse Lane and Station Street, would also experience light spill predominantly from vehicle headlights. These impacts would be minimised during detailed design through design refinement and during construction through implementation of mitigation measures. An Urban Design Plan would be prepared as part of the CEMP and present an integrated urban design for the project, providing practical detail on the application of design principles and objectives identified in the environmental assessment (Safeguard V1).

Safeguards V2 to V6 outline requirements which would be considered during detailed design to minimise visual impacts of the proposal, including exposed design features, the twin bridges and other structures such as retaining walls, active transport trails and landscape design. Safeguard V6 has been amended to require consideration of screening for potential light spill from the proposal when operational.

In addition, two VMS are proposed in each section of the proposal (one on the eastbound carriageway and one on the westbound carriageway). The VMS are not expected to be directly visible from residential receivers, however this would be confirmed through additional assessment during detailed design. These signs would form part of the proposal's safety and resilience improvements along the Great Western Highway.

Biodiversity – construction impacts

A number of submissions raised concern about the impacts of the proposal on biodiversity during construction.

Transport notes the concern of the respondents at the potential impacts of the proposal to biodiversity. The vegetation clearance footprint would be reduced wherever possible and practical during detailed design and the need to clear vegetation would be assessed, in accordance with Safeguard B2.

Potential impacts to the Blue Mountains Swamp TEC would be managed through the implementation of targeted mitigation measures. Treatments such as buffer areas of at least five metres between the proposal area and boundary of the Blue Mountains Swamp TEC and monitoring of potential impacts to the swamp would occur to minimise indirect impacts to the swamp near the twin bridges (Safeguards B1 and B14). A monitoring program is to be established before, during as after construction to understand the surface water entering the TEC (Safeguard SGW1). The program would include surface water and shallow groundwater sampling and monitoring of water levels. This monitoring would include pH levels during construction, including pH adjustment where appropriate (Safeguard B14).

The removal of native vegetation would result in impacts to threatened species, including a loss of fauna habitat (refer to Table 6-14 of the REF). This would impact one threatened flora species and 25 threatened species of fauna. Loss of habitat to these species are not considered significant due to the abundance of available habitat in the immediate area.

Transport would undertake offsetting in accordance with the Biodiversity Offset Policy. Transport is considering a parcel of land near the Great Western Highway to be gazetted as national park which may be suitable to meet its biodiversity offset requirements as well as provide compensatory land for the national park revocation. This offset land could be protected as part of the Blue Mountains National Park in perpetuity. These discussions are ongoing between Transport and National Parks and Wildlife Service.

This non-significant impact of the proposal is on the assumption that a local population of Eastern Pygmy-Possums is likely to be widespread due to the extent of high-quality habitat around the proposal. To support this conclusion, Transport has commenced the coordination of further surveys for the Eastern Pygmy-possum are proposed to better understand the size and extent of the population within the surrounding area. Following the completion of the monitoring program, a final assessment of significance for the Eastern Pygmy-possum would be generated and mitigation measures further refined.

The proposal would also result in indirect impacts to parts of the Blue Mountains National Park and WaterNSW Blackheath Special Area to the east of the Medlow Bath to Blackheath section. The section of the national park adjacent to the Medlow Bath to Blackheath section is not part of the Greater Blue Mountains World Heritage Area. Potential indirect impacts from construction would generally be of a short to medium timeframe and would be minimised through implementation of safeguards and management measures in accordance with the CEMP.

Other mitigation measures designed to minimise the impacts to biodiversity during construction include:

- the requirement to delineate work areas and minimise indirect impacts to the surrounding environment, including the sensitive Blue Mountains Hanging Swamp TEC (Safeguards B2, B8 and B14)
- translocation and seed collection for threatened flora species including Needle Geebung (*Persoonia acerosa*) (Safeguards B4 and B5)
- monitoring of road kills (Safeguard B6)
- measures to prevent invasion and spread of pathogens and disease (Safeguard B12).

Surface water and groundwater

A number of submissions raised concern about the impacts of the proposal on surface water and groundwater during construction and operation of the proposal and whether the proposal would result in impacts to the Cascade Dams.

Transport notes that the proposal passes through the Katoomba Special Area and the Blackheath Special Area and that the twin bridges are located near the Blue Mountains Swamp TEC. As a result of this environmental sensitivity, design development criteria were established for the proposal (refer to Section 2.3.2 of the REF), including the criterion to adopt water quality control measures to improve the management of stormwater out flows into the Sydney drinking water catchment especially through the Blackheath Special Area. As such, a detailed assessment of surface water and groundwater was carried out (refer to section 6.1 of the REF).

During construction, work near and across Megalong Creek and Back Creek would pose the highest risk to surface water flows, turbidity and water quality in the Katoomba to Medlow Bath section. The tributaries which flow into Cascade Dam would not be directly impacted by construction of the proposal as it does not intercept them. The slope of the existing road corridor falls away from those tributaries and in some cases there are sharp increases of the topography which act as barriers. There is also the existing railway corridor between the proposal and these tributaries. Water from the proposal would be diverted away from the tributaries during construction under the proposed erosion and sediment controls (in accordance with Safeguards SGW1 and SGW2).

Groundwater flow interruption is not anticipated due to the localised nature of the piling works during construction (near the twin bridges and retaining walls). Groundwater contamination to the Cascade Dams is not anticipated to occur with the proposed mitigation measures in place (refer to Safeguard SGW1).

MUSIC modelling has been carried out to evaluate the water quality treatment system to make sure that the design would protect existing water quality. As per the guidelines which require that a Neutral or Beneficial Effect assessment needs to be undertaken as the proposal is within the Sydney Drinking Water Catchment, the assessment showed that the proposal would have a beneficial effect on the surrounding water quality during operation. This is due to the proposal capturing and treating all surface runoff from the highway. This water quality treatment system was developed in consultation with Blue Mountains City Council and WaterNSW.

Non-Aboriginal heritage – Pulpit Hill

A number of submissions raised concern about the impacts of the proposal on non-Aboriginal heritage near Pulpit Hill, including the proposal's design, the presence of *Eucalyptus oreades* in this area and the heritage listing of the site.

The Statement of Heritage Impact carried out for the proposal has assessed Pulpit Hill as a place through its assessment of the Pulpit Hill and Environs locally listed heritage item, which included the lock-up, stockyard and elements of Cox's Road. As noted in Section 6.4.3 of the REF, during construction, the proposal would have direct physical impacts to the eastern curtilage of this item but would not impact on some components of the Pulpit Hill and Environs heritage item. Regardless, it would have high partial physical impacts to the heritage item and overall would result in cumulative impacts to the greater Pulpit Hill environs. However, the Statement of Heritage Impact also noted that the mitigation measures proposed to be implemented including the Great Western Highway Upgrade Program cultural interpretation strategy could conserve or enhance the significance of the item.

A heritage interpretation strategy for the Pulpit Hill area would be developed as part of the cultural interpretation strategy (for both Aboriginal and non-Aboriginal heritage) for the Great Western Highway Upgrade Program – Katoomba to Lithgow to reinterpret the existing heritage interpretation area and communicate the heritage significance of the Pulpit Hill area. The existing Blue Mountains City Council heritage interpretation area would be retained and be further developed to display the Aboriginal and non-Aboriginal heritage of the area (refer to Section 3.2.3 of the REF).As part of this strategy, the interpretation of the Pulpit Hill area including all heritage significant areas to the place (including the Explorers Tree and grave site) (safeguard NA6) would be further developed in consultation with stakeholders. Transport commits to carrying out further study in partnership with heritage groups to drive heritage interpretation

around Pulpit Hill prior to construction commencing (Safeguard NA6). These further investigations would allow the proposal to contribute to the knowledge base of the history of Pulpit Hill.

While Transport acknowledges that the community may culturally associate the *Eucalyptus oreades* with the Pulpit Hill area, no historic evidence of deliberate planting of *Eucalyptus oreades* has been identified in non-Aboriginal heritage assessment carried out for the proposal. Blue Mountains Ash (*Eucalyptus oreades*) and Silvertop Ash (*Eucalyptus sieberi*) woodlands are the co-dominant types of native vegetation in the Pulpit Hill area and *Eucalyptus oreades* were observed on site during biodiversity investigations.

During detailed design, Transport would consider opportunities to include *Eucalyptus Oreades* within the enhanced Pulpit Hill heritage interpretation area. In addition, Safeguard NA11 has been added which would require the *Eucalyptus Oreades* on Pulpit Hill to be offset as required under Transport's *Guidelines for Biodiversity Offsets* (Transport, 2016b).

Section 6.2.1 of the Statement of Heritage Impact (SOHI, Appendix F to the REF) notes that the Pulpit Hill and Environs heritage item currently has Local heritage listing and is recommended for State listing. In addition, Section 10.1.3.1 in Appendix 2 to the SOHI notes that, depending on the integrity of archaeological profile, Pulpit Hill may be of State heritage significance. Transport has contributed to the development of understandings of the heritage significance of this site during development of this REF. Transport commits to working with Blue Mountains City Council during and after the Great Western Highway Upgrade Program to share findings on the heritage fabric and significance of Pulpit Hill Envrions with Blue Mountains City Council as they seek State heritage listing of this site. Changes to the proposal

The design changes in the revised design include:

- Extending the new separate eastbound carriageway and the upgrade of the westbound carriageway to connect back to the existing Great Western Highway just to the east of Tennyson Road.
- Continuing the active transport trail in the Medlow Bath to Blackheath section to Valley View Road, Blackheath. The active transport trail would also serve as maintenance access to utilities, water quality basins and the national park (for approved access only).
- High voltage electricity, optical fibre and water main relocations between Medlow Bath and Blackheath have been extended and connected back to existing utility networks at Blackheath.
- Minor adjustments to maintenance access and rail corridor interfaces in both sections of the proposal.
- Type and construction methodology of the twin bridges west of Pulpit Hill to introduce bridge designs that minimise environmental impacts.
- Optimising the lane alignment tie-in near Coachhouse Lane.
- Sealing of unsealed sections of active transport trail

Environmental assessment of design changes

The following additional investigations have been carried out for the revised design:

- a revision to the REF Biodiversity Assessment Report
- an addendum non-Aboriginal heritage assessment
- an addendum construction and operational surface water quality assessment
- an addendum noise and vibration assessment
- an addendum landscape character and visual impact assessment
- an addendum Aboriginal Cultural Heritage Assessment Report (ACHAR).

The design changes would not increase the impacts of the proposal to the extent that would change a non-significant impact (identified in Chapter 6 of the REF) to a significant impact. Refer to Section 5 of the submissions report for further details.

Next steps

Transport as the determining authority will consider the information in the Great Western Highway East – Katoomba to Blackheath REF and this submission report and make a decision whether or not to proceed with the proposal.

As part of this process, this assessment and determination process would be undertaken jointly with the assessment and determination of the Medlow Bath Upgrade.

Transport for NSW will inform the community and stakeholders of this decision and where a decision is made to proceed will continue to consult with the community and stakeholders prior to and during the construction phase.

As discussed in the REF, the revocation process for a portion of land reserved as the Blue Mountains National Park is currently in progress. Transport intends to exclude from its determination any works requiring revocation until such time that a decision has occurred, via an Act of Parliament. The revocation process is currently ongoing.

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Appendix F	Addendum Landscape Character and Visual Impacts Assessment
Appendix G	Addendum Noise and vibration impact assessment

1. Introduction and background

1.1 The proposal

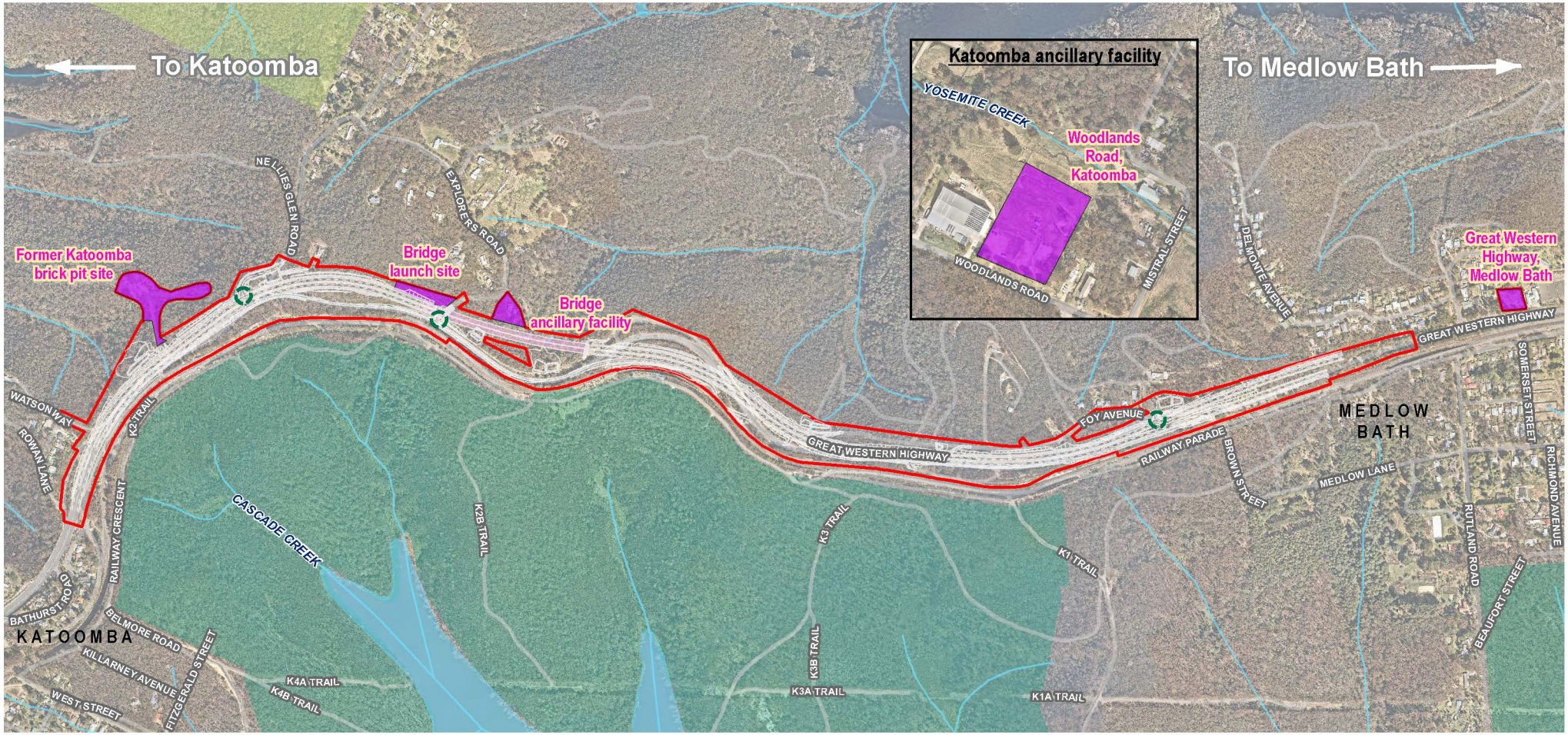
Transport for NSW (Transport) is proposing to widen the Great Western Highway, between Rowan Lane, Katoomba and Tennyson Road, Blackheath from one to two lanes in each direction (the proposal) (refer to Figure 1-1a-b). The proposal is part of the Great Western Highway Upgrade Program which aims to provide a safer, more efficient connection between the Central West region of New South Wales (NSW), the Blue Mountains and Sydney. The proposal consists of two sections:

- Katoomba to Medlow Bath – about 3.5 kilometres of highway between Rowan Lane at Katoomba and Bellevue Crescent at Medlow Bath
- Medlow Bath to Blackheath – about 1.8 kilometres of highway between Station Street, Medlow Bath and Tennyson Road, Blackheath.

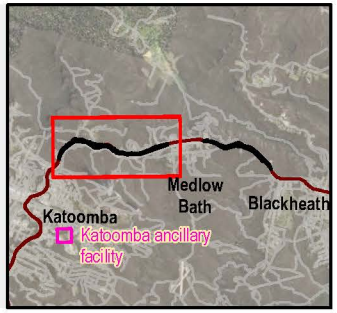
Key features of the proposal, as per the design in the *Great Western Highway East – Katoomba to Blackheath REF* (Transport for NSW, April 2022) would include:

- widening of the Great Western Highway to provide a four-lane divided carriageway in two sections:
  - between Rowan Lane, Katoomba and Bellevue Crescent, Medlow Bath (about 3.5 kilometres)
  - between Station Street, Medlow Bath and Tennyson Road, Blackheath (about 1.8 kilometres)
- new concrete twin bridges (about 400 metres long) over the valley from Pulpit Hill near Explorers Road
- upgrades to intersections at Nellies Glen Road, Explorers Road and Foy Avenue
- re-use of redundant sections of the existing highway pavement for new truck stopping areas, local service roads and maintenance areas
- consolidation and improvement of the Pulpit Hill heritage interpretation area on Nellies Glen Road, including improved visitor parking
- adjustment of bus stops on the highway at Bonnie Doon Reserve, Explorers Road and Foy Avenue to provide set down and pick up locations for buses
- installation of 11 water quality basins including biofiltration and on-site detention
- upgrade and enhancement of existing sections and providing new active transport connections along the Great Western Highway, which would form part of the broader Great Blue Mountains Trail to improve active transport connectivity between Katoomba and Blackheath
- construction activities and ancillary work common to both sections, including:
  - relocation of rail infrastructure, maintenance areas, access roads and utilities (including electrical, gas, water and telecommunications)
  - work on associated rail infrastructure including adjustments to power connections and rail corridor fencing
  - civil earthworks, retaining walls, drainage work, water quality controls and tie in work to adjoining sections of the highway
  - new national park, railway, fire trail and utility authority maintenance access tracks to connect with other corridors
  - final roadworks including pavement, kerb and gutters, signs, landscaping lighting and line marking
  - new intelligent transport systems including, but not limited to, closed-circuit television, variable-message signs and variable speed limit signs
  - establishment of temporary ancillary facilities to support construction, including compound sites, site offices, stockpile and laydown locations, temporary access tracks, water quality devices and concrete batching plants.

Since the REF was displayed, the design of the proposal has been revised (refer to Chapter 4 for more details).



The REF design
Original REF proposal area
Proposed ancillary facilities
Bridge
Blue Mountains National Park
Ngula Bulgarabang Regional Park
Proposed intersection upgrades



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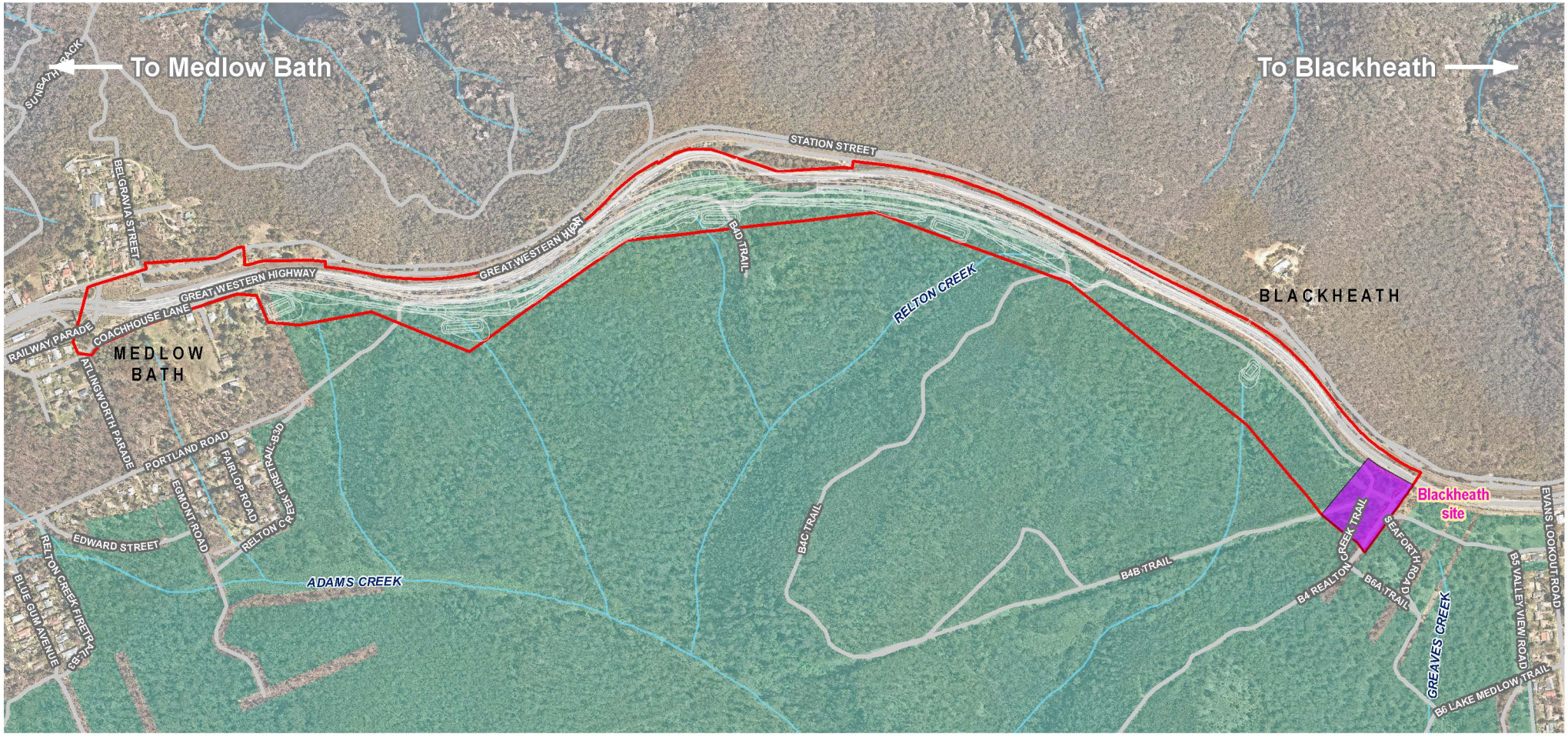
Projection: GDA2020 MGA Zone 56

FIGURE 1-1a: The REF proposal - Katoomba to Medlow Bath section



The REF design

Original REF proposal area

Proposed ancillary facilities

Blue Mountains National Park

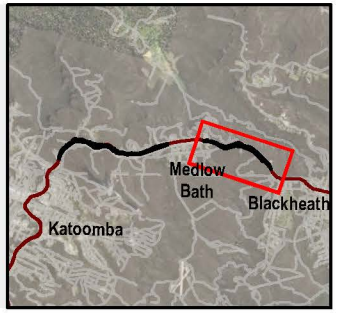


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FIGURE 1-1b: The REF proposal - Medlow Bath to Blackheath section

1.2 REF display

Transport for NSW prepared a review of environmental factors (REF) to assess the potential environmental impacts of the proposed works. The REF was publicly displayed for 35 days between 15 May 2022 and 19 June 2022 at four locations, as detailed in Table 1-1. Hard copies were provided via mail upon request. The REF was published on the Katoomba to Blackheath project interactive web portal at ***nswroads.work/gwheastconsult*** and made available for download.

The REF and concept design consultation was widely promoted within the Blue Mountains, the Central West and Western Sydney through print and radio advertisements, social media, print and electronic newsletters, and static displays.

Table 1-1 Display locations

Location	Address
Blaxland Library	33 Hope St, Blaxland NSW 2774
Blue Mountains City Council – Katoomba Council Headquarters	2-6 Civic Place, Katoomba NSW 2780
Glenbrook Customer Service Counter (Glenbrook Visitor Information Centre)	Hamment Place, Glenbrook NSW 2773
Katoomba Library	Blue Mountains Cultural Centre, 30 Parke St, Katoomba 2780

Six public consultation sessions were held between 23 May and 9 June 2022 which were a mixture of online and face-to-face sessions. Two general online sessions and two targeted online sessions were held. The targeted online sessions focused on localised impacts during and after construction and biodiversity and water quality. The face-to-face consultation sessions were held at Katoomba and Blackheath. These are detailed in Table 1-2.

Local Aboriginal community members were invited to a consultation session focused on Aboriginal cultural heritage, held before the Katoomba face-to-face consultation. Local knowledge holders have also been consulted, following Transport's Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI) process.

Phone consultations were offered for anyone unable to engage either online or in person.

Table 1-2 Community information sessions

Date	Location and time
Monday, 23 May 2022	Online general session – 6:30pm – 8pm
Wednesday, 25 May 2022	Aboriginal stakeholder engagement session – 4:30pm – 6pm General face to face session – 6pm – 8pm Seminar Room, Katoomba Cultural Centre, 30-32 Parke Street Katoomba
Tuesday, 31 May 2022	Specialised online session – biodiversity & water quality 6:30pm – 8pm
Saturday, 4 June 2022	Face to face session – 10am – 12pm Blackheath Neighbourhood Centre, 41 Gardiner Cres, Blackheath
Monday, 6 June 2022	Specialised online session – localised access/construction & completion 6:30pm – 8pm
Thursday, 9 June 2022	Online general session – 6:30pm – 8pm

1.3 Purpose of the report

This submissions report relates to the REF prepared for the Great Western Highway East: Katoomba to Blackheath section and should be read in conjunction with that document.

The REF was placed on public display and submissions relating to the proposal and the REF were received by Transport for NSW. This submissions report summarises the issues raised by individuals and community groups (Chapter 2) and government agencies (Chapter 3) and provides responses to each issue. It describes design refinements that have occurred (Chapter 4) and assesses the environmental impact of these refinements (Chapter 5) and identifies new or revised environmental management measures (Chapter 6).

2. Response to community issues

Transport for NSW received 102 submissions from individuals and community groups, accepted up until the 27 June 2022. Appendix A lists the respondents and each respondent's allocated submission number. The table also indicates where the issues from each submission have been addressed in Chapter 2 of this report.

2.1 Overview of community issues raised

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

Of these submissions, 25 per cent supported part or all of the proposal, 66 per cent did not support the proposal and nine per cent did not offer their position.

The most common issues raised by the public included:

- Concern about the Medlow Bath Upgrade and its perceived impacts.
- Alternate alignments to the proposal. This included suggestions to:
  - extend the tunnel from Blackheath to a location to the east of Katoomba or to provide a tunnel under Medlow Bath.
  - investigate and cost a bypass of Medlow Bath
  - consider alternative surface roads including Great Western Highway and Bell's Line of Road or the electricity easement, alternate tunnel / surface road design via the Megalong Valley and Kanimbla Valley and utilised as a bypass of Katoomba and an alternate route between Sydney and the Central West.
- A request for an Environmental Impact Statement (EIS) to be carried out for the entire Great Western Highway Upgrade Program
- Concern about the operational landscape character and visual impacts of the proposal including:
  - Concern that the visual impact assessment has not assessed the impacts of the twin bridges from Hargraves lookout, Kanangra Walls, the Megalong Valley and the Jenolan Caves Road and impacts of the Pulpit Hill cutting from Wynne's Rock at Mt Wilson and Mount Banks when viewed from a distance
  - Concern about visual impact of the elevated nature along Pulpit Hill to Medlow Bath and elevated road alignment when viewed from Explorers Road, Pulpit Hill Road and Ngula Bulgarabang Regional Park
  - Concern about other visual impacts, including the Variable Message Signs (VMS) and light spill in both sections of the proposal.
- Concern about the impacts of the proposal on biodiversity during construction.

2.2 Aboriginal cultural heritage

2.2.1 Assessment methodology

Submission number(s)

28, 31, 37, 45 and 85.

Issue description

- Concern that Aboriginal heritage is not prioritised in the REF.
- Concern about the assessment methodology for Aboriginal heritage, including consultation and study area.
- Call to preserve Aboriginal cultural heritage.
- Concern about the impacts of the proposal on Aboriginal cultural heritage in native bushland.

Response

The Archaeological Survey Report was undertaken the Great Western Highway between Katoomba and Lithgow. Consultation with Aboriginal stakeholders was carried out following the requirements described for Stage 2 of PACHCI. This involved Deerubbin Local Aboriginal Land Council (LALC) providing a cultural heritage survey report to Transport.

A desktop assessment of the study area was conducted, including:

- a review of the environmental context
- a review of the ethnographic and cultural context
- a search and review of the Aboriginal Heritage Information Management System (AHIMS)
- a review of relevant heritage data from previous archaeological assessments.

The desktop assessment and consultation informed an archaeological survey of the study area. Field walkovers of the area covered by this proposal were conducted with representatives from the Deerubbin LALCs between November 2019 and March 2020. All previously recorded AHIMS sites within the study area were visited, where feasible and property access was granted.

As no known Aboriginal heritage sites were located in the REF proposal area and no further sites found during field investigations, so further assessment was not warranted.

However, as part of the design changes identified in this submissions report, a further field walkover was undertaken in the revised proposal area with Aboriginal stakeholders. This walkover found a scarred tree in an area that is currently Blue Mountains National Park. Refer to Section 5.9 for further details.

As a result of this find, an Aboriginal Heritage Impact Permit (AHIP) would need to be sought prior to any harm coming to the tree (see safeguard AH4 in Section 6.2 of this report). In addition, safeguard AH1 was included in the REF that requires The *Standard Management Procedure - Unexpected Heritage Items* (Transport for NSW, 2015d) to be followed in the event that an unknown or potential Aboriginal object/s, including skeletal remains, is found during construction.

Safeguard AH3 provides for the preparation of a cultural interpretation strategy across the entire Great Western Highway Upgrade program. As part of this strategy, Transport is proposing during detailed design to investigate the suitability of the former Katoomba brick pit site for purposes of Aboriginal cultural education. The site would be developed for use as an Aboriginal yarning circle and remain a site which would hold future Aboriginal cultural significance. Should the site be deemed unsuitable, another more suitable site would be selected along the proposal alignment in consultation with Aboriginal stakeholders.

2.2.2 Safeguards and management measures

Submission number

69

Issue description

- Need for Aboriginal heritage mitigation measures in case Aboriginal sites are encountered during construction.

Response

Safeguard AH1 identifies the need to prepare an Aboriginal heritage management plan for construction work which will provide specific guidance on measures and controls to be implemented for managing impacts on Aboriginal heritage. In addition, safeguard AH2 was included in the REF that requires The *Standard Management Procedure - Unexpected Heritage Items* (Transport for NSW, 2015d) to be followed in the event that an unknown or potential Aboriginal object/s, including skeletal remains, is found during construction.

2.3 Biodiversity

2.3.1 Assessment methodology

Submission number(s)

45, 65

Issue description

- Concern about the limited buffer areas applied in the biodiversity assessment with the study area applied too narrow so did not allow for all impacts of the proposal to be assessed.
- Request to repeat biodiversity surveys across multiple days as required by an EIS and include areas and trees not yet studied.

Response

As noted in Section 6.3.1 of the REF, the biodiversity study area is the area that would be subject to direct impacts (revised proposal area) and some areas of potential habitat beyond that boundary. The biodiversity study area is shown in Figure 6-2 of the REF.

This study area was developed to define the area required for field surveys for the proposal in accordance with the NSW Government's Biodiversity Assessment Methodology (BAM) and relevant threatened biodiversity survey guidelines. While it was not a requirement for field surveys to follow the BAM for this proposal's biodiversity assessment, the survey effort is equivalent to what would have been required if a Biodiversity Development Assessment Report was required to inform an EIS. Seven separate field surveys were carried out for the REF proposal and revised design across multiple days in different seasons throughout a calendar year. The field survey methodology for the proposal is explained further in Section 2 of the BAR, attached to the REF as Appendix E.

Desktop database searches also considered an extended area of 10 kilometre radius of the study area to capture a broader understanding of the surrounding area.

Additional biodiversity assessment has also been carried out to assess the impacts of the revised design on biodiversity. Refer to Section 5.3 for further details.

2.3.2 Construction impacts

Submission number(s)

8, 9, 10, 11, 28, 31, 32, 39, 65, 67, 85, 99, 100

Issue description

- Concern about the impacts of the proposal on biodiversity including wildlife damage, vegetation clearing, hollow bearing tree removal. Impact to the 25 threatened species, 207 Hollow bearing trees, clearance of 40 hectares of bushland due to the twin bridges and loss of 20 hectares of vegetation in the national park water catchment in the Medlow Bath to Blackheath section.
- Concern around the amount of land to be cleared and hollow bearing trees to be removed given the sensitive World Heritage area and associated changes to animal and bird habitat.
- Concern about impacts of the proposal to flora and fauna, threatened species, removal of hollow bearing trees, the hanging swamp, bushland and vegetation removal.
- Concern that the biodiversity assessment does not consider downstream and adjacent impacts, including to the Blue Mountains Swamp TEC. There is a need to have a plan to avoid impacts to the Hanging Swamp.
- Concern that Transport would not carry out further monitoring of the Eastern Pygmy Possum.
- Concern about the relocation process for habitat trees.
- Concern about vegetation removal required for the truck stopping areas.

Response

Transport notes the concern of the respondents at the potential impacts of the proposal to biodiversity. The potential impacts of the proposal on biodiversity were investigated during the REF through a combination of a desktop assessment, field surveys and the assessment of biodiversity impacts. These findings are presented in Section 6.3 of the REF and the BAR (Appendix E of the REF). The assessment has also identified a range of safeguards to be implemented to minimise the potential impacts of the proposal on biodiversity during construction.

The proposal would result in direct impacts on biodiversity from the removal of up to a total of 50.01 hectares of native vegetation across both sections of the proposal (refer to Section 5.3.3). The twin bridges would not require clearance of 40 hectares of native vegetation. In addition, the truck stopping areas would re-use the existing highway that would become redundant and wouldn't, in itself result in any additional vegetation clearance. The majority of vegetation likely to be affected by the proposal is located adjacent to the Great Western Highway and has been subject to historic clearing and edge effects and is therefore thinned in areas and some areas are dominated by a range of introduced species.

While the proposal design has avoided direct impact to the Blue Mountains Swamp TEC (PCT 1078) near the twin bridges in the Katoomba to Medlow Bath section, there may be potential indirect impacts to 0.12 hectares of the swamp located within the proposal area. Transport acknowledges the concern of the community about the impacts of the proposal to water quality, which would in turn impact the Blue Mountains Swamp TEC both within the proposal area and downstream. These impacts would be managed through the implementation of targeted mitigation measures. Treatments such as buffer areas of at least five metres between the proposal area and boundary of the Blue Mountains Swamp TEC and monitoring of potential impacts to the swamp would occur to minimise indirect impacts to the swamp near the twin

bridges (Safeguards B1 and B14). As such, it is unlikely that run-off during construction would negatively impact the swamp habitat.

In addition, any potential downstream impacts to waterways and adjacent populations of Blue Mountains Swamp TEC would be minimised through the implementation of erosion and sediment control measures during construction in accordance with Safeguards SGW1 (Soil and Water Management Plan) and SGW 2. Transport is further conducting a surface water and groundwater monitoring program as identified in SGW1 to capture surface water runoff quality before, during and after construction. The program would include surface water and shallow groundwater sampling and monitoring of water levels. pH, electrical conductivity, oxidation-reduction potential, dissolved oxygen, temperature, major ions and dissolved metals. Turbidity, total suspended soils, total metals and groundwater dissolved metals would be measured for surface water samples as well. One flow gauging station would also be installed in the western end of the Medlow Bath to Blackheath section downstream of any sampling locations. The program would commence with monthly sampling for six months. Following a review of the program after six months, frequency of sampling may then reduce to quarterly sampling. Of the initial monthly sampling, at least two samples would occur after higher rainfall events of at least 10 to 15 millimetres of rain.

Up to 220 hollow-bearing trees have the potential to be directly impacted by the proposal (refer to Section 5.3). These values are upper limits and would be reduced wherever possible and practical during detailed design, in accordance with Safeguard B2.

The removal of native vegetation would result in impacts to threatened species, including a loss of fauna habitat (refer to Table 6-14 of the REF). This would impact one threatened flora species and 25 threatened species of fauna. Loss of habitat to these species are not considered significant due to the abundance of available habitat in the immediate area.

In acknowledgement of the impact to vegetation, while not required by legislation, Transport would offset this impact in accordance with the TfNSW Biodiversity Offset Policy.

In addition, part of the revocation process is providing compensatory lands to the national park being revoked in all areas of the Great Western Highway Upgrade Program. Transport is considering a parcel of land near the Great Western Highway to be gazetted as national park which may be suitable to meet its biodiversity offset requirements as well as provide compensatory land for the national park revocation. This would result in more land in the Blue Mountains region being protected as national park and enhance protection of the natural and cultural resources of the regional landscape. This offset land could be protected as part of the Blue Mountains National Park in perpetuity. These discussions are ongoing between Transport and National Parks and Wildlife Service.

As part of the Flora and Fauna Management Plan (Safeguard B1), pre-clearing survey requirements, vegetation removal and habitat removal would occur in line with Transport's vegetation clearance protocol. A staged habitat removal process (as outlined in the *Biodiversity Guidelines: Protecting and Managing Biodiversity on Projects*) would be followed for identified habitat, such as hollow bearing trees. Staged habitat removal minimises direct impacts on fauna by providing them with an opportunity to vacate hollows once felled (but before they are removed) and relocate naturally. It also sets out arrangements for wildlife carer or ecologist input in the clearing process and record-keeping requirements.

The proposal would also result in indirect impacts to parts of the Blue Mountains National Park and WaterNSW Blackheath Special Area to the east of the Medlow Bath to Blackheath section. The section of the national park adjacent to the Medlow Bath to Blackheath section is not part of the Greater Blue Mountains World Heritage Area Indirect impacts from construction would generally have a short to medium timeframe and would be minimised through implementation of safeguards and management measures in accordance with the CEMP (refer to Section 6.2).

However, assessments of significance carried out for threatened species which were identified with potential to occur within the proposal area found that the proposal would not have a significant impact on threatened biota. Significant impacts would be avoided through the implementation of mitigation measures,

including the implementation of a Flora and Fauna Management Plan (Safeguard B1). In particular the assessment of significance for the Eastern Pygmy-possum identified that the species is likely to be widespread and there is large amount of high-quality habitat (K Madden DPE 2021, personal communication) around the proposal that would not be impacted. Based on this, the proposal is not considered likely to significantly impact a local population of the Eastern Pygmy-possum. However, as little is known about the overall population of Eastern Pygmy-possum in the Blue Mountains region, Transport is commencing further surveys for the Eastern Pygmy-possum to better understand the size and extent of the population within the surrounding area. Following the completion of this monitoring program, a final assessment of significance for the Eastern Pygmy-possum would be prepared. Should the impact be determined to be significant at this stage, Transport would carry out an addendum REF with a subsequent Biodiversity Development Assessment Report.

Other mitigation measures designed to minimise the impacts to biodiversity during construction include:

- the requirement to delineate work areas and minimise indirect impacts to the surrounding environment, including the sensitive Blue Mountains Hanging Swamp TEC (Safeguards B2, B8 and B14)
- translocation and seed collection for threatened flora species including Needle Geebung (*Persoonia acerosa*) (Safeguards B4 and B5)
- monitoring of road kills (Safeguard B6)
- measures to prevent invasion and spread of pathogens and disease (Safeguard B12).

Refer to Section 6.2 of this submissions report for further details on safeguards to be implemented.

Submission number(s)

28

Issue description

- Risk of invasive weed spread through native bush particularly around the twin bridge construction.

Response

There is a risk of weed incursion occurring during operation of the proposal. This risk would be greatest in areas not currently adjacent to a road corridor, including vegetated areas in the Katoomba to Medlow Bath section, parts of the Blue Mountains National Park and the WaterNSW Blackheath Special Area to the east of the Medlow Bath to Blackheath section. In Safeguard B1, the Flora and Fauna Management Plan would set out procedures for weed management during construction.

Safeguard B12 outlines measures design to minimise the potential for invasion and spread of pathogens and disease. This safeguard includes provision for:

- excavated earth to be either disposed or reused appropriately
- enforcement of correct plant hygiene will be minimised to minimise spread of weeds, Phytophthora and other contaminants
- disposal of all weed material at an off-site suitable waste facility, ensuring weed infested materials are not mulched and reused on site to avoid the reintroduction and further spread of weeds and pathogens in the area.

2.3.3 Operational impacts

Submission number(s)

8, 20

Issue description

- Concern about long term environmental and wildlife damage during operation.

Response

Transport acknowledges the concern of the respondents around the operational impacts of the proposal, including due to fauna injury and death from road kill and indirect impacts, including altered hydrology to the Blue Mountains Swamp TEC.

During detailed design, opportunities to reduce vegetation clearance and associated biodiversity impacts (Safeguard B2) and implement connectivity features as part of a Fauna Connectivity Strategy (Safeguard B9) would be considered. Any refinements to the design which would result in avoided biodiversity impacts would reduce the operational, long-term impacts of the proposal.

In addition, Transport would monitor road kills along the Great Western Highway before, during and after commencement of the proposal, in accordance with Safeguard B6. This would allow any indirect impacts to threatened species to be identified and mitigated where required. The Great Western Highway is already fenced along much of its alignment within the proposal area which limits the potential for fauna strikes within this section of the highway. Fencing requirements associated with the rail corridor for the entire alignment and the Blackheath Special Area in the Medlow Bath to Blackheath section would limit crossing opportunities and the potential for vehicle strikes. To minimise the impact to fauna movement, Safeguard B9 identifies the development of a Fauna Connectivity Strategy to help establish safe fauna crossing points along the length of the proposal.

The proposed water treatment and drainage network would result in a beneficial impact on water quality due to the proposal (refer to Section 3.2.3 and Section 6.1.3 of the REF). This would minimise hydrologic impacts to surrounding sensitive environments, including the Blue Mountains Swamp TEC habitat.

Transport would offset impacts to vegetation and threatened species habitat in accordance with the TfNSW Biodiversity Offset Policy. In addition, part of the revocation process is providing compensatory lands to the national park being revoked in all areas of the Great Western Highway Upgrade Program. Transport is considering a parcel of land near the Great Western Highway to be gazetted as national park which may be suitable to meet its biodiversity offset requirements as well as provide compensatory land for the national park revocation. This would result in more land in the Blue Mountains region being protected as national park and enhance protection of the natural and cultural resources of the regional landscape. This offset land could be protected as part of the Blue Mountains National Park in perpetuity. These discussions are ongoing between Transport and National Parks and Wildlife Service.

2.3.4 Safeguards and management measures

Submission number(s)

25, 60

Issue description

- Concern about loss of hollow bearing trees. What is the procedure for removing hollow bearing trees?
- Request biodiversity safeguards to be implemented, including erection of barricades to protect bushland during construction, provision for the avoidance or relocation of native bush plants, planting of local native plants, ongoing weeding of the highway once operational and fauna connectivity measures for fauna passage underneath the highway.

Response

- As part of the Flora and Fauna Management Plan (Safeguard B1), pre-clearing survey requirements, vegetation removal and habitat removal would occur in line with Transport's vegetation clearance protocol. A staged habitat removal process (as outlined in the Biodiversity Guidelines: Protecting and Managing Biodiversity on Projects) would be followed for identified habitat, such as hollow bearing trees. Staged habitat removal minimises direct impacts on fauna by providing them with an opportunity to vacate hollows once felled (but before they are removed) and relocate naturally. It also sets out arrangements for wildlife carer or ecologist input in the clearing process and record-keeping requirements. Transport's *Biodiversity Guidelines: Protecting and Managing Biodiversity on Projects* (Roads and Traffic Authority, 2011a) requires the offsetting of tree hollows removed as part of construction activities carried out by Transport. This is part of Transport's commitment to 'no net loss' of biodiversity. Where Transport has more recent biodiversity guidelines, they would be adopted for the proposal.

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

  A Construction Environmental Management Plan (CEMP) will be prepared to describe the safeguards and management measures identified. The CEMP will provide a framework for establishing how these measures will be implemented and who would be responsible for their implementation. In accordance with Safeguard B1, a Flora and Fauna Management Plan would be prepared and implemented as part of the CEMP. Vegetation removal would occur in accordance with Transport's vegetation clearance protocol, which would avoid the inadvertent removal of any additional trees and full-time supervision of clearing work by an independent contractor environmental officer (refer to Safeguard B1).

  Specific safeguards would be implemented to minimise the potential biodiversity impacts of the proposal, including demarcation of the construction boundary (Safeguard B3), the translocation and seed collection of threatened flora species (Safeguards B4 and B5), weeding of the planted vegetation along the proposal during operation (new Safeguard B17) and development of a Fauna Connectivity Strategy (Safeguard B9). In addition, native and endemic plantings would be used along the Great Western Highway outside the townships (Safeguard V6).

  Works being undertaken adjacent to the Blue Mountains National Park would only commence once a new permanent fence is erected on the boundary. This will avoid any accidental incursions into the National Park.

2.4 Noise and vibration

2.4.1 Assessment methodology

Submission number(s)

16, 31, 41, 45, 73, 93, 94

Issue description

- Concern about the baseline noise measurement applied in the noise and vibration assessment and queried the noise modelling methodology (including location of loggers, duration of monitoring and impact of COVID lockdowns).
- Query about whether noise monitoring has been carried out near Nellies Glen, Pulpit Hill and Explorers Road.
- Concern about construction noise and vibration impacts and inadequacy of modelling in the REF.
- Request for a noise and vibration assessment to be carried out to consider the noise impacts to areas not immediately adjacent to the proposal (including consideration of wind direction).

Response

- The noise assessment has been carried out using both noise monitoring and noise modelling. Computer modelling is used to create a baseline noise model that incorporates, topography, sensitive receivers and existing road / railway design information. The noise model incorporates all areas surrounding the proposal and noise monitoring at representative locations is used to calibrate this noise model and ensure that the modelling is accurately detecting the noise levels.

  Noise monitoring was carried out along the proposal in August 2021 to determine the existing background noise environment. Due to the noise model, noise monitoring is not required at every sensitive receiver across the proposal area.

  The noise monitoring locations were chosen to be representative of the different Noise Catchment Areas (groupings of sensitive receivers with similar characteristics), with five of seven loggers installed at residences with unobstructed views of the Great Western Highway. Noise monitoring was carried out at the locations outlined in Table 6-30 in the REF. The closest noise monitoring locations to Nellies Glen Road, Pulpit Hill and Explorers Road are 26 Explorers Road, Katoomba and 313 Bathurst Road, Katoomba.

  The timing, duration and location of noise monitoring was in accordance with the NSW EPA Road Noise Policy. The noise monitoring locations were chosen to be representative of the different NCAs surrounding the proposal.

  The operational traffic noise levels were modelled for both the REF proposal and revised design using CadnaA software and predicted in accordance with the Calculation of Road Traffic Noise (CoRTN). The model was validated using the noise monitoring results, which allowed a high level of confidence to be placed in the noise model for predicting future traffic noise levels.

- The construction noise assessment for both the REF proposal and revised design has been undertaken in accordance with relevant government and industry guidelines on construction noise assessment.

  The construction noise model captures the likely construction methodology to be able to attribute noise levels to equipment/ activities and the noise impacts to the surrounding areas.

- The operational traffic noise model considers all noise impacts of the proposal, including in all directions from the Great Western Highway. Under the EPA Road Noise Policy (RNP), road projects need to assess impacts to a distance up to 600 metres away from the road. Operational noise impacts of the proposal are shown in Figures 6-8a-b - 6-11-a-b in Section 6.6.4 of the REF. Changes to the proposal's operational noise impacts due to the revised design are assessed in Section 5.6.

  Noise impacts have been assessed in accordance with Transport's Noise Criteria Guideline and the RNP. The operational traffic noise model has been developed in accordance with the Calculation of Road Traffic Noise (CoRTN) which considers moderately adverse wind velocities when predicting road traffic noise levels at residential receivers.

2.4.2 Construction impacts

Submission number(s)

20, 28, 73

Issue description

- Concern about construction noise impacts.
- Concern about how construction noise and vibration would be managed to minimise impacts on residents on Explorers Road.
- Query about whether there would be vibration impacts near Pulpit Hill Road during construction.

Response

- Transport acknowledges that the proposal would have potential noise and vibration impacts on residential receivers during construction. Section 6.6.4 of the REF outlines the worst-case noise and vibration impacts during construction of the proposal at the most affected receivers in each noise catchment area for each scenario where construction equipment is at the closest point to each receiver. Detailed noise level predictions are included in Appendix H of the REF. An addendum noise assessment was undertaken (refer to Section 5.6 of this report) for changes to the proposal. Section 5.6.3 of this submissions report outlines the revised construction noise and vibration impacts due to the proposal.

  Section 6.2 of this submissions report outlines the safeguards and management measures that would be implemented to minimise potential noise and vibration impacts of the proposal. A Construction Noise and Vibration Management Plan (CNVMP) would be prepared and implemented as part of the CEMP (Safeguard NV1). This would include identification of a monitoring program to assess performance against relevant noise and vibration criteria and contingency measures to be implemented in the event of non-compliance with noise and vibration criteria.

  During construction, source controls would be employed to minimise noise impacts, such as using noise screens and mufflers, maximising offset distance, and orienting plant away from sensitive receivers (Safeguard NV7). Noisiest activities will be limited to standard construction hours, where practicable (Safeguard NV5). In addition, the selection of plant and machinery will consider noise emissions, operated to reduce maximum noise levels, maintained regularly and turned off when not in use (Safeguard NV8). Where feasible and reasonable, less vibration emitting construction methods would also be used to reduce vibration impacts (Safeguard NV3).

  These measures would be implemented throughout the revised proposal area to minimise impacts to residents, including those on Explorers Road.

- The construction vibration assessment carried out for the proposal identified that the proposal would not result in human annoyance or cosmetic structural damage vibrations near Pulpit Hill Road during construction. Minimum working distances for vibration impact are shown in Appendix N of the noise and vibration assessment (refer to Appendix H to the REF).

2.4.3 Existing environment

Submission number(s)

8, 65

Issue description

- Comment that there is an error in the addresses of The Pines and Gatekeeper's Cottage in the noise and vibration assessment.

Response

Transport notes that the address for The Pines is 16-18 Coachhouse Lane, Medlow Bath and Gatehouse Cottage is 33 Station Street, Medlow Bath.

2.4.4 Operational impacts

Submission number(s)

16, 18, 19, 20, 25, 27, 28, 32, 37, 40, 41.

Issue description

- Concern about increases to traffic noise and vibration due to the proposal for residents living near the highway. Request for design to incorporate available noise reduction technologies.
- Multiple respondents were particularly concerned around noise impacts to Nellies Glen Road, Explorers Road and surrounding environment, particularly due to the construction of the twin bridges
- Concern that current road noise levels would not be reduced by the proposal.

Response

Transport acknowledges that the proposal would have potential noise and vibration impacts on residential receivers during operation. Section 6.6.4 of the REF outlines the expected non-significant operational noise impacts of the proposal in each NCA. Figure 6-8a-b to Figure 6-11a-b of the REF display the predicted operational impacts along the length of the proposal. Detailed noise level predictions are included in Appendix H of the REF. Section 5.6.3 of this submissions report affirms that the changes to the proposal following display of the REF would also result in non-significant operational noise impacts.

The greatest predicted noise levels are adjacent to the new road corridor. Changes in noise impacts due to the proposal would be highest where the proposal is located away from the current alignment and where topographic and other environmental features impact road noise levels. Generally, the proposal would occur in an area with existing levels of noise disturbance from the existing road and railway corridor, which would result in minimal changes to noise levels to sensitive receivers and fauna.

Transport acknowledges that proposal would result in a change in vertical alignment along the length of the proposal, including near Nellies Glen Road and the twin bridges over the valley from Pulpit Hill. The operational traffic noise model considers a three-dimensional representation of the proposal and

surrounding area to predict operational noise levels, including local terrain, receiver buildings and structures. The change in vertical alignment associated with the proposal has been considered in the operational traffic noise assessment.

A number of sensitive residential receiver buildings are predicted to have exceedances of the NCG operational road traffic noise criteria around Nellies Glen Road and Explorers Road. These receivers are eligible for consideration of 'additional noise mitigation'.

The noise assessment considered the range of noise mitigation options for those receivers that exceed the NCG noise criteria. Of the possible options, low noise pavement and at-house treatments were considered reasonable and feasible options for the proposal. Noise barriers or mounds were not considered as it was not in character for the Great Western Highway.

Transport has commenced discussions with property owners about the provision of at-property treatment for affected residential receivers. These treatments would be installed as early as feasible in the construction program in consultation with the property owner (Safeguard NV10). This would mitigate the potential impacts of construction noise and operational road traffic noise for these receivers.

As the aim of the proposal is not to introduce Higher Productivity Vehicles onto the highway, the noise assessment has modelled similar vehicles to the existing scenario using the highway during operation of the proposal. Any change to the types of heavy vehicles allowed on the Great Western Highway would be a decision of Government and would involve continued engagement with Blue Mountains City Council.

2.4.5 Safeguards and management measures

Submission number(s)

3, 8, 14, 60, 67, 69, 75

Issue description

- Request for noise barriers to be considered during construction and operation of the proposal
- Concern about what at-property noise treatments would be offered for older and heritage-listed buildings.
- Request for installation of noise mitigation measures for properties on Delmonte Avenue up to 36 Delmonte Avenue.
- Query about noise and vibration safeguards during construction and operation for properties on Rowan Lane and Watson Way.
- Request for safeguards to minimise impacts of traffic noise on residents.

Response

The noise assessment considered the range of noise mitigation options for those receivers that exceed the NCG noise criteria. Of the possible options, low noise pavement would need further assessment during detailed design to consider the impacts of ice and snow in the area. Low noise pavement benefits are not normally achieved in speed zones of 80 kilometres per hour or less and as such the effectiveness may be minimal.

Noise barriers were not considered as they are not in character for the Great Western Highway urban design framework and would not be consistent with the urban design objectives outlined in Section 2.3.3 of the REF.

Transport are progressing at-house treatments as the preferred approach for noise mitigation along the Great Western Highway through the Blue Mountains.

The heritage status of any receiver building would be considered during the selection of appropriate at-property noise treatments. Transport would discuss possible treatment options with the property owners of these buildings. A total of 31 sensitive residential receiver buildings are predicted to have exceedances of the NCG operational road traffic noise criteria along the proposal length (refer to Section 6.6.4 of the REF). These receivers are eligible for consideration of 'additional noise mitigation' and have been notified of their eligibility directly by Transport. An addendum noise assessment was undertaken (refer to Section 5.6 of this report) for changes to the proposal. This assessment did not result in any change to the properties to be considered for at property treatments.

Transport has commenced discussions with property owners about the provision of at-property treatment for affected residential receivers. These treatments would be installed as early as feasible in the construction program in consultation with the property owner (Safeguard NV10). This would minimise the impacts of operational road traffic noise for these receivers. Transport has commenced discussions with property owners about the provision of at-property treatment for affected residential receivers. These treatments would be installed as early as feasible in the construction program in consultation with the property owner so as to mitigate the potential noise impacts during construction (Safeguard NV10). They would also mitigate the impacts of operational road traffic noise for these receivers.

2.5 Construction

2.5.1 Construction methodology

Submission number(s)

8, 12, 65, 73

Issue description

- There is a discrepancy as to which carriageway would be constructed first in the Medlow Bath to Blackheath section. This does not inspire confidence in the process.
- It was important for the existing active transport trails between Katoomba and Blackheath to remain open during construction and requested for construction staging for active transport trails during construction so that access is maintained at all times, similar to road traffic.
- Query about whether female participation would be a requirement in the construction contract.

Response

- As noted in Section 3.3.8 of the REF, the construction of the proposal would be staged to allow the Great Western Highway to remain open to traffic during construction at all times. Construction of the new offline carriageways would generally occur first while traffic continues to use the existing highway. An example of this would include construction of the twin bridges within the Katoomba to Medlow Bath section while traffic remains on the existing highway. For the Katoomba to Medlow Bath section, the new off-line carriageway constructed first would be the westbound carriageway. For the Medlow Bath to Blackheath section, the new offline carriageway constructed first would be the eastbound carriageway. Once complete, the traffic would be switched onto the new carriageways while the second carriageway for each section is completed and redundant pavement removed. The upgraded sections would then be opened to traffic.

  However, Transport notes that a design and construct contracting method is proposed for the Katoomba to Blackheath section. The detailed design and construction staging would be reviewed, refined and designed in detail to provide the most efficient construction staging outcome for traffic management.

- In the Katoomba to Medlow Bath section, as noted in Section 3.3.8 of the REF, the Great Blue Mountains Trail would be temporarily closed during construction off the off-line carriageway in the Katoomba to Medlow Bath section. Transport would consider opportunities for alternative transport arrangements to provide access for vulnerable community members who would normally access this section of the Great Blue Mountains Trail (Safeguard SE8).

  The existing active transport trail between Medlow Bath and Blackheath along Station Street would not be impacted by the proposal and would remain open to the public during construction.

- The Great Western Highway Upgrade Program is committed to achieving positive outcomes for local and regional employment, Aboriginal participation in construction, skills development and equal employment opportunities. Procurement contracts would be written in line with current State and Federal policies and guidelines and the wider Transport approach to Skills, Employment and Industry Development.

2.5.2 Construction timing

Submission number(s)

15, 28, 69, 75 and 82.

Issue description

- Request for further information and consultation with the community about timing of construction to minimise impacts on residents and traffic movements.
- Construction needs to occur as efficiently as possible and in a timely manner.
- A contraflow is required along the highway. Suggestion that construction should not occur during bushfire season so that access can be maintained during emergencies.
- Query about the expected duration of construction between Rowan Lane and Explorers Road.

Response

- Transport acknowledges the respondent's support for efficient construction of the proposal. Construction of the proposal could commence in 2023 with early works, however the main construction is anticipated to commence from late 2024 and, subject to weather, would last for a period of about:
  - 36 months for the Katoomba to Medlow Bath section
  - 30 months for the Medlow Bath to Blackheath section.
- Where possible, Transport would seek to minimise the duration of construction to reduce impacts on motorists and the community. For example, as noted in Section 3.3.4 of the REF, to reduce the overall construction timeframe of the proposal to provide relief to the Blue Mountains community from a number of longer-term construction projects, Transport is seeking approval for ‘extended construction hours’ for this proposal. The proposed extended construction hours are:
  - Monday to Friday: 6am to 7pm
  - Saturday: 8am to 5pm
  - Sunday and Public Holidays: no work.

  This would provide additional work hours at the end of each day (Monday to Friday) and on Saturday afternoon outlining the maximum hours that could be worked. Certain work may still need to occur outside these hours (known as night works) to minimise disruption to customers, pedestrians, road users and nearby sensitive receivers.

As noted in Section 3.3.8 of the REF, the construction of the proposal would be staged to allow the Great Western Highway to remain open to traffic during construction at all times. Construction of the new offline carriageways would generally occur first while traffic continues to use the existing highway. An example of this would include construction of the twin bridges within the Katoomba to Medlow Bath section while traffic remains on the existing highway. For the Katoomba to Medlow Bath section, the new off-line carriageway constructed first would be the westbound carriageway. For the Medlow Bath to Blackheath section, the new offline carriageway constructed first would be the eastbound carriageway. Once complete, the traffic would be switched onto the new carriageways while the second carriageway for each section is completed and redundant pavement removed. The upgraded sections would then be opened to traffic. As such, access would be maintained at all times for the community and emergency services.

Transport would continue to update the community on construction timing prior to and during construction, including with details about any delays to traffic movements.

Transport acknowledges the bushfire risks associated with construction of the proposal which were highlighted by the 2019/2020 bushfire season. The potential risks associated with work during bushfire season would be minimised through implementation of a Bushfire Management Plan as part of the CEMP (Safeguard O5) and by maintaining consultation with emergency services for the duration of construction (Safeguard O6). In addition, during a bushfire emergency, work would stop on the Great Western Highway, which would further reduce the potential delays due to construction work experienced by residents evacuating along the road corridor.

- Construction of the proposal could commence in 2023 with early works, however the main construction is anticipated to commence from late 2024 and, subject to weather, last for a period of about 36 months in the Katoomba to Medlow Bath section. Work closest to residential receivers on Rowan Lane would occur in the first part of construction when the new offline carriageway is being constructed in the Katoomba to Medlow Bath section. In addition, work would occur near these receivers during upgrades to the existing carriageway once the new carriageway is in use under contraflow arrangements.

2.5.3 Local access

Submission number(s)

28, 73

Issue description

- Concern about how local access and safety will be managed during construction along Nellies Glen, Pulpit Hill and Explorers Road. .
- Query about whether the right turn out from Explorers Road onto the existing highway would be maintained during construction.

Response

As noted in Section 6.7.4 of the REF, there may be temporary changes in access arrangements for residents on Nellies Glen Road and Explorers Road.

During construction of the new offline westbound carriageway in the Katoomba to Medlow Bath section, Nellies Glen Road would be temporarily closed to traffic as the intersection is reconstructed further east of the existing intersection. Access to residents on Pulpit Hill and for visitors to the Six Foot Track would occur via Explorers Road. During this phase of construction, the right turn out from Explorers Road would be maintained. When work is occurring to the bridge structures over Explorers Road, the Great Western

Highway / Explorers Road intersection may be closed. Access to Explorers Road would be redirected to the upgraded Nellies Glen Road intersection alignment with movement permitted in all directions, similar to the existing scenario at Explorers Road.

Temporary traffic control measures would be implemented during construction to maintain safety of road users and construction workers at all times as part of the Traffic Management Plan (Safeguard TT1). This would include temporary traffic control barriers, signage and lighting along the edge of work areas. As noted in Section 3.3.8 of the REF, some construction work (particularly during tie-in work) would be carried out outside of peak traffic periods using temporary traffic management arrangements, such as night-time and weekend lane closures, and relevant traffic controls.

2.5.4 Coachhouse Lane

Submission number(s)

7, 8

Issue description

- Concern about safety for pedestrians, motorists and Coachhouse Lane residents during construction and request that safeguards and management measures to be implemented.
- Concern about impacts, particularly socio-economic, landscaping and property impacts on Coachhouse Lane during construction.
- Concern about impacts to access on Coachhouse Lane during construction, including for shift workers who require access to be maintained.

Response

Transport notes the concerns of the residents in Coachhouse Lane about the impacts that they would experience during construction. Transport appreciates that residents have previously experienced substantial disruption during construction of previous upgrades to the Great Western Highway in 2002.

Chapter 6 of the REF assesses the environmental impacts of the proposal, including those in Coachhouse Lane. It is anticipated that there would be temporary visual, noise, traffic and transport and socio-economic impacts for residents in Coachhouse Lane during construction.

These impacts, while unavoidable, can be managed through effective communication with residents of Coachhouse Lane when planning the works. Construction work in this area would be carried out in a way that minimises impacts to residents in Coachhouse Lane.

Vehicle and pedestrian access to Coachhouse Lane for residents and emergency services would be maintained at all times during construction. Pedestrian access would only be available for pedestrians accessing Coachhouse Lane to and from the Medlow Bath village, as per the existing scenario. Where required, access would be maintained with appropriate safety measures such as traffic control.

In addition, there is currently no formal on-street parking in Coachhouse Lane, with all parking occurring on private property. In accordance with new Safeguard TT9, auxiliary construction light vehicle parking would not be permitted in Coachhouse Lane. As such, with private property access maintained, construction would not result in disruptions to parking for Coachhouse Lane residents.

The proposal would not require access to, or directly impact upon, private properties on Coachhouse Lane.

Transport will continue to engage with residents of Coachhouse Lane during construction of the proposal to ensure their concerns around construction impacts are addressed.

2.5.5 Environmental management

Submission number(s)

27, 28

Issue description

- There is a need for rigorous enforcement of environmental management measures during construction to avoid serious impacts to surrounding sensitive environments. How would safeguards and management measures would be implemented and how compliance by the construction contractor would be monitored.

Response

The REF included mitigation measures to minimise adverse environmental impacts of the proposal (refer to Section 7.2 of the REF and Section 6.2 of this submissions report). Should the proposal proceed, these safeguards and management measures would be incorporated into the detailed design and applied during the construction and operation of the proposal.

Transport agrees that it is extremely important for the proposed safeguards to be appropriately implemented to minimise impacts of the proposal, including to sensitive surrounding environments. A Construction Environmental Management Plan (CEMP) will be prepared to describe the safeguards and management measures identified (in accordance with Safeguard GEN1). The CEMP will provide a framework for establishing how these measures will be implemented and who would be responsible for their implementation.

The construction contractor would have an Environmental Manager, who will be responsible for making sure that the conditions as detailed in the REF are being successfully implemented. Transport would also maintain oversight of the works on site. In addition, the proposal requires an Environmental Protection Licence (EPL). As part of the EPL, the EPA would also maintain oversight of the works on site to ensure that any conditions as part of the EPL are complied with.

2.6 Consultation

2.6.1 Coachhouse Lane

Submission number(s)

7, 93, 94

Issue description

- Request for specific consultation with Transport and Coachhouse Lane residents about potential impacts they would experience during construction.

Response

Transport acknowledges the ongoing consultation with Coachhouse Lane residents that has occurred since the public display of the Great Western Highway Medlow Bath Upgrade strategic design in 2020. Transport has since held multiple consultation sessions with residents of Coachhouse Lane and will continue to consult with these residents during the construction phase of both the Medlow Bath Upgrade and this proposal.

In addition, feedback from these residents and the broader community is welcomed at all times. The project team are always able to be contacted via 1800 953 777 or ***gwhd@transport.nsw.gov.au***.

2.6.2 Consideration of community feedback

Submission number(s)

29, 51, 58, 78, 96, 97

Issue description

- Concern about whether community feedback would be considered by Transport and influence design development.
- Concern about the lack of visibility regarding submissions made to the Medlow Bath Upgrade and query about whether community input would be made public for this proposal.
- Concern that consultation process and format for providing feedback has been challenging and not conducive to contributing to the design outcome.
- Appreciation of Transport's efforts in engaging with the community and stakeholder groups during development of the proposal.

Response

- Transport values the community's feedback as an important part of the proposal development process. Some of the design changes outlined in Section 5 of this submissions report have been incorporated as a result of community, stakeholder or agency feedback. This includes the extension of the active transport trail in the Medlow Bath to Blackheath section. In addition, a number of safeguards (Section 6 of this report) have been added or strengthened to respond to community concerns.
- As mentioned in the community newsletter in March 2022, Transport will determine the Medlow Bath REF together with the East REF. This is in response to concerns raised by the community and Blue Mountains City Council.
- Transport is considering feedback to both the Medlow Bath REF and the East section REF. The submissions report for the Medlow Bath REF will be made public at the same time as this report.
- Transport notes the appreciation of their engagement with the community and stakeholder groups during development of the proposal.

2.6.3 Issues with consultation

Submission number(s)

2, 16, 36, 44, 45, 50, 54, 55, 56, 63, 67, 93, 94,102

Issue description

- Request to limit the involvement of the Medlow Bath Residents Association in the design process. Respondent found that action groups have made it difficult for consultation to occur.
- Concern that there was nobody available to discuss additional noise mitigation measures during consultation sessions. Issues accessing the hard copy REFs provided at Blue Mountains City Council.
- Concern about the lack of face-to-face sessions with the Medlow Bath community and consultation with the community in general
- Concern that it is unfair for the community to be required to read the REF and technical appendices in less than 4 weeks.

- It was not possible to download appendices from the project website, which made it difficult to read and analyse them.
- Concern that the community was assured that entry and exit from Foy Avenue would be enhanced (and not diminished) and that this is not the case under the proposal.

Response

- Transport appreciates that action groups have been very vocal during this consultation process and that this may have made it difficult for some members of the community to engage with us. Transport will continue to engage with the community during detailed design and construction of the proposal.
- Transport has subsequently held a one-on-one meeting with the property owner to address their queries surrounding additional noise mitigation that were unable to be addressed at one of the consultation sessions.
- The upgrades to the section of the Great Western Highway between Katoomba and Blackheath has been assessed in two separate REFs, being the REF for this proposal and the REF for the Great Western Highway Medlow Bath Upgrade.

  The Medlow Bath Upgrade REF was on public display for 41 days and the East REF on public display for 36 days.

  During the display of both REFs, the following actions were taken by Transport to help ensure that all stakeholders had opportunity to review the documentation and make a submission:

  - Provision of consultation sessions, with Transport staff guiding attendees to the appropriate section of the documents that addressed the topic raised.
  - Individual consultations were made available and encouraged.
  - Provision of access to hard copies of the REF for local community members.
  - Provision of a reply-paid submission form.

  During display of the Medlow Bath Upgrade REF, Transport extended the display period to enable the additional time to consider information and provided two additional online sessions as part of the extended display period. Unfortunately, due to Government COVID restrictions, face to face meetings were not permitted at that time.

  During display of the REF for this proposal, Transport held four virtual interactive information sessions via Microsoft Teams and two face-to-face interactive sessions in Katoomba and Blackheath in accessible venues to all residents between Katoomba and Blackheath.

  Transport commits to continuing to engage with the community and stakeholders as the proposal progresses through the detailed design phase and then through until completion of the proposal (Safeguard SE2). This would include the ongoing provision of a 24-hour toll free proposal information and complaints line and encouragement of individual consultations with members of the community. These activities would be carried out as part of the Communication Plan (in accordance with SE1).

- The REF for this proposal was on public display for a total of 36 days. The REF and technical appendices, as well as a series of fact sheets about the proposal, were made available to the community via the REF Web Portal and local drop-in centres. Community members were able to take advantage of a reply-paid submission form to make their submission to the REF.

  Transport held four virtual interactive information sessions via Microsoft Teams and two face-to-face interactive sessions in Katoomba and Blackheath in accessible venues. During these sessions, Transport staff guided attendees to the appropriate section of the documents that addressed the topic raised. Individual consultation sessions were made available and encouraged by the Transport proposal team.

  During the REF display period, Transport did not receive a request from any community members to extend the duration of consultation, or an extension for their individual submission. The REF Web Portal

provides the functionality for users to save a copy of the REF and technical appendices to their own computer.

- Based on feedback received from Foy Avenue residents, Transport undertook an options assessment to look at options for a right turn out from Foy Avenue. However, due to safety concerns including sight lines and heavy vehicles on the highway, the right turn out was not feasible. Instead, Transport has provided for a U turn facility in Bellevue Crescent to turn back onto the highway to travel to Katoomba. The intersection of Bellevue Crescent and the Great Western Highway is a signalised intersection providing a greater level of safety for turning vehicles.

2.6.4 Request for further updates/consultation

Submission number(s)

65, 93, 94

Issue description

- Request for consultation and opportunity to submit feedback in response to the detailed design.

Response

The community would continue to be updated about the progress of detailed design and construction and be provided notification of any lane or road closures to facilitate staging and night works or general high impact construction activities in advance of the works occurring.

Community engagement through the construction phase for the overall proposal would be undertaken by Transport. Activities or notifications that could occur include:

- advanced/start of work notifications
- traffic management notifications, including any lane closures, parking or bus stop changes
- night-time work notifications and consultation
- quarterly project updates
- responding to enquiries and complaints
- end of construction
- tree removal
- ongoing construction communications.

Other activities include (but are not limited to) separate engagement with local residents, businesses and stakeholders on specific or sensitive aspects of the overall proposal. Feedback from the community is welcomed at all times. The project team are always able to be contacted via 1800 953 777 or ***gwhd@transport.nsw.gov.au***.

2.7 Cumulative impacts

2.7.1 Assessment methodology

Submission number(s)

16, 45, 93, 94

Issue description

- Concern that the cross-over or intersection between the Medlow Bath REF and the East REF was not addressed in the REF.
- Concern about adequacy of assessment of cumulative impacts.

Response

While the REF focuses on the potential environmental impacts of this proposal, it is important that these potential impacts are considered in their wider contextual surroundings. Cumulative impacts are those that may not be considered significant on their own but that may be more significant when considered in association with other impacts.

In accordance with Section 171(2)(o) of the EP&A Regulation 2021, any cumulative environmental effects of the proposal with other existing and likely future activities must be taken into account in assessing the potential environmental impacts of the proposal. As part of this proposal's REF, a cumulative impact assessment was undertaken that considered the cumulative impacts of the proposal as well as the Medlow Bath Upgrade and the Little Hartley to Lithgow Upgrade. Though it is not a requirement for a Division 5.1 proposal, the newly released cumulative impact assessment guideline for SSI (DPIE) were used as a guide. Refer to Section 6.11 of the REF. As part of this, the REF considered to the full extent possible issues arising across all the projects. This assessment found that the impact of the proposal, when considered cumulatively with the other projects, would not increase to the extent that would change a non-significant impact to a significant impact.

Potential cumulative impacts associated with the proposal and the other projects identified in Section 6.11.3 are detailed in Section 6.11.4 of the REF. As noted in Section 6.11.3 of the REF, the Great Western Highway Medlow Bath Upgrade was one of the relevant future projects identified and considered when assessing cumulative impacts of this proposal. These potential impacts would be minimised through the safeguards outlined in Section 6.2 of this submissions report.

2.7.2 Construction impacts

Submission number(s)

67

Issue description

- Concern about cumulative noise impacts from the Medlow Bath Upgrade and this proposal during construction for receivers on Delmonte Avenue.

Response

Transport notes the concern of the respondent about cumulative noise impacts during construction for receivers on Delmonte Avenue.

The construction noise assessment carried out for this proposal (refer to Section 6.6 and Appendix H of the REF) and the Medlow Bath Upgrade identify the predicted construction noise impacts of each project for receivers in Medlow Bath. Construction staging would mean that peak construction work from both projects would not be occurring simultaneously. The maximum construction noise impacts expected at any one time would be as identified in the aforementioned construction noise assessments.

As a result, there would be minimal cumulative increase in construction noise levels for sensitive receivers near Delmonte Avenue, Medlow Bath, near the tie-in of the proposal with the Medlow Bath Upgrade. However, there may be some sensitive receivers in these areas who may also experience noise impacts

over a longer duration due to the projects. The impacts would not be for the full construction period of the proposal and the Medlow Bath Upgrade as the work would be progressive in areas. In addition, during detailed design, opportunities to shorten the overall duration of construction of both projects near Delmonte Avenue, Medlow Bath would be considered to minimise the cumulative duration of construction near these receivers.

Transport would work with eligible receivers to provide appropriate mitigation, including respite periods where feasible. In addition, where a parcel of land would be impacted by multiple projects within the Great Western Highway Upgrade Program, noise treatment options would be considered for the greater of the predicted noise impacts (Safeguard NV9).

Cumulative noise impacts to these receivers would be minimised through co-ordination of out of hours work across this proposal and the Great Western Highway Upgrade – Medlow Bath in Medlow Bath to minimise out of hours work periods and minimise ongoing out of hours work noise to sensitive receivers (Safeguard C3). Where required, respite periods would be provided to sensitive receivers. In addition, properties that would be eligible for at-property noise mitigation treatments, would be treated as early as feasible in the construction program in consultation with eligible property owners (Safeguard NV10).

2.7.3 Operational impacts

Submission number(s)

8, 31, 62, 65, 67

Issue description

- Concern that cumulatively the East and Medlow Bath upgrades may result in the loss of business for the Hydro Majestic Hotel and that the heritage buildings may fall into disrepair.
- Concern about cumulative visual impacts of the proposal, including the variable messaging signs.
- Concern about additional traffic in Medlow Bath due to the proposed left turn out only from Foy Avenue.
- Concern about cumulative noise impacts from the Medlow Bath Upgrade and this proposal during operation for receivers on Delmonte Avenue.

Response

- With construction of this proposal and the Medlow Bath Upgrade spanning from 2023 to 2027, Transport notes that there may be some construction fatigue experienced by the local community and stakeholders. Transport also appreciates the concern of the respondents on the impact of the upgrades on the Hydro Majestic. It is not expected that the proposal and the Medlow Bath Upgrade would lead to the Hydro Majestic falling into disrepair due to increased demand from the construction workforce and enhanced opportunities for tourism expected during operation.

  During construction activities, it is expected that the increased workforce demand would increase demand for mid-week accommodation and provide additional customers to local businesses. Transport is also committed to working with local businesses during construction to ease the potential economic impacts on the area. This includes limiting work on weekends where possible and developing staging plans that maximise construction work during standard working hours. Access to businesses within Medlow Bath would be maintained during construction.

  During operation, the Great Western Highway Upgrade Program would improve connection to social infrastructure and provide new active transport opportunities along the Great Western Highway. There would be long term positive impacts on access and connectivity for local and regional communities, business and industry. By improving transport connections to the Blue Mountains area, these projects

would support and enhance existing tourism as well as create new economic development opportunities (supporting Transport's Tourism and Transport Plan).

The Medlow Bath Upgrade would provide better east/west connectivity for residents, visitors and recreation users on the upgraded road corridor and proposed shared user path. This would enhance the tourism appeal of the town of Medlow Bath and broader Blue Mountains area. The Little Hartley to Lithgow Upgrade would also improve the movement of vehicles along the Great Western Highway and includes provision for the future development of shared paths near that project. These features would also provide safety and wellbeing benefits to residents and visitors, who would be more easily able to access recreational sites in the region.

- Transport notes that there would be a change in landscape character between Katoomba and Lithgow due to the entire Great Western Highway Upgrade Program. The removal of vegetation and widening of the Great Western Highway road corridor from one to two lanes in each direction would lead to cumulative operational visual impacts. This would be most noticeable for motorists travelling the length of the upgraded highway. However, the Great Western Highway Upgrade Program has applied a consistent urban design framework across all projects. The design of the Medlow Bath Upgrade is an integrated design that fits with the existing visual qualities, ecology and character of Medlow Bath and the Blue Mountains. This proposal has also considered the urban design and visual impacts on the township of Medlow Bath.

  Variable Message Signs (VMS) would form part of the proposal's resilience and safety improvements along the Great Western Highway. They would allow real-time incident warnings, advance warning for overheight vehicles and general road information to be provided to motorists. This would facilitate emergency response to issues and improve resilience of the entire Great Western Highway corridor. This has included the positioning of Variable Message Signs (VMS) at least 400 metres from the entrances to the Medlow Bath village. Two VMS are proposed (one on the eastbound carriageway and one on the westbound carriageway) installed in the Katoomba to Medlow Bath section, about 500 metres east of the Great Western Highway / Foy Avenue intersection. There would also be two VMS installed in the Medlow Bath to Blackheath section. The westbound sign would be about 400 metres west of Coachhouse Lane, Medlow Bath and the eastbound sign would be about 700 metres west of Coachhouse Lane, Medlow Bath. Medlow Bath residents who travel regularly to Katoomba or Blackheath would also be exposed to the visual changes to the environment from the proposal, the Medlow Bath West Sectioning Hut project and the Medlow Bath Upgrade. These future projects would have localised visual impacts in the township.

  The application of the consistent urban design strategy across the entire Great Western Highway Upgrade Program would minimise the potential for inconsistent landscape character impacts along the upgraded road corridor between Katoomba and Lithgow.

- The traffic and transport assessment carried out for the REF has considered traffic impacts to the local road network. Transport notes that there are low numbers of total existing vehicle movements (all possible movement directions) at the Great Western Highway / Foy Avenue intersection. During the existing peak hours in the weekday, there are two to three vehicles per hour that either turn in or turn out of Foy Avenue into the Great Western Highway. This compares to 1356 vehicles in the AM peak and 1617 vehicles in the PM peak that pass through in an hour along the Great Western Highway. As such, with the left out only from Foy Avenue would have a negligible impact on traffic volumes, with only an additional one to two vehicles an hour from Foy Avenue anticipated to use the Delmonte Avenue U-turn facility.

- Transport appreciates the concern of the respondent about operational cumulative noise impacts of the proposal and the Medlow Bath Upgrade.

As noted in Section 6.11.4 of the REF, some receivers along Delmonte Avenue, Medlow Bath would experience cumulative operational noise impacts during operation of this proposal and the Medlow Bath Upgrade. The noise and vibration assessment carried out for this proposal considered the potential for cumulative noise impacts of both this proposal and the Medlow Bath Upgrade. It identified two sensitive receivers on Delmonte Avenue as being eligible for at-property treatment which were also identified as part of the Medlow Bath Upgrade. These cumulative noise impacts would be considered when determining noise mitigations for individual receivers (in accordance with Safeguard NV9). Transport would also make sure that potential noise impacts are treated consistently across all projects within the Great Western Highway Upgrade Program.

2.8 Environmental assessment process

2.8.1 Assessment methodology

Submission number(s)

9, 10, 11, 48, 66

Issue description

The REF does not adequately assess the impacts of the proposal on multiple environmental disciplines (including water quality, national park, biodiversity, noise, landscape character and visual impacts, Blue Mountains World Heritage Area). Call for a thorough assessment of environmental impacts.

Response

Transport has undertaken a Review of Environmental Factors (REF) under the EP&A Act 1979 Division 5.1 and examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity. Consideration of all environmental impacts found, that while there would be environmental impacts, it was unlikely to cause a significant impact on the environment. Further details on the environmental assessment of the proposal, refer to Chapter 6 of the REF.

The statutory planning pathway for the proposal was established in accordance with the *Environmental Planning and Assessment Act 1979* (EP&A Act) and the State Environmental Planning Policy (Transport and Infrastructure) 2021 (T&ISEPP). Section 2.109 of the T&ISEPP permits development on any land for the purpose of a road or road infrastructure facilities to be carried out by or on behalf of a public authority without consent. As the Proposal is for a road upgrade and duplication and is to be carried out by Transport for NSW, it can be assessed under Division 5.1 of the EP&A Act.

The REF has assessed the environmental issues around water quality, national park, biodiversity, noise, landscape character and visual impacts and the Blue Mountains World Heritage Area. Consideration of all environmental impacts found that it was unlikely to cause a significant impact on the environment and therefore it was not necessary for an EIS to be prepared and for approval to be sought from the Minister under Division 5.2 of the EP&A Act.

2.8.2 Choice of project limits

Submission number(s)

16, 45

Issue description

- Concern that information was not provided about the Medlow Bath Upgrade in this REF.
- Concern about differences in study area boundaries for each environmental discipline and that Medlow Bath was not included in this REF.

Response

The proposal is only one part of the overall Great Western Highway Upgrade Program of works. Further upgrades have been proposed based upon available funding, project location, construction type and staging. these projects have therefore sought their own approvals, including the Medlow Bath Upgrade and Little Hartley to Lithgow Upgrade projects.

However, as part of the REF for this proposal, a cumulative impact assessment was undertaken that considered the cumulative impacts of the proposal as well as Medlow Bath Upgrade and the Little Hartley to Lithgow Upgrade. Though it is not a requirement for a Division 5.1 proposal, the newly released cumulative impact assessment guideline for SSI (DPIE) were used as a guide. Refer to Section 6.11 of the REF. This assessment found that the impact of the proposal, when considered cumulatively with the other projects, including the Medlow Bath Upgrade, would not increase to the extent that would change a non-significant impact to a significant impact.

2.8.3 Detailed design

Submission number(s)

93, 94

Issue description

- Request for clarity about the meaning of 'detailed design'.

Response

The proposal is currently at the concept design phase, which broadly agrees the principles of the design and its alignment and footprint. Should the proposal be approved, detailed design would commence. This would produce a design that has enough information for a contractor to construct the proposal. Detailed design would not result in a change in upgrade option or alignment. If a design refinement to the proposal during detailed design is determined to not be consistent with the environmental assessment carried out in the REF and submissions report, Transport would be required to carry out additional environmental assessment.

2.8.4 Environmental Impact Statement

Submission number(s)

1, 28, 31, 33, 35, 37, 38, 40 ,45, 46, 47, 49, 50, 51, 52, 53, 54, 55, 56, 58, 59, 61, 62, 63, 64, 65, 93, 94, 97, 99, 100, 101

Issue description

Multiple submissions asked that an EIS is required for the entire Great Western Highway Upgrade Program.

Response

Transport has undertaken a Review of Environmental Factors (REF) under the EP&A Act 1979 Division 5.1 and examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity.

The statutory planning pathway for the proposal was established in accordance with the EP&A Act and the State Environmental Planning Policy (Transport and Infrastructure) 2021 (T&ISEPP). Section 2.109 of the T&ISEPP permits development on any land for the purpose of a road or road infrastructure facilities to be carried out by or on behalf of a public authority without consent. As the Proposal is for a road upgrade and duplication and is to be carried out by Transport for NSW, it can be assessed under Division 5.1 of the EP&A Act.

It was found that the proposal was unlikely to cause a significant impact on the environment. As such, it was not necessary for an EIS to be prepared and approval sought from the Minister under Division 5.2 of the EP&A Act. Further consideration of community feedback on biodiversity impacts, refer to section 2.3 of this report.

Additionally, the proposal was not likely to have an impact on matters of national environmental significance or the environment of Commonwealth land within the meaning of the *Environment Protection and Biodiversity Conservation Act 1999*. A referral to the Australian Government Department of Agriculture, Water and Environment (now the Department of Climate Change, Energy, the Environment and Water) was not required.

The Proposal is only one part of the overall Great Western Highway Upgrade Program of works. Further upgrades have been proposed based upon available funding, project location, construction type and staging.

Other upgrades including the Medlow Bath Upgrade and Little Hartley to Lithgow Upgrade projects have also been subject to assessment in accordance with the EP&A Act, with the appropriate statutory planning pathway selected as per each project's potential significance of impacts.

As part of the REF for this proposal, a cumulative impact assessment was undertaken that considered the cumulative impacts of the Proposal as well as Medlow Bath Upgrade and the Little Hartley to Lithgow Upgrade . Though it is not a requirement for a Division 5.1 proposal, the newly released cumulative impact assessment guideline for SSI (DPIE) were used as a guide. Refer to Section 6.11 of the REF. This assessment found that the impact of the proposal, when considered cumulatively with the other projects, would not increase to the extent that would change a non-significant impact to a significant impact.

The NSW Assessment Bilateral Agreement is relevant for major projects that require both NSW and Australian Government environmental approvals. The proposal, Medlow Bath Upgrade and the Little Hartley to Lithgow Upgrade either separately or together would not result in an impact on any matters of National Environmental Significance or the environment of Commonwealth land. As such, approval is not required for the projects by the Australian Government. A business case has been prepared for the full

Great Western Highway Upgrade Program and is under consideration by government. The proposal's and Little Hartley to Lithgow Upgrade's business cases have been accepted by Infrastructure NSW (INSW). Given the level of information within, the business case will maintain its confidentiality to help drive value-creating competition from a wide range of participants during procurement processes and support a value-for-money outcome.

All Transport business cases are developed in alignment with the Transport for NSW Business Case Guide (Transport for NSW, 2021), which supplements the general principles of existing NSW Government business case guidance to ensure due consideration is given to sufficiently assess a project's viability. This is independently assured by INSW.

2.9 Great Western Highway Upgrade Program

2.9.1 Objection to the Great Western Highway Upgrade Program

Submission number(s)

60

Issue description

- Opposition to the Great Western Highway upgrade program because it will result in increased traffic congestion, unsafe higher traffic speeds, noise, vibration, exhaust pollution, visual pollution, environmental impacts and significant impacts to cultural and historic lands and Medlow Bath.

Response

Transport notes the respondent's submission. The Great Western Highway Upgrade program seeks to upgrade the highway between Katoomba and Lithgow to two lanes either direction to improve capacity and road safety of the highway. The Great Western Highway East - Katoomba to Blackheath REF provides details on the potential impacts of the proposal including traffic and access, noise and vibration, biodiversity and heritage impacts. The proposal would result in more efficient travel and reduced congestion, which should result in reduced vehicle emissions, even with an increase in traffic volumes The REF also provides a range of safeguards that would be implemented as part of the proposal to mitigate or manage impacts.

2.9.2 Support need for the Great Western Highway Upgrade Program

Submission number(s)

13, 22, 30, 34, 42, 45, 63, 64

Issue description

- Support need for an upgrade. Acknowledgement of environmental and engineering constraints faced by the Great Western Highway Upgrade Program. There is a need for two lanes in each direction between Katoomba and Lithgow.
- Support for two lanes from Katoomba to Mount Victoria.
- There is a need for two lanes in each direction through Medlow Bath.

Response

The Great Western Highway Upgrade Program would upgrade the Great Western Highway between Katoomba and Lithgow to be two lanes in each direction. The support for the Great Western Highway Upgrade Program is noted.

2.9.3 Traffic and transport

Submission number(s)

34, 50, 51, 58, 67

Issue description

- Concern about cumulative impacts of the Great Western Highway Upgrade Program due to different speed limits along the highway. Concern that the existing speed limits would mean that there are minimal benefits of the Great Western Highway Upgrade Program.
- The Great Western Highway Upgrade Program would not ease traffic congestion because of the changes in speed limits between Katoomba and Blackheath and because the Great Western Highway Blackheath to Little Hartley (Blackheath to Little Hartley Upgrade) tunnel may never be built.
- The traffic modelling has assumed that the upgraded highway would continue to a four lane separated road at each end, which is not the case.
- Concern that the proposal would not address the existing congestion issues during peak holiday periods.

Response

The NSW Government and the Australian Government are committed to delivering the Great Western Highway Upgrade Program between Katoomba and Lithgow.

Transport acknowledges that there are different speed limits across the highway due to there being different precincts that the highway passes through. While this will provide some slowing down on approach to Medlow Bath, this is necessary for the safety of all road users in Medlow Bath. However, this would not result in delays in traffic flow.

With the proposal in place, the current congested situation of the highway, particularly on weekends would ease as the traffic would now have two lanes to be able to travel on, rather than the one lane currently. Traffic would also travel at more consistent speeds due to improvements in road alignment. As such the proposal and other upgrades would see improvement in the traffic flow across the program area. Further details on the traffic and transport impacts of the proposal are provided in Section 6.7.4 of the REF and Section 4.1 of the Traffic and Transport Assessment (Appendix J to the REF).

2.9.4 Project commitment

Submission number(s)

67

Issue description

- Query about whether allocated funding is available for this proposal. If this proposal doesn't proceed, the Medlow Bath Upgrade will create a bottleneck.

Response

The NSW Government and the Australian Government are committed to delivering the Great Western Highway Upgrade Program between Katoomba and Lithgow. This proposal and the Medlow Bath Upgrade are both funded for construction under the joint NSW Government and Australian Government announced funding for the Great Western Highway Upgrade Program.

In the Transport infrastructure Pipeline 2027 document released by Transport for NSW, the Great Western Highway East proposal is identified as a 'confirmed' project with construction procurement, detailed design and construction programmed to be completed in 2027.

2.10 Landscape character and visual impacts

2.10.1 Operational impacts

Submission number(s)

1, 16, 27, 29, 30, 31, 32, 34, 38, 40, 41, 45, 51, 58, 60, 63, 65, 67, 85, 93, 94

Issue description

- Concern about clarity of messaging in REF regarding proposed safety measures.
- Concern about height and visual impacts of the twin bridges. Concern about visual impact of the elevated nature along Pulpit Hill to Medlow Bath and elevated road alignment when viewed from Explorers Road, Pulpit Hill Road and Ngula Bulgarabang Regional Park.
- Concern that the visual impact assessment has not assessed the impacts of the twin bridges from Hargraves lookout, Kanangra Walls, the Megalong Valley and the Jenolan Caves Road and impacts of the Pulpit Hill cutting from Wynne's Rock at Mt Wilson and Mount Banks when viewed from a distance.
- Concern about impacts of the proposal on the natural beauty of the Blue Mountains.
- Concern about operational light pollution along the highway including for receivers on Delmonte Avenue.
- Opposed to proposed concrete walls.
- Query about difference in magnitude ratings for LCZ1 and LCZ2.
- Request for noise barriers to be included on either side of the highway to reduce the highway's visual impacts.
- Concern about the visual impacts of the proposal, including variable messaging signs.
- Concern that the visual impact assessment for Viewpoint 7 in the LCVIA is limited, and information is not provided about how visual impacts would be mitigated.

Response

- Transport appreciates the concern felt by members of the community relating to visual impacts of the proposed safety measures, including Variable Message Signs (VMS). Detail on the locations of the VMS and their visual impacts were not included in the REF.

  Two VMS are proposed (one on the eastbound carriageway and one on the westbound carriageway) installed in the Katoomba to Medlow Bath section, about 500 metres east of the Great Western Highway / Foy Avenue intersection. In the same manner, there would also be two VMS installed in the Medlow Bath to Blackheath section. The westbound sign would be about 400 metres west of Coachhouse Lane, Medlow Bath and the eastbound sign would be about 700 metres west of Coachhouse Lane, Medlow Bath.

Each VMS would span 8.5 metres across the carriageway and would stand around six metres above the road surface, the sign area would be about 2.5 metres tall. They would be similar to other VMS used across main roads and highways including the existing Great Western Highway (refer to Figure 2-1).

The VMS are not expected to be directly visible from residential receivers in Medlow Bath and would only be visible by the travelling public.

These signs would form part of the proposal's resilience and safety improvements along the Great Western Highway. They would allow real-time incident warnings, advance warning for overheight vehicles and general road information to be provided to motorists. This would facilitate emergency response to key issues and improve resilience of the entire Great Western Highway corridor.

Figure 2-1 Artistic impression of VMS about 500 metres east of the Great Western Highway / Foy Avenue intersection

- Transport acknowledges the community's concern about the visual impacts of the twin bridges. Details of the twin bridges are included in section 3.2.3 of the REF. The bridge structures are necessary due to the existing topography of this location. A land-based solution in this location would not achieve the required road safety outcomes required for the proposal. Images showing the height of the bridge structure in relation to the existing highway and the active transport trail is shown in Appendix G of the REF.

  Aspects of the proposal such as the twin bridges may be partially visible from some north facing receivers on Explorers Road. For some Explorers Road and Pulpit Hill residences, Pulpit Hill and intervening vegetation between the receiver and the highway would obstruct views to the twin bridges. The Kangara Walls area, the Jenolan Caves Road, Mount Wilson and Mount Banks are all a substantial distance from the proposal. It is anticipated that the proposal would not be visible from these locations.

  A viewshed assessment of the view from Hargraves Lookout has been carried out. This identified that the twin bridges would be visible in the distance below the ridgeline from this lookout. Transport also notes that the existing Great Western Highway is already visible from this location, towards Medlow Bath. The twin bridges are also expected to be visible from a distance from the Megalong Valley. However in both of these locations, this would form a small proportion of the overall visual catchment

and would have a negligible increase in assessed visual impact.

During detailed design, the bridge design and the design of peripheral elements would be refined to reduce its visual impact (Safeguard V3).

- Landscape character and visual impacts are addressed in Section 6.5 and Appendix G of the REF. Transport acknowledges that respondents' concerns about the visual impacts of the proposal. An addendum landscape character and visual impact assessment was undertaken (refer to Section 5.5 of this report) for changes to the proposal. During operation, there is potential for visual impacts ranging from low to high along the length of the proposal (refer to Table 6-27 in Section 6.5.3 of the REF). This would include light spill predominantly from vehicle headlights for residential receivers near the proposal, including on Foy Avenue, Delmonte Avenue, Coachhouse Lane and Station Street. The duplication of the highway along its existing alignment reduces the impact of light spill from additional receivers not already in proximity to the highway.

  These impacts would be minimised during detailed design through design refinement and during construction through implementation of mitigation measures. An Urban Design Plan would be prepared as part of the CEMP and present an integrated urban design for the project, providing practical detail on the application of design principles and objectives identified in the environmental assessment (Safeguard V1).

  Safeguards V2 to V6 outline requirements which would be considered during detailed design to minimise visual impacts of the proposal, including exposed design features, the twin bridges and other structures such as retaining walls, active transport trails and landscape design. Safeguard V6 has been amended to require consideration of screening for potential light spill from the proposal when operational.

- Transport notes the respondent's opposition to the proposed concrete walls. These impacts would be minimised during detailed design through design refinement and during construction through implementation of mitigation measures. An Urban Design Plan would be prepared and present an integrated urban design for the project, providing practical detail on the application of design principles and objectives identified in the environmental assessment (Safeguard V1).

  Safeguard V5 would be implemented during detailed design to design retaining walls so that the finishes are of a high standard and quality that is keeping with the Great Western Highway character. Further details on proposed retaining walls types are detailed in Table 3-2 of the Landscape Character and Visual Impact Assessment (Appendix G of the REF).

  Landscape character zones (LCZ) 1 and 2 are two distinct sections within the Katoomba to Medlow Bath section of the proposal, which are shown on Figure 6-5 of the REF. The boundaries of these areas have been determined as having the same landscape character. The operational landscape character impacts of the proposal have been assessed for each LCZ. While both LCZ would experience an increase in the amount of road-related infrastructure, clearing of mature bushland and changes to the natural landform, the magnitude of impacts in LCZ1 are expected to be 'high' and magnitude of impacts in LCZ2 are expected to be 'moderate'. This is because the magnitude of removal of bushland offline from the highway would be greater in LCZ1 than LCZ2. Further details on the magnitude of impacts in these sections are outlined in Section 4.2 of Appendix G to the REF.

- The noise assessment considered the range of noise mitigation options for those receivers that exceed the NCG noise criteria. Of the possible options, low noise pavement would need further assessment during detailed design to consider the impacts of ice and snow in the area. Low noise pavement benefits are not normally achieved in speed zones of 80 kilometres per hour or less and as such the effectiveness may be minimal.. Noise barriers were not considered as they are not in character for the

Great Western Highway urban design framework and would not be consistent with the urban design objectives outlined in Section 2.3.3 of the REF.

Transport are progressing at-house treatments as the preferred approach for noise mitigation along the Great Western Highway through the Blue Mountains.

The heritage status of any receiver building would be considered during the selection of appropriate at-property noise treatments. Transport would discuss possible treatment options with the property owners of these buildings. Transport understands the community member's concern about impact of the design to receivers near viewpoint seven. The proposal would increase the road barrier height and investigate installing pencil pines along the rail corridor frontage on the western side of the Great Western Highway past the Railway Parade bridge (see amended Safeguard V1). This would block headlight glare from vehicles travelling west from Medlow Bath to Blackheath for receivers at viewpoint seven.

2.10.2 Safeguards and management measures

Submission number(s)

27, 60

Issue description

- Concern about visual impacts of the proposal and request for these impacts to be minimised, including through careful consideration of tree removal and implementation of appropriate tree removal policies.
- Request for visual impact safeguards to be implemented, including the use of natural construction materials and bushland-muted tones and measures to avoid highway light spill.

Response

- Transport understands the respondent's concerns about the visual impacts of vegetation removal due to the proposal. In accordance with Safeguard B2, measures to further avoid and minimise the construction footprint and native vegetation or habitat removal and the need to clear vegetation would be investigated during detailed design and implemented where practicable and feasible. Vegetation removal would occur in accordance with Transport's vegetation clearance protocol, which would avoid the inadvertent removal of any additional trees and full-time supervision of clearing work by an independent contractor environmental officer (refer to Safeguard B1).

  In addition, Transport would also develop an Urban Design Plan (safeguard V1) that would consider areas for protecting existing vegetation as well as areas for revegetation. In conjunction with this, Transport is undertaking a seed collection exercise (safeguard B5) particularly for any threatened or native species to assist in the establishment of planted vegetation.

- Landscape character and visual impacts are addressed in Section 6.5 and Appendix G of the REF. An addendum landscape character and visual impact assessment was undertaken (refer to Section 5.5 of this report) for changes to the proposal. Transport acknowledges that respondents' concerns about the visual impacts of the proposal. During operation, there is potential for visual impacts ranging from low to high along the length of the proposal (refer to Table 6-27 in Section 6.5.3 of the REF). This would include light spill for residential receivers near the proposal, including on Foy Avenue, Delmonte Avenue, Coachhouse Lane and Station Street.

  These impacts would be minimised during detailed design through design refinement and during construction through implementation of mitigation measures. An Urban Design Plan would be prepared

as part of the CEMP and present an integrated urban design for the project, providing practical detail on the application of design principles and objectives identified in the environmental assessment (Safeguard V1).

Safeguards V2 to V6 outline requirements which would be considered during detailed design to minimise visual impacts of the proposal, including exposed design features, the twin bridges and other structures such as retaining walls, active transport trails and landscape design. Safeguard V6 has been amended to require consideration of screening for potential light spill from the proposal when operational.

Transport notes the respondent's opposition to the proposed concrete walls. In accordance with Safeguard V2, during detailed design, the proposed design would be refined. This would include consideration of the cut and fill batter and final treatment of exposed rock face cuttings. This safeguard has been amended to consider opportunities for natural construction materials and bushland-muted tones during detailed design to reduce visual impacts of the proposal.

The layout of ancillary facility sites would be designed to limit visual impacts, including screening of boundaries facing sensitive receivers or views and careful placement of structures and buildings to maintain viewpoints or provide additional screening of site activities (Safeguard V7).

2.11 Non-Aboriginal heritage

2.11.1 Existing environment

Submission number(s)

16

Issue description

- Correction of existing environmental information provided in the Statement of Heritage Impact (SOHI). Comment about rarity of interior layout of the Gatekeeper's Cottage.

Response

Transport thanks the respondent for their submission and for providing additional information about the Gatekeeper's Cottage heritage item, including the rarity of the interior layout.

The heritage status of any receiver building would be considered during the selection of appropriate at-property noise treatments, where eligible (refer to Section 6.6.4 of the REF). Transport would discuss possible treatment options with the property owners of these buildings. Transport has commenced discussions with property owners about the provision of at-property treatment for affected residential receivers. These treatments would be installed as early as feasible in the construction program in consultation with the property owner (Safeguard NV10).

2.11.2 Operational impacts

Submission number(s)

31, 63

Issue description

- Concern about the impacts to Pulpit Hill due to the proposed road design and cutting.
- Query about how the heritage significance of Explorer's Tree / Pulpit Hill has been considered in the design.

Response

- As noted in Section 6.4.3 of the REF, during construction, the proposal would have direct physical impacts to the eastern curtilage of this item but would not impact on some components of the Pulpit Hill and Environs heritage item. Regardless, it would have high partial physical impacts to the heritage item and overall would result in cumulative impacts to the greater Pulpit Hill environs. However, the Statement of Heritage Impact also noted that the measures proposed to be implemented including the Great Western Highway Upgrade Program cultural interpretation strategy could conserve or enhance the significance of the item.

  Transport commits to carrying out further study in partnership with heritage groups prior to construction to develop a heritage interpretation strategy around Pulpit Hill.

  Near Pulpit Hill, in accordance with Safeguard NA6, the following measures would be undertaken to minimise or manage impacts:

  - preparing a Conservation Management Plan (CMP) for Pulpit Hill and Environs to manage the heritage significance of the site and provide for ongoing management
  - further refining the proposal's design during detailed design to minimise adverse heritage impact on the Pulpit Hill and Environs curtilage (including Stone Arrangements site) and interpret the heritage significance of this site, including the role the Explorers Tree played as a waypoint
  - carrying out further investigations if it is not possible to completely avoid the Stone Arrangements, including an Historical Archaeology Assessment, an Archaeological Research Design (ARD) for archaeological work, an archaeological test excavation targeting a portion of the Stone Arrangements, a soil analysis of excavated soil to confirm the presence of graves and further remote sensing studies to verify previous study results
  - carrying out an archaeological test excavation to confirm whether a permit under Section 140 of the *Heritage Act 1977* would be required for the proposal.

  These further investigations would allow the proposal to contribute to the knowledge base of the history of Pulpit Hill.

  In addition, a heritage interpretation strategy for the Pulpit Hill area would be developed as part of the cultural interpretation strategy (for both Aboriginal and non-Aboriginal heritage) for the Great Western Highway Upgrade Program – Katoomba to Lithgow to reinterpret the existing heritage interpretation area and communicate the heritage significance of the Pulpit Hill area. The existing Blue Mountains City Council heritage interpretation area would be retained and be further developed to display the Aboriginal and non-Aboriginal heritage of the area (refer to Section 3.2.3 of the REF).

- The existing Blue Mountains City Council heritage interpretation area on Nellies Glen Road would be retained and be further developed as part of the proposal to display the Aboriginal and non-Aboriginal

heritage of the area (refer to Section 3.2.3 of the REF).

A heritage interpretation strategy would be developed as part of the cultural interpretation strategy (for both Aboriginal and non-Aboriginal heritage) for the Great Western Highway Upgrade Program – Katoomba to Lithgow. As part of this strategy, the interpretation of the Pulpit Hill area including all heritage areas associated with the place (including the Explorers Tree and grave site) (safeguard NA6) would be further developed in consultation with stakeholders.

2.12 Out of scope

2.12.1 Great Western Highway Medlow Bath Upgrade

Submission number(s)

5, 18, 21, 23, 28, 29, 31, 33, 35, 36, 37, 39, 41, 45, 46, 47, 49, 51, 52, 53 ,54, 55, 56, 58, 61, 62, 63, 64, 65, 67, 78, 84, 93, 94, 95, 96, 98, 99, 100

Issue description

- Multiple submissions were received that were concerned about the Medlow Bath Upgrade and its perceived impacts.

Response

The Medlow Bath Upgrade has been assessed as a separate project (the Great Western Highway Upgrade Medlow Bath REF). That REF assessed the environmental impacts of the project. The REF was placed on public display between 27 July 2021 to 24 August 2021 and feedback sought from the community. Refer to that REF for consideration of impacts of the project.

Transport has considered the feedback from the community to that project and responses have been provided in the Great Western Highway Upgrade Medlow Bath Submissions Report. Refer to that document for consideration of feedback on the Medlow Bath Upgrade.

An additional 3D model has been generated to show how the Great Western Highway Upgrade East connects to the Medlow Bath Upgrade. This is now available on the Medlow Bath Upgrade website: ***https://caportal.com.au/rms/medlow-bath***.

2.12.2 Great Western Highway Blackheath to Little Hartley

Submission number(s)

20, 86, 87, 88

Issue description

- Concern about impacts of the Blackheath to Little Hartley Upgrade tunnel, including on local water streams and groundwater and tourism. Opposition to the tunnel. Suggestion for consideration of alternatives such as rail upgrades.
- Opposed to the Blackheath to Little Hartley Upgrade tunnel.
- Concern about discrepancy of information in the Blackheath to Little Hartley Upgrade web portal.
- Concern about light impacts from the Blackheath to Little Hartley Upgrade tunnel.

Response

The historical development of the Great Western Highway between Katoomba and Blackheath has long focussed on surface widening. This is because there is no feasible alternate route that can bypass Medlow Bath without impacting the village, national park or Megalong escarpment. This is reflected in the Local Environmental Plan (LEP) reservations and corridor planning regimes dating back to the 1950's.

The Great Western Highway Upgrade Program proposes to deliver 34 kilometres of four lane divided highway between Katoomba and Lithgow. The NSW Government has committed $2.5 billion in funding towards the planning and construction of the duplication.

In November 2019, the strategic corridor for the proposed upgrade between Katoomba and Lithgow was put to the community and stakeholders for feedback. This included the previously reserved corridor from Mount Victoria to Lithgow and included the corridor between Katoomba and Mount Victoria. At this time the NSW Government also committed to examining the feasibility of providing tunnels under Blackheath and Mount Victoria.

The Australian Government has committed more than $2 billion in funding towards the East and West sections of the Great Western Highway Upgrade, between Katoomba and Blackheath, and between Little Hartley and Lithgow, respectively. The upgrade of the Great Western Highway between Katoomba and Lithgow, including Medlow Bath, is supported by reference to several strategic planning and policy documents including NSW Future Transport Strategy 2056 (Transport, 2018) and the NSW Freight and Ports Plan (Transport, 2018). The Proposal is needed to provide a safer and more efficient link between Central West NSW and the Sydney Motorway network for freight, tourist and general traffic.

In May 2021, the NSW Government announced that Transport would investigate the feasibility of a tunnel between Blackheath and Little Hartley.

Studies have confirmed that two identical (twin) tunnels, one eastbound and one westbound, around 11 kilometres long between Blackheath and Little Hartley is the most viable option and Transport will take this option forward for further development, community consultation and environmental investigation.

The Great Western Highway is being upgraded alongside long-term rail and intermodal options (Transport, 2022b). The Great Western Highway carries around nine million tonnes of road freight each year, with seven million tonnes transported by rail. Upgrading the rail is no substitute for upgrading the highway as both are needed to meet future demand and address issues around safety, congestion and journey reliability.

The Blackheath to Little Hartley Upgrade web portal was updated to remove ambiguity of the information shown.

This proposal is for the upgrade of the Great Western Highway between Katoomba and Blackheath and does not include the tunnel portal sites. The Tunnel portals form part of the Blackheath to Little Hartley Upgrade and would be further developed as part of that project and displayed in the EIS for that project.

2.12.3 Miscellaneous

Submission number(s)

38, 41 45, 72, 73, 78, 96

Issue description

- Several requests for upgrades to the Great Western Highway Katoomba and Penrith, including at Katoomba and Faulconbridge due to congestion, traffic impacts to the local road network and safety
- Support for improved active transport connections within towns and for bike paths between towns.

- Concern about safety of all road users on Nellies Glen Road due to narrow pavement and steep embankments. Request for an upgrade to Nellies Glen Road.
- Suggestion for a holistic regional integrated transport policy including the Blue Mountains LGA.
- Suggestion for a State Road management plan for the Great Western Highway between Penrith and Lithgow and State managed connections to the Hawkesbury Area. Suggestion for commitment for a team within Transport to plan and coordinate new and legacy upgrades as well as maintain all State managed roads in the Blue Mountains LGA.

Response

- The Great Western Highway Upgrade program seeks to upgrade the highway between Katoomba and Lithgow to two lanes in either direction where there is currently only one lane either direction. Upgrades to the Great Western Highway east of Rowan Lane is outside of the scope of this program of works.
- Transport notes the support for improved active transport connections. The proposal is providing upgraded active transport trails designed for use by cyclists between the towns of Katoomba and Medlow Bath and Medlow Bath to Blackheath (refer to Section 3.2.3 of the REF). Active transport trails within these towns is outside the scope of the proposal.
- Nellies Glen Road is a Council managed road and falls outside the scope of this proposal.
- Transport is committed to delivering an integrated transport network throughout the Blue Mountains that meets the needs of all road and rail users. While delivering the Great Western Highway Upgrade Program is one of the ways in which Transport is achieving this, the development of the broader network and associated management plans and strategies is outside the scope of this proposal.

2.13 Proposal design (active transport)

2.13.1 Opposed to design feature

Submission number(s)

16, 41

Issue description

- Concern that the proposed active transport trail in the Medlow Bath to Blackheath section is unnecessary, a waste of money, unwarranted and unsustainable given there is already an active transport trail on the western side of the highway.
- Concern that it is unrealistic for people to walk between villages due to distance, grade, surface and proximity to the highway.

Response

The alignment of the active transport trail in the Medlow Bath to Blackheath section is required for ongoing maintenance of the water quality basins as well as for maintenance access to utilities, the national park and Blackheath Special Area. By proposing that this trail is used as a new active transport connection in the Medlow Bath to Blackheath section, Transport is promoting improved recreational linkages between the villages of Medlow Bath and Blackheath.

Together with other proposed active transport trails in the Katoomba to Medlow Bath section of this proposal, this trail would provide uninterrupted pedestrian and cyclist access between Katoomba and Blackheath. The new sections of trail as well as sections of existing unsealed active transport trail within the proposal area would be sealed with bitumen, asphalt or surfaced with concrete as appropriate along the

length. The trail would be a minimum of three metres wide and be graded to be suitable for pedestrians and cyclists to use for travel between the villages.

In addition, along the length of the trail, safety barriers would be provided separating active transport users from motorists travelling along the highway.

2.13.2 Proposal design suggestion

Submission number(s)

12, 27, 28, 57, 76, 96

Issue description

- Active transport trail proposal design suggestions, including:
  - Concern about the lack of views from the active transport trail.
  - Request for alternate active transport trail route on the western side of the Highway near the Bonnie Doon Reserve bus stop.
  - Concern about danger of the existing active transport trail along Nellies Glen Road / Explorers Road. Request for alternate active transport trail route across the top of Pulpit Hill on the western side of the highway and extension of trail along Nellies Glen Road.
  - Concern about air quality and safety impacts of the proposed active transport trail. Request for alternate route away from the highway to connect into Foy Avenue.
  - Concern about proposed active transport trail route along the highway west of Foy Avenue. Request for alternate route along the proposal area boundary.
  - Request for the proposed active transport trail to follow the western boundary of the proposal area (or extend further west beyond the proposal area boundary).
  - The existing active transport trail on Station Street is adequate. Concern about viability of the proposed eastern active transport trail due to its location within the WaterNSW Special Area.
- Support for the proposed active transport trails, however request for it to be sympathetic to the environment and not require additional land clearing.
- Request for adequate active transport connections near Explorers Road, with a concern that pedestrians and cyclists would access the old highway to go to Katoomba resulting in a safety issue.
- Support for the provision of an active transport trail, however opposed to the retention of any parts of the existing Great Blue Mountains Trail due to surface quality, route and grade. Suggestion of design parameters for the proposed active transport trail, including quality equal to the highway, sealed surface, lighting, equal or better grade to the highway, connections into town centres and 2.5 metre minimum width. Request for on-road sections of the active transport trail to include appropriate physical road infrastructure.
- Request to upgrade the existing bridge over the railway at Medlow Bath to provide shoulders in each direction.
- Request for a separated highway cycle path to be added along the length of the proposal and in other sections of the Great Western Highway Upgrade Program.
- Suggestion for a safe cross sign, hand rail for cyclists and pedestrians and green paint at crossing point near the intersection of the to be repurposed existing Great Western Highway and Explorers Road.
- Need for the existing footpath between Old Bathurst Road and the bridge on the existing Great Western Highway to be widened and a safety rail installed on the bridge to protect cyclists from clipping pedals on the W-Beam barriers.
- Suggestion for the Great Western Highway / Bathurst Road intersection to be upgraded to better facilitate cyclist crossing.

- Suggestion to re-route the eastern active transport trail to follow the existing rail access service track to access Old Bathurst Road.
- Suggestion for lighting to be installed along the entire active transport trail. At a minimum, the following areas should have lighting installed:
  - Old Bathurst Road – to cycleway commencement
  - Interpretation/ Heritage area
  - Explorers Road crossing of existing highway (direct route)
  - Under and around the twin carriage way bridge area
  - Foy Ave (including the intersection of the Great Western Highway and Foy Ave)
  - Between Bellevue Cres intersection and through to Coachhouse Lane
  - Any sharp bends or hazards
- Recommendation of design specifications for the active transport trail, including that it should be sealed with a 5mm aggregate asphalt and suitable binding agent, have a minimum width of 2.5 metres, and that retained sections of trail are integrated into the new surface with a consistent surface quality.
- Support for design features which improve grades and remove hazards along the length of active transport trail. Request for consideration of remedies for remaining hazards on the active transport trail network including dips, culverts, shallow drains and rises at the bottom of descents.
- Request for appropriate signposting along the length of the active transport trail with route markers to destinations.
- Suggestion for an area map of the active transport trail network to be located at Medlow Bath, Old Bathurst Road and Blackheath.
- Suggestion for signage along Foy Avenue to indicate that it is a shared space and for appropriate road surface to be selected so that loose gravel is removed and is consistent with the other sections of active transport trail.
- Suggestion for on-road separation of motorists and cyclists near the Great Western Highway / Foy Avenue intersection allowing cyclists to travel along the western side of Foy Avenue to avoid turning vehicles.
- Support for removal of vehicle access to the rear of properties on Delmonte Avenue from the Great Western Highway. Request for active transport trail too be upgraded with a new sealed surface consistent with newly constructed sections between Foy Avenue and Bellevue Crescent.
- Suggestion for improvements to active transport connections between the Station Street bridge signalised crossing, Railway Parade and Coachhouse Lane.
- Request for active transport trail to be extended from the western end of the proposed active transport trail at B4 Realton Creek fire trail to the Blackheath town centre.
- Request for consideration of options to include at least a 1.5 metre wide shoulder in each direction on the existing Great Western Highway rail overbridge near Station Street in Medlow Bath.

Response

- The proposal would relocate, upgrade and connect with existing sections that make up the Great Blue Mountains Trail along the Katoomba to Medlow Bath section as well as provide a new publicly accessible trail in the Medlow Bath to Blackheath section. The sections of trail that are proposed or would be upgraded as part of the proposal as well as existing active transport links throughout the proposal area are shown in Figure 3-14a-b of the REF. Active transport trails would also serve as a maintenance access trail to utilities, water quality basins, national park (for approved access only), local streets and other walking trails in the area.

  The active transport trails would provide uninterrupted pedestrian and cyclist access between Katoomba and Blackheath. The trail would be sealed with bitumen, asphalt or surfaced with concrete as appropriate along the length. The new sections of trail would be a minimum of three metres wide and be graded to be suitable for pedestrians and cyclists to use for travel between the villages.

Options to route the active transport trail through Bonnie Doon Reserve and along the western side of the Pulpit Hill cut have not been adopted to minimise impacts to the listed non-Aboriginal heritage items in these areas (refer to Section 6.4.2 of the REF). However, the proposal would not impact on the existing active transport trails through Bonnie Doon Reserve or between Bonnie Doon Reserve and Nellies Glen Road that can still be used.

In addition, the active transport trail design has followed the topography to provide a suitable grade for pedestrians and cyclists, while minimising environmental impacts where possible. This is the case near Foy Avenue. While this means that active transport users would be closer to the highway in some locations, safety barriers would be provided separating active transport users from motorists travelling along the highway. While there may be localised air quality impacts from vehicle emissions, the proposal would result in reduced congestion, which should result in reduced vehicle emissions, even with an increase in traffic volumes.

The alignment of the active transport trail in the Medlow Bath to Blackheath section is required for ongoing maintenance of the water quality basins as well as for maintenance access to utilities, the national park and Blackheath Special Area. By proposing that this trail is used as a new active transport connection in the Medlow Bath to Blackheath section, Transport is promoting improved recreational linkages between the villages of Medlow Bath and Blackheath. The revised design outlined in this submissions report extends this section of trail through to Valley View Road, Blackheath.

The national park / Special Area would be fenced from the road corridor, with locked gate access to existing firebreaks and trails (including B4 Realton Creek Trail and B5 Trail) maintained for maintenance, operations and emergency purposes for authorised personnel, as is the current situation. Transport is not promoting improved recreational linkages into sections of national park closed to public access due to its location within the Blackheath Special Area.

- Transport thanks the respondent for their support of the proposed active transport trails. The design of the active transport trail has sought to, where possible, use existing areas of trails that are suitable to avoid the need for additional clearing and construction work. The design of the active transport trails would be refined during detailed design as part of the implementation of the Urban Design Plan for the proposal. This plan would present an integrated urban design for the project, providing practical detail on the application of design principles and objectives identified in the environmental assessment (Safeguard V1). In addition, design changes to further avoid and minimise the construction footprint and native vegetation or habitat removal and the need to clear vegetation will be investigated during detailed design and implemented where practicable and feasible (Safeguard B2).

- The proposal would connect a new section of active transport trail on the eastern side of the highway from Katoomba to the intersection of Explorers Road and the new service road. This would be between the road and rail corridors through to Explorers Road and provide improved grades for walking and cycling.

  This trail alignment has been adopted to provide an alternate, safe route for active transport users to access the Explorers Road precinct. At the old highway (to become a local service road) crossing, there would be a pedestrian refuge and separated bike crossing provided at the crossing of the new service road allowing active transport users to reach Explorers Road and join the other sections of the broader active transport network. Signage would be provided to help pedestrians and cyclists navigate the active transport trails.

- Transport notes the respondent's support for the improvements to pedestrian safety and active transport linkages as part of the proposed active transport network.

- The proposal has been designed so that cyclists do not need to stay on the Great Western Highway west of the Great Western Highway / Railway Parade intersection.

On-road cyclists travelling from Medlow Bath towards Blackheath would be able to exit to the left off the westbound lanes of the Great Western Highway onto Station Street, Medlow Bath. They would then be able to use the traffic lights at the Great Western Highway / Railway Parade intersection to travel straight ahead onto Railway Parade and access the new active transport trail in the Medlow Bath to Blackheath section via Coachhouse Lane.

Alternatively, as outlined in the Great Western Highway Medlow Bath Upgrade REF and submissions report, the Medlow Bath Upgrade would provide a new pedestrian bridge across the Great Western Highway, allowing active transport users to cross the highway. This would provide a new connection between the western side of the Great Western Highway in Medlow Bath and Coachhouse Lane via Railway Parade, allowing seamless connection through Medlow Bath for active transport users between Katoomba and Blackheath using the active transport trails proposed as part of this REF.

- The proposal would relocate, upgrade and connect with existing sections that make up the Great Blue Mountains Trail along the Katoomba to Medlow Bath section as well as provide a new publicly accessible trail in the Medlow Bath to Blackheath section. The sections of trail that are proposed or would be upgraded as part of the proposal as well as existing active transport links throughout the proposal area are shown in Figure 3-14a-b of the REF. The active transport trails would provide pedestrian and cyclist access between Katoomba and Blackheath. The new sections of trail as well as sections of existing unsealed active transport trail within the proposal area would be sealed with bitumen, asphalt or surfaced with concrete as appropriate. The trail would be a minimum of three metres wide and be graded to be suitable for pedestrians and cyclists to use for travel between the villages.

  Where required, sections of unsealed existing trail within the proposal area would be upgraded to allow safe travel and a consistent pavement quality along the length of the trails. Some sections of the existing trail would remain as per the current scenario as they are suitable for use and would avoid further environmental impacts and construction work.

  Active transport is a consideration in the other Great Western Highway Upgrade program projects.

- A separated bike crossing of the new service road would be provided near the Explorers Road intersection. Transport would also investigate opportunities to provide other road furniture at this location. These details would be confirmed during detailed design.

- Due to proximity to the rail corridor, there are limited options to widen the existing footpath between Old Bathurst Road and the bridge on the Great Western Highway. However, opportunities to install a safety rail would be considered during detailed design.

- The limits of work for this proposal are Rowan Lane, Katoomba and Bellevue Crescent, Medlow Bath for the Katoomba to Medlow Bath section and Station Street, Medlow Bath and Tennyson Road, Blackheath for the Medlow Bath to Blackheath section. The active transport trail design would provide safety improvements within this proposal's limits of work. The intersection of Great Western Highway / Bathurst Road and the cycling facilities there are out of scope of the proposal.

- Due to proximity of the rail corridor, it would not be possible to re-route the eastern active transport trail to follow the existing rail access service track.

- In keeping with the rural character of the Blue Mountains, the proposal would provide flag lighting for the road pavement at intersections only. It is not proposed for lighting to be incorporated at other locations along the active transport trail.

- The active transport trails would provide pedestrian and cyclist access between Katoomba and Blackheath with a consistent surface along the length. The new sections of trail as well as sections of existing unsealed active transport trail within the proposal area would be sealed with bitumen, asphalt

or surfaced with concrete as appropriate. The trail would be a minimum of three metres wide and be graded to be suitable for pedestrians and cyclists to use for travel between the villages.

The proposal would provide supporting infrastructure (including signage) along the active transport trails within the proposal area. The design and location of signs would be confirmed during detailed design, and include consideration of tourism route markers, maps of the active transport network and road or active transport user signs.

- The active transport trails would provide uninterrupted pedestrian and cyclist access between Katoomba and Blackheath, with connections to existing active transport trails into town centres. The new sections of trail as well as sections of existing unsealed active transport trail within the proposal area would be sealed with bitumen, asphalt or surfaced with concrete as appropriate and be a minimum of three metres wide. It would be graded to be suitable for pedestrians and cyclists to use for travel between the villages. Where required, sections of unsealed existing trail within the proposal area would be upgraded to allow safe travel and a consistent pavement quality along the length of the trails. Some sections of the existing trail would remain as per the current scenario as they are suitable for use and would avoid further environmental impacts and construction work.

  Any sections of the active transport trail on local roads would include appropriate road infrastructure. As a minimum, work on active transport trails adjoining local roads would comply with Council standards. The sections of upgraded and proposed active transport trails would also comply with Transport's standards.

  Transport notes the hazards on the existing active transport trails within the proposal area. Where the proposal would construct new sections of active transport trail, these would be of a higher quality and often adjacent to the existing highway. These would have softer grades than the existing active transport trail and have no major hazards such as cross-surface drainage, dips and shallows. However, in some areas, the existing trail has been retained.

- The proposal would provide supporting infrastructure (including signage) along the active transport trails within the proposal area. The design and location of signs would be confirmed during detailed design, and include consideration of tourism route markers, maps of the active transport network and road or active transport user signs. Opportunities to separate motorists and active transport users using the active transport trail on Foy Avenue would be confirmed during detailed design. This would include selection of appropriate supporting infrastructure such as signage and line marking.

- Transport notes the organisation's support for the removal of vehicle access to the rear of properties on Delmonte Avenue from the Great Western Highway. This access needs to remain, however would only be available to approved maintenance of the electricity easement.

  The active transport trails would provide uninterrupted pedestrian and cyclist access between Katoomba and Blackheath with a consistent surface along the length. The new sections of trail as well as sections of existing unsealed active transport trail within the proposal area would be sealed with bitumen, asphalt or surfaced with concrete as appropriate within the REF proposal area. The trail would be a minimum of three metres wide and be graded to be suitable for pedestrians and cyclists to use for travel between the villages.

- Transport notes the suggestion to improve the arrangement for cyclists at the signalised Great Western Highway / Railway Parade crossing. The proposal has been designed so that cyclists do not need to stay on the Great Western Highway west of the Great Western Highway / Railway Parade intersection.

  On-road cyclists travelling from Medlow Bath towards Blackheath would be able to exit to the left off the westbound lanes of the Great Western Highway onto Station Street, Medlow Bath. They would then be able to use the traffic lights at the Great Western Highway / Railway Parade intersection to travel straight ahead onto Railway Parade and access the new active transport trail in the Medlow Bath to Blackheath section via Coachhouse Lane.

Alternatively, as outlined in the Great Western Highway Medlow Bath Upgrade REF and submissions report, the Medlow Bath Upgrade would provide a new pedestrian bridge across the Great Western Highway, allowing active transport users to cross the highway. This would provide a new connection between the western side of the Great Western Highway in Medlow Bath and Coachhouse Lane via Railway Parade, allowing seamless connection through Medlow Bath for active transport users between Katoomba and Blackheath using the active transport trails proposed as part of this REF.

- As noted in Section 4.2 of this submissions report, the revised design includes an extension of the active transport trail in the Medlow Bath to Blackheath section of the proposal to Valley View Road, Blackheath. By extending the length of the trail to Valley View Road, it would provide a continuous active trail between Medlow Bath and Blackheath and improved emergency and maintenance access to utilities and national park assets.

- Transport notes that there are space constraints on the existing Great Western Highway rail overbridge. The proposal has been designed so that cyclists do not need to stay on the Great Western Highway west of the Great Western Highway / Railway Parade intersection.

  On-road cyclists travelling from Medlow Bath towards Blackheath would be able to exit to the left off the westbound lanes of the Great Western Highway onto Station Street, Medlow Bath. They would then be able to use the traffic lights at the Great Western Highway / Railway Parade intersection to travel straight ahead onto Railway Parade and access the new active transport trail in the Medlow Bath to Blackheath section via Coachhouse Lane. Alternatively, on-road cyclists exiting the highway onto Station Street could continue on the existing connection via Station Street through to Blackheath.

  As outlined in the Great Western Highway Medlow Bath Upgrade REF and submissions report, the Medlow Bath Upgrade would provide a new pedestrian bridge across the Great Western Highway, allowing active transport users to cross the highway. This would provide a new connection between the western side of the Great Western Highway in Medlow Bath and Coachhouse Lane via Railway Parade, allowing seamless connection through Medlow Bath for active transport users between Katoomba and Blackheath using the active transport trails proposed as part of this REF.

2.13.3 Support need

Submission number(s)

17, 96

Issue description

- Emphasis on the need for active transport options and request for bike path.
- Future upgrades of the Great Western Highway, including legacy sections, to enhance the completion of the duplication of the Great Western Highway should be leveraged to construct off-highway shared paths, safe road shoulders and no traffic zones to realise the middle sections of this active transport / tourism network.

Response

Transport acknowledges the support for the need for active transport options. The proposal would relocate, upgrade and connect with existing sections that make up the Great Blue Mountains Trail along the Katoomba to Medlow Bath section as well as provide a new publicly accessible trail in the Medlow Bath to Blackheath section. The sections of trail that are proposed or would be upgraded as part of the proposal as well as existing active transport links throughout the proposal area are shown in Figure 3-14a-b of the REF. Active transport trails would also serve as a maintenance access trail to utilities, water quality basins, national park (for approved access only), local streets and other walking trails in the area.

The active transport trails would provide uninterrupted pedestrian and cyclist access between Katoomba and Blackheath. The trail would be sealed with bitumen, asphalt or surfaced with concrete as appropriate. The trail would be a minimum of three metres wide and be graded to be suitable for pedestrians and cyclists to use for travel between the villages.

2.13.4 Support for design feature

Submission number(s)

19, 57, 96

Issue description

- Support for the proposed active transport trails.
- Support for the proposed active transport trail on the eastern side of the Great Western Highway between Katoomba and Explorers Road.
- Support the provision of on-road cycle infrastructure and Transport's commitment during community consultation to provide on-road cyclists continuity lanes through all intersections on the highway. (57.05)
- Support for the proposed active transport connection between Bathurst Road and Explorers Road on the eastern side of the highway. Preference for this eastern alternative route than to route cyclists along the Nellies Glen / Explorers Road local road loop between sections of proposed active transport trail.
- Support for the proposed active transport trail design in the Medlow Bath to Blackheath section. It is noted that the active transport trail would be appropriately graded and sealed for both cyclists and pedestrians.

Response

- Transport thanks the respondents for their support of the proposed active transport network, including the trail on the eastern side of the Great Western Highway between Katoomba and Explorers Road, for on-road cycle infrastructure and for the new active transport trail in the Medlow Bath to Blackheath section. The active transport trails would provide pedestrian and cyclist access between Katoomba and Blackheath with a consistent sealed surface and grade.

  The Katoomba to Explorers Road active transport trail would complement the existing local route along Nellies Glen Road and Explorers Road. This route would remain accessible to active transport users during operation of the proposal.

  Transport re-affirms its commitment to the community to provide on-road cyclists with continuity lanes through all intersections of local roads with the Great Western Highway within the proposal area.

- Transport notes the support of the new active transport trail along Medlow Bath to Blackheath. By proposing that this trail is used as a new active transport connection in the Medlow Bath to Blackheath section, Transport is promoting improved recreational linkages between the villages of Medlow Bath and Blackheath.
  Together with other proposed active transport trails in the Katoomba to Medlow Bath section of this proposal, this trail would provide pedestrian and cyclist access between Katoomba and Blackheath. The new sections of trail as well as sections of existing unsealed active transport trail within the proposal area would be sealed with bitumen, asphalt or surfaced with concrete as appropriate. The trail would be a minimum of three metres wide and be graded to be suitable for pedestrians and cyclists to use for travel between the villages.

2.14 Proposal design (bridge)

2.14.1 Safety

Submission number(s)

65, 87

Issue description

- Concern about the safety of the twin bridges due to snow, ice and strong westerly crosswinds and that a windsock is not a suitable mitigation measure for this risk.

Response

The design of the twin bridges has considered various environmental elements including snow and ice and wind. The bridge structures will be north south facing with twin rail type-F barriers (comprising a 500-millimetre-high twin rail steel barrier on top of a 410-millimetre-high solid barrier). The direction and solid barrier height would allow the sun to shine on the road surface and avoid shading, providing the best conditions for any snow or ice buildup on the road pavement to melt. The separation of the carriageways would reduce the risk of head-on crashes and reduce the need to close the highway during snow and ice events. The installation of a wind sock is a standard mitigation to warn drivers of the potential high wind risk. Further consideration would be given to these items in a more detailed risk assessment in the detailed design.

2.14.2 Proposal design suggestion

Submission number(s)

27

Issue description

- Concern about visual impacts of the twin bridges. Request for an alternative design to soften the impacts, such as by following land contours.

Response

The alignment and concept design of the twin bridges best achieves the goal of providing a highway corridor with less changes to horizontal alignment and elevation changes. This is required for the increases in design and posted speed limits. The existing alignment through this section is constrained by the topography when considering spaced required for duplication of the road carriageways. The design of the twin bridges would be further refined during the detailed design to soften the visual appearance.

The urban design plan would also contribute to the design of the bridge structure and landscaping strategies would be finalised during detailed design. In accordance with Safeguard V3, bridge design and the design of peripheral elements would be refined to reduce its visual impact during detailed design.

2.15 Proposal design (drainage and water quality)

2.15.1 Support for design feature

Submission number(s)

57, 69

Issue description

- Support the proposed bioretention basins, including that Transport for NSW are responsible for their ongoing management.

Response

Transport acknowledges the respondents' support for the proposed drainage and water quality design, including bioretention basins. Transport would be responsible for ongoing maintenance of these basins and would maintain them to achieve the predicted beneficial effect on water quality as identified in Section 6.1 and Appendix C of the REF.

2.15.2 Design clarification

Submission number(s)

28, 93, 94

Issue description

- Query about whether the runoff in the Katoomba to Medlow Bath section would be funnelled into only a few treatment basins, which would increase the impervious surface area in some catchments, or whether current drainage lines would be maintained and fitted with an appropriate stormwater management design.
- Query about how the water flow after rain will be managed and how water quality and waterways will be protected near Pulpit Hill.

Response

- The proposal would provide several drainage design features that are expected to achieve a beneficial effect on water quality in the Katoomba and Blackheath Special Areas based off the MUSIC modelling carried out for the proposal (refer to Section 6.1.3 of the REF). The drainage design also includes several Gross Pollutant Traps, water quality basins and swales to retain and treat stormwater runoff (refer to Section 3.2.3 of the REF).

  The proposal would not change the area for the overall catchments. Details of each catchment are provided in Section 3.4.11 of this report. However, a water quality basin has been provided for each sub-catchment, which have been designed to capture all run-off from the proposal. The capacity of these basins has considered the increase in impervious area in the sub-catchments due to the proposal.

  Further details on the sub-catchments, including total area, impervious area and figures indicating the sub-catchments which were modelled, are provided in Section 3.4.11 of this submissions report.

- Transport also notes that the proposal passes through the Katoomba and Blackheath Special Areas and numerous watercourses along the proposal length including at Pulpit Hill. As a result of this environmental sensitivity, design development criteria was established for the proposal (refer to Section 2.3.2 of the REF), including the criterion to adopt water quality control measures to improve the management of stormwater out flows into the Sydney drinking water catchment.

  The REF included extensive design development of construction and operational water quality measures to be implemented for the proposal. This design was undertaken in consultation with WaterNSW and Blue Mountains City Council through regular meetings during the development of the concept design. The design has considered changes in impervious surface area in the sub-catchments draining to each drainage basin.

  MUSIC modelling has been undertaken to evaluate the water quality treatment system to make sure that the design would protect existing water quality. The MUSIC modelling was revised to assess changes to the proposal (refer to Section 5.1). As per the guidelines which require that a Neutral or Beneficial Effect assessment needs to be undertaken as the proposal is within the Drinking Water Catchment, the assessments showed that the proposal would have a beneficial effect on the surrounding water quality. This is due to the proposal capturing and treating all surface runoff from the highway. The beneficial effect on water quality would minimise hydrologic impacts to surrounding sensitive environments, including the Blue Mountains Swamp TEC habitat. Further information on the water quality management and treatment system of the proposal can be found in Section 3.2.3 of the REF. The proposed water quality basin locations are shown in Figure 3-1a-f and Figure 3-2a-e of the REF.

  In addition, as noted in Section 3.2.3 of the REF, the pavement drainage pit and pipe network has been designed to achieve flood immunity for a ten per cent annual exceedance probability (AEP) flood event and the transverse drainage network would be designed to achieve flood immunity for a one per cent AEP flood event. The pavement drainage network would also incorporate overland flow routes through the proposed road pavement and landscaped areas to provide capacity in storm events. The provision of detention would match or reduce the existing one per cent AEP discharge flow rate to the downstream environment. An assessment of climate change sensitively was carried out on the proposed stormwater runoff design to assess performance under climate change rainfall scenarios (refer to Appendix D of the REF).

  The water quality treatment system would be developed further during detailed design (including confirmation of the extent of scour protection required), which would minimise any potential for scour to occur at the outflow points from the system (SGW7). Transport is also commencing a surface and groundwater monitoring program to identify current state surface water runoff as well as monitor runoff characteristics during and post construction.

2.16 Proposal design (landscape and urban)

2.16.1 Design clarification

Submission number(s)

71

Issue description

- Concern about lack of grass and trees in the middle of the road.

Response

An urban design and landscape strategy has been developed for the proposal from the urban design objectives and principles (refer to section 2.3.3 of the REF). The strategy includes urban design direction for design elements such vegetation to maintain the existing character of the local area. With regard to median planting, the road alignment, including provision of space in the median between the two carriageways, has been developed with consideration of local topography, the provision of driver sight lines (in accordance with Transport's standards) and to minimise environmental impacts. Where permitted by these constraints, trees or native vegetation planting would be provided in medians. The urban design and landscaping strategies to be implemented would be finalised during detailed design.

Refer to the Urban Design Concept, Landscape Character and Visual Impact Assessment Report attached to the REF as Appendix G for further detail.

2.16.2 Opposed to design feature

Submission number(s)

20, 67, 69

Issue description

- Objection to more concrete surfaces and visual objects in the existing natural environment.
- Concern about landscape character and visual impacts of the proposal on the natural beauty and character of the Blue Mountains.

Response

Transport notes that the respondents are opposed to proposed urban design features.

An urban design and landscape strategy has been developed for the proposal from the urban design objectives and principles (refer to section 2.3.3). This strategy provides direction for design elements to be consolidated into the proposed design to maintain the existing character of the local area. The urban design and landscaping strategies implemented as part of the proposal would be finalised during detailed design.

An Urban Design Plan would be prepared as part of the CEMP and present an integrated urban design for the project, providing practical detail on the application of design principles and objectives identified in the environmental assessment (Safeguard V1). Safeguards V2 to V6 outline requirements which would be considered during detailed design to minimise visual impacts of the proposal, including exposed design features, concrete surfaces, the twin bridges and other structures such as retaining walls, active transport trails and favourable landscape design. Safeguard V6 has been amended to require consideration of screening for potential light spill from the proposal when operational.

2.16.3 Proposal design suggestion

Submission number(s)

69, 74, 75, 78

Issue description

- Request for monument where the Explorer's Tree used to stand due to its social significance to the community.
- Request for additional revegetation of the bushland surrounding the highway.

- Request for the urban design to consider natural finishes (including stone and colouring).
- Query about whether local artists would contribute to the proposal.
- Request for urban design and landscaping adjustments near water detention basins to minimise visual impacts of the basins and to move the basins away from the road verge to achieve better urban design outcomes.
- Suggestion for additional rough sawn sandstone facing blocks.

Response

- While the proposed eastbound carriageway would pass through the location of the former Explorer's Tree, Transport would consider opportunities to represent the tree in the enhanced Pulpit Hill heritage interpretation area. The design of the heritage interpretation area would be further developed during detailed design as part of the Great Western Highway Upgrade Program cultural interpretation strategy, in consultation with the Blue Mountains City Council, Heritage NSW, Aboriginal knowledge holders and the local community.

- The urban design and landscaping strategies implemented as part of the proposal would be finalised during detailed design. In accordance with Safeguard V6, this would include implementation of addition landscape features into the design. Bushland reconstruction and bushland seeding would be maximised where possible and opportunities for additional tree plantings along the proposal corridor would be investigated, with native and endemic plantings used along the highway outside of the villages. The selection of plant species would complement and integrate with the existing environment. Revegetation along the highway would be maximised to reduce perceived corridor width. The urban design and landscape strategy includes provisions to provide natural finishes to design elements which blend into the existing environment. Further details are available in Section 3.4 of Appendix G to the REF. In addition, in accordance with Safeguard V2, cut and fill batters would be rounded to help integrate into the existing landform and create a more naturalised appearance.

- Safeguard V2 has been amended to include provision for Transport to engage with local artists during detailed design to contribute to the urban design and landscaping strategies of the proposal.

- Due to the location of the proposal within the Katoomba and Blackheath Special Areas and adjacent to the Blue Mountains National Park, it is important that the water quality treatment provides a beneficial effect on water quality. The location and design of the proposed water quality basins have been determined to achieve this outcome based off the MUSIC modelling carried out for the proposal (refer to Section 6.1.3 of the REF).

  The urban design and landscape strategy includes provides input into the drainage and water quality design, including basin, channel and gutter design. Further details are available in Section 3.4 of Appendix G to the REF. The urban design and landscaping strategies implemented as part of the proposal, as well as the water quality basin design, would be finalised during detailed design. This would include consideration of opportunities to minimise the visual impacts of the basins through screening and minor adjustments to location of basins. It is noted however, that drainage basins will be fenced.

- In accordance with Safeguard V2, exposed rock faces would be retained in rock cuttings. Opportunities to include additional rough sawn sandstone facing blocks where appropriate would be confirmed during detailed design.

2.16.4 Support for design feature

Submission number(s)

57

Issue description

- Support the urban design for the proposal.

Response

Transport thanks the respondent for their support of the proposal's urban design.

2.17 Proposal design (road and civil)

2.17.1 Design clarification

Submission number(s)

2, 45, 75

Issue description

- What would local access from Nellies Glen Road to Katoomba be?
- What is the speed limit of the proposal?
- Would there be charging locations for electric vehicles
- Concern about clarity of wording in the REF and that Transport has omitted details about the design (for example, bridge heights, Variable Message Signs (VMS)
- Would there be access to a safe right turn heading east from Rowan Lane onto the Great Western Highway, including in fog, at night and in heavy traffic?

Response

- Vehicular access from Nellies Glen Road towards Katoomba would be via Explorers Road, where there is a right turn out to Katoomba. Refer to Table 3-4 in the REF for further details. Pedestrian/ cyclist access from Nellies Glen Road to Katoomba would not change, being able to use the existing trails from Nellies Glen Road to Bonnie Doon Reserve connecting with the existing pedestrian pathway along the highway to Rowan Lane. A new active transport link would also be provided on the eastern side of the highway between Explorers Roads connecting into the highway pedestrian pathway west of Bathurst Road. This could also be used to get into Katoomba.
- Between Katoomba (Watsons Way) to Medlow Bath (west of Foy Avenue) and Medlow Bath (west of Coachhouse Lane) and Blackheath (east of Evans Lookout Road) would be 80 kilometres per hour. Through Medlow Bath, as discussed in the Medlow Bath REF, the speed limit would be 60 kilometres per hour.
- The proposal does not include EV charging locations. The closest charging locations are in Medlow Bath (Hydro Majestic) and in a number of locations in Katoomba.
- Variable messaging signs have been noted to be included in the scope of work as per section 3.2.3 of the REF. During detailed design, Transport would undertake further design to confirm the type of VMS to be included as part of the highway. The height of the twin bridges is identified in section 3.2.3 of the REF. In addition, the fly through video produced and released as part of the REF display and

visualisation images included in the Landscape character and visual impact assessment show the height of the bridge structures.
- There are no changes proposed to the Rowan Lane intersections with the Great Western Highway.

2.17.2 Fauna connectivity/habitat

Submission number(s)

27, 60

Issue description

- How would the proposal allow wildlife to cross the highway?
- Request for the highway alignment to avoid environmentally sensitive areas and include ecological buffer areas.

Response

- Currently the highway, particularly where it is adjacent to the rail corridor is an obstruction to fauna movement. However, the widening of the highway could result in an increased constraint for gliding and terrestrial fauna to safely cross the Great Western Highway. As part of detailed design and further studies, a fauna connectivity strategy would be developed (management measure B9) with any measures complying with the Wildlife Connectivity Guidelines for Road Projects (Roads and Traffic Authority, 2011c) (Safeguard B11).
- The highway, by virtue of widening the existing road corridor has sought to avoid impacts whereever possible. In addition, further measures have been included as part of the proposal to minimise impacts further. For example, the design has avoided any direct impact to the Hanging Swamps west of Explorers Road and will put in place appropriate buffer to the swamps during construction that will include sedimentation fencing which will prevent sediment entering the vegetation. In addition, water quality basins will be used to capture and treat run off before using level spreaders to mimic overland water flow to return water back into the ground and the Hanging Swamps.
  As part of the detailed design process, further refinements may be made to reduce the footprint and minimise impacts such as vegetation clearing (Safeguard B2).

2.17.3 Objection to the project

Submission number(s)

36, 43, 45, 71

Issue description

- Opposed to the design.
- Objection to proposal due to lack of information on impacts to the Blue Mountains National Park and no reduction in traffic using the highway.

Response

Respondents' objection to the design is noted.

The REF for this proposal details the impacts to the Blue Mountains National Park throughout the document.

Traffic along the Great Western Highway between Katoomba and Blackheath is anticipated to grow by 1-1.7 per cent per annum, even without the proposal. The proposal is needed to provide a safer and more efficient link between Central West NSW and the Sydney Motorway network for freight, tourist and general traffic.

Duplicating the highway from two lanes to four lanes would provide travel time savings for all traffic users and would maintain those savings well into the future. Without an upgrade, travel times would worsen, while congestion would continue to deteriorate.

Reducing traffic on the highway is not within the scope of this proposal. However, future traffic modelling considered traffic volumes with and without the Blackheath to Little Hartley Upgrade. When the Blackheath to Little Hartley Upgrade was included in the future modelling, there would be a decrease in heavy vehicles upon opening because of a shift to longer heavy vehicles (Higher Productivity Vehicles (HPVs)) that are able to transport more freight per vehicle. It is predicted that use of these types of vehicles could reduce the total truck trips by at least 15 per cent along the Great Western Highway. (Great Western Highway Upgrade Program Road Freight in the Blue Mountains, TfNSW, 2022). Reduction of trucks on the highway would result in reduction lessin congestion, safer roads and a better driver experience.

However, the aim of the this proposal is not to introduce HPVs onto the highway. Any change to the types of heavy vehicles allowed on the Great Western Highway would be a decision of Government and would involve continued engagement with Blue Mountains City Council.

2.17.4 Property acquisition

Submission number(s)

67, 78

Issue description

- Concern about amount of property acquisition required for the proposal and its environmental impacts.
- Suggestion for further property acquisition to occur in narrow sections of the proposed alignment, including at Coachhouse Lane.

Response

- The REF for this proposal details the property acquisition and the vegetation clearing that would occur as part of the proposal. Wherever possible, the proposal has sought to minimise the footprint and associated potential impacts. Where there are resultant impacts, a detailed list of management measures has been identified that Transport and their contractor would need to adhere to further minimise and manage any potential impacts during construction and operation. This includes further work during detailed design to minimise vegetation clearing where possible and establish strong and effective construction management plans. A Blue Mountains National Park Management Framework would be prepared and implemented to guide all construction activities adjacent to the National Park to avoid any indirect impacts relating to vegetation loss or water quality impacts (management measure GEN 4).
- The REF for this proposal details the property acquisition that would be required for the operational footprint and construction footprint (refer to Section 3.6 of the REF). The footprint identified in the REF near Coachhouse Lane is sufficient for the widened roadway and any construction activities required in that area.

2.17.5 Proposal design suggestion

Submission number(s)

46, 54, 55, 56, 57, 73, and 78.

Issue description

- Request for either a seagull or two-staged crossing at the Foy Avenue intersection. These intersection design options would be the most efficient and effective option.
- Request to keep 2.5 metre shoulders on the approach to Medlow Bath.
- Has there been any consideration to lightning with any relevant structures that will be erected?
- Suggestion for the highway to be moved towards the rail corridor at Pulpit Hill instead of the proposed cut. Concern that the proposal would result in a poor outcome.

Response

- Following discussions with the community regarding Foy Avenue, Transport undertook an assessment of a potential seagull intersection for Foy Avenue to include a right turn onto the Great Western Highway. The assessment found that there was little traffic demand for the right turn at any time of the day. The seagull intersection would be unsafe with traffic needing to merge with the eastbound traffic (which would be travelling at 80km/h). In addition, there was a high risk of collision due to the speed environment and percentage of heavy vehicles.

  The upgrade to Bellevue Crescent with a U-Turn bay and traffic lights provides a much safer arrangement to turn right onto the Great Western Highway as it would stop traffic on the highway, minimising the risk of collisions.

- Due to spacing constraints on the eastern approach of Medlow Bath and the existing road bridge over the rail on the western approach to Medlow Bath, 2.5 metre shoulders could not be maintained. Rather, the active transport trail (Great Blue Mountains Trail) is in proximity to the highway, with the trail running along Foy Avenue then connecting into an active transport trail that runs alongside the highway from Foy Avenue into Medlow Bath. On the western approach, the existing Great Blue Mountains Trail runs along Station Street, while the proposal would also construct a new trail from the end of Coachhouse Lane that pedestrians and cyclists can use to travel between Medlow Bath and Blackheath.

- The proposal would reduce exposure of electricity utility assets to lightning compared to the existing scenario due to proposed undergrounding of sections of overhead electricity wires. In addition, any relocated utilities would be properly earthed.
  Transport notes that the proposal would result in new high-points along the alignment associated with the twin bridges. Lightning conductors on the bridges would be assessed during detailed design. This would include consideration of installation of a lightning rod if a wind sock was installed on the bridges.

- At Pulpit Hill, there is minimal space between the existing highway and the rail corridor to facilitate the upgrade. At this location, the road needs to be straightened to comply with current road safety design guidelines, due to the space constraints to the east of the highway, the highway needs to be duplicated to the west. In this case, the existing highway is being repurposed as a local access road with a short-term truck stopping area. In Medlow Bath to Blackheath, the road is being duplicated, with the existing highway being used as either part of the operational traffic lanes or as a short-term truck stopping area.

2.17.6 Resilience

Submission number(s)

8, 16, 38, 51, and 58.

Issue description

- Concern about lack of an alternative local route for residents in Medlow Bath so that access to Medlow Bath is maintained during emergencies.
- Concern about usefulness of maintaining the emergency access to Coachhouse Lane from the Great Western Highway due to the proposed separation of carriageways in M2B.
- Concern that the proposal would worsen resilience of the Great Western Highway / Main Western Railway due to the road corridor moving closer to the rail corridor and perceived hazards.
- Concern that the proposal would not improve resilience of the road network as the highway (including the proposed twin bridges) would need to be closed during bushfires, other extreme weather events and accidents.

Response

- The proposal would result in increased capacity of the road network that would reduce congestion, allowing more efficient traffic flow. Duplicated dual carriageways could result in the highway not being shut if there is a traffic incident, with the potential to maintain one operational lane. During bushfire events, the upgraded highway would provide greater buffer areas from vegetation that could result in the highway still being operational even in times of bushfire events.

  Within the Medlow Bath to Blackheath section of the proposal, a cross over location has been identified for emergency services and in times of emergency incidents. This will allow traffic to be diverted onto either carriageway to maintain traffic movements in the event of a closure in one direction. From Katoomba to Medlow Bath, the two separate bridge structures would allow for traffic to be moved onto one bridge should an incident occur on the other.

  Retaining the existing highway near Explorers Road provides an additional contingency to allow traffic flow to be maintained should there be an incident on the highway.

- The upgraded dual-carriageway would have better safety outcomes than the existing Great Western Highway and would be less likely to result in a full closure of the highway due to a crash. The continuity of the barrier system proposed at Coachhouse Lane would offer better protection for residents than the existing gate from run-off type accidents (especially heavy or hazardous vehicles).

  There would be no access between the highway and Coachhouse Lane. Access for emergency services only would be provided between Coachhouse Lane and the active transport trail to attend to incidents in the National Park. No resident vehicular access would be allowed to the active transport trail to protect the adjacent national park and WaterNSW Blackheath Special Area.

2.17.7 Safety

Submission number(s)

93, 94

Issue description

- Query about what safety would be provided to residents in Coachhouse Lane, as it will now become a shared zone between local traffic, maintenance vehicles, cyclists and pedestrians.

Response

Coachhouse Lane is a public road and the access proposed is consistent with its current and designated use. Traffic will predominantly remain as residential traffic, with emergency and maintenance vehicles only occasionally accessing the path for scheduled maintenance and emergency access. It should be noted that between Coachhouse Lane and the active transport trail, there will be a removable bollard to stop unlawful use of the active transport trail by vehicles.

2.17.8 Truck stopping areas

Submission number(s)

2, 14, 25

Issue description

- Query about whether amenities would be provided at the proposed truck stopping areas.
- Request for toilet amenities at truck stopping areas.
- Objection to the truck stopping area near Explorers Road due to impacts to nearby residents and wildlife.

Response

As noted in Section 3.2.3 of the REF, the proposed truck stopping areas are intended as short term stop areas for heavy vehicle checking and would not be ‘rest areas’. There would be no ablutions or other facilities provided at these locations to promote these areas as a short-term load checking spot, impacts to residents would be minimised.

The location of the truck stopping area was chosen to reuse existing road pavement that would not be required for the upgraded highway. As such, heavy vehicles would be on the existing highway as is the current situation, however, they would be travelling at a reduced speed which would reduce risk to wildlife and active transport users. The use of the existing road pavement also means that there is no additional vegetation clearing required.

The Great Western Highway Upgrade Program is providing two rest areas as part of the Little Hartley to Lithgow Upgrade at Hartley Valley. Heavy vehicle drivers travelling across the Blue Mountains would be able to use amenities at these rest areas.

2.17.9 Support for design feature

Submission number(s)

96

Issue description

- Support for the 2.5-metre-wide shoulder in both carriageways.

Response

The support for 2.5-metre-wide shoulders on the highway is noted. Due to spacing constraints on the eastern approach of Medlow Bath and the existing road bridge over the rail on the western approach to Medlow Bath, 2.5 metre shoulders could not be maintained. Rather, the active transport trail (Great Blue Mountains Trail) is in proximity to the highway, with the trail running along Foy Avenue then connecting into an active transport trail that runs alongside the highway from Foy Avenue into Medlow Bath. On the western approach, the existing Great Blue Mountains Trail runs along Station Street, while the proposal would also construct a new trail from the end of Coachhouse Lane that pedestrians and cyclists can use to travel between Medlow Bath and Blackheath.

2.18 Proposal design (utilities)

2.18.1 Design clarification

Submission number(s)

73

Issue description

- Query about whether provision of utilities to the western side of the highway near Nellies Glen, Pulpit Hill and Explorers Road has been considered to provide and future proof water, sewerage and gas to local residents.
- Query about whether lights would be installed at intersections during construction.

Response

- Transport is not the owner or operator of water, sewerage and gas utilities to residents. As such future proofing assets is a matter for the utilities authorities and outside the scope of the proposal. However, Transport acknowledges that as a result of the proposal, utilities may be impacted. The proposal includes the protection or relocation of utilities to maintain services to users. Transport has consulted with utility providers about the proposal and any potential impact to their utility networks.
- Appropriate lighting would be installed wherever construction works are required to be done at night to ensure the safety of construction personnel and the local community. The local community would also be notified of construction activities prior to works.

2.19 Proposal need and options

2.19.1 Alignment with objectives

Submission number(s)

1, 63, 93, and 94.

Issue description

What is the relevance of Great Western Highway Upgrade Program objectives to the proposal?

Response

The proposal objectives are detailed in Section 2.3.1 of the REF. In that section, Table 2-1 summarises how the proposal meets the Great Western Highway Upgrade Program objectives. Similarly, this is detailed in Section 2.4.1 of the Medlow Bath REF.

2.19.2 Heavy vehicles

Submission number(s)

28, 38, 41, 50, 57, 63, 64

Issue description

- Concern about the safety risks due to the proposal allowing larger trucks to use the Great Western Highway.
- Concern that the cost of the proposal is not justified given it would result in increased heavy (B Doubles) and light vehicle traffic.
- Request for clarity in the project justification about whether the intention is to increase freight along the highway as a result of the proposal.
- Concern that there would still be a large number of heavy vehicles using the Great Western Highway and the proposal would likely reduce freight efficiency outside of the scope of the Great Western Highway Upgrade Program.
- Opposed to an increase in heavy vehicle load and size limits on the highway.
- Concern about impacts of the proposal due to increased truck movement along the highway.
- Concern about safety of motorists with increased traffic and large trucks on the roads.

Response

Average weekday traffic volumes through the proposal area were about 23,000 vehicles between Katoomba and Medlow Bath and 21,000 vehicles between Medlow Bath and Blackheath (March 2020). Even without the proposal, private vehicle and freight traffic movements along the corridor are expected to increase. Between 2018 and 2026, it is predicted that daily car volumes would increase by 19 per cent along the Katoomba to Medlow Bath section and 17 per cent along the Medlow Bath to Blackheath section. This increase in traffic would result in a worsening of the existing performance of the Great Western Highway unless it is upgraded.

The amount of road freight on the highway is projected to grow 20 per cent by 2036, without the proposal. With the rising freight task, there will be an increase of up to 700 more heavy vehicles each day (based on the current sized vehicles that are allowed on the Great Western Highway). This includes 19 metre B-

doubles and 20 metre Performance Based Standards (PBS) vehicles, which are already permitted on the highway.

As such, to address this, the Australian and NSW Government are investing more than $4.5 billion toward upgrading the Great Western Highway between Katoomba and Lithgow. To ensure that investment is delivering good value for people of NSW, we are making sure that we future proof the highway for different types of vehicles.

An increase in heavy vehicle size to Higher Productivity Vehicles (HPVs) would be able to carry more freight in one load. It is predicted that use of these types of vehicles could reduce the total truck trips by at least 15 per cent along the Great Western Highway (Great Western Highway Upgrade Program Road Freight in the Blue Mountains, TfNSW, 2022). Reduction of trucks on the highway would result in less congestion, safer roads and a better driver experience.

However, the aim of this proposal is not to introduce HPVs onto the highway. Any change to the types of heavy vehicles allowed on the Great Western Highway would be a decision of Government and would involve continued engagement with Blue Mountains City Council.

Further details are provided in the Traffic and Transport Assessment (Appendix I to the REF).

2.19.3 Safety

Submission number(s)

50, 93, 94

Issue description

- Concern that the proposal is not a cost-effective approach for improving safety along the highway and that reduction and enforcement of the speed limits should be considered. Other approaches for improving safety should be considered such as driver education, lowering the speed limit, traffic calming measures, speed cameras and substance testing by the police.
- How does the proposal contribute to the 2026 Road Safety Action Plan target.

Response

- The posted speed limits of the proposal are considered suitable based on the proposed design. The speed limit would ensure efficient free flowing traffic while minimising potential safety risks due to the adoption of feasible and reasonable traffic safety measures including those related to geometry, pavement, lighting and signage consistent with current Australian Standards, road design guidelines and industry best practice.

  The proposal would provide the opportunity to reduce potential crashes, as it would improve the design of the Great Western Highway through improved curves and gradients of the highway alignment and intersection upgrades with local roads.

  Lowering the speed limit is inconsistent with the program's objective to improve travel time on the Great Western Highway between Katoomba and Lithgow.

- The NSW Road Safety Action 2026 was not released during the preparation of the REF. However, the REF did discuss how the East project would be consistent with the Road Safety Strategy 2012 - 2021 and the Road Safety Plan 2021 in Section 2.1.1 of the REF.

Similar to how the proposal is consistent with those plans, the proposal would be consistent with the Road Safety Action Plan 2026. This includes providing the opportunity to reduce crashes and help achieve the targets set by the strategy by improving road safety, upgrading intersections, improving pedestrian and cyclist facilities and increasing capacity to reduce congestion. The proposal would also provide a better standard of road with improved safety through the separation of carriageways and the implementation of contemporary design standards.

2.19.4 Strategic need

Submission number(s)

8, 50

Issue description

- Current proposal design and Medlow Bath Upgrade (via surface widening) does not align with 5 identified directions from the Blue Mountains Community Strategic Plan 2035.
- Concern that the entire Great Western Highway Upgrade Program is not justified, given unknown construction cost and external costs and difficulty quantifying benefits of the project.
- The development of the proposal has not followed proper planning process, given that a transparent cost-benefit analysis has not been completed and alternative technologies, modes and options have not been considered. Public planning inquiries and an independently peer reviewed business case should also be carried out.

Response

- The REF for this proposal reviews the proposal against a number of strategic government and council policies, including the Blue Mountains Community Strategic Plan 2035. As mentioned in that section, the proposal would meet several strategies identified in the plan. Refer to Section 2.1 of the REF.

- A business case has been prepared for the full Great Western Highway Upgrade Program and is under consideration by government. The proposal's and Little Hartley to Lithgow Upgrade's business cases have been accepted by Infrastructure NSW (INSW). Given the level of information within, the business case will maintain its confidentiality to help drive value-creating competition from a wide range of participants during procurement processes and support a value-for-money outcome.

  All Transport business cases are developed in alignment with the Transport for NSW Business Case Guide (Transport for NSW, 2021), which supplements the general principles of existing NSW Government business case guidance to ensure due consideration is given to sufficiently assess a project's viability. This is independently assured by INSW.

  Further, in determining the viability of a road project, the issue of route standards also needs to be taken into account as each road project forms part of a National or State route.

  The historical development of the Great Western Highway between Katoomba and Blackheath has long focussed on surface widening. This is because there is no feasible alternate route that can bypass Medlow Bath without impacting the village, national park or Megalong escarpment. This is reflected in the Local Environmental Plan (LEP) reservations and corridor planning regimes dating back to the 1950's.

  The Great Western Highway Upgrade Program proposes to deliver 34 kilometres of four lane divided highway between Katoomba and Lithgow. The NSW Government has committed $2.5 billion in funding

towards the planning and construction of the duplication.

In November 2019, the strategic corridor for the proposed upgrade between Katoomba and Lithgow was put to the community for feedback. This included the previously reserved corridor from Mount Victoria to Lithgow and included the corridor between Katoomba and Mount Victoria. At this time the NSW Government also committed to examining the feasibility of providing tunnels under Blackheath and Mount Victoria.

The Australian Government has committed more than $2 billion in funding towards the East and West sections of the Great Western Highway Upgrade, between Katoomba and Blackheath, and between Little Hartley and Lithgow, respectively. The upgrade of the Great Western Highway between Katoomba and Lithgow, including Medlow Bath, is supported by reference to several strategic planning and policy documents including NSW Future Transport Strategy 2056 (Transport, 2018) and the NSW Freight and Ports Plan (Transport, 2018). The Proposal is needed to provide a safer and more efficient link between Central West NSW and the Sydney Motorway network for freight, tourist and general traffic.

The NSW Future Transport Strategy 2056 (Transport 2018) makes specific reference to “A focus on east-west connectivity is now essential to create a truly connected transport network, with initiatives for investigation including…Great Western Highway…improvements; each providing improved movement, road safety and/or travel time and reliability on key east-west corridors.”

The NSW Freight and Ports Plan 2018-2023 makes multiple references to the risk carried by forecast increases in traffic on critical supply routes with a specific action to improve “capacity enhancements crossing the Blue Mountains, including bypasses of Blackheath and Mount Victoria, duplication of the Great Western Highway from Katoomba to Forty Bends”

Further details on the options assessment for the proposal is discussed in Section 2.4 of the REF.

2.19.5 Support for the project

Submission number(s)

2, 6, 15, 24, 45, 69, 70, 72, 74, 79, 81, 27, 57, 82, 90, 92

Issue description

- Support for the proposal.
- Support for a dual-carriageway, however concern that the proposal would result in significant impacts to the highway.
- Support for improved freight access across the Blue Mountains.

Response

- Transport acknowledges the support for the proposal. Transport will continue to engage with the community through the future project stages.
- The Review of Environmental Factors have been undertaken for the proposal, the Medlow Bath Upgrade and Little Hartley to Lithgow Upgrade assessed the impacts of the projects and identified a range of mitigation measures to be identified to mitigate any impacts. In addition, cumulatively, the Great Western Highway program would not result in a significant impact.
- Transport acknowledges the support for improved freight access across the Blue Mountains. Transport will continue to engage with the community through the future project stages.

2.19.6 Alternate alignment - surface road

Submission number(s)

42, 51, 58, 78, 83, 86

Issue description

A number of alternative surface roads were suggested including:

- Great Western Highway and Bell's Line of Road or the electricity easement.
- alternate tunnel / surface road design via the Megalong Valley and Kanimbla Valley and for a bypass of Katoomba.
- alternate route between Sydney and the Central West.

Response

The historical development of the Great Western Highway between Katoomba and Blackheath has long focussed on surface widening. This is because there is no feasible alternate route that can bypass Medlow Bath without impacting the village, national park or Megalong escarpment. This is reflected in the Local Environmental Plan (LEP) reservations and corridor planning regimes dating back to the 1950's.

The Great Western Highway Upgrade Program proposes to deliver 34 kilometres of four lane divided highway between Katoomba and Lithgow. The NSW Government has committed $2.5 billion in funding towards the planning and construction of the duplication.

In November 2019, the strategic corridor for the proposed upgrade between Katoomba and Lithgow was put to the community for feedback. This included the previously reserved corridor from Mount Victoria to Lithgow and included the corridor between Katoomba and Mount Victoria. At this time the NSW Government also committed to examining the feasibility of providing tunnels under Blackheath and Mount Victoria.

The Australian Government has committed more than $2 billion in funding towards the East and West sections of the Great Western Highway Upgrade, between Katoomba and Blackheath, and between Little Hartley and Lithgow, respectively. The upgrade of the Great Western Highway between Katoomba and Lithgow, including Medlow Bath, is supported by reference to several strategic planning and policy documents including NSW Future Transport Strategy 2056 (Transport, 2018) and the NSW Freight and Ports Plan (Transport, 2018). The Proposal is needed to provide a safer and more efficient link between Central West NSW and the Sydney Motorway network for freight, tourist and general traffic.

The NSW Future Transport Strategy 2056 (Transport 2018) makes specific reference to "A focus on east-west connectivity is now essential to create a truly connected transport network, with initiatives for investigation including…Great Western Highway…improvements; each providing improved movement, road safety and/or travel time and reliability on key east-west corridors."

The NSW Freight and Ports Plan 2018-2023 makes multiple references to the risk carried by forecast increases in traffic on critical supply routes with a specific action to improve "capacity enhancements crossing the Blue Mountains, including bypasses of Blackheath and Mount Victoria, duplication of the Great Western Highway from Katoomba to Forty Bends"

The current performance of the corridor constrains local and inter regional traffic. Average daily traffic volumes vary from around 20,000 vehicles per day near Katoomba to around 8,500 vehicles per day towards Forty Bends. Traffic volumes are growing between 1-1.7 per cent per annum. There is a relatively high proportion of heavy vehicles along the corridor (between 12 and 24 per cent) with 18,500 tonnes of freight transported each day (10,300 towards Sydney and 8,500 towards the Central West).

Duplicating the highway from two lanes to four lanes would provide travel time savings for all traffic users and would largely maintain those savings well into the future. Without an upgrade, travel times would worsen, while congestion would continue to deteriorate beyond unacceptable levels.

The upgrade of the remaining 34 kilometres of two-lane highway along the Great Western Highway to dual carriageway can significantly improve safety, reduce congestion and improve overall resilience and provide capacity for future demands. Projected traffic demand for Great Western Highway does not warrant a second route crossing that would impact on the Greater Blue Mountains World Heritage Area. This was one of the design development criteria outlined in Section 2.3.2 of the REF adopted during initial options development for the proposal.

Section 2.4 of the REF provides further details on the historic route development, corridor route options and strategic and concept design options that were considered for the proposal and justification of the selection of the preferred option.

2.19.7 Alternate alignment - other

Submission number(s)

20, 29, 44, 50, 71, 78, 96, 102

Issue description

- Rather than upgrading the road and promoting more motor vehicle use, resulting in high carbon dioxide emissions, public transport infrastructure (including rail) should be improved.
- Suggestion for a very fast rail connection across the Blue Mountains to Sydney and for freight to be shifted onto the rail network through rail upgrades and inter modal facilities.
- Suggestion for alternate routes and operational features (e.g. tolls).
- Suggestion to invest in First Mile Last Mile rail infrastructure as an alternative to upgrading the Great Western Highway.
- Suggestion to straighten the railway so that the highway does not need to be realigned and additional underpasses and railway crossovers can be installed along the alignment.
- Suggestion to use a drive-on / drive-off rail flatbed rolling stock instead of a road upgrade to increase road freight capacity. This would be more cost-effective.
- Objection to the proposal due to impacts to local flora and fauna, their habitat and surface water and groundwater flows. Concern that an elevated highway on pylons/piers has not been considered.

Response

Refer to response in Section 2.19.6 (Alternate alignment – surface road).

The upgrade of the Great Western Highway between Katoomba and Lithgow, including Medlow Bath, is supported by reference to several strategic planning and policy documents including NSW Future Transport Strategy 2056 (Transport, 2018) and the NSW Freight and Ports Plan (Transport, 2018). The Proposal is needed to provide a safer and more efficient link between Central West NSW and the Sydney Motorway network for freight, tourist and general traffic.

The Great Western Highway is being upgraded alongside long-term rail and intermodal options (Transport, 2022b). The Great Western Highway carries around nine million tonnes of road freight each year, with seven million tonnes transported by rail. Upgrading the rail is no substitute for upgrading the highway as both are needed to meet future demand and address issues around safety, congestion and journey reliability.

The REF has assessed the impacts of the proposal on environmental and social factors, including biodiversity (Section 6.3 of the REF) and surface water and groundwater (Section 6.1 of the REF). An addendum biodiversity assessment (refer to Section 5.3 of this report) and an addendum surface water and groundwater assessment (refer to Section 5.1 of this report) were carried out for changes to the proposal. Refer to response in Section 2.3.2 in this report (biodiversity construction impacts) and Sections 2.21.2 and 2.21.3 (surface water and groundwater impacts) for further details.

In addition, Transport is committed to considering all suitable designs and construction methodologies for the twin bridges to reduce direct vegetation impacts and achieve better longer-term environmental outcomes. As noted in Section 4.4, further consideration of the twin bridges design and construction methodology has been carried out from the concept detailed in the REF. Another potential construction methodology has been identified as being feasible for the twin bridges. The potential alternative construction methodology would include:

- Balanced cantilever structure with only two piers (as opposed to the REF concept of box girders with eight piers)
- More traditional form of construction involving works from the ground up, and not incrementally launched.

2.19.8 Alternate alignment - tunnel

Submission number(s)

4, 5, 7, 8, 18, 23, 26, 28, 31, 37, 41, 45, 47, 49, 51, 58, 62, 63, 64, 65, 68, 69. 77 ,78, 80, 87, 89, 91, 100

Issue description

- Request to extend the tunnel from Blackheath to a location to the east of Katoomba or to provide a tunnel under Medlow Bath.
- Concern about the cost of the proposed twin bridges compared to a tunnel.
- Concern about inadequacy of options and alternatives considered during development of the proposal.
- Query about whether a cut and cover tunnel was considered under Medlow Bath as a cheaper alternative.
- Request for independent review of the design of Katoomba to Blackheath including the bypass of Medlow Bath and environmental impacts and provision of a tunnel across the Blue Mountains.
- Request for tunnel and consideration of rail and public transport as alternatives to a full road upgrade.

Response

Refer to response in Section 2.19.6 (Alternate alignment – surface road) regarding the options considered and history of the upgrade of the Great Western Highway.

In May 2021, the NSW Government announced that Transport would investigate the feasibility of a tunnel between Blackheath and Little Hartley.

Studies have confirmed that two identical (twin) tunnels, one eastbound and one westbound, around 11 kilometres long between Blackheath and Little Hartley is the most viable option and Transport will take this option forward for further development, community consultation and environmental investigation.

2.19.9 Alternate alignment - second route (non-specific)

Submission number(s)

16, 33, 35, 38, 39, 46, 52, 53, 54, 55, 56, 93, 94, 99

Issue description

- Concern about suitability of the proposal design to meet the needs of road users and the local community. Request for a bypass of villages impacted by the proposal to provide an accessible, flexible and user-friendly highway.
- Request for a bypass of Medlow Bath to be investigated and costed.
- Request for independent review of the design of Katoomba to Blackheath including the bypass of Medlow Bath and environmental impacts and provision of a second route across the Blue Mountains.

Response

Refer to response in Section 2.19.6 (Alternate alignment – surface road) regarding the options considered and history of the upgrade of the Great Western Highway.

2.19.10 Alternate alignment - safety upgrade of GWH

Submission number(s)

34, 38

Issue description

- In designing a road for 80km/hr, there would be increased biodiversity, visual, non-Aboriginal heritage, socio-economic, construction and Aboriginal heritage impacts. The increase in speed limit from 70km/hr to 80km/hr is not warranted for the length of road. Alternative designs with a 70km/hr speed limit should be considered (such as a safety upgrade or widening and straightening of the road corridor).
- Suggestion to upgrade the existing highway to minimise impacts to Aboriginal heritage.

Response

The proposal consists of the widening and straightening of the existing road corridor. This has resulted in a solution that minimises to the greatest extent practicable, environmental impacts. The only location where this is not possible is west of Pulpit Hill where the topography falls away from the road, necessitating a bridge structure solution. In this case, the existing highway is being repurposed as a local access road with a short term truck stop area. In Medlow Bath to Blackheath, the road is being duplicated, with the existing highway being used as either part of the operational traffic lanes or as short term truck stop area.

The proposal has considered the potential for Aboriginal cultural heritage impacts. A PACHCI stage 2 assessment was undertaken which found that as the existing highway was being upgraded in areas that have generally been historically disturbed, there was minimal risk of finding any site or artefacts. An AHIMS search also didn't find any known sites within the proposal area. However, since display of the REF, Transport has carried out further field investigations in conjunction with Aboriginal stakeholders to assess the revised proposal area. One new Aboriginal site (Scar Tree 1) was identified. Refer to Section 5.9 of this submissions report for further details. Transport will continue to consider Aboriginal heritage in the future stages of the proposal. In addition, an Unexpected Finds Procedure would be implemented during construction (Safeguard NA2) in the unlikely case that a potential artefact or item is found that will further assess and protect or appropriately manage the find.

2.20 Socio-economic, property and land use

2.20.1 Assessment methodology

Submission number(s)

37

Issue description

- Query about whether socio-economic impacts have been sufficiently assessed.

Response

As noted in Section 6.8.1 of the REF, the socio-economic impact assessment has been prepared for a 'moderate' level assessment as specified by Transport's Environmental Impact Assessment Practice Note – Socio-economic Assessment (EIA-N05) (Transport, 2020a). The moderate level of assessment has been adopted as it reflects the scale and magnitude of potential impacts to the socio-economic environment.

This assessment included a review of relevant statutory planning and legislative requirements, a site visit to the study areas, identification of the existing socio-economic environment of the study areas, identification and assessment of potential socio-economic impacts of the proposal and recommendation of safeguards to avoid, minimise and manage these potential impacts.

The significance of likely impacts has been assessed with consideration to the sensitivity and magnitude of the impacts, as outlined in Section 6.8.2 of the REF.

Further details on the socio-economic impact assessment are provided in Section 3 of Appendix J to the REF.

In addition, additional socio-economic, property and land use assessment was carried out for changes to the proposal (refer to Section 5.8 of this report).

2.20.2 Construction impacts

Submission number(s)

38, 40

Issue description

- Concern about clarity of messaging in the REF relating to impacts to local road users and residents during construction, including alternate routes, particularly during after hours and weekend work.
- Concern about personal safety, amenity and access during construction period, which would impact access to/from Katoomba and Blackheath via the Great Western Highway.

Response

- The construction of the proposal would be staged to allow the Great Western Highway to remain open to traffic during construction at all times. With the offline carriageways for each section constructed first and traffic switched onto the new carriageways while the second carriageway for each section is completed and redundant pavement is removed. In most cases, the construction would be undertaken away from live traffic, however, where work is required in proximity to live traffic, work zones would be

created behind safety barriers where construction work can be completed safely and during standard construction working hours, to avoid the need for lane closures. Further details about traffic management and controls on the Great Western Highway are provided in Section 3.3.8 of the REF.

As noted in Section 6.7.4 of the REF, there may be temporary changes in access arrangements for residents on Nellies Glen Road and Explorers Road. During construction of the new offline westbound carriageway in the Katoomba to Medlow Bath section, Nellies Glen Road would be temporarily closed to traffic as the intersection is reconstructed further east of the existing intersection. Access to residents near Pulpit Hill and for visitors to the Six Foot Track would be from Great Western Highway via Explorers Road. During this phase of construction, the right turn out from Explorers Road would be maintained. When work is occurring to the bridge structure over Explorers Road, the Great Western Highway / Explorers Road intersection would be closed and access to Explorers Road would be via the upgraded Nellies Glen Road intersection with movement temporarily permitted in all directions. During construction of the eastbound carriageway, access to Foy Avenue would be maintained from the highway via a temporary side-track with controlled access.
As noted in Section 3.3.4 of the REF, to reduce the overall construction timeframe of the proposal to provide relief to the Blue Mountains community from a number of longer term construction projects, Transport is seeking approval for 'extended construction hours' for this proposal. The proposed extended construction hours are:

- Monday to Friday: 6am to 7pm
- Saturday: 8am to 5pm
- Sunday and Public Holidays: no work.

This would provide additional work hours at the end of each day (Monday to Friday) and on Saturday afternoon. Extended construction hours would apply across the full length of the proposal and would be limited to daylight hours, with potentially shorter working periods throughout winter months.

Certain work may still need to occur outside these hours (known as night works) to minimise disruption to customers, pedestrians, road users and nearby sensitive receivers. Any night work would be undertaken in accordance with the Construction Noise and Vibration Guidelines (Roads and Maritime, 2016).

The construction program, including night and weekend work, would be confirmed by the construction contractor during the detailed design and pre-construction phases of this proposal. This program would include co-ordination of traffic management controls to minimise cumulative traffic impacts, particularly during peak holiday periods.

Transport and the construction contractor would continue to engage with the community and provide advanced notification of works, anticipated traffic change such as alternative routes and work arrangements.

- Transport acknowledges that the Great Western Highway is the respondent's only travel route to services in Katoomba and Blackheath and that they are concerned about access, safety and amenity impacts due to the proposal.

  As noted in Section 3.3.8 of the REF, the construction of the proposal would be staged to allow the Great Western Highway to remain open to traffic during construction and minimise impact to the travelling public. Construction of the off-line carriageways would occur first, including the construction of the twin bridges within the Katoomba to Medlow Bath section, while traffic remains on the existing highway. For the Katoomba to Medlow Bath section, the off-line carriageway would be the westbound carriageway. For the Medlow Bath to Blackheath section, the off-line carriageway would be the eastbound carriageway. Once complete, the traffic would be switched onto the new carriageways while

the second carriageway for each section is completed and redundant pavement removed. The upgraded sections would then be opened to traffic. As such, access would be maintained at all times for the community and emergency services.

In addition, safety measures would be implemented during construction to maintain the safety of all members of the community and construction workers. In most cases, the construction would be carried out away from live traffic. However, where work is required in proximity to live traffic, work zones would be created behind safety barriers where construction work can be completed safely and during standard construction working hours, to avoid the need for lane closures. Further details about traffic management and controls on the Great Western Highway are provided in Section 3.3.8 of the REF. In addition, Transport would consider opportunities for alternative transport arrangements to provide access for vulnerable community members who would normally access the Great Blue Mountains Trail (Safeguard SE8).

In accordance with Safeguard SE4, amenity impacts would be managed through other safeguards for the proposal, including those related to noise and vibration, visual changes, heritage and traffic. Details on these safeguards are provided in Section 6.2 of this submissions report.

2.20.3 Operational impacts

Submission number(s)

65, 67, 69, 93, 94

Issue description

- Concern that the proposal would not preserve the natural character and heritage of the Great Western Highway and would be detrimental to tourism.
- Concern about bringing the road closer to residential properties.
- Concern about devaluing properties due to increased noise and light pollution.
- Request for clarity around assessment of socio-economic cumulative impacts outlined in Sections 7.1.7 and 7.2.7 of Appendix J to the REF.

Response

- During operation, the proposal would improve connection to social infrastructure and provide new active transport opportunities along the Great Western Highway, including through increased road capacity, travel efficiency and improved access along the Great Western Highway, enhancements to the Pulpit Hill heritage interpretation area and provision of continuous active transport connections between Katoomba and Blackheath (refer to Section 3.2.3 of the REF for further details). The heritage interpretation area would be further developed as part of the Great Western Highway Upgrade Program via a cultural interpretation strategy, in consultation with the Blue Mountains City Council, Heritage NSW, Aboriginal knowledge holders and the local community.

  In addition, the provision of upgraded active transport trails would provide the opportunity to attract more tourism and active transport users to the area, through improved accessibility.

  An urban design and landscape strategy has been developed for the proposal from the urban design objectives and principles. These objectives include the development of an integrated design that fits with the existing high visual qualities, ecology and character of areas between townships in the Blue Mountains setting and to minimise impacts to the integrity of heritage sites, significant trees and cultural values of the community within the proposal. The urban design and landscaping strategies implemented

would be finalised during detailed design.

As a result, there would be long term positive impacts on access and connectivity for local and regional communities, business and industry. By improving transport connections to the Blue Mountains area, the proposal, along with other projects in the Great Western Highway Upgrade Program, would support and enhance existing tourism as well as create new economic development opportunities (supporting Transport's *Tourism and Transport Plan*).

- Transport understands the concerns about the proposal bringing the Great Western Highway closer to some residential properties. These impacts have been minimised during the development of the design and would be further minimised as far as practicable through detailed design and managed through implementation of the safeguards outlined in Section 6.2 of this submissions report.

  To minimise impacts from operational light spill, street lighting would only be provided at the three intersections in the Katoomba to Medlow Bath intersection. This would include appropriate screening as part of the landscaping design (Safeguard V6) and provision of at-property noise treatment for eligible sensitive receivers (Safeguards NV1, NV9 and NV10).

- Property values are driven by a range of economic, social and amenity factors. These may include housing supply and demand, interest rates, economic growth, local amenity and accessibility to such things as employment and social infrastructure. It is likely that broader external factors would influence property values more than perceived or actual impacts resulting from the proposal. Improvements to travel efficiency, reduced congestion and increase amenity through incorporation of active transport connections and heritage interpretation as part of the proposal are likely to improve liveability in the vicinity of the proposal.

  Transport acknowledges that some residents would experience temporary amenity impacts during the construction phase of the proposal. These impacts will be mitigated through the implementation of the suite of safeguards outlined in Section 6.2 of this submissions report.

- Cumulative socio-economic impacts have been assessed in accordance with Transport's *Environmental Impact Assessment Practice Note – Socio-economic assessment (EIA-N05)* (Transport, 2020). While the REF focuses on the potential environmental impacts of this proposal, it is important that these potential impacts are considered in their wider contextual surroundings. Cumulative impacts are those that may not be considered significant on their own but that may be more significant when considered in association with other impacts.

  Transport understands that Sections 7.1.7 and 7.2.7 of Appendix J to the REF indicate different levels of significance of cumulative impacts.

  Section 7.1.7 of Appendix J to the REF assesses potential cumulative socio-economic impacts *during construction*. The sensitivity of the community to cumulative impacts is considered to be high due to there being several surrounding projects, however the magnitude of these impacts to traffic and amenity would be moderate. This would result in high-moderate cumulative socio-economic impacts during construction.

  In contrast, Section 7.2.7 of Appendix J to the REF assesses potential cumulative socio-economic impacts *during operation*. During operation, the proposal and other projects identified in Section 6.11.4 of the REF would cumulatively substantially improve traffic movement between Katoomba and Lithgow, however, while still resulting in some amenity issues. These amenity issues would be addressed in part through a range of safeguards identified in section 6.2 of this submissions report. As a result, the magnitude of any negative impacts would be negligible.

These potential impacts would be minimised through Safeguards C1 to C3 outlined in Section 6.2 of this submissions report.

2.20.4 Coachhouse Lane

Submission number(s)

65, 93, 94

Issue description

- Concern that Coachhouse Lane would become a thoroughfare due to maintenance vehicles, local traffic and tourists using the road to access the new active transport trail. This would deprive residents of the security currently afforded to them.
- Request for further details about mitigation measures and compensation to be provided to residents of Coachhouse Lane.

Response

- Transport notes the concerns about Coachhouse Lane becoming a busy thoroughfare and impacts to the security which currently exists on Coachhouse Lane.

  During construction, vehicle and pedestrian access to Coachhouse Lane would be maintained at all times for residents and emergency services. Pedestrian access would only be available for pedestrians accessing Coachhouse Lane to and from the Medlow Bath village, as per the existing scenario. Where required, access would be maintained with appropriate safety measures such as traffic control. Construction workers would not require access to properties on Coachhouse Lane as no work would occur within the curtilage of any properties on Coachhouse Lane.

  During operation, access to properties would be maintained on Coachhouse Lane as per the existing scenario. There may be an increase in active transport users along Coachhouse Lane taking advantage of the new active transport trail between Medlow Bath and Blackheath. However, the proposal would not provide a new vehicle through road to Blackheath, so any increase in traffic volumes would be minimal. Maintenance access to the national park would be on an as needed basis but not expected to generate large hourly increase in traffic.

- A number of safeguards and management measures have been identified in the REF to minimise adverse environmental impacts, including social impacts, which could potentially arise as a result of the proposal. Should the proposal proceed, these safeguards and management measures would be incorporated into the detailed design and applied during the construction and operation of the proposal. A Construction Environmental Management Plan (CEMP) would be prepared to describe the safeguards and management measures identified (Safeguard GEN1). The CEMP would provide a framework for establishing how these measures will be implemented and who would be responsible for their implementation. Many of these measures would minimise impacts to and support the residents of Coachhouse Lane, including Safeguards:
  - GEN2 – general notification of construction
  - NA10 – measures to minimise impacts to The Pines
  - NV1-NV8 – measures to minimise construction noise impacts
  - NV9-10 – measures to minimise operational noise impacts
  - TT1, TT6, TT7, TT8 – measures to minimise construction traffic impacts

- SE1, SE2, SE4 – measures to support ongoing communication and minimise construction socio-economic impacts
- C1, C2, C3 – measures to minimise cumulative construction impacts.

In addition, a total of 31 sensitive residential receiver buildings are predicted to have exceedances of the NCG operational road traffic noise criteria along the proposal length, including some receivers on Coachhouse Lane (refer to Section 6.6.4 of the REF). These receivers are eligible for consideration of 'additional noise mitigation' and have been notified of their eligibility directly by Transport. These works would be undertaken prior to construction of the proposal to assist in mitigate construction noise as well as operational road noise.

Transport commits to ongoing consultation with residents on Coachhouse Lane. Feedback from these residents and the broader community is welcomed at all times. The project team are always able to be contacted via 1800 953 777 or ***gwhd@transport.nsw.gov.au***.

2.21 Surface water and groundwater

2.21.1 Assessment methodology

Submission number(s)

18, 27, 28, 93, 94

Issue description

- Request for increased severity of rainfall in the future to be considered in the design due to recent extreme floods and impacts of climate change.
- Concern that impacts on the World Heritage Area or the Sydney drinking water catchment have not been sufficiently assessed.
- Query about whether runoff into Cascade Dams has been assessed in the REF.

Response

- Consideration of potential climate change is a crucial factor in assessing the impacts of this proposal, as it has the potential to influence the general environmental water balance as well as groundwater availability, soil and water salinity and water quality. As noted in Section 6.1.1 of the REF, a climate change assessment comprising a high-level local climate assessment has been carried out for the proposed drainage system. This system has been developed with sufficient capacity to account for any changed in localised flood intensity caused by higher intensity of rainfall due to climate change.

  In addition, as noted in Section 3.2.3 of the REF, the pavement drainage pit and pipe network has been designed to achieve flood immunity for a ten per cent annual exceedance probability (AEP) flood event and the transverse drainage network would be designed to achieve flood immunity for a one per cent AEP flood event. The pavement drainage network would also incorporate overland flow routes through the proposed road pavement and landscaped areas to provide capacity in storm events. The provision of detention would match or reduce the existing one per cent AEP discharge flow rate to the downstream environment.

- Transport, for the proposal, has identified that surface water issues were a key concern due to the proximity of the Blue Mountains National Park and the Katoomba and Blackheath Special Areas. As such, a detailed assessment of surface water and groundwater was undertaken (refer to section 6.1 of

the REF). As part of this assessment, MUSIC computer modelling has been undertaken that analyses the effect of the water quality treatment system to make sure that the design would protect existing water quality. The MUSIC modelling was revised (refer to Section 5.1 of this report) for changes to the proposal to make sure that these changes would also protect existing water quality. This water quality treatment system was developed in consultation with Blue Mountains City Council and WaterNSW. Further information on the water quality management and treatment system of the proposal can be found in Section 3.2.3 of the REF.

A Neutral or Beneficial Effect assessment was undertaken as the proposal is within the Sydney Drinking Water Catchment. The assessment showed that the proposal would have a beneficial effect on the surrounding water quality, including in the Blackheath and Katoomba Special Areas. This is due to the proposal capturing and treating all surface runoff from the highway. The section of the national park adjacent to the Medlow Bath to Blackheath section is not part of the Greater Blue Mountains World Heritage Area.

- During construction, work near and across Megalong Creek and Back Creek would pose the highest risk to surface water flows, turbidity and water quality in the Katoomba to Medlow Bath section during construction. The tributaries which flow into Cascade Dam would not be directly impacted by construction of the proposal as it does not intercept them. The slope of the existing road corridor falls away from those tributaries and in some cases there are sharp increases of the topography which act as barriers. There is also the existing railway corridor between the proposal and these tributaries. Water from the proposal would be diverted away from the tributaries during construction under the proposed erosion and sediment controls (in accordance with Safeguards SGW1 and SGW2).

  Groundwater flow interruption is not anticipated due to the localised nature of the piling works during construction (near the twin bridges and retaining walls). Groundwater contamination to the Cascade Dams is not anticipated to occur with the proposed mitigation measures in place (refer to Safeguard SGW1).

  During operation, the proposal would have a beneficial effect on water quality (refer to Section 6.1.3 of the REF and Section 5.1.3 of this report). This assessment considers all surface water run-off from the proposal, including runoff into the Cascade Dams. Under the proposed drainage design, the road alignment within the Katoomba to Medlow Bath section would drain to the west of the alignment (i.e. away from Cascade Dams), except at the following locations:

  - Ch. 260 – The existing drainage outlet from the road alignment would be maintained. While the proposed drainage network would connect to this existing pipe, the proposed catchment when compared to existing conditions would remain unchanged with only kerb alignment and grading changes to the road.
  - Ch. 780 – The existing drainage outlet would be removed and replaced with a new drainage outlet, with a small catchment draining to this point. The flows which would discharge to this point would be less than the existing flow rates. A GPT would be provided to meet the WaterNSW NorBE water quality targets.
  - Ch. 2360 and Ch. 2860 – The proposed road alignment would discharge to the existing drainage pipes which cross the rail corridor to the east at these locations. A combined onsite detention/water quality basin would be provided on the western side of the alignment to make sure that the flow rates are less than or equal to existing flow rates and that the water quality discharge meets the WaterNSW NorBE requirements as well as Transport's sustainability guideline targets. By meeting the Transport sustainability guideline targets, the proposal would provide better discharge quality than what is required by WaterNSW.
  - Ch. 3340 – A new cross drainage pipe would be provided draining to the east to replace the existing cross drainage pipe. The discharge point would be to the existing railway channel on the upstream

side of the rail alignment (as per the existing drainage network). There would only be upstream runoff conveyed across the road alignment, with no road carriageway runoff directed to this pipe.

2.21.2 Construction impacts

Submission number(s)

93, 94

Issue description

- Request for further information about impacts on small perched aquifers.

Response

As noted in Section 6.1.3 of the REF, earthworks associated with road construction are generally likely to be shallow and unlikely to intercept larger groundwater systems during most construction activities. However, due to the potential for perched aquifers in the proposal, it is possible that groundwater could be intercepted in localised areas. While dewatering is not anticipated, should shallow groundwater be intercepted, the quality of the groundwater would be considered to determine whether the groundwater can be returned to the ground (i.e. allowed to seep back into the groundwater table or required to be treated or disposed offsite.

Piling for bridge and retaining wall construction in the Katoomba to Medlow Bath section may be more likely to intercept groundwater resources due to the increased depth of ground penetration. Groundwater flow interruption is not anticipated due to the localised nature of the piling work during construction. If groundwater was to be intercepted during piling, construction contaminants may be introduced into the groundwater aquifers. These impacts would be short-term. Further monitoring would be carried out to evaluate the existing condition and monitor impacts of the proposal on groundwater. This would include implementation of a construction groundwater management plan as part of the Soil and Water Management Plan (SGW1) which would provide information on groundwater conditions for design, construction and operation of water quality basins and enable monitoring of pollution originating from stormwater seeping into the groundwater.

Further geotechnical and groundwater investigations would be undertaken during detailed design which would further identify applicable management procedures in terms of perched aquifers if the proposal is likely to intersect them. Transport is commencing a groundwater and surface water monitoring program to measure and monitor water quality across the program before, during and after construction (Safeguard SGW1).

2.21.3 Operational impacts

Submission number(s)

27, 37, 38, 41, 45, 93, 94

Issue description

- Concern about environmental impact of surface water runoff and soil erosion within the Sydney drinking water catchment due to vegetation clearance and increase in impervious surfaces. Concern about increases in damaging runoff to surrounding environments, including the Blue Mountain Swamps, and impacts to endangered species in the swamp unless runoff is carefully managed.
- Concern about additional run-off associated with additional hard surfaces on active transport trails.

- Concern about the impacts to and lack of intention to improve quality of overland flow to the Cascade Dams in the REF.

Response

- Transport notes the respondents' concern about the proposal's impacts on surface water runoff, including due to changes in impervious surface area.

  Transport also notes that the proposal passes through the Katoomba Special Area and the Blackheath Special Area and that the twin bridges are located near the Blue Mountains Swamp TEC. As a result of this environmental sensitivity, design development criteria were established for the proposal (refer to Section 2.3.2 of the REF), including the criterion to adopt water quality control measures to improve the management of stormwater out flows into the Sydney drinking water catchment especially through the Blackheath Special Area.

  The REF included extensive design development of construction and operational water quality measures to be implemented for the proposal. This design was undertaken in consultation with WaterNSW and Blue Mountains City Council through regular meetings during the development of the concept design. The design has considered changes in impervious surface area in the sub-catchments draining to each drainage basin.

  MUSIC modelling has been undertaken to evaluate the water quality treatment system to make sure that the design would protect existing water quality. The MUSIC modelling was revised (refer to Section 5.1 of this report) for changes to the proposal to make sure that these changes would also protect existing water quality. As per the guidelines which require that a Neutral or Beneficial Effect assessment needs to be undertaken as the proposal is within the Drinking Water Catchment, the assessment showed that the proposal would have a beneficial effect on the surrounding water quality. This is due to the proposal capturing and treating all surface runoff from the highway. The beneficial effect on water quality would minimise hydrologic impacts to surrounding sensitive environments, including the Blue Mountains Swamp TEC habitat. Further information on the water quality management and treatment system of the proposal can be found in Section 3.2.3 of the REF. The proposed water quality basin locations are shown in Figure 3-1a-f and Figure 3-2a-e of the REF.

  Section 3.2.3 of the REF identifies the pavement drainage pit and pipe network that has been designed to achieve flood immunity for a ten per cent annual exceedance probability (AEP) flood event and the transverse drainage network would be designed to achieve flood immunity for a one per cent AEP flood event. The pavement drainage network would also incorporate overland flow routes through the proposed road pavement and landscaped areas to provide capacity in storm events. The provision of detention would match or reduce the existing one per cent AEP discharge flow rate to the downstream environment.

  The water quality treatment system would be developed further during detailed design (including confirmation of the extent of scour protection developed in consultation with WaterNSW), which would minimise any potential for scour to occur at the outflow points from the system (SGW7).

- During construction, work near and across Megalong Creek and Back Creek would pose the highest risk to surface water flows, turbidity and water quality in the Katoomba to Medlow Bath section during construction. The tributaries which flow into Cascade Dam would not be directly impacted by construction of the proposal as the proposal does not intercept them. The slope of the existing road corridor falls away from those tributaries and in some cases there are sharp increases of the topography which act as barriers. There is also the existing railway corridor between the proposal and these tributaries. Water from the proposal would be diverted away from the tributaries during construction under the proposed erosion and sediment controls (in accordance with Safeguards SGW1

and SGW2).

Groundwater flow interruption is not anticipated due to the localised nature of the piling works during construction (near the twin bridges and retaining walls). Groundwater contamination to the Cascade Dams is not anticipated to occur with the proposed mitigation measures in place (refer to Safeguard SGW1).

During operation, the proposal would have a beneficial effect on water quality (refer to Section 6.1.3 of the REF and Section 5.1.3 of this report). This assessment considers all surface water run-off from the proposal, including runoff into the Cascade Dams. Under the proposed drainage design, the road alignment within the Katoomba to Medlow Bath section would drain to the west of the alignment (i.e. away from Cascade Dams), except at the following locations:

- Ch. 260 – The existing drainage outlet from the road alignment would be maintained. While the proposed drainage network would connect to this existing pipe, the proposed catchment when compared to existing conditions would remain unchanged with only kerb alignment and grading changes to the road.
- Ch. 780 – The existing drainage outlet would be removed and replaced with a new drainage outlet, with a small catchment draining to this point. The flows which would discharge to this point would be less than the existing flow rates. A GPT would be provided to meet the WaterNSW NorBE water quality targets.
- Ch. 2360 and Ch. 2860 – The proposed road alignment would discharge to the existing drainage pipes which cross the rail corridor to the east at these locations. A combined onsite detention/water quality basin would be provided on the western side of the alignment to make sure that the flow rates are less than or equal to existing flow rates and that the water quality discharge meets the WaterNSW NorBE requirements as well as Transport's sustainability guideline targets. By meeting the Transport sustainability guideline targets, the proposal would provide better discharge quality than what is required by WaterNSW.
- Ch. 3340 – A new cross drainage pipe would be provided draining to the east to replace the existing cross drainage pipe. The discharge point would be to the existing railway channel on the upstream side of the rail alignment (as per the existing drainage network). There would only be upstream runoff conveyed across the road alignment, with no road carriageway runoff directed to this pipe.

2.21.4 Safeguards and management measures

Submission number(s)

60

Issue description

- Request for erosion and sediment control safeguards to be implemented before, during and after construction.

Response

Indicative construction erosion and sediment control measures are outlined in Section 6.1.4 of the REF. A preliminary Erosion and Sedimentation Management Plan (ESMR) and Erosion and Sedimentation Control Plans (ESCP) were also developed to inform the REF (refer to Appendix D to the REF). The ESMR and ESCPs have been revised to assess changes to the proposal (refer to Appendix B). These would be further developed by a Soil and Water Management Plan and updated Erosion and Sedimentation Management Plan (ESMR) and Erosion and Sedimentation Control Plans (ESCP) prior to construction and implemented throughout construction in accordance with safeguards SGW1 and SGW2 in Section 6.2 of this

submissions report. In accordance with Safeguard SGW6, where possible, permanent drainage structures including water quality basins will be installed as early as possible to facilitate effective separation of clean offsite and dirty onsite water.

Throughout the development of the REF, Transport has held ongoing meetings with WaterNSW and Blue Mountains City Council to discuss the operational stormwater runoff management and treatment. These meetings have resulted in a robust management and treatment process that will result in a beneficial water quality effect to the surrounding area. Appropriate stormwater detention and water quality control measures are outlined in Section 3.2.3 of the REF and include safeguards SGW1 – SGW7 in Section 6.2 of this submissions report.

2.22 Traffic and transport

2.22.1 Assessment methodology

Submission number(s)

50

Issue description

- Concern that traffic modelling for the proposal has occurred in isolation and has not considered the surrounding road network.
- Concern that induced demand is not considered in the traffic and transport modelling for the REF.
- Freight efficiency was not adequately addressed in this REF.

Response

- The traffic and transport modelling carried out for the proposal was carried out using SIDRA modelling software in the Katoomba to Medlow Bath section and using a mid-block capacity analysis in accordance with the *Austroads Guide to Traffic Management Part 3* guidelines in the Medlow Bath to Blackheath section. The traffic model encompasses the highway within the proposal area as well as all connecting local roads.

  Future year traffic modelling considered traffic growth forecasts associated with implementation of the proposal as well as across the broader network context, including due to impacts of the Great Western Highway Upgrade Program (due to the heavy vehicle changes that would occur with the Blackheath to Little Hartley Upgrade, two scenarios, with and without this upgrade were modelled) on route choice for traffic. Refer to Section 2.6 of the Traffic and Transport Assessment (Appendix I to the REF) for further details.

  In addition, within the Katoomba to Medlow Bath section, the SIDRA modelled assessed performance of the Great Western Highway at its intersection with three local roads within the proposal area, being Nellies Glen Road, Explorers Road and Foy Avenue.

- The traffic growth forecasts adopted in the traffic and transport assessment considered the number of heavy and light vehicles using the highway, as well as increases in efficiency of freight movement. Annual traffic growth was predicted to occur largely at a linear rate. However, the model assumed that in the scenario where the Blackheath to Little Hartley upgrade proceeded, the volume of freight transported would increase but the number of vehicles required to transport that freight would decrease. Refer to Section 2.6 of the Traffic and Transport Assessment (Appendix I to the REF) for further details. The improvement in capacity and overall road efficiency would also see a direct benefit for heavy

vehicles and freight transporters.

In addition, the two short-term truck stopping areas proposed as part of the proposal (one in the Katoomba to Medlow Bath section and one in the Medlow Bath to Blackheath section) are designed to aid the freight industry in supporting heavy vehicle operations while meeting their workplace goals within the prescribed heavy vehicle driving hours regulatory framework. This would improve the safety and efficiency of heavy vehicle operations along the Great Western Highway.

2.22.2 Existing environment

Submission number(s)

4, 6, 12, 38, 93, 94

Issue description

- Concern about existing traffic and transport conditions, where the highway is gridlocked every weekend and on long weekends.
- Important that the active transport trail is suitable for normal walkers.
- Concern about the safety of the existing section of highway between Katoomba and Medlow Bath.
- Request for clarification about heavy vehicle volumes that is identified as 23 or 22 per cent of total traffic volume in the REF but elsewhere Transport has indicated that it 40% of heavy traffic beginning or end their journey between Katoomba and Lithgow.

Response

- Transport acknowledges that the community's concern at the current performance of the Great Western Highway during peak travel periods, including long weekends. The proposal would improve the performance of the highway by increasing the capacity of the road and improving road safety.

  In the Katoomba to Medlow Bath section, operation of the proposal would result in good operation (Level of Service (LOS) A) at Nellies Glen Road, Explorers Road and Foy Avenue in 2026, 2031 and 2036 scenarios. This would mean that all intersections would operate at acceptable levels and would experience decreased delays.

  In the Medlow Bath to Blackheath section, the proposal would operate acceptably at LOS B in 2031 and 2036 under both weekend and weekday scenarios. In 2026, the proposal would have good operation (LOS A) for the westbound AM peak (6 – 9am) weekday, eastbound weekday and PM peak (4 – 7pm) westbound weekend scenarios.

  The improvement in capacity would also see improved traffic flow and less congestion through the long weekend periods, where traffic along the Great Western Highway becomes busy with travellers.

- The proposal would provide for upgraded active transport trails with a three-metre width and would be graded to be suitable for pedestrians and cyclists. During operation, the proposal would provide uninterrupted pedestrian and cyclist access between Katoomba and Blackheath. The sections of upgraded and proposed active transport trails would also comply with Transport's standards.

- Transport notes the respondent's concern about safety issues along the existing Great Western Highway between Katoomba and Medlow Bath. The proposal has been designed to reduce actual and perceived safety risks in accordance with the Great Western Highway Upgrade Program objectives outlined in Section 2.3.1 of the REF.

The proposal would deliver safety benefits to all road users by separating opposing lanes of traffic, upgrading intersections, improving the alignment and paving to current standards including widened shoulders, straightening curves and reducing gradients of the highway. This would reduce the occurrence of incidents and full road closures of the Great Western Highway. In addition, the proposal would provide improved access during traffic incidents or other emergency incidents including natural disasters.

- The traffic counts carried out in March and April 2021 have been analysed to identify average daily traffic volumes for the proposal (refer to Table 6-47 in Section 6.7.3 of the REF). On an average weekday, there was an average 22,680 vehicles in the Katoomba to Medlow Bath section and an average 20,596 vehicles in the Medlow Bath to Blackheath section. On an average weekend, there was an average 23,392 vehicles in the Katoomba to Medlow Bath section and an average 22,387 vehicles in the Medlow Bath to Blackheath section. Heavy vehicles currently make up about 16 to 23 per cent of 24-hour traffic on a weekday and about six to 14 per cent of 24-hour traffic on a weekend. In addition, about 40 per cent of all heavy vehicles on the highway begin or end their journey between Katoomba and Lithgow.

2.22.3 Coachhouse Lane

Submission number(s)

7, 8, 31, 45, 65, 93, 94

Issue description

- Noted that Coachhouse Lane is narrow and there is limited space for larger vehicles or guest vehicles, including requirement for property access to be maintained during construction and operation.
- Concern about long-term impact on Coachhouse lane due to use of the road by local traffic, maintenance vehicles and active transport users. Concern that security of the current cul de sac lifestyle would be removed and that Coachhouse Lane would be converted into a thoroughfare.
- Request for emergency entrance and exit from Coachhouse Lane to be maintained as an unlocked gate. Emergency egress from Coachhouse Lane would no longer be possible onto the westbound carriageway. Concern that this would reduce the safety of residents in Medlow Bath and prevent exit from Coachhouse Lane altogether if the blockage of the highway is at the Railway Parade traffic lights.

Response

- Transport notes the local access constraints along Coachhouse Lane and the concerns of residents about impacts of the proposal on access to their properties. The proposal would not require access to, or directly impact upon, private properties on Coachhouse Lane. Construction work would also avoid impacts to the nature strip in front of residences on Coachhouse Lane.

  During construction, vehicle and pedestrian access to Coachhouse Lane would be maintained at all times for residents and emergency services. When construction is occurring near Coachhouse Lane, this may require access to be managed by traffic control to maintain safe and efficient access for residents. Pedestrian access would only be available for pedestrians accessing Coachhouse Lane to and from the Medlow Bath village, as per the existing scenario. Where required, access would be maintained with appropriate safety measures such as traffic control.

  During operation, access to properties would be maintained on Coachhouse Lane as per the existing scenario. There may be an increase in active transport users along Coachhouse Lane taking advantage

of the new active transport trail between Medlow Bath and Blackheath. However, the proposal would not provide a new vehicle through road to Blackheath, so any increase in traffic volumes would be minimal. Maintenance access to the national park would be on an as needed basis.

- The upgraded dual-carriageway would have better safety outcomes than the existing Great Western Highway and would be less likely to result in a full closure of the highway due to a crash. The continuity of the barrier system proposed at Coachhouse Lane would offer better protection for residents than the existing gate from run-off type accidents (especially heavy or hazardous vehicles).

  There would be no access between the highway and Coachhouse Lane. Access for emergency services only would be provided between Coachhouse Lane and the active transport trail to attend to incidents in the National Park. No resident vehicular access would be allowed to the active transport trail to protect the adjacent national park and WaterNSW Blackheath Special Area.

2.22.4 Operational impacts

Submission number(s)

28, 46, 50, 52, 54, 55, 56, 57

Issue description

- Query about whether there would be improvement to Nellies Glen Road to accommodate additional traffic that would result from the proposal.
- Concern that the community was assured that entry and exit from Foy Avenue would be enhanced (and not diminished) and that this is not the case under the proposal. Concern that the proposed Foy Avenue intersection design would be inconvenient, result in congestion and provide a slower and less resilient route to the community.
- Concern that the proposal would not provide Level of Service A during the periods identified in the REF.
- Increasing road space and encouraging more car and truck use would do very little to reduce carbon emissions from transportation. Concern that negative externalities such as carbon dioxide emissions are not considered in the environmental assessment.
- Parking near the Pulpit Hill heritage interpretation area is not used for the heritage interpretation area, but rather as long-term parking for users of the Six Foot Track.

Response

- Any work on Nellies Glen Road away from its intersection with the Great Western Highway is outside the scope of this proposal.

  The proposal would upgrade the Great Western Highway / Nellies Glen Road intersection. This intersection is currently a priority controlled one-way intersection, with left-in westbound travel movements only permitted from the Great Western Highway into Nellies Glen Road. The left-out movement from Nellies Glen Road was removed in 2021 due to safety concerns.

  The proposal would realign this intersection further east to improve driver sight lines of traffic on the highway and reinstate the left-out movement at Nellies Glen Road removed in 2021 due to safety concerns would be reinstated, making the intersection left-in left-out only for westbound traffic.

- Following discussions with the community regarding Foy Avenue, Transport undertook an assessment of a potential seagull intersection for Foy Avenue to include a right turn onto the Great Western Highway. The assessment found that there was little traffic demand for the right turn at any time of the

day. The seagull intersection would be unsafe with traffic needing to merge with the eastbound traffic (which would be travelling at 80 kilometres per hour). In addition, there was a high risk of collision due to the speed environment and percentage of heavy vehicles.

The upgrade to Bellevue Crescent with a U-Turn bay and traffic lights provides a much safer arrangement to turn right onto the Great Western Highway as it would stop traffic on the highway, minimising the risk of collisions.

- The traffic and transport assessment carried out for the proposal identified that the proposal is anticipated to improve the performance of the highway. The traffic and transport modelling carried out for the proposal was carried out using SIDRA modelling software in the Katoomba to Medlow Bath section and using a mid-block capacity analysis in accordance with the Austroads Guide to Traffic Management Part 3 guidelines in the Medlow Bath to Blackheath section. The traffic model encompasses the highway within the proposal area as well as all connecting local roads.

  In the Katoomba to Medlow Bath section, operation of the proposal would result in good operation (Level of Service (LOS) A) at the three key intersections within the proposal area in 2026, 2031 and 2036, meaning that all intersections would operate at acceptable levels.

  In the Medlow Bath to Blackheath section, the proposal would operate acceptably at LOS B in 2031 and 2036 under both weekend and weekday scenarios. In 2026, the proposal would have good operation (LOS A) for the westbound AM peak (6 – 9am) weekday, eastbound weekday and PM peak (4 – 7pm) westbound weekend scenarios.

  Further details on the operational performance of the proposal are available in Section 6.7.4 and Appendix I of the REF.

- During operation, the proposal would improve efficiency, reduce congestion during peak periods, thereby reducing idling time and consumption of fuels in vehicles. Ongoing energy consumption for the proposal would be for Intelligent Transport Systems and minimal street lighting. The provision of the improved active transport network would encourage more active transport users to travel between Katoomba and Blackheath.
  In addition, implementation of Transport's *Future Transport 2056 Strategy* and *Future Energy Action Plan 2020-2025* as part of the proposal would result in long-term improvements in air quality. These policies contribute to the NSW Government *Climate Change Policy Framework*'s goal of net zero emissions by 2050. The successful implementation of the Action Plan and achieving the objectives and targets of the overarching Policy and Strategy would likely improve air quality in and around the proposal area in the long-term.
  Transport notes that the parking near the upgraded Pulpit Hill heritage interpretation area would be publicly accessible and available for members of the community to use. The heritage interpretation area has been designed to better connect users with the interpretation area via the improved visitor car parking and active transport trails.

3. Response to government agency submissions

3.1 Overview of submissions received

A total of six formal submissions were received from government agencies in response to the display of the REF, which have been responded to in the following sections.

This included submissions from:

- National Parks and Wildlife Service
- Crown Land
- Blue Mountains City Council
- WaterNSW
- National Trust
- Heritage Advisory Committee.

Transport has and will continue to consider any informal feedback provided by government agencies during detailed design and the construction of the proposal.

In summary, the issues raised by each individual government agency generally relate to the following topics:

3.1.1 National Parks and Wildlife Services

National Parks and Wildlife Services' submissions identified the following key issues:

- access to the National Park for maintenance
- property acquisition
- concerns about potential impacts on local hydrological conditions as part of the proposal.

3.1.2 Crown Land

Crown Land's submissions identified Crown land that would be impacted by the proposal.

3.1.3 Blue Mountains City Council

Blue Mountains City Council's submissions identified the following key issues:

- request for appropriate tie-ins on local roads and kerbs with existing infrastructure, active transport tie-ins and for new pathways and kerb ramps to comply with Council's standards
- concern for construction and operational impacts related to surface and groundwater
- request for further traffic impact analysis to the local road network.

3.1.4 WaterNSW

WaterNSW's submissions identified the following key issues:

- protection of the Blackheath Special Area in terms of fencing and not promoting public use of the area
- concern for construction and operational impacts related to the surface and groundwater
- request for further design clarification for the design of the basins
- request for ongoing consultation through the later stages of the project.

3.1.5 National Trust Blue Mountains Branch

National Trust's submissions identified the following key issues:

- the importance to minimise impact on biodiversity are carefully implemented and rigorously monitored
- concerns around the heritage impact on Pulpit Hill and the proposal design preventing future archaeological investigations on the heritage site
- suggestion of an alternative alignment to avoid impacts to Pulpit Hill.

3.1.6 Heritage Advisory Committee

Heritage Advisory Committee's submissions identified the following key issues:

- Concerns around the heritage impact on Pulpit Hill and the proposal design preventing future archaeological investigations on the heritage site.
- Suggestion of an alternative alignment to avoid impacts to Pulpit Hill
- Request for the Pulpit Hill site to receive State heritage listing.

3.2 National Parks and Wildlife Service

3.2.1 Consultation

Issue description – Request for further updates/consultation

- Support for Transport's commitment for ongoing consultation with NPWS and requests that NPWS be included in consultation identified in safeguards SE01 and GEN2.
- Suggestion for Transport to develop a communication strategy about impacts to the national park targeted at the general public.
- Request for copy of the determined REF to be provided to NPWS and notification at least four weeks before construction commences to NPWS and include contact details of the Transport communications team, Transport project coordinator, onsite primary contractor and the project website.
- Request for Transport to inform the community and relevant key local groups about the proposal in advance of the work commencing.

Response

Transport acknowledges NPWS' support for previous and current communication about the proposal and broader Great Western Highway Upgrade Program and thanks NPWS for their engagement in discussions to date.

Transport would provide National Parks and Wildlife Service (NPWS) a copy of the determined REF. In accordance with Safeguard GEN4, Transport would also provide NPWS at least four week's notification of when work is due to commence, including key contact details.

In accordance with Safeguard GEN2 and Safeguard SE1 (refer to Section 6.2 of this submissions report), Transport would provide notification to the general community and key stakeholders about the proposal. These safeguards have been amended to specifically call out NPWS, alongside other agencies who have made submissions to the REF. The Communication Plan outlined in Safeguard SE1 is a detailed communication strategy which would be developed and implemented as part of the CEMP and include communication of impacts related to the national park.

3.2.2 Environmental assessment process

Issue description – Environmental management

- The construction plans referred to throughout the REF should be included in any determination conditions of the proposal and should include the national park boundary as an exclusion zone. Support for mitigation measures GEN3 and GEN4. Recommendation that a construction environmental management plan and a Blue Mountains National Park Management Framework should be developed prior to construction.
- Request for Transport's decision to assess the proposal as multiple projects under Part 5.1 instead of a single project assessed under Part 5.2 of the EP&A Act as State Significant Infrastructure to be justified. Request for justification as to why the proposal does not require development consent or approval under State Environmental Planning Policy (Planning Systems) 2021 (i.e. State Significant Infrastructure).

Response

Transport has undertaken a Review of Environmental Factors (REF) under the EP&A Act 1979 Division 5.1 and examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity.

The statutory planning pathway for the proposal was established in accordance with the EP&A Act and the State Environmental Planning Policy (Transport and Infrastructure) 2021 (T&ISEPP). Section 2.109 of the T&ISEPP permits development on any land for the purpose of a road or road infrastructure facilities to be carried out by or on behalf of a public authority without consent. As the Proposal is for a road upgrade and duplication and is to be carried out by Transport for NSW, it can be assessed under Division 5.1 of the EP&A Act.

As part of this proposal's REF, a cumulative impact assessment was undertaken that considered the cumulative impacts of the proposal as well as Medlow Bath Upgrade and the Little Hartley to Lithgow Upgrade. Though it is not a requirement for a Division 5.1 proposal, the newly released cumulative impact assessment guideline for SSI (DPE) were used as a guide. Refer to Section 6.11 of the REF. This assessment found that, when the impacts of this proposal were considered cumulatively with the other projects in the Great Western Highway Upgrade Program, there would not be an increase to the extent that would change a non-significant impact to a significant impact.

The REF for this proposal found that it was unlikely to cause a significant impact on the environment and therefore it was not necessary for an EIS to be prepared and for approval to be sought from the Minister under Division 5.2 of the EP&A Act.

Additionally, the project was not likely to have an impact on matters of national environmental significance or the environment of Commonwealth land within the meaning of the *Environment Protection and Biodiversity Conservation Act 1999*. A referral to the Australian Government Department of Agriculture, Water and Environment (now the Department of Climate Change, Energy, the Environment and Water) was not required.

This proposal is only one part of the overall Great Western Highway Upgrade Program of works. Further upgrades have been proposed based upon available funding, project location, construction type and staging. Consideration was given to each of these projects being able to stand alone from each other in construction and when operational. This approach is consistent with the previous upgrades of the Great Western Highway.

Other upgrades including the Medlow Bath Upgrade and Little Hartley to Lithgow Upgrade projects have also been subject to assessment in accordance with the EP&A Act, with the appropriate statutory planning pathway selected as per each project's potential significance of impacts.

3.2.3 Statutory and planning

Issue description - Concern

- While not a statutory requirement, the NPWS management guidelines should have been considered in more places in the REF.
- NPWS has an interest in the other matters raised in the NPWS Adjacent Development Guidelines that are not directly addressed in Table 5-4 of the REF, particularly erosion and sediment control (Section 2.1 of the guidelines), stormwater runoff (Section 2.1 of the guidelines and which states in part the aim to ensure no detrimental change to hydrological regimes) and threats to groundwater dependent ecosystems (section 2.8, and which states in part that groundwater-dependent ecosystems in NPWS land are to be protected).

Response

The REF did not elaborate on the issues identified in the document Developments adjacent to National Parks and Wildlife Service lands (NPWS 2020). Table 3-2 below details these 10 issues and how they have been responded to by the proposal.

Table 3-1 Issues raised in Developments adjacent to National Parks and Wildlife Services lands (NPWS 2020)

Issue	Response / where addressed
Erosion and Sediment control	Appropriate erosion and sediment control measures are outlined in Section 6.1.4 of the REF. A preliminary Erosion and Sedimentation Management Plan (ESMR) and Erosion and Sedimentation Control Plans (ESCP) was also developed to inform the REF. An addendum ESMR and addendum ESCPs have been prepared to consider changes to the proposal (refer to Appendix B). A Soil and Water Management Plan and updated Erosion and Sedimentation Management Plan (ESMR) and Erosion and Sedimentation Control Plans (ESCP) will be prepared prior to construction in accordance with safeguards SGW1 and SGW2 in Section 6.2 of this submissions report.
Stormwater runoff	Throughout the development of the REF, Transport had ongoing meetings with WNSW and BMCC to discuss the operational stormwater runoff management and treatment. These meetings have resulted in a robust drainage and water quality management and treatment process that will result in a beneficial water quality effect. Appropriate stormwater detention and water quality control measures are outlined in Section 3.2.3 of the REF and include safeguards SGW1 - SGW7 in Section 6.2 of this submissions report.
Wastewater	The proposal would not produce any wastewater. All runoff from the proposal would be captured in the construction and operational drainage treatment process to be managed and treated prior to release back to the environment.
Pests, weeds and edge effects	The impact of pests, weeds and edge effects have been assessed in Section 6.3.3 and Appendix E of the REF. Biodiversity controls for these impacts are included in Safeguards B1 and B12 (refer to Section 6.2 of this submissions report). In addition, Safeguard GEN4, identifies that hygiene protocols would be put in place for works that are adjacent to the National Park boundary to manage the potential risk of pests and weeds.
Fire and the location of asset protection zones	Asset protection zones are not provided in this proposal. Transport will continue to manage ground cover within the Great Western Highway road corridor to reduce fuel loading and potential for fire ignition. Woody vegetation in the vicinity of the road will be actively managed, and roadside trees inspected for stability and safety following fire events.
Boundary encroachments and access	In accordance with Safeguard GEN4, a Blue Mountains National Park Framework would be prepared to manage potential impacts to the national park. It would include demarcation of the national park boundary during early work. All work would occur within the revised proposal area, subject to revocation of the land currently reserved under the NPW Act via an Act of

Issue	Response / where addressed
through NPWS land	Parliament. Refer to Section 3.2.4 [local access] of this submissions report for further details. Prior to works commencing, permanent boundary fencing would be installed along the boundary. Access for authorised personnel to established trails in the National Park would be maintained through locked gates.
Visual, odour, noise, vibration, air quality and amenity impacts	An assessment of amenity impacts for the proposal are detailed in Section 6 of the REF, with safeguards and management measures summarised in Section 6.2 of this submissions report.
Threats to ecological connectivity and groundwater dependent ecosystems	The REF details the potential impacts of the proposal to ecological connectivity and groundwater dependent ecosystems (refer to Section 6.3 of the REF). Safeguards B1, B2, B3, B7, B8, B9, B10, B13, B14 and B15 have been developed to further manage potential impacts (refer to Section 6.2 of this submissions report).
Cultural heritage	Non-Aboriginal heritage and Aboriginal cultural heritage have been assessed in Section 6.4 and Section 6.9 of the REF respectively. Further assessment of heritage has been undertaken as part of the Submissions Report due to the changed extents of the proposal. These investigations identified evidence of historical non -Aboriginal development in the northern extent of the revised proposal area, none of these features would be impacted by the revised proposal. The addendum ACHAR also identified a scarred tree in the Blue Mountains National Park that would be impacted by the revised proposal. Further assessments of these impacts are detailed in Section 5 of this report. Safeguards and management measures to protect cultural heritage are outlined in Section 7.2 of the REF and in Section 6.2 of this report. The Great Western Highway cultural interpretation strategy would interpret both Aboriginal and non-Aboriginal heritage along the highway alignment.
Access to parks	In accordance with the Blue Mountains National Park Management Framework (refer to Safeguard GEN4), access to existing trails within the national park would be maintained via locked access gates along the proposed national park boundary during construction and operation for permitted vehicles only, including WaterNSW, NPWS, RFS, utilities providers and their contractors, as per the existing scenario. The proposal would not provide public access into the Blue Mountains National Park, where public access is not currently permitted.

In addition to the items of interest to NPWS identified in Table 5-4 of the REF, the proposal would minimise impacts to:

- soils, surface water and groundwater, including through implementation of erosion and sediment control measures and by managing stormwater runoff through the proposal's drainage design (refer to Section 6.1 of the REF)
- groundwater dependent ecosystems, including through avoidance of impacts to groundwater dependent ecosystems located within NPWS land (refer to Section 6.3 of the REF).

Issue description – Property acquisition

- The REF contains contradictory statement about whether or not acquisition of NPWS land would occur prior to or after determination of the REF. Note that Transport would be required to exclude from its determination any work requiring revocation until that decision has occurred via an Act of Parliament.
- Clarification about the permissibility of the proposal under the NPW Act as being the primary reason for the need for revocation.
- Request for land proposed for revocation to be clearly identified in the REF. Concern that Figures 3-14, 3-15c and 3-15d do not show the proposed future national park boundary and so show work on NPWS land which is not permissible.

Response

- Transport submitted a proposal to revoke a section of national park estate in the Medlow Bath to Blackheath section of the proposal in 2021 (as shown in Figure 3-17a-b in Section 3.6.2 of the REF). The revocation submission addresses the requirements of NPWS Revocation, recategorisation and road adjustment policy, including an outline of the potential impacts of the revocation. A compensation package will also be negotiated with NPWS. This revocation would transfer ownership of the land to Transport

  Transport intends to exclude from its determination any work requiring revocation until such time that a decision has occurred, via an Act of Parliament. Subject to the revocation being passed by Parliament, the proposal can proceed by virtue of Section 2.109 of the Transport and Infrastructure SEPP. The proposal would be permissible without consent.

- Transport notes that the section of the proposal in the Medlow Bath to Blackheath section which is on land reserved under the NPW Act is not covered under Section 2.109 of the Transport and Infrastructure SEPP and therefore Transport cannot solely determine the proposal on that land. The lands are required to be excluded from NPWS estate to allow the proposal to proceed.

  Lands reserved under the NPW Act will generally only be revoked as a last resort and where no other practical options are available. If not, the development cannot proceed as it would encroach upon the park. For the land to be transferred to Transport under Part 11 of the NPW Act, it would need to be revoked from the gazetted park by an Act of Parliament.

  Transport intends to exclude from its determination any work requiring revocation until such time that a decision has occurred, via an Act of Parliament. Subject to the revocation being passed by Parliament, the proposal can proceed by virtue of Section 2.109 of the Transport and Infrastructure SEPP. The proposal would be permissible without consent.

- Figure 4-1 of the REF shows that the REF proposal area is entirely within the proposed Blue Mountains National Park revocation for the Great Western Highway Upgrade Program. As such, all work shown within the REF proposal area would be permissible, subject to revocation of that section of national park estate via an Act of Parliament.

  Transport intends to exclude from its determination any work requiring revocation until such time that a decision has occurred, via an Act of Parliament. Subject to the revocation being passed by Parliament, the proposal can proceed by virtue of Section 2.109 of the Transport and Infrastructure SEPP. The proposal would be permissible without consent.

3.2.4 Proposal design (road/civil)

Issue description – local access

- Clear instructions are to be provided as part of any operation documents produced by Transport to ensure no unauthorised works, access or encroachments occur in Blue Mountains National Park
- NPWS requires the installation of fences along the boundary with the national park, designed in consultation with NPWS Upper Mountains Area, to define boundaries to minimise the potential for future encroachments onto NPWS estate
- No access to or temporary works on park (such as for investigations, monitoring or temporary construction compounds) are to occur as part of this proposal unless authorisation is granted by NPWS under the *National Parks and Wildlife Act 1974* (NPW Act) or the National Parks and Wildlife Regulation 2019. In particular, the park is not to be used to gain access to the development site or for the storage of materials, equipment, workers' vehicles or machinery at any time.
- Recommendation for the following measures to be included as safeguards for the proposal:
    1. Ensure clear direction is provided as part of all operation documents that the park is classified as a restricted area, and that environmental safeguards are in place to protect the interface between the park and the proposal.
    2. Apply procedures to ensure demarcation of the park boundary occurs before works commence and that such demarcation remains a visually obvious barrier during all operations.
    3. Ensure staff and contractors are adequately briefed on park boundary management protocols and procedures and restrictions applying to the protection of the park before commencement of works.
    4. Ensure all operational documentation contains clear procedures for incident management should issues arise on the interface or directly affecting park. Procedures should include emergency reporting via the Environment Line on 131 555 and in writing to the Manager, NPWS Upper Mountains Area.
    5. No ancillary construction related facilities, utilities or access are to be provided on park.
- Request for details of fencing to the common boundary with the national park to be confirmed in consultation with NPWS Upper Mountains Area.
- Remediation of the park interface should include suitable methods to stabilise exposed cuts and batters, to be applied where cut/fill is proposed proximate to the park. The addition of native vegetation is recommended where viable.
- Support that access to NPWS lands would be maintained at all times during construction.
- Concern that the proposal has not considered access to existing park management trails. Request for access to NPWS lands to be maintained during the operation of the proposal. Recommendation for discussions with NPWS Upper Mountains Area to achieve an appropriate design response.

Response

Transport is aware that the Blue Mountains National Park within the Medlow Bath to Blackheath section is currently not publicly accessible due to its location within the Blackheath Special Area. These arrangements would be maintained during construction and operation of the proposal.

Investigations carried out to date within the Blue Mountains National Park to inform the environmental assessment in this REF and proposal design have occurred with the permission of NPWS.

Construction would only occur within the proposal area identified in Figure 4-1a-b, subject to the revocation of land currently reserved under the NPW Act within the proposal area. Work would not proceed within the section of land within the proposal area currently reserved under the NPW Act until the revocation of that land is passed by an Act of Parliament, meaning that work would only occur outside of the national park. Access to works adjacent to the National Park boundary would be via the road corridor and access tracks within the proposal footprint. Access would not be obtained through the National Park.

The proposal would not provide public access into the Blue Mountains National Park, where public access is not currently permitted. This would include establishing boundary fencing early in the construction phase, with locked access gates to maintain access for authorised personnel (WaterNSW, NPWS, RFS, utilities providers and their contractors, as per the existing scenario) along existing fire breaks and maintenance trails into the National Park. Mainline construction work adjacent to the national park boundary, including vegetation clearance, would only commence after permanently fencing is erected and water quality control devices are in place along the new boundary (Safeguard GEN5). The boundary fencing and locked access gate design would be finalised during detailed design subject to approval from NPWS and WaterNSW.

As per Safeguard GEN4 in Section 6.2 of this submissions report, a Blue Mountains National Park Management Framework would be established for the proposal prior to construction to minimise potential impacts of the proposal on the national park. The Blue Mountains National Park Management Framework would:

- Outline the boundary and fencing line
- Outline the water quality controls to be implemented during construction and identify requirements for ongoing management of stormwater runoff through operational water quality controls. These measures would manage impacts of sediment movement towards sensitive environments in the national park and surface water run-off during construction and operation of the proposal.
- Outline requirements for operational documentation, including incident management and environmental management procedures.

Safeguard GEN4 has been amended to include provision for Transport to consider during detailed design opportunities for remediation of the park interface, including stabilisation of exposed cuts and batters where batter slopes are proposed near the national park and inclusion of native vegetation where suitable.

All personnel working near the national park interface would receive training about the Blue Mountains National Park boundary protocols in accordance with Safeguard GEN3 (refer to Section 6.2 of this submissions report).

Transport would continue to consult with NPWS through the detailed design and construction phases to ensure that access for maintenance and emergency purposes is maintained to the national park. Transport will also consider protocols to allow access through the construction site if required to access the park.

Issue description – Drainage and water quality

- Need for erosion and sediment controls to be implemented to avoid increased risk of erosion or increased movement of sediment moving towards the national park due to the surrounding sensitive environments, including the upland swamps and World and National Heritage values of the areas.
- Measures to manage run-off from the construction area to ensure no increase in surface water flow (or stormwater) into the national park and no works are carried out near the national park during wet weather events.

Response

- Indicative construction erosion and sediment control measures are outlined in Section 6.1.4 of the REF. A preliminary Erosion and Sedimentation Management Plan (ESMR) and Erosion and Sedimentation Control Plans (ESCP) was also developed to inform the REF. These will be further developed by a Soil and Water Management Plan and updated Erosion and Sedimentation Management Plan (ESMR) and Erosion and Sedimentation Control Plans (ESCP) prior to construction in accordance with safeguards SGW1 and SGW2 in Section 6.2 of this submissions report.

  Throughout the development of the REF, Transport had ongoing meetings with WNSW and Blue Mountains City Council to discuss the operational stormwater runoff management and treatment. These

meetings have resulted in a robust management and treatment process that will result in a beneficial water quality effect to the surrounding area.

Appropriate stormwater detention and water quality control measures are outlined in Section 3.2.3 of the REF and include safeguards SGW1 - SGW7 in Section 6.2 of this submissions report.

The Blue Mountains National Park Management Framework (Safeguard GEN4) would also:

- Outline the water quality controls to be implemented during construction and identify requirements for ongoing management of stormwater runoff through operational water quality controls. These measures would manage impacts of sediment movement towards sensitive environments in the national park and surface water run-off during construction and operation of the proposal.
- Outline requirements for operational documentation, including incident management and environmental management procedures.

  Transport would consider during detailed design opportunities for remediation of the park interface, including stabilisation of exposed cuts and batters where batter slopes are proposed near the national park and inclusion of native vegetation where suitable.

- Indicative construction erosion and sediment control measures are outlined in Section 6.1.4 of the REF. A preliminary Erosion and Sedimentation Management Plan (ESMR) and Erosion and Sedimentation Control Plans (ESCP) was also developed to inform the REF. These will be further developed by a Soil and Water Management Plan and updated Erosion and Sedimentation Management Plan (ESMR) and Erosion and Sedimentation Control Plans (ESCP) prior to construction in accordance with safeguards SGW1 and SGW2 in Section 6.2 of this submissions report.

  Throughout the development of the REF, Transport had ongoing meetings with WNSW and Blue Mountains City Council to discuss the operational stormwater runoff management and treatment. These meetings have resulted in a robust management and treatment process that will result in a beneficial water quality effect to the surrounding area.

  Appropriate stormwater detention and water quality control measures are outlined in Section 3.2.3 of the REF and include safeguards SGW1 - SGW7 in Section 6.2 of this submissions report.
  The Blue Mountains National Park Management Framework (Safeguard GEN4) would also:

  - Outline the water quality controls to be implemented during construction and identify requirements for ongoing management of stormwater runoff through operational water quality controls. These measures would manage impacts of sediment movement towards sensitive environments in the national park and surface water run-off during construction and operation of the proposal.
  - Outline requirements for operational documentation, including incident management and environmental management procedures.

    Transport would consider during detailed design opportunities for remediation of the park interface, including stabilisation of exposed cuts and batters where batter slopes are proposed near the national park and inclusion of native vegetation where suitable.

Issue description – Request for further updates/consultation

- Current NPWS management trails and asset protection zones (APZ) will be impacted by the proposal and so may need replacing in consultation with NPWS Upper Mountains Area
- It is recommended that Transport commence discussions with NPWS Upper Mountains Area as to appropriate fire management and asset and community protection responses that would be required for the locality."

Response

Transport would continue to consult with NPWS during the detailed design phase of the proposal, including about asset protection zones, fire management and community protection.

3.2.5 Construction

Issue description - Construction methodology

- Note that it is assumed that no activities would be carried out outside the defined construction boundary.

Response

No construction activities would occur outside the proposal area shown in Figure 4-1a-b of this submissions report. Works on land adjacent to the National Park boundary would not occur until the erection of a permanent fence to demarcate the boundary.

3.2.6 Biodiversity

Issue description - Safeguards and management measures

- Concern that figures in the BAR (except Figure 2-1) do not show exclusion zones at the limit of clearing.
- Recommendation to ensure hygiene protocols are established and implemented for machinery, vehicles, equipment and materials to limit the introduction of foreign soil, plant matter or pathogens.

Response

- Exclusion zones would be provided around the proposal to identify no go areas and outlined in the Flora and Fauna Management Plan (refer to Section 6.3.4 of the REF). This includes a five-metre exclusion zone would be provided around the Blue Mountains Hanging Swamps TEC due to the sensitive nature of the threatened flora in this location, as shown on Figure 2-1 of the BAR. Other exclusion zones would be prepared during the detailed design and pre-construction phases of the proposal and be established during construction in accordance with the Flora and Fauna Management Plan.

  Separate to this, a vegetation clearing footprint would be developed for the project (the proposal footprint in the REF). This footprint would be the limit for any clearing. In areas adjacent to the National Park, a permanent fence would be constructed prior to vegetation removal to avoid any accidental clearing beyond the fence line.

- As stated in Safeguard GEN4, the Blue Mountains National Park Management Framework will include hygiene protocols for construction crews to implement through construction.

3.2.7 Non-Aboriginal heritage

Issue description – Construction impacts

- Recommendation to seek advice from the Department of Agriculture, Water and the Environment over the proposal (including revocation) and its potential impact on World and National Heritage values in the locality.

Response

Transport has undertaken a Review of Environmental Factors (REF) under the EP&A Act 1979 Division 5.1 and examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity.

The proposal was also not likely to have an impact on matters of national environmental significance or the environment of Commonwealth land within the meaning of the *Environment Protection and Biodiversity Conservation Act 1999*. A referral to the Australian Government Department of Agriculture, Water and Environment (now the Department of Climate Change, Energy, the Environment and Water) was not required. Transport has discussed the proposal with the Department.

The non-Aboriginal heritage assessment identified that the area of National Park to be revoked was identified as a nominated place to the National Heritage List. The assessment found: 'There would be direct impacts due to vegetation clearance, road widening and construction of associated drainage basins along the western periphery of the Greater Blue Mountains Area - Additional Values area. It would involve the removal of established native trees that contribute to the overall significance of the heritage item however the loss of these elements would not reduce the overall significance of the item.'

3.2.8 Aboriginal cultural heritage

Issue description – Issues with consultation

- Query about whether consultation with all relevant Aboriginal groups has been carried out as Appendix C (consultation) has not been provided and Section 1.2 of the Archaeological Survey Report does not identify the Gundungurra Aboriginal Heritage Association Incorporated or the Gundungurra ILUA agreement area.

Response

Consultation required under Stage 2 of PACHCI has been carried out for the proposal with key Aboriginal stakeholders. The Gundungurra ILUA agreement area has been identified in Table 2-1 (Section 2) and Section 4.1.1 of Appendix K to the REF.

Consultation occurred with Gundungurra Aboriginal Heritage Association Incorporated as part of the ACHAR completed for the Great Western Highway Upgrade Program (available as Appendix G to the Great Western Highway West REF).

3.2.9 Surface water and groundwater

Issue description - Construction and operational impacts:

- Concern about potential impacts on local hydrological conditions as a result of the proposal, including the construction and operational stages, and that increased runoff volume, frequency, flow rate and pollutant load as well as inappropriate discharge points each have potential to have a significant impact on adjacent groundwater dependent ecosystems including hanging swamps.
- Recommendation that stormwater management systems are designed and function to limit adverse impacts to surface water flow and water quality associated with the upgrades during construction and operation.

Response

- Transport notes NPWS' concern about the potential impacts of the proposal on local hydrological connections and groundwater dependent ecosystems (GDE). Section 6.1.3 of the REF identifies the potential impacts of the proposal on surface water and groundwater during construction and operation, including to GDEs.
- Potential impacts to the two aquatic GDEs located downstream of the bridge construction in the Katoomba to Medlow Bath section and due to construction work and potential leaks and spills to the identified GDE near the proposed westernmost drainage basin in the Medlow Bath to Blackheath section would be high due to potential of experiencing both surface and groundwater impacts if controls are not implemented. However, managing impacts to surface water and groundwater by implementing water quality treatment measures discussed in Section 6.1.4 of the REF would reduce the potential impacts to the aquatic GDEs.
- As per Safeguard SGW1, the CEMP would include a Soil and Water Management Plan (SWMP). This would be drafted based on the detailed design and the planned construction methodology. It would include sensitive site-specific practices and procedures to control surface water runoff during construction, including requirements due to the proposal's intersection with the Sydney Drinking Water Catchment.
- To minimise the impacts of increased impervious surface area and potential for scour during operation, the proposal includes several Gross Pollutant Traps (GPT), water quality basins and swales to retain and treat stormwater runoff (refer to Section 3.2.3 of the REF). The drainage design includes drainage pipes diverting dirty road water to six bioretention basins along the Katoomba to Medlow Bath section and five bioretention basins along the Medlow Bath to Blackheath section.

Issue description - Safeguards and management measures:

- Recommendation that application of adequate sediment and erosion control is utilised to limit the movement of sediment across the park interface in accordance with recognised standards such as the ‘Blue Book’.
- Recommendation that Erosion and Sediment Control Plans, Soil and Water Management Plans and Water Quality Management Plans developed for the proposal should include engineered structures (for instance riprap) to ensure there is no increased runoff volume, frequency, flow rate and pollutant load being discharged to receiving waterways in Blue Mountains National Park as a result of the development.
- Recommendation that Safeguard B8 in the REF be extended to apply to Blue Mountains National Park.

Response

- Indicative construction erosion and sediment control measures are outlined in Section 6.1.4 of the REF. A preliminary Erosion and Sedimentation Management Plan (ESMR) and Erosion and Sedimentation

Control Plans (ESCP) was also developed to inform the REF. These will be further developed by a Soil and Water Management Plan and updated Erosion and Sedimentation Management Plan (ESMR) and Erosion and Sedimentation Control Plans (ESCP) prior to construction in accordance with safeguards SGW1 and SGW2 in Section 6.2 of this submissions report.

Throughout the development of the REF, Transport had ongoing meetings with WNSW and Blue Mountains City Council to discuss the operational stormwater runoff management and treatment. These meetings have resulted in a robust management and treatment process that will result in a beneficial water quality effect to the surrounding area.

Appropriate stormwater detention and water quality control measures are outlined in Section 3.2.3 of the REF and include safeguards SGW1 - SGW7 in Section 6.2 of this submissions report, which reference the Blue Book.

The Blue Mountains National Park Management Framework (Safeguard GEN4) would also:

- Outline the water quality controls to be implemented during construction and identify requirements for ongoing management of stormwater runoff through operational water quality controls. These measures would manage impacts of sediment movement towards sensitive environments in the national park and surface water run-off during construction and operation of the proposal.
- Outline requirements for operational documentation, including incident management and environmental management procedures.

- In accordance with Safeguard GEN2, water quality controls to be implemented during construction would be identified as part of the proposal's Blue Mountains National Park Framework. This would include consideration of engineered structures to minimise impacts of the proposal to waterways within the Blue Mountains National Park. Details would also be provided in the Erosion and Sediment Control Plans, Soil and Water Management Plan and Water Quality Management Plan to be developed during detailed design.

- The Medlow Bath to Blackheath section of the proposal (adjacent to the Blue Mountains National Park) drains to five water quality basins, so that all runoff gets captured and treated prior to release. This has been developed based on MUSIC modelling and is detailed in the Preliminary Erosion and Sediment Control Plans. These plans would be further developed during detailed design.

3.2.10 Out of scope

Issue description

- Details on the NPWS compensation proposal are not included in the REF.

Response

As noted in Sections 3.6.2 and 4.2.3 of the REF, Transport will continue negotiate a compensation package with NPWS due to impacts of the proposal on land currently reserved under the NPW Act. This process is currently being progressed under a separate process with NPWS outside of the REF and submissions report. Transport notes that the section of the proposal in the Medlow Bath to Blackheath section which is on land reserved under the NPW Act is not covered under Section 2.109 of the Transport and Infrastructure SEPP. The revocation of national park land is subject to the NPW Act and therefore Transport cannot solely determine the proposal on that land. The lands are required to be excluded from NPWS estate to allow the proposal to proceed.

3.3 Crown Land

3.3.1 Proposal design (road/civil)

Issue description - Property acquisition

- Identification of Crown land that would be affected by the proposal. Appropriate authorisation to occupy Crown land (including Crown roads) is required.

Response

Section 3.6.1 of the REF identifies Lot 208 DP1218075, Lot 178 DP751657 and Lot 215 DP751657 as Crown land which requires acquisition due to the proposal.

The proposal would also occur within two Crown roads, adjoining Lot 1 DP713158 at Watson Way and adjoining Lot 1 DP 712975 on the eastern end of the Medlow Bath to Blackheath section. As Transport proposes to use this road for the purpose of constructing a public road, acquisition of these Crown roads would not be required for the proposal.

3.4 WaterNSW

3.4.1 Construction

Issue description – Ancillary facility location

- Request that ancillary facilities already being established for the Great Western Highway Medlow Bath Upgrade be used for work in the Medlow Bath to Blackheath section instead of establishing the proposed ancillary facility in that section.
- If the Tennyson Road, Blackheath ancillary facility proceeds, request for additional and conservative management measures to be included in the CEMP and implemented to prevent contamination being mobilised.

Response

The proposal would reuse the Great Western Highway, Medlow Bath ancillary facility which would be established as part of the Medlow Bath Upgrade as a community information facility and office. The other ancillary facilities proposed as part of the Great Western Highway Medlow Bath Upgrade are either located within the Medlow Bath village or to the east of Medlow Bath in the Katoomba to Medlow Bath section of this proposal. They would not be suitable to support road construction activities to the Medlow Bath to Blackheath section of the proposal. As such, further ancillary facilities are required for this section of the proposal. The choice of ancillary facilities in this section of the proposal is constrained due to topography as well as existing development and infrastructure. The Tennyson Road, Blackheath ancillary facility is flat and located away from residences.

Potential impacts of the use of the Tennyson Road, Blackheath ancillary facility on surface water and due to contaminated land have been assessed in Sections 6.1.3 and Section 6.1.4 of the REF respectively. The ancillary facility would be sealed and erosion and sediment control measures implemented in accordance with Safeguards SGW1, SGW2, SGW3 and SGW4. The Contaminated Land Management Plan (refer to Safeguard SC1 in Section 6.2.4 of the REF) would outline the methodology for managing work with contaminated materials and require further investigation prior to construction of the extent, concentration and type of contamination to minimise mobilisation of contamination. The site-specific emergency spill plan

(refer to Safeguard SC2 in Section 6.2.4 of the REF) would provide measures to minimise the potential impacts associated with accidental leaks and spills during construction.

Issue description – Local access

- In addition, 24/7 access for WaterNSW staff and contractors must be maintained to the fire trails, and security measures implemented to prevent public access as are now in place (locked gate).
- Note that the B4 track requires an upgrade and maintenance regime for it to remain fit for purpose during construction.

Response

- Permanent locked access gates into the national park would be established as part of the proposal along the proposed national park revocation boundary. There would be security measures implemented to prevent public access as per the existing scenario. Access to the WaterNSW Blackheath Special Area would be maintained for WaterNSW, NPWS, RFS and utilities providers staff and contractors throughout construction by providing temporary or escorted access where required.
- The sections of the B4 track within the proposal area would be decommissioned during construction due to the proposed road design. Maintenance access would be provided during construction and formalised as part of the active transport trail, including for access to the proposed water quality basins, during operation of the proposal.

Issue description – Construction methodology

- What would the construction water supply be?

Response

As noted in Section 3.3.7 of the REF, water required for construction would be obtained from the town water supply.

3.4.2 Consultation

Issue description – Request for further updates/consultation

- Request for continued consultation with WaterNSW throughout the design and development of the Soil and Water Management Plan/Construction Environmental Management Plan and construction of the proposal.
- Request for RFS to be consulted about the proposal.
- Request for further consultation with WaterNSW during detailed design to resolve queries about the ESCPs, including a request for all required information to be included in the ESCPs rather than including references to separate documents.

Response

- Transport commits to ongoing consultation with WaterNSW during detailed design and construction of the proposal.
- Transport provided notification of the REF display to the NSW Rural Fire Service (RFS). Transport would continue to consult with the RFS during construction in accordance with Safeguard 06, to:
  - ensure emergency access is maintained during construction

- co-ordinate any bush fire emergency actions as outlined in the proposal's Bushfire Management Plan.

- Transport commits to ongoing consultation with WaterNSW during detailed design (in accordance with Safeguard SGW7) and construction (in accordance with Safeguard SE1).

3.4.3 Other impacts

Issue description – Operational impacts

- Concern that the active transport trail between Medlow Bath and Blackheath would increase the occurrence of users illegally accessing other parts of the Special Area and increase the risk of bushfire and impacts to water quality of the water supply.
- Request for cleared vegetation to be removed from the Special Areas and not used as mulch in roadside verges due to bushfire risk.

Response

- The proposed active transport trail in the Medlow Bath to Blackheath section would provide a new publicly accessible trail outside the Blue Mountains National Park within the road reserve between Coachhouse Lane, Medlow Bath and Valley View Road, Blackheath. Along the proposed national park boundary, security measures similar to the existing, including a fence line and locked gates would be installed to prevent access from the road reserve into the Blue Mountains National Park. The boundary fencing and access gate design would be finalised during detailed design subject to approval from NPWS and WaterNSW.

  Access to existing trails within the national park would be provided via these gates for permitted vehicles only, including WaterNSW, NPWS, RFS, utilities providers and their contractors, as per the existing scenario. As such, the potential for illegal access to the Special Area within the Blue Mountains National Park would remain similar to the existing scenario with security measures in place.

  The potential for there to be increased risk of bushfire due to illegal access would therefore also remain similar to the existing scenario. As noted in Section 6.10.1 of the REF, the proposal would also increase the width of the buffer zone across the existing highway, providing a larger cleared area that could increase the likelihood of the Great Western Highway remaining open during bushfire periods for evacuation purposes.

- The proposal is not intending to use mulch in the Medlow Bath to Blackheath section. However, hydromulching is currently proposed for bushland reconstruction in both sections of the proposal. Transport would engage with WaterNSW during detailed design regarding landscaping of the proposal.

3.4.4 Out of scope

Issue description - Property acquisition

- Note that the perimeter track in the Katoomba Special Area would require an upgrade if it were to be used for construction.

Response

The Katoomba to Medlow Bath section of the proposal does pass through the Katoomba Special Area, however it should be noted that the proposal area does not extend further east of the rail tracks towards the Cascade Dams and the perimeter track would not be used for construction purposes. As such, the proposal would not need to upgrade the perimeter track.

3.4.5 Proposal design (active transport)

Issue description – Proposal design feature

- Request for the B4 trail to remain open for 24/7 maintenance access for WaterNSW, NPWS, RFS and utilities providers. Request for active transport trail to not be used to balance the loss of recreational land elsewhere in the REF.

Response

Transport notes WaterNSW's objection to the establishment of the proposed active transport trail on the eastern side of the Great Western Highway in the Medlow Bath to Blackheath section. By proposing this new active transport connection, Transport is promoting improved recreational linkages between the villages of Medlow Bath and Blackheath. The new access trail would be within the road corridor. The National Park would be fenced from the road corridor, with locked gate access to existing firebreaks and trails (including B4 Realton Creek Trail and B5 Trail) maintained for maintenance, operations and emergency purposes for authorised personnel, as is that current situation. Transport is not promoting improved recreational linkages into sections of national park closed to public access due to its location within the Blackheath Special Area.

Issue description – Opposed to design feature

- Objection to the establishment of a new active transport trail on the eastern side of the Great Western Highway and improved recreational linkages with other sections of national park within the Blackheath Special Area. Concern that the impacts associated with clearing and earthworks required to construct the active transport trail between Medlow Bath and Blackheath are unnecessary given there is an existing track on the western side of the Great Western Highway, which should be upgraded instead.

Response

Transport notes WaterNSW's objection to the establishment of the proposed active transport trail on the eastern side of the Great Western Highway in the Medlow Bath to Blackheath section. By proposing this new active transport connection, Transport is promoting improved recreational linkages between the villages of Medlow Bath and Blackheath. The new access trail would be within the road corridor. The National Park would be fenced from the road corridor, with locked gate access only maintained for maintenance, operations and emergency purposes for authorised personnel, as is that current situation. Access to the locked gates for authorised personnel and vehicles would be via the maintenance trail. Transport is not promoting improved recreational linkages into sections of national park closed to public access due to its location within the Blackheath Special Area. The proposed extension of the trail also provides an essential service to allow access to maintain the water quality detention basins along the Medlow Bath to Blackheath alignment.

The existing active transport trail along Station Street on the western side of the Great Western Highway is outside of the scope of the proposal. Transport is not proposing upgrades to this trail as it would result in additional environmental impacts beyond those required for the proposed widening of the Great Western Highway.

3.4.6 Proposal design (drainage and water quality)

Issue description – Support for design feature

- WaterNSW appreciates and supports Transport's approach to achieve a beneficial effect on water quality during construction and operation of the proposal.

Response

Transport acknowledges the support of WaterNSW for the proposal and appreciates WaterNSW's collaboration during the development of the water quality and drainage design for the proposal.

Issue description - Request for further updates/consultation

- Request for the cross-section and/or section details showing outlet details of each bioretention basin/OSD to be provided in consultation with Council

Response

Transport would continue to consult with WaterNSW during the detailed design phase of the project to develop best practice outcomes for water quality during construction, operation and future maintenance of the highway.

Issue description – proposal design suggestion

- The REF does not state that the Blue Mountains dams are owned and managed by WaterNSW. Due to the proximity of the proposal to these dams, including the top Cascades offtake dam, the proposal should include the objective of protecting water quality.
- Suggestion for hydrocarbon removal prior to bioretention to be considered in detailed design.

Response

- Transport notes that the Blue Mountains dams are owned and managed by WaterNSW and that the drinking water supply for the upper and middle Blue Mountains comes from these dams. Transport also notes that the proposal passes through the Katoomba Special Area and the Blackheath Special Area.

  As a result of this environmental sensitivity, design development criteria were established for the proposal (refer to Section 2.3.2 of the REF), including the criterion to adopt water quality control measures to improve the management of stormwater out flows into the Sydney drinking water catchment especially through the Blackheath Special Area.

  The REF included extensive design development of construction and operational water quality measures to be implemented for the proposal. This design was undertaken in consultation with WaterNSW through regular meetings during the development of the concept design.

  In addition, MUSIC modelling has been undertaken to evaluate the water quality treatment system to make sure that the design would protect existing water quality. The MUSIC modelling was revised (refer to Section 5.1 of this report) for changes to the proposal to make sure that these changes would also protect existing water quality. As per the guidelines which require that a Neutral or Beneficial Effect assessment needs to be undertaken as the proposal is within the Drinking Water Catchment, the assessment showed that the proposal would actually have a beneficial effect on the surrounding water quality. This is due to the proposal capturing and treating all surface runoff from the highway. Further information on the water quality management and treatment system of the proposal can be found in

Section 3.2.3 of the REF.

- The proposal would provide several drainage design features that are expected to achieve a beneficial effect on water quality in the Katoomba and Blackheath Special Areas based off the MUSIC modelling carried out for the proposal (refer to Section 6.1.3 of the REF). The drainage design also includes several Gross Pollutant Traps, water quality basins and swales to retain and treat stormwater runoff (refer to Section 3.2.3 of the REF).
  However, Transport would undertake further design refinements prior to construction and would consider opportunities for hydrocarbon removal prior to bioretention.

Issue description – Design clarification

- Would the basins in the Medlow Bath to Blackheath section interfere with the scour valves of the existing water pipe and Telstra communications line?
- Request for scour volumes and velocity to be factored into the capacity and design of the basins.
- Query about whether the water quality basins would be individually fenced or sit behind new boundary fencing for the Special Areas.

Response

- As noted in Section 6.5 of the REF, some public utility adjustments and relocations would be required for the proposal. This includes relocation of the existing Sydney Water water main and Telstra telecommunications conduit in some sections of the Medlow Bath to Blackheath section (refer to Table 3-9 in the REF). Further work during detailed design may result in changes to the required relocations and adjustments. All utility adjustments or relocations would be finalised in consultation with utility providers during detailed design.
- As noted in Section 3.2.3 of the REF, scour protection would be provided at transverse culverts, longitudinal pipes and channels to prevent erosion and scour from the flow of water. The extent of scour protection would be confirmed during detailed design in accordance with Safeguard SGW7.
- All water quality basins across the proposal would remain within the road reserve and would be individually fenced for safety purposes.

3.4.7 Proposal design (landscape/urban)

Issue description - Request for further updates/consultation

- Request for planting details for the water quality basins to be provided in consultation with Council.

Response

Transport would continue to consult with WaterNSW during the detailed design phase of the project to develop best practice outcomes for water quality during construction, operation and future maintenance of the highway.

3.4.8 Proposal design (road/civil)

Issue description – Local access

- Request for upgrade to the existing B4 access track to allow for ongoing use for maintenance of the water quality basins.
- Query about the location of new boundary fencing for the Special Areas.

Response

- The sections of the B4 track within the proposal area would be decommissioned during construction due to the proposed road design. Maintenance access would be provided during construction and formalised as part of the active transport trail, including for access to the proposed water quality basins, during operation of the proposal.
- For the Medlow Bath to Blackheath section that passes through the Blackheath Special Area, permanent fencing would be erected along the National Park revocation boundary. For Katoomba to Medlow Bath section that passes through the Katoomba Special Area, fencing would be provided on a property basis and installed only where required as per the current scenario.

3.4.9 Soils and contaminated land

Issue description - Property acquisition

- Request for all chemicals and fuels to be appropriately stored and bunded in a manner that prevents contaminated runoff, and for all refuelling to take place in designated ancillary facility areas. Request for spill kits to be available to all workers where refuelling of equipment is carried out.

Response

Transport has included two additional management measure to ensure that all liquids are appropriately stored and refuelling is undertaken in an appropriate manner (refer to Safeguards SC7 and SC8).

A site-specific emergency spill plan (refer to Safeguard SC2 in Section 6.2.4 of the REF) has already been proposed to be developed and incorporated in the CEMP. This would include measures to avoid spillages of fuels, chemicals, and fluids into any waterways and minimise the potential impacts associated with accidental leaks and spills during construction.

3.4.10 Statutory and planning

Issue description - Concern

In summary, WaterNSW raised the following issues:

- Concern that the term ‘Special Catchment Area’ used throughout the REF is confusing.
- Note that revocation of national park status, as proposed in the REF, does not affect, change, or revoke the extent of the ‘Special Areas’.
- Concern that a risk assessment has not been carried out for allowing recreational access into currently restricted parts of the Special Area. Note that this risk assessment is a minimum requirement of a joint agency group including WaterNSW, NSW Health and Sydney Water Corporation and does not guarantee that recreational access will be granted.

Response

- The term 'Special Catchment Area' in the REF refers to the Special Areas declared under the Water NSW Act 2014 and associated Water NSW Regulation 2020.

  Transport notes that the revocation of national park status of the land identified in Section 4.1.1 of the REF does not affect, change or revoke the extent of the Katoomba or Blackheath Special Areas.

- The land subject to revocation under the NPW Act would be transferred to Transport's ownership once the land is revoked from the national park estate via an Act of Parliament. This section of land would become road reserve, with public access permitted similar to the existing arrangements for publicly accessible land (including the existing Great Western Highway road reserve) within the Katoomba and Blackheath Special Area.

  In addition, the proposal would not allow recreational access into the Blue Mountains National Park. Along the proposed national park boundary, security measures similar to the existing, including a fence line and locked gates would be installed to prevent access from the road reserve into the Blue Mountains National Park. Access to existing trails within the national park would be provided via these gates for permitted vehicles only, including WaterNSW, NPWS, RFS, utilities providers and their contractors, as per the existing scenario.

3.4.11 Surface water and groundwater

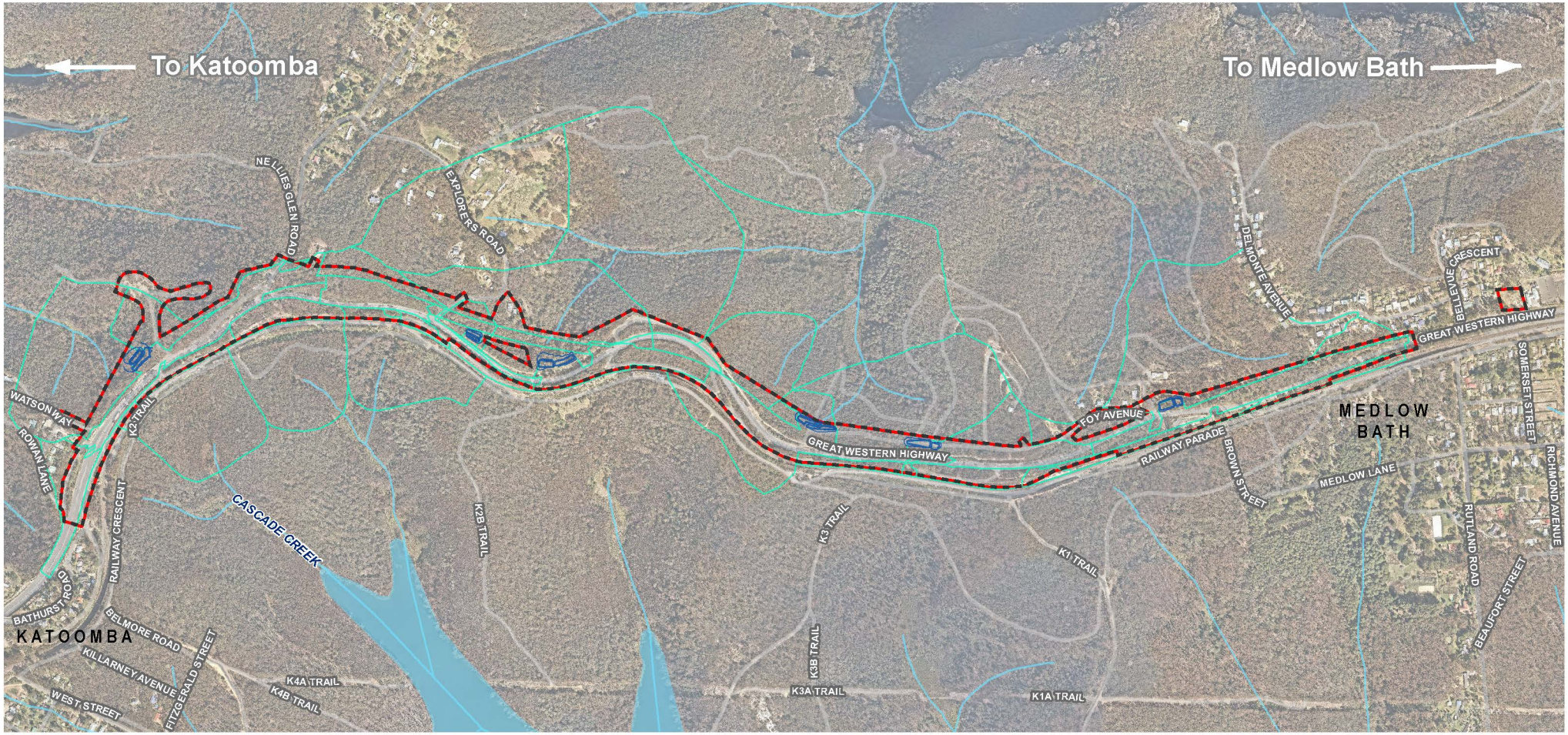
Issue description – Assessment methodology

- Request for each catchment assessed in the REF to be mapped and pervious/impervious area to be calculated.

Response

The catchments assessed as part of the proposal are shown in

Figure 3-1a-b. The western extension of the active transport trail outside the REF proposal area has been included in the operational MUSIC modelling carried out for the revised design (refer to Section 5.1).

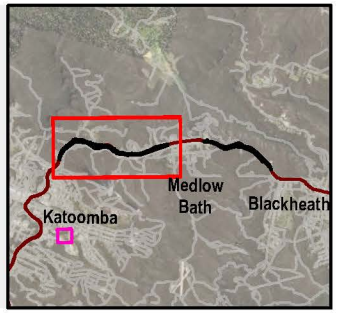


REF proposal area

Revised proposal area

Drainage basin

Assessed catchments



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Source: Aurecon, Mott MacDonald, LPI, Nearmap

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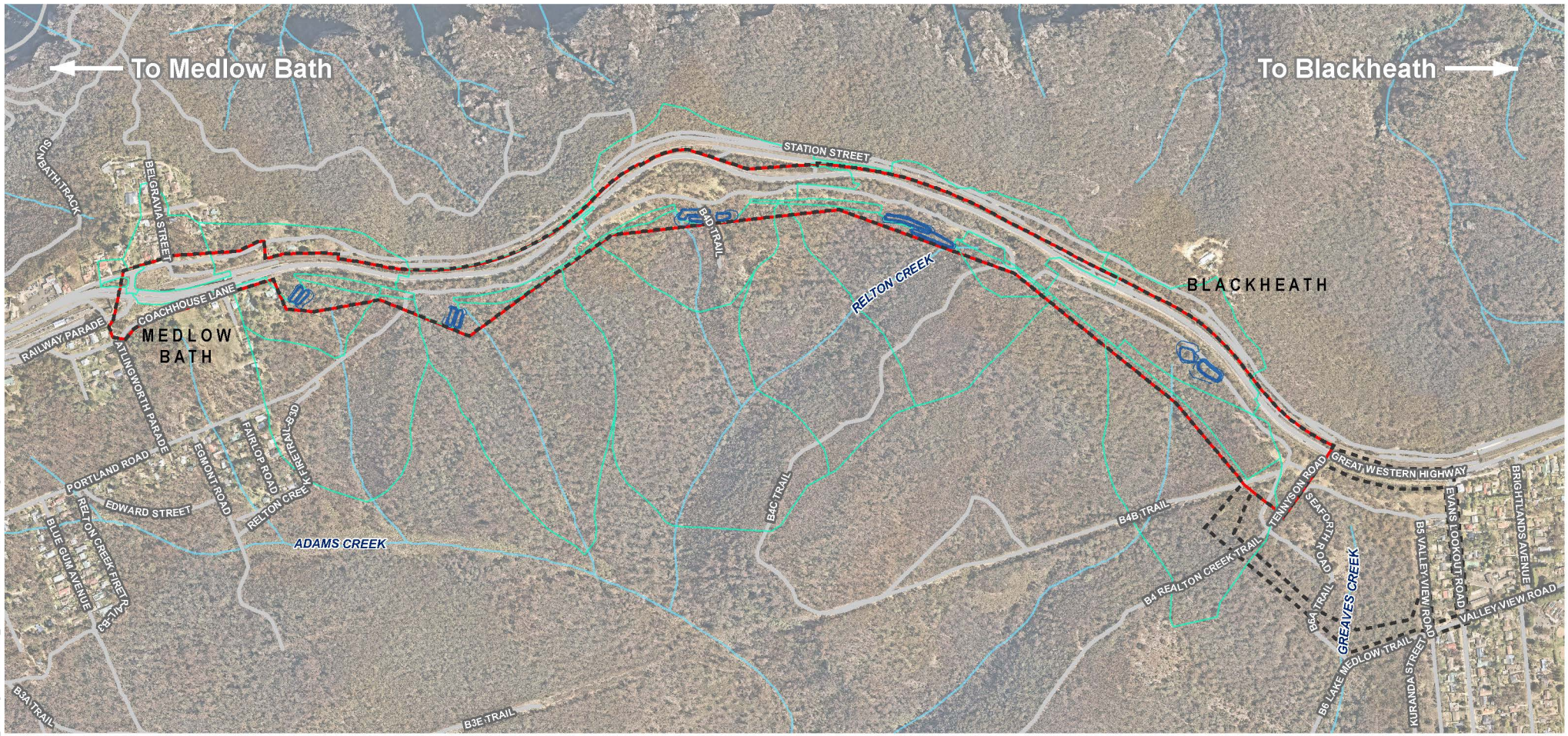
Projection: GDA2020 MGA Zone 56

FIGURE 3-1a: Drainage catchments - Katoomba to Medlow Bath section

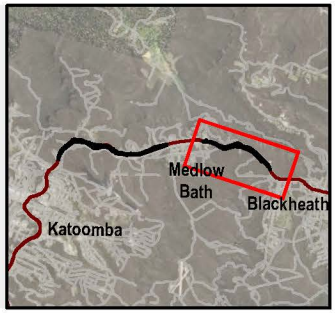


REF proposal area

Revised proposal area

Drainage basin

Assessed catchments



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Source: Aurecon, Mott MacDonald, LPI, Nearmap

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Projection: GDA2020 MGA Zone 56

FIGURE 3-1b: Drainage catchments - Medlow Bath to Blackheath section

Following display of the REF, adjustments have been made to the drainage design, including the MUSIC modelling sub-catchments, to optimise the surface water outcomes of the proposal and revised design. The pervious and impervious area in each catchment are outlined in Table 3-2 (Katoomba to Medlow Bath section) and Table 3-3 (Medlow Bath to Blackheath section). The proposal would realign the existing drainage catchments with consideration of constraints along the alignment, with road runoff and upstream catchment discharges redirected into the 12 proposed discharge locations. For any given discharge location, where the proposed catchment area has reduced compared to the existing catchment area, the discharge would now be captured by an adjoining sub-catchment. In addition, the total proposed catchment area for each section of the proposal covers a greater area than the existing catchment, meaning more discharge would be captured and treated under the proposal than the existing scenario.

Table 3-2 Catchment details in Katoomba to Medlow Bath section

Basin reference chainage	MUSIC sub-catchment	Total area (ha)	Percentage impervious (%)
545	Existing	2.32	30
	Proposed	3.39	74
780	Existing	0.89	6
	Proposed	0.40	75
1160	Existing	1.45	32
	Proposed	1.43	65
1460	Existing	2.70	12
	Proposed	2.98	74
2160	Existing	5.90	21
	Proposed	5.67	42
2410	Existing	1.12	21
	Proposed	1.50	71
3040	Existing	2.36	73
	Proposed	3.02	73

Table 3-3 Catchment details in Medlow Bath to Blackheath section

Basin reference chainage	MUSIC sub-catchment	Total area (ha)	Percentage impervious (%)
4910	Existing	3.30	37
	Proposed	4.08	44
5240	Existing	2.14	24
	Proposed	2.59	60
5700	Existing	6.06	22
	Proposed	6.58	41
6100	Existing	3.92	28
	Proposed	5.14	37

Basin reference chainage	MUSIC sub-catchment	Total area (ha)	Percentage impervious (%)
6800	Existing	5.24	22
	Proposed to basin	3.85	18
	Proposed to bypass basin	1.99	36

For the basin at Chainage 6800, some runoff from the catchment would bypass the bioretention basin due to topographic constraints. This runoff would be captured within grass lined swales and directed to the discharge point from the proposal. There would also be sheet flow runoff to the east from the proposed extension to the active transport trail via a buffer strip to the natural ground level. This was factored into the MUSIC modelling carried out for the revised design (refer to Section 5.1). The proposed bioretention basin is oversized for the proposal and provides greater nutrient reduction.

Issue description – Construction impacts

- Request for water quality management measures to be included in the Soil and Water Management Plan (SWMP) that consider any additional requirements for the ancillary facilities in the Katoomba to Medlow Bath section due to their proximity to the Sydney Drinking Water Catchment.

Response

The REF included mitigation measures to minimise adverse environmental impacts from the development that would be implemented during later stages of the proposal. These are detailed in Section 6.2 of this submissions report and include the writing of a Construction Environmental Management Plan (CEMP) and sub plans.

The CEMP would be prepared in consultation with government agencies, including Blue Mountains City Council. As per Safeguard SGW1, the sub plans would also include a Soil and Water Management Plan (SWMP). These plans would be developed to capture all construction activities includes all ancillary facilities used during construction. These plans would be drafted based on the detailed design and the planned construction methodology. It would include practices and procedures to control surface water runoff during construction, including requirements due to the proposal's intersection with the Sydney Drinking Water Catchment.

As per Safeguard SGW2, the preliminary Erosion and Sedimentation Management Plan (ESMR) and Erosion and Sedimentation Control Plans (ESCP) produced for the proposal (Appendix D to the REF) would be updated during the detailed design phase to confirm the erosion and sedimentation controls for both sections of the proposal, including the construction of progressive ESCPs and the continual updating of these plans. Again, this will cover all construction activities including ancillary facilities.

Issue description – Operational impacts

- Concern that the active transport trail between Medlow Bath and Blackheath would increase the occurrence of users illegally accessing other parts of the Special Area and increase the risk of bushfire and impacts to water quality of the water supply.
- Note that MUSIC modelling has been assessed to meet NorBE requirements.

Response

- The proposed active transport trail in the Medlow Bath to Blackheath section would provide a new publicly accessible trail outside the Blue Mountains National Park within the road reserve between Coachhouse Lane, Medlow Bath and Valley View Road, Blackheath. Along the proposed national park boundary, security measures similar to the existing, including a fence line and locked gates would be installed to prevent access from the road reserve into the Blue Mountains National Park. Access to existing trails within the national park would be provided via these gates for permitted vehicles only, including WaterNSW, NPWS, RFS, utilities providers and their contractors, as per the existing scenario. As such, the potential for illegal access to the Special Area within the Blue Mountains National Park would remain similar to the existing scenario with security measures in place.

  The potential for there to be increased risk of impacts to water quality of the water supply due to illegal access would therefore also remain similar to the existing scenario.

- Transport notes that the MUSIC modelling carried out to assess the operational water quality impacts of the proposal meets NorBE requirements. In addition, further MUSIC modelling carried out for the revised design (refer to section 5 of this report) also showed that the revised design would also meet the NorBE requirements.

Issue description – Safeguards and management measures

- Request for construction and operational maintenance responsibilities of water quality treatment basins to be included in the SWMP and any ongoing Operational Environmental Management Plan (OEMP).
- Support for mitigation and operational management and maintenance measures that would lead to a beneficial effect on water quality.
- Request for further detail on the four temporary sedimentation basins including the spillway and discharge outlets; and enhanced erosion controls proposed in locations where sediment basins are not feasible.

Response

- As noted in Safeguard SGW2, design and implementation of construction water quality treatment basins would be the responsibility of Transport and its construction contractor. During operation of the proposal, Transport would be responsible for ongoing maintenance of the water quality treatment basins.
- Transport thanks WaterNSW for its support for the implementation of mitigation measures that would lead to a beneficial effect on water quality during operation of the proposal.
- As noted in Safeguard SGW2, the preliminary Erosion and Sedimentation Management Plan (ESMR) and Erosion and Sedimentation Control Plans (ESCP) produced for the proposal (Appendix D to the REF) would be updated during the detailed design phase to confirm the erosion and sedimentation controls for both sections of the proposal, including the construction of progressive ESCPs. The

updated ESMR and ESCPs would provide additional details on enhanced erosion controls proposed for locations where sediment basins are not feasible.

3.5 Blue Mountains City Council

3.5.1 Biodiversity

Issue description – Construction impacts

- Query about why the impact of the proposal can be determined if the extent of the Eastern Pygmy possum has not been determined.

Response

The assessment of significance for the Eastern Pygmy-possum identified that the species is likely to be widespread and there is large amount of high-quality habitat (K Madden DPE 2021, personal communication) around the proposal that would not be impacted. Based on this, the proposal is not considered likely to significantly impact a local population of the Eastern Pygmy-possum.

However, as little is known about the overall population of Eastern Pygmy-possum in the Blue Mountains region, Transport is commencing further surveys for the Eastern Pygmy-possum to better understand the size and extent of the population within the surrounding area. Following the completion of this monitoring program, a final assessment of significance for the Eastern Pygmy-possum would be prepared. Should the impact be determined to be significant at this stage, Transport would carry out an addendum REF with a subsequent Biodiversity Development Assessment Report.

Refer to Section 6.3.3 of the REF for further details.

Issue description – Operational impacts

- Concern that details of potential fauna connectivity measures have not been provided.
- Concern about the impact of the proposal on the Hanging Swamp, including that the bridge footings would impact groundwater received by the swamp.
- Concern about the impacts of concentration of stormwater flow and changes to existing surface water flows to downstream vegetation communities.

Response

- The existing Great Western Highway and rail corridor provide an existing barrier to local fauna movement from east to west across the proposal area. However, consideration has been given to the inclusion of fauna connectivity structures in design development to date (as per Section 1.2.1 of Appendix E to the REF notes that). The twin bridges were identified as providing a corridor for fauna movement in the Explorers Road area. Some types of fauna connectivity measures such as rope crossings are not considered to be feasible for the proposal as they are not able to be installed over the rail corridor for safety reasons.

  As noted in Section 6.3.3 of the REF, a Fauna Connectivity Strategy would be developed during detailed design and include consideration of provision of safe passage for fauna across the road and fauna fencing. Any fauna connectivity features would be within the proposal area and would not occur in the Greater Blue Mountains World Heritage Area. These features would also be consistent with the urban design objectives outlined in Section 2.3.3 of the REF.

- Transport notes Blue Mountains City Council's concern about impacts of the proposal on the Hanging Swamp.

  The concept design has been developed so that the bridge piers avoid the Hanging Swamps TEC. A buffer zone of at least five metres would be established between the proposal area and the boundary of the Hanging Swamp (Safeguard B4). Exclusion fencing and sedimentation fencing would be used to avoid accidental encroachment or release of sediment into the Hanging Swamps. In addition, the water quality management process would include grassed line swales with check dams at the discharge point from the basins, where possible, to slow down the runoff velocity and promote infiltration to the existing low point or overland flow path.

- The proposed drainage and water quality design would capture all runoff from the road corridor and drain into water quality treatment basins for each sub-catchment. The water quality management process would include grassed line swales with check dams at the discharge point from the basins, where possible, to slow down the runoff velocity and promote infiltration to the existing low point or overland flow path. This would minimise any changes to existing surface water flows and associated impacts to downstream vegetation communities. Further details on the drainage and water quality design are provided in Section 3.2.3 of the REF.

3.5.2 Construction

Issue description – Local access

- Request for active transport movement to be facilitated during construction as much as possible.

Response

- In the Katoomba to Medlow Bath section, as noted in Section 3.3.8 of the REF, the Great Blue Mountains Trail would be temporarily closed during construction off the off-line carriageway in the Katoomba to Medlow Bath section. Transport would consider opportunities for alternative transport arrangements to provide access for vulnerable community members who would normally access this section of the Great Blue Mountains Trail.
- In the Medlow Bath to Blackheath section, the existing active transport connections on the western side of the Great Western Highway are outside the proposal area and would not be impacted during construction.
- Transport would explore opportunities during detailed design and construction to maintain active transport movement between Katoomba and Blackheath, where possible.

3.5.3 Landscape character and visual impacts

Issue description – Operational impacts

- Request for assessment of visual impacts in areas where additional views would occur as a result of the proposal.

Response

- The landscape character and visual impact assessment (LCVIA) was carried out in accordance with the Practice Note: *Guideline for landscape character and visual impact assessment* (EIA-N04). The assessment included a visual impact assessment, which assessed the proposal's impacts on views.

- A number of submissions from members of the community raised concerns about the visual impacts of the proposal from specific additional viewpoints. Refer to Section 2.10.1 of this submissions report for further details.

3.5.4 Proposal design (active transport)

Issue description – Proposal design suggestion

- Request for new formed footpaths or shared paths where feasible for the entire length of the proposal with a target 2.5 metre width. Support for the aspects of the proposed design that achieve this.
- Provisions for on road cyclist should be included in the design as appropriate particularly at intersections
- Request for an active transport trail to be provided from Railway Parade / the Great Western Highway to Coachhouse Lane.
- Request for a separated bike crossing of the service road near the Explorers Road intersection.
- Request for new pathways and kerb ramps to comply with Council's standards.

Response

- Transport notes Blue Mountains City Council's support for the improvements to pedestrian safety and active transport linkages as part of the proposed active transport network.
- The proposal would provide for upgraded active transport trails with a three metre width. This would comprise a combination of newly constructed active transport trails and re-use of existing active transport trails, as identified in Figures 3-1a-f and 3-2a-e. During operation, the proposal would provide uninterrupted pedestrian and cyclist access between Katoomba and Blackheath.
- Provision for on-road cyclists at intersections would be included during detailed design.
- As outlined in the Great Western Highway Medlow Bath Upgrade REF and submissions report, the Medlow Bath Upgrade would provide a new pedestrian bridge across the Great Western Highway, allowing active transport users to cross the highway. This would provide a new connection between the western side of the Great Western Highway in Medlow Bath and Coachhouse Lane via Railway Parade, allowing seamless connection through Medlow Bath for active transport users between Katoomba and Blackheath using the active transport trails proposed as part of this REF.
- A separated bike crossing of the new service road would be provided near the Explorers Road intersection. This would be further detailed during the detailed design.
- As a minimum, work on active transport trails adjoining local roads would comply with Council standards. The sections of upgraded and proposed active transport trails would also comply with Transport's standards.

Issue description – Choice of project limits

- The REF should consider the safety impacts of the proposal along the full extent of the local active transport network.
- Request for active transport connections to be provided to the full extent of the proposal area in the Katoomba to Medlow Bath section.

Response

- The limits of work for this proposal are Rowan Lane, Katoomba and Bellevue Crescent, Medlow Bath for the Katoomba to Medlow Bath section and Station Street, Medlow Bath and Tennyson Road, Blackheath for the Medlow Bath to Blackheath section. The active transport trail design would provide safety improvements within this proposal's limits of work.

- As noted in Section 3.3.1 of the REF, the proposal area is the footprint required for construction of the proposal. While the length of upgrades to active transport trails has been maximised to provide the best outcome to active transport users, the proposal's active transport trail design provides tie-ins to existing trails and has considered engineering and environmental constraints in determining the extent of the upgraded trails.

3.5.5 Proposal design (drainage/water quality)

Issue description – Support for design feature

- Support for the consideration of Water Sensitive Urban Design in the proposal and that there would not be a net increase in pollutants entering the water network.

Response

- Transport acknowledges Blue Mountain City Council's support for consideration of Water Sensitive Urban Design in the proposal, noting that there would not be a net increase in pollutants entering the water network due to the proposal. (BMCC-20)

Issue description – Proposal design suggestion

- Request for stormwater runoff to drain to vegetated swales at the base of any rock cuttings. Avoid the use of concrete lined channels as far as possible.
- Suggestion for stormwater drainage from both westbound and eastbound carriageways in the Medlow Bath to Blackheath section near CH5700 to flow to a vegetated swale in the area where the paved median is shown.

Response

- Transport thanks Blue Mountains City Council for their suggestions for the drainage and water quality design. The proposed road drainage infrastructure is outlined in Section 3.2.3 of the REF and include longitudinal drains, cross drainage pipes, a bridge drainage system and water quality management and stormwater treatment measures. Transport would continue to work with Blue Mountains City Council and WaterNSW on the design of the water quality devices through the detailed design.
- The crossover location in the Medlow Bath to Blackheath section would be maintained during operation as an emergency crossover location. This would improve resilience of the road corridor during breakdowns, crashes, extreme weather events or other emergencies, with the ability to maintain traffic flow during these events in a contraflow arrangement. Transport would optimise the area of hardstand pavement required at the crossover location during detailed design to minimise environmental impacts. As such, use of this space as a vegetated swale is not suitable.

  The proposal includes several Gross Pollutant Traps, water quality basins and swales to retain and treat stormwater runoff (refer to Section 3.2.3 of the REF). The drainage design includes drainage pipes diverting dirty road water to six bioretention basins along the Katoomba to Medlow Bath section and five bioretention basins along the Medlow Bath to Blackheath section. MUSIC modelling carried out for the proposal (refer to Section 6.1.3 of the REF) shows that this strategy would have a beneficial effect on water quality in the Katoomba and Blackheath Special Areas.

Issue description - Maintenance

- Concern that Transport needs to commit money to ongoing maintenance of bioretention basins for the predicted MUSIC modelling outcomes to materialise.

Response

Transport acknowledges the requirement for ongoing maintenance of water quality basins during operation of the proposal in order to achieve the predicted beneficial effect on water quality and would be responsible for ongoing maintenance of these basins.

3.5.6 Proposal design (landscape/urban)

Issue description - Proposal design suggestion

- Request for optimisation of the hardstand as part of the operational crossover location in the Medlow Bath to Blackheath section.
- Request for the proposed treatment of shotcrete to be included in detailed design.

Response

- The crossover location in the Medlow Bath to Blackheath section would be maintained during operation as an emergency crossover location. This would improve resilience of the road corridor during breakdowns, crashes, extreme weather events or other emergencies, with the ability to maintain traffic flow during these events in a contraflow arrangement. Transport would seek to optimise the area of hardstand pavement required at the crossover location during detailed design to minimise environmental impacts.
- The proposed treatment of shotcrete would be confirmed during detailed design.

3.5.7 Proposal design (road/civil)

Issue description – Support for the project

- Support for design objectives for the proposal.

Response

Transport acknowledges Council for their support of the design objectives of the proposal.

Issue description - Maintenance

- Request for clarification about which assets Council would be responsible for during operation.

Response

Similar to the existing scenario, Transport would hold responsibility to maintain State road assets during operation of the proposal, this would include the road corridor, active transport trail and water quality basins. Transport would confirm the maintenance responsibility for other assets in consultation with Council during detailed design.

Issue description – Proposal design suggestion

- Request for appropriate tie-ins on local roads with existing infrastructure.
- Request for the tie-in between the new kerbs and gutters and the existing shoulder treatment to prevent erosion and scouring.
- Request for the design to comply with Council standards.
- Request for amenities to be provided at the truck stopping areas, including toilets, water supply, street lights for pedestrians, smart technology and safety cameras.
- Request for bus stop and street furniture in line with existing mountains street furniture and the Blue Mountains City Council public domain technical manual.
- Suggestion for the existing road to be narrowed to be used as an active transport trail in the Medlow Bath to Blackheath section instead of as a truck stopping area.

Response

- The proposal includes provision of appropriate tie-ins with existing infrastructure on local roads, including kerbs, gutters and shoulders. These design features would be finalised during detailed design.

- Work on local roads would comply with Council standards. However, the sections of road which form part of the State road network would comply with Transport's standards.

- As noted in Section 3.2.3 of the REF, the proposed truck stopping areas are intended as short term stop areas for heavy vehicle checking and would not be 'rest areas'. There would be no ablutions or other facilities provided at these locations

  The Great Western Highway Upgrade Program is providing two rest areas as part of the Little Hartley to Lithgow Upgrade at Hartley Valley. Heavy vehicle drivers travelling across the Blue Mountains would be able to use amenities at these rest areas.

- The proposal would involve like-for-like reinstatement and installation of the existing bus stops in consultation with local bus operators. Other street furniture impacted by the proposal would also be reinstated like-for-like with the existing assets. Details on supporting infrastructure would be confirmed during detailed design.

- The proposed truck short-term stopping area in the Medlow Bath to Blackheath section would be best suited for use as a truck stopping area due to its proximity and direct connection to the proposed westbound carriageway. It would also be the final informal opportunity for heavy vehicles travelling westbound to stop and secure their loads before entering the proposed tunnel as part of the Blackheath to Little Hartley Upgrade.

- Narrowing of this section of pavement to become an active transport trail would not be suitable as this parcel of land would be isolated between the highway and the rail corridor and there would not be any connection to other active transport trails, while cyclists could use the highway shoulder to that point, there would be no access for pedestrians. Due to the safety concerns that this presents, this will not be converted to an active transport trail.

3.5.8 Proposal (utilities)

Issue description - Property acquisition

- Request for the undergrounding of powerlines and telecommunications to minimise bushfire risk, visual impact and cost and provide resilience.

Response

Public utilities adjustments required for the proposal are outlined in Section 3.5 of the REF. Undergrounding of electricity or telecommunications is proposed at several locations along both sections of the proposal. There are also sections of existing overhead utilities which are proposed to be reinstated overhead during operation of the proposal.

The utilities design has been developed with consideration of the proximity of utilities to civil and drainage design features such as retaining walls and bridge abutments, complexity of relocation of utilities, cost and environmental impacts. In some locations, overhead electrical switching gear needing replacement was retained overhead as a substantially larger footprint would be impacted if these services were undergrounded.

While undergrounding utilities is more expensive, Transport commits to investigating further opportunities to underground electrical supply during detailed design, especially in the Medlow Bath to Blackheath section of the proposal. All utility adjustments or relocations would be finalised in consultation with utility providers during detailed design.

Transport also notes that placing electricity cables underground doesn't guarantee that the utilities would become fire proof as they would still be susceptible to heating, melting or burning. The proposal would only relocate existing utilities, rather than provide new utilities, meaning that bushfire risk would not be increased due to the proposal.

The visual impacts of the proposal and revised design, including due to utilities relocations, have been assessed in Section 6.5.3 of the REF and Section 5.5 of this report respectively.

3.5.9 Socio-economic, property and land use

Issue description – Construction impacts

- Request for parking arrangements for contractors to be clearly communicated, implemented and adhered to avoid impacts to local business, residents and the bus network.

Response

Car parking for construction workers would be provided within the proposed ancillary facilities. There would be no construction worker parking in local streets. This would minimise impacts to local businesses, residents and the bus network from construction workers parking in public areas. Construction workers would also be actively encouraged to use public transport if available and carpool where possible.

3.5.10 Surface water and groundwater

Issue description – Existing environment

- Request for groundwater investigations to occur prior to finalisation of water quality basin design in detailed design.

Response

The water quality basin design has considered the existing groundwater environment near the proposal. Section 6.1.3 of the REF identifies the potential impacts of the proposal on groundwater during construction and operation.

Refer to the responses in Section 2.21.2 (Surface water and groundwater construction impacts) and Section 2.21.3 (Surface water and groundwater operational impacts) for further details on proposed further safeguards and management measures during detailed design and construction.

Issue description – Construction impacts

- Concern that water quality impacts of the proposed concrete batching plant cannot be assessed as no Soil and Water Management Plan has been developed.
- Request for the CEMP to be developed in conjunction with Council and be included in the REF. These measures are important for minimising impacts to the Hanging Swamp.
- Concern that detailed design, a SWMP, a CEMP and an ESCP are required to determine if there would be residual impact of the proposal.

Response

The REF included mitigation measures to minimise adverse environmental impacts from the development. These are detailed in Section 6.2 of this submissions report and include the writing of a Construction Environmental Management Plan (CEMP) and sub plans. These plans would be developed prior to construction when the methodology and use of ancillary facilities such as a potential concrete batching plant have been confirmed.

Transport would share the approved CEMP with government agencies, including Blue Mountains City Council. As per Safeguard SGW1, the sub plans would also include a surface water management plan (SWMP). This would be drafted based on the detailed design and the planned construction methodology. It would include site-specific practices and procedures to control surface water runoff in and adjacent to sensitive environments during construction, including requirements due to the proposal's intersection with the Sydney Drinking Water Catchment.

As per Safeguard SGW2, the preliminary Erosion and Sedimentation Management Plan (ESMR) and Erosion and Sedimentation Control Plans (ESCP) produced for the REF proposal (Appendix D to the REF) and revised design (Appendix B to this report) would be updated during the detailed design phase to confirm the erosion and sedimentation controls for both sections of the proposal, including the construction of progressive ESCPs and the continual updating of these plans.

Issue description – Operational impacts

- Concern that after a specified storm intensity, basins would increase flooding issues downstream and would therefore have a negligible impact on water quality.
- Suggestion to make sure that the one per cent AEP flood event is investigated to confirm that the downstream drainage network can cope.

Response

Transport notes that the proposal would not connect to Blue Mountains City Council's downstream drainage network, but rather would be captured and treated before release.

As noted in Section 3.2.3 of the REF, the pavement drainage pit and pipe network has been designed to achieve flood immunity for a ten per cent annual exceedance probability (AEP) flood event and the transverse drainage network would be designed to achieve flood immunity for a one per cent AEP flood event. The pavement drainage network would also incorporate overland flow routes through the proposed road pavement and landscaped areas to provide capacity in storm events. The provision of detention would match or reduce the existing one per cent AEP discharge flow rate to the downstream environment.

Issue description – Safeguards and management measures

- Request for ongoing consultation with Council for the development of construction sediment basins and operational water quality basins.

Response

Transport have engaged with the Blue Mountains City Council water quality team during development of the water quality design and thanks the team for their engagement to date. Transport would continue to consult with Blue Mountains City Council during the detailed design phase of the project to develop best practice outcomes for water quality during construction, operation and future maintenance of the highway.

3.5.11 Traffic and transport

Issue description – Construction impact

- Request for construction traffic impacts to be considered.
- Recommendation to avoid peak hours and school zones when truck movements are scheduled for safety reasons during construction.
- How will Transport provide access for emergency vehicles during construction.
- Request for access requirements for local residents to be considered in the Traffic Management Plan.
- How will the safety of cyclists and pedestrians would be maintained during construction.
- Request for assessment of impacts of local road closure or restricted access on the local road network to make sure that it can accommodate increased volumes.

Response

- The traffic and transport assessment carried out for the REF has considered traffic impacts to the local road network. this is summarised in Section 6.7.4 of the REF, upgrades to local roads could result in disruption or delays to local road traffic during construction in the Katoomba to Medlow Bath section.

  Transport will continue to consult with Council and local residents regarding any temporary changes to

local roads as a result of construction.

- As noted in Table 6-50 of the REF, construction traffic is unlikely to affect the performance of the Great Western Highway during construction. There may be localised increases in traffic near access points to construction areas and at intersections.

  Construction vehicle movements would be scheduled with consideration of peak hours and school drop-off and pick-up periods in accordance with the Traffic Management Plan (Safeguard TT1).
- The vehicle movements expected during construction would be as follows (refer to Section 3.3.3):
  - Katoomba to Medlow Bath section – 275 average total vehicle movements per day and 550 vehicle movements per day at peak construction periods
  - Medlow Bath to Blackheath section – 255 average total vehicle movements per day and 450 vehicle movements per day at peak construction periods

  These traffic volumes are low compared with the existing traffic volumes on the Great Western Highway (refer to Section 6.7.3). As such, construction traffic is unlikely to affect the performance of the Great Western Highway during construction. However, a localised increase in traffic may be seen along the road corridor near access points and at intersections

  As noted in Section 6.7.4 of the REF, emergency service access along the Great Western Highway would be maintained throughout construction. For the Medlow Bath to Blackheath section, at least one emergency service vehicle crossing would be provided where there are separated carriageways during construction.

  Emergency service access would also be maintained along local roads in line with temporary local road access arrangements.

  Transport would continue to consult with emergency services regarding the construction timeframes.

- The traffic and transport assessment carried out for the REF has considered traffic impacts to the local road network. As noted in Section 6.7.4 of the REF, upgrades to local roads could result in disruption or delays to local road traffic during construction in the Katoomba to Medlow Bath section. The following temporary traffic arrangements would be managed as part of the Traffic Management Plan so access, including for residents is maintained during construction (refer to Safeguard TT1):
  - Nellies Glen Road would be temporarily closed to traffic as the intersection is reconstructed further east of the existing intersection. Access to residents on Pulpit Hill and for visitors to the Six Foot Track would be retained from Great Western Highway via Explorers Road.
  - When work is occurring to the bridge structure over Explorers Road, disruptions to local traffic may occur including temporary closures of the road. Access to Explorers Road would be retained via the upgraded Nellies Glen Road intersection alignment.
  - During construction of the eastbound carriageway, access to Foy Avenue would be maintained from the highway via a temporary side-track with controlled access. Transport and the construction contractor will continue to notify local residents of the construction traffic impacts to local roads. During construction of the westbound carriageway, the active transport trail between Katoomba and Medlow Bath would be closed to maintain the safety of pedestrians and cyclists. Alternative routes for active transport users during construction would be clearly identified by signage and the use of traffic controllers where required to maintain safety. Transport would also consider opportunities for alternative transport arrangements to provide access for vulnerable community members who would normally access the Great Blue Mountains Trail.

  There would be no impacts to other active transport trails during construction of the proposal. Access to the Six Foot Track would still be possible via Explorers Road when Nellies Glen Road is closed for

construction.

- The traffic and transport assessment carried out for the REF has considered traffic impacts to the local road network. As noted in Section 6.7.4 of the REF, upgrades to local roads could result in disruption or delays to local road traffic during construction in the Katoomba to Medlow Bath section.

  There are low numbers of total existing vehicle movements (all possible movement directions) at the three local road intersections with the Great Western Highway in the Katoomba to Medlow Bath section, as outlined in Table 3-4. Due to the low volumes of traffic which use these local roads, no capacity issues are anticipated during construction.

Table 3-4 Intersection traffic volumes

Intersection	Weekday		Weekend	
	AM peak	PM peak	AM peak	PM peak
Great Western Highway / Nellies Glen Road	4	12	5	10
Great Western Highway / Explorers Road	16	10	9	11
Great Western Highway / Foy Avenue	3	2	2	2

- To minimise any traffic and transport impacts, the following temporary traffic arrangements would be implemented as part of the Traffic Management Plan so access, including for residents is maintained during construction (refer to Safeguard TT1):
  - Nellies Glen Road would be temporarily closed to traffic as the intersection is reconstructed further east of the existing intersection. Access to residents on Pulpit Hill and for visitors to the Six Foot Track would be retained from Great Western Highway via Explorers Road.
  - When work is occurring to the bridge structure over Explorers Road, disruptions to local traffic may occur including temporary closures of the road. Access to Explorers Road would be retained via the upgraded Nellies Glen Road intersection alignment.
  - During construction of the eastbound carriageway, access to Foy Avenue would be maintained from the highway via a temporary side-track with controlled access.

3.5.12 Out of Scope

Issue description

- Request for active transport connections to be made with the local network in Katoomba.

Response

The proposal would connect the upgraded active transport trail with existing pathways in the local network in Katoomba, connecting into existing infrastructure at Bathurst Road on the eastern side of the Great Western Highway and Rowan Lane on the western side of the Great Western Highway. Transport commits to working with Blue Mountains City Council regarding details of the active trails.

3.6 National Trust Blue Mountains Branch

3.6.1 Proposal need and options

Issue description - Alternate alignment - other

- Suggestion to consider alternative alignments at Pulpit Hill, such as a landbridge.

Response

Transport notes the suggestion of a landbridge or tunnelling construction option through Pulpit Hill to retain the potential archaeological features that may be present on the site.

However, this particular construction methodology would not be suitable as the length of cut is too short for tunnelling. As such to create a landbridge, a 'cut and cover methodology' would need to be used. This methodology would require that all material would be excavated (similar to what is proposed) and a new cover structure placed on top of the cutting to create a 'landbridge'. The result of this is that all current land material would be lost and would not be able to be returned on top of the cover structure due to its weight. As such, any archaeological material would be lost using this methodology. In addition, there would be limited vegetation cover that could be placed over the cover structure so that there would be limited opportunity for fauna connectivity.

In addition, as this methodology would require a substantial cover structure with associated supports, the cutting would need to be wider to facilitate appropriate support and road operational requirements.

3.6.2 Biodiversity

Issue description - Safeguards and management measures

- It will be critical that the mitigation strategies designed to minimise impacts of the proposal on biodiversity of the national park are carefully implemented and rigorously monitored.

Response

The REF acknowledges and assesses the potential impacts of the proposal on biodiversity (refer to section 6.3 of the REF). In response to this, the REF included a range of mitigation measures to minimise and manage adverse environmental impacts of the proposal. In particular, there are a number of measures developed to minimise impacts of the proposal on biodiversity of the national park. Across the entire proposal, during detailed design, further design refinement would seek to further minimise vegetation removal.

Management measures are detailed in Section 6.2 of this submissions report and include the writing of a Construction Environmental Management Plan (CEMP) and sub plans.

3.6.3 Non-Aboriginal heritage

Issue description - Pulpit Hill

- Concern about the proposed design through the Pulpit Hill precinct due to its heritage significance. Concern about removal of the commemorate planting of oreades from the site of the Explorer's Tree to the old grave sites. Note that glades of oreades are protected and have an important cultural heritage value.
- Concern that the proposal would result in a high heritage impact to Pulpit Hill and would prevent future archaeological investigations and opportunities to complete historical records and interpret the history of the site.

Response

- Transport notes the National Trust Blue Mountains Branch's concerns about the proposal design through the Pulpit Hill precinct, including the removal of commemorate planting of oreades from the site of the Explorer's Tree to the unmarked grave site. While Transport acknowledges that the community may culturally associate the *Eucalyptus oreades* with the Pulpit Hill area, no historic evidence of deliberate planting of *Eucalyptus oreades* has been identified in non-Aboriginal heritage assessment carried out for the proposal. Blue Mountains Ash (*Eucalyptus oreades*) and Silvertop Ash (*Eucalyptus sieberi*) woodlands are the co-dominant types of native vegetation in the Pulpit Hill area and *Eucalyptus oreades* were observed on site during biodiversity investigations.

  During detailed design, Transport would consider opportunities to include *Eucalyptus Oreades* within the enhanced Pulpit Hill heritage interpretation area. In addition, Safeguard NA11 has been added which would require the *Eucalyptus Oreades* on Pulpit Hill to be offset as required under Transport's *Guidelines for Biodiversity Offsets* (Transport, 2016b).

- As noted in Section 6.4.3 of the REF, during construction, the proposal would have high partial physical impacts to the Pulpit Hill and Environs locally listed heritage item. There would be direct physical impacts to the eastern curtilage of this item. This would occur through road widening, earthworks, bridge construction, intersection upgrade and carpark construction. Whilst there would be no potential heritage impacts to some components of Pulpit Hill and Environs, the cumulative impacts to the greater Pulpit Hill environs would impact the significance of these elements.

- Transport commits to carrying out further study in partnership with heritage groups prior to construction to develop a heritage interpretation strategy around Pulpit Hill.

- Near Pulpit Hill, in accordance with Safeguard NA6, the following measures would be undertaken to minimise or manage impacts:
  - preparing a Conservation Management Plan (CMP) for Pulpit Hill and Environs to manage the heritage significance of the site and provide for ongoing management
  - further refining the proposal's design during detailed design to minimise adverse heritage impact on the Pulpit Hill and Environs curtilage (including Stone Arrangements site) and interpret the heritage significance of this site, including the role the Explorers Tree played as a waypoint
  - carrying out further investigations if it is not possible to completely avoid the Stone Arrangements locally listed heritage item, including an Historical Archaeology Assessment, an Archaeological Research Design (ARD) for archaeological work, an archaeological test excavation targeting a portion of the Stone Arrangements, a soil analysis of excavated soil to confirm the presence of graves and further remote sensing studies to verify previous study results
  - carrying out an archaeological test excavation to confirm whether a permit under Section 140 of the *Heritage Act 1977* would be required for the proposal.

These further investigations would allow the proposal to contribute to the knowledge base of the history of Pulpit Hill.
In addition, a heritage interpretation strategy for the Pulpit Hill area would be developed as part of the a cultural interpretation strategy (for both Aboriginal and non-Aboriginal heritage) for the Great Western Highway Upgrade Program – Katoomba to Lithgow to reinterpret the existing heritage interpretation area and communicate the heritage significance of the Pulpit Hill area. The existing Blue Mountains City Council heritage interpretation area would be retained and be further developed to reinterpret and display the Aboriginal and non-Aboriginal heritage of the area (refer to Section 3.2.3 of the REF).

3.7 Blue Mountains Heritage Advisory Committee

3.7.1 Proposal need and options

Issue description - Alternate alignment - other

- Suggestion to consider alternative alignments at Pulpit Hill, such as a landbridge.
- Concern that alternative options are not considered in the REF. Suggestion for consideration of a split carriageway design (similar to Wentworth Falls and Boddington Hill) and relocation of the service road away from the western side of the rail corridor. Request for consideration of these options for public consultation.

Response

- Transport notes the suggestion of a landbridge or tunnelling construction option through Pulpit Hill to retain the potential archaeological features that may be present on the site.

  However, this particular construction methodology would not be suitable as the length of cut is too short for tunnelling. As such to create a landbridge, a 'cut and cover methodology' would need to be used. This methodology would require that all material would be excavated (similar to what is proposed) and a new cover structure placed on top of the cutting to create a 'landbridge'. The result of this is that all current land material would be lost and would not be able to be returned on top of the cover structure due to its weight. As such, any archaeological material would be lost using this methodology. In addition, there would be limited vegetation cover that could be placed over the cover structure so that there would be limited opportunity for fauna connectivity.

  In addition, as this methodology would require a substantial cover structure with associated supports, the cutting would need to be wider to facilitate appropriate support and road operational requirements.

- Section 2.4 of the REF outlines the options that were considered for the proposal and justifies the selection of the preferred design (Section 2.4.5) which is assessed in the REF.

  Transport notes Blue Mountains Heritage Advisory Committee's proposal design suggestions near Pulpit Hill. Opportunities to adopt a retaining wall to reduce the extent of cutting into Pulpit Hill and remove the proposed bench from the design would be considered during detailed design.

  The proposed local service road near Explorers Road would re-use the existing Great Western Highway pavement that can no longer be used due to the slight alignment shift in the upgrade. As such, relocating the service road away from the western side of the rail corridor would result in additional environmental impacts.

In addition, re-use of this section of pavement would also contribute to Transport's Sustainability Plan 2021 sustainability focus area of improving environmental outcomes as it would rehabilitate the existing pavement rather than removing it to go to landfill. This would contribute to the development of a circular economy for Transport by designing waste out of the proposal and keeping the pavement materials in use.

3.7.2 Cumulative impacts

Issue description - Assessment methodology

- Concern about sufficiency of consideration of cumulative heritage impacts in the REF and request for a more detailed assessment of these impacts.

Response

While the REF and SOHI (Appendix F to the REF) focuses on the potential environmental impacts of this proposal, it is important that these potential impacts are considered in their wider contextual surroundings. Cumulative impacts are those that may not be considered significant on their own but that may be more significant when considered in association with other impacts.

In accordance with Section 171(2)(o) of the EP&A Regulation 2021, any cumulative environmental effects of the proposal with other existing and likely future activities must be taken into account in assessing the potential environmental impacts of the proposal. Though it is not a requirement for a Division 5.1 proposal, the newly released cumulative impact assessment guideline for SSI (DPIE) were used as a guide. Refer to Section 6.11 of the REF. As part of this, the REF considered to the full extent possible issues arising across all the projects. This assessment found that the impact of this proposal, when considered cumulatively with the other projects, would not increase to the extent that would change a non-significant impact to a significant impact.

Potential cumulative impacts associated with the proposal and the other projects identified in Section 6.11.3 are summarised in Section 6.11.4 of the REF. In terms of non-Aboriginal heritage, for each individual project and impacts to individual heritage items for the projects considered as part of the cumulative impact assessment, there would not been a significant impact. Cumulatively, this would not escalate into a significant impact when considered together. These potential impacts would be minimised through the safeguards outlined in Section 6.2 of this submissions report.

In addition, a cultural interpretation strategy for the Great Western Highway Upgrade Program – Katoomba to Lithgow would be developed to capture cumulative themes across the different projects.

3.7.3 Non-Aboriginal heritage

Issue description - Pulpit Hill

In summary, Blue Mountains Heritage Advisory Committee raised the following issues:

- Concern about the proposed design through the Pulpit Hill precinct due to its heritage significance. Concern about removal of the commemorate planting of oreades from the site of the Explorer's Tree to the old grave sites. Note that glades of oreades are protected and have an important cultural heritage value.
- Objection to the project due to heritage impacts.
- Request for the impacts of the proposal on the heritage significance of Pulpit Hill as a place to be assessed as there is concern that the proposal would result in a high heritage impact to Pulpit Hill and would prevent future archaeological investigations and opportunities to complete historical records and interpret the history of the site. Request for further assessment of the history of the Pulpit Hill site, including through a Conservation Management Plan. Request for archaeological monitoring during construction of Pulpit Hill.
- Concern that the significance of Nellies Glen Road and impacts of its relocation have not been assessed. Concern about the proximity of the existing interpretation area to the proposed road alignment and that potential impacts to the area have not been considered.
- Request for the Pulpit Hill site to receive State heritage listing.

Response

- Transport notes the National Trust Blue Mountains Branch's concerns about the proposal design through the Pulpit Hill precinct, including the removal of commemorate planting of oreades from the site of the Explorer's Tree to the unmarked grave site. While Transport acknowledges that the community may culturally associate the *Eucalyptus oreades* with the Pulpit Hill area, no historic evidence of deliberate planting of *Eucalyptus oreades* has been identified in non-Aboriginal heritage assessment carried out for the proposal. Blue Mountains Ash (*Eucalyptus oreades*) and Silvertop Ash (*Eucalyptus sieberi*) woodlands are the co-dominant types of native vegetation in the Pulpit Hill area and *Eucalyptus oreades* were observed on site during biodiversity investigations.

  During detailed design, Transport would consider opportunities to include *Eucalyptus Oreades* within the enhanced Pulpit Hill heritage interpretation area. In addition, Safeguard NA11 has been added which would require the *Eucalyptus Oreades* on Pulpit Hill to be offset as required under Transport's *Guidelines for Biodiversity Offsets* (Transport, 2016b).

- The Statement of Heritage Impact carried out for the proposal has assessed Pulpit Hill as a place through its assessment of the Pulpit Hill and Environs locally listed heritage item, which included the lock-up, stockyard and elements of Cox's Road. As noted in Section 6.4.3 of the REF, during construction, the proposal would have direct physical impacts to the eastern curtilage of this item but would not impact on some components of the Pulpit Hill and Environs heritage item. Regardless, it would have high partial physical impacts to the heritage item and overall would result in cumulative impacts to the greater Pulpit Hill environs. However, the Statement of Heritage Impact also noted that the measures proposed to be implemented including the Great Western Highway Upgrade Program cultural interpretation strategy could conserve or enhance the significance of the item.

- Transport commits to carrying out further study in partnership with heritage groups to drive heritage interpretation around Pulpit Hill prior to construction commencing. Near Pulpit Hill, in accordance with Safeguard NA6, this would include:
  - preparing a Conservation Management Plan (CMP) for Pulpit Hill and Environs to manage the heritage significance of the site and provide for ongoing management

- further refining the proposal's design during detailed design to minimise adverse heritage impact on the Pulpit Hill and Environs curtilage (including Stone Arrangements site) and interpret the heritage significance of this site, including the role the Explorers Tree played as a waypoint
- carrying out further investigations if it is not possible to completely avoid the Stone Arrangements locally listed heritage item, including an Historical Archaeology Assessment, an Archaeological Research Design (ARD) for archaeological work, an archaeological test excavation targeting a portion of the Stone Arrangements, a soil analysis of excavated soil to confirm the presence of graves and further remote sensing studies to verify previous study results
- carrying out an archaeological test excavation to confirm whether a permit under Section 140 of the *Heritage Act 1977* would be required for the proposal.

- Safeguard NA2 would also require the Standard Management Procedure - Unexpected Heritage Items (Transport, 2015d) to be followed if any unexpected heritage items, archaeological remains or potential relics of Non-Aboriginal origin are encountered. Work would only re-commence once the requirements of that Procedure have been satisfied.

- In addition, a heritage interpretation strategy for the Pulpit Hill area would be developed as part of a cultural interpretation strategy for the Great Western Highway Upgrade Program – Katoomba to Lithgow to reinterpret the existing heritage interpretation area and communicate the heritage significance of the Pulpit Hill area. The existing Blue Mountains City Council heritage interpretation area would be retained and accommodated in the new road alignment of Nellies Glen Road and the Great Western Highway. This area would be protected during construction and be further developed to reinterpret and display the Aboriginal and non-Aboriginal heritage of the area (refer to Section 3.2.3 of the REF).

- Transport notes the Blue Mountains Heritage Advisory Committee's concern that the significance of Nellies Glen Road and impacts of its relocation have not been assessed. While this area has been considered through a comprehensive review of literature and databases and site inspection in June 2021 (as outlined in Section 6.4.1 of the REF), Transport commits to further investigation and consultation with Blue Mountains City Council's Environment and Heritage Branch about the matter.

- The impacts to the existing heritage interpretation area have been considered in Section 3.2.3 of the REF. As noted, Council's existing interpretation area would be protected during construction and would be expanded to reinterpret and display the Aboriginal and non-Aboriginal heritage of the area. Further details on the layout of the interpretation area would be developed as part of the heritage interpretation strategy for the Pulpit Hill area as part of a cultural interpretation strategy for the Great Western Highway Upgrade Program – Katoomba to Lithgow to reinterpret the existing heritage interpretation area and communicate the heritage significance of the Pulpit Hill area.

- Section 6.2.1 of the Statement of Heritage Impact (SOHI, Appendix F to the REF) notes that the Pulpit Hill and Environs heritage item currently has Local heritage listing and is recommended for State listing. In addition, Section 10.1.3.1 in Appendix 2 to the SOHI notes that, depending on the integrity of archaeological profile, Pulpit Hill may be of State heritage significance. Transport has contributed to the development of understandings of the heritage significance of this site during development of this REF. Transport commits to working with Blue Mountains City Council during and after the Great Western Highway Upgrade Program to support Blue Mountains City Council seeking a State heritage listing of this site.

Issue description - Proposal design suggestion

- Suggestion of design elements for inclusion in the heritage interpretation area, including recognition of the Explorer's Tree, the history of 'blazing' trees, incorporating a 'mark' into urban infrastructure and representation of the tree in the interpretation area.
- Request for the Eucalyptus Oreades which would be impacted near Pulpit Hill to be offset like for like.
- Suggestions for improved active transport connections, parking and amenities near the heritage interpretation area and Six-Foot Track.
- Request for pedestrian access and heritage interpretation to the grave sites.

Response

- Transport thanks the Blue Mountains Heritage Advisory Committee for their suggestions of design elements for inclusion in the heritage interpretation area, including recognition of the Explorer's Tree, the history of 'blazing' trees, incorporating a 'mark' into urban infrastructure and representation of the tree in the interpretation area. The design of the heritage interpretation area would be further developed during detailed design and include consideration of these suggestions. This would occur as part of the Great Western Highway Upgrade Program cultural interpretation strategy, in consultation with the Blue Mountains City Council, Heritage NSW, Aboriginal knowledge holders and the local community.

- The proposal would provide biodiversity offsets for vegetation removal as required under Transport's Guideline for Biodiversity Offsets (Transport, 2016b) (refer to Section 6.3.5 of the REF). .

- As noted in Section 3.2.3 of the REF, the proposal would develop an expended and cohesive heritage interpretation area on Nellies Glen Road to display the Aboriginal and non-Aboriginal heritage of the area. This would incorporate improved visitor car parking and active transport trails that form part of the Great Blue Mountains Trail around Nellies Glen Road to better connect users with the interpretation area. The design of the precinct would focus on heritage interpretation and ablutions and other amenities would not be provided. Figure 3-9 in Section 3.2.3 of the REF provides an indicative image of the enhanced heritage interpretation area.

- In addition, a heritage interpretation strategy for the Pulpit Hill area would be developed as part of the cultural interpretation strategy for the Great Western Highway Upgrade Program – Katoomba to Lithgow to reinterpret the existing heritage interpretation area and communicate the heritage significance of the Pulpit Hill area. The existing Blue Mountains City Council heritage interpretation area would be retained and accommodated in the new road alignment of Nellies Glen Road and the Great Western Highway. This area would be protected during construction and be further developed to reinterpret and display the Aboriginal and non-Aboriginal heritage of the area (refer to Section 3.2.3 of the REF). This could include further consideration of connection to the grave sites.

Issue description – Construction Impacts

- Request for the brick pit located in Bonnie Doon Reserve to be studied further and any brickwork to be retained during construction.

Response

The former Katoomba brick pit site is proposed as an ancillary facility during construction (refer to Section 3.4 of the REF). Transport is proposing during detailed design to investigate the suitability of the site for purposes of Aboriginal cultural education. The site would be developed for use as an Aboriginal yarning circle and remain a site which would hold future Aboriginal cultural significance. Should the site be deemed

unsuitable, another more suitable site would be selected along the proposal alignment in consultation with Aboriginal stakeholders. This would occur in accordance with revised Safeguard A3.

As noted in Section 3.6.1 of the REF, the Minister for Environment is the owner of this land, as the Minister administering the EP&A Act. The Department of Planning and Environment are supportive of the proposed use of this site as an Aboriginal yarning circle.

Transport would carry out further consultation with Aboriginal and other stakeholders during detailed design, construction and operation of the proposal. In addition, further studies would be carried out as part of an archival recording process. This process would consider items with potential historical significance, including the brick pit access gate and kilns.

3.7.4 Out of scope

Issue description – GWH Medlow Bath Upgrade

- Concern about the heritage impacts of the pedestrian footbridge as part of the Great Western Highway Medlow Bath Upgrade.

Response

The Medlow Bath Upgrade has been assessed as a separate project (the Great Western Highway Upgrade Medlow Bath REF). That REF assessed the environmental impacts of the project. The REF was placed on public display between 27 July 2021 to 24 August 2021 and feedback sought from the community. Refer to that REF for consideration of impacts of the project.

Transport has considered the feedback from the community to that project and responses have been provided in the Great Western Highway Upgrade Medlow Bath Submissions Report. Refer to that document for consideration of feedback on the Medlow Bath Upgrade.

3.7.5 Proposal need and options

Issue description - Alternate alignment - other

- Suggestion to consider alternative alignments at Pulpit Hill, such as a landbridge.
- Concern that alternative options are not considered in the REF. Suggestion for consideration of a split carriageway design (similar to Wentworth Falls and Boddington Hill) and relocation of the service road away from the western side of the rail corridor. Request for consideration of these options for public consultation.

Response

- Transport notes the suggestion of a landbridge or tunnelling construction option through Pulpit Hill to retain the potential archaeological features that may be present on the site. However, this particular construction methodology would not be suitable as the length of cut is too short for tunnelling. As such to create a landbridge, a 'cut and cover methodology' would need to be used.

  This methodology would require that all material would be excavated (similar to what is proposed) and a new cover structure placed on top of the cutting to create a 'landbridge'. The result of this is that all current land material would be lost and would not be able to be returned on top of the cover structure due to its weight. As such, any archaeological material would be lost using this methodology. In addition, there would be limited vegetation cover that could be placed over the cover structure so that

there would be limited opportunity for fauna connectivity.

In addition, as this methodology would require a substantial cover structure with associated supports, the cutting would need to be wider to facilitate appropriate support and road operational requirements.

- Section 2.4 of the REF outlines the options that were considered for the proposal and justifies the selection of the preferred design (Section 2.4.5) which is assessed in the REF.

  Transport notes Blue Mountains Heritage Advisory Committee's proposal design suggestions near Pulpit Hill. Opportunities to adopt a retaining wall to reduce the extent of cutting into Pulpit Hill and remove the proposed bench from the design would be considered during detailed design.

  The proposed local service road near Explorers Road would re-use the existing Great Western Highway pavement that can no longer be used due to the slight alignment shift in the upgrade . As such, relocating the service road away from the western side of the rail corridor would result in additional environmental impacts.

  In addition, re-use of this section of pavement would also contribute to Transport's Sustainability Plan 2021 sustainability focus area of improving environmental outcomes as it would rehabilitate the existing pavement rather than removing it to go to landfill. This would contribute to the development of a circular economy for Transport by designing waste out of the proposal and keeping the pavement materials in use.

4. Changes to the proposal

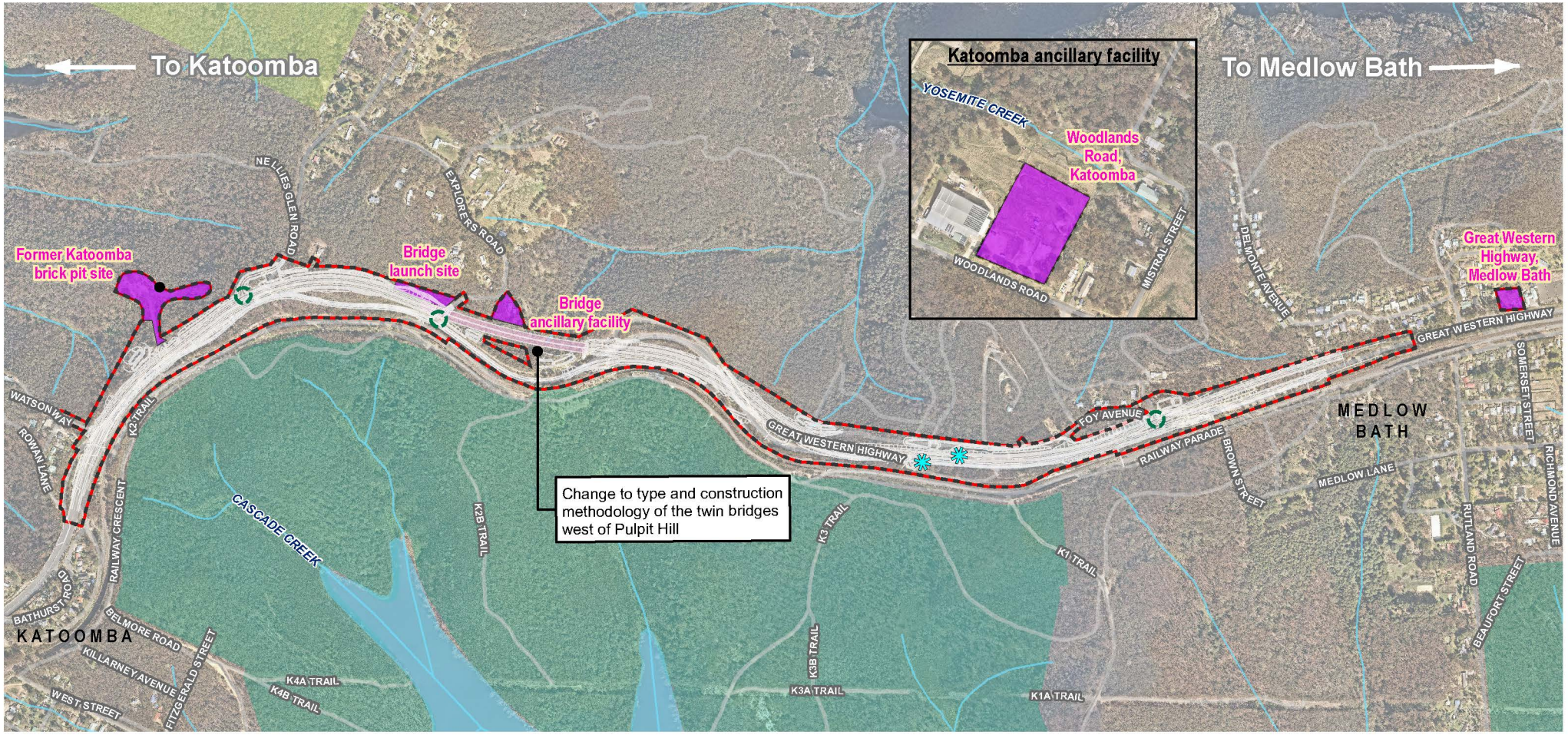
Following exhibition of the REF, the proposal design has been refined (referred to as 'the revised design') in response to stakeholder feedback and further progression of the design, including to either realise social benefits earlier or to allow construction efficiencies.

Figure 4-1a-b outlines the revised design and

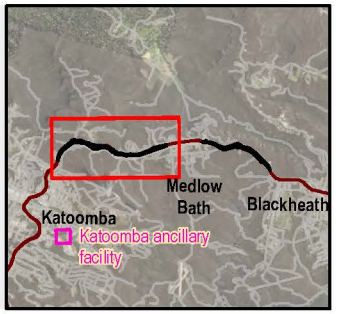
Figure 4-2 indicates the locations where design changes are proposed in the revised design compared to the design outlined in the REF. These figures identify the revised proposal area, which includes a western extension of the REF proposal area towards Blackheath and has been developed as the footprint required for the construction of the revised design.

The design changes in the revised design include:

- Extending the new separate eastbound carriageway and the upgrade of the westbound carriageway to connect back to the existing Great Western Highway just to the east of Tennyson Road.
- Continuing the active transport trail in the Medlow Bath to Blackheath section to Valley View Road, Blackheath. The active transport trail would also serve as maintenance access to utilities, water quality basins and the national park (for approved access only).
- High voltage electricity, optical fibre and water main relocations between Medlow Bath and Blackheath have been extended and connected back to existing utility networks at Blackheath.
- Minor adjustments to maintenance access and rail corridor interfaces in both sections of the proposal.
- Type and construction methodology of the twin bridges west of Pulpit Hill to introduce bridge designs that minimise environmental impacts.
- Optimising the lane alignment tie-in near Coachhouse Lane.
- Sealing of unsealed sections of active transport trail.



The revised design
REF proposal area
Revised proposal area
Proposed ancillary facilities
Bridge
Blue Mountains National Park
Ngula Bulgarabang Regional Park
Proposed intersection upgrades
Variable Message Sign



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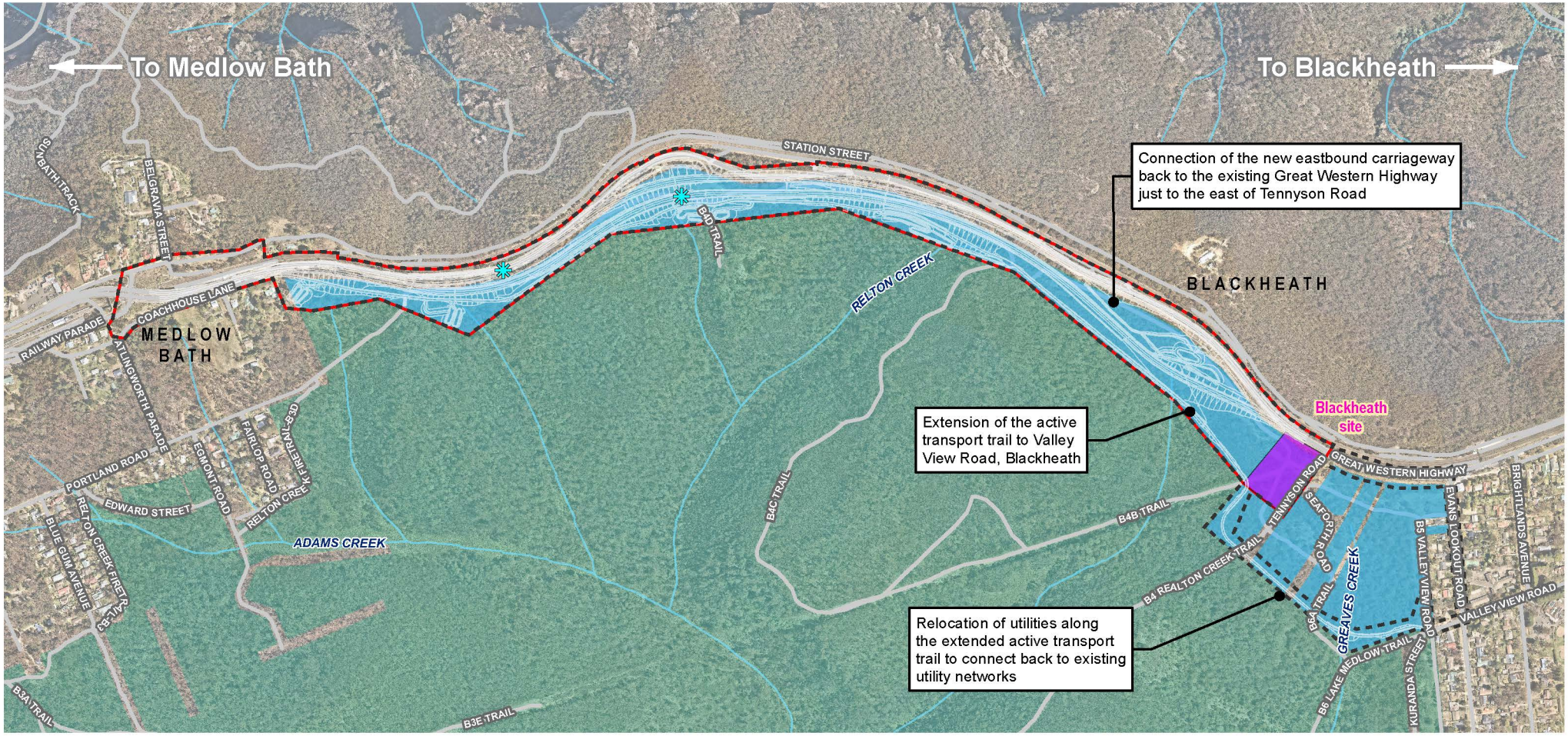
Source: Aurecon, Mott MacDonald, LPI, Nearmap

1:13,500@A4
0 150 300m

Projection: GDA2020 MGA Zone 56

FIGURE 4-1a: Revised design - Katoomba to Medlow Bath section



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Source: Aurecon, Mott MacDonald, LPI, Nearmap

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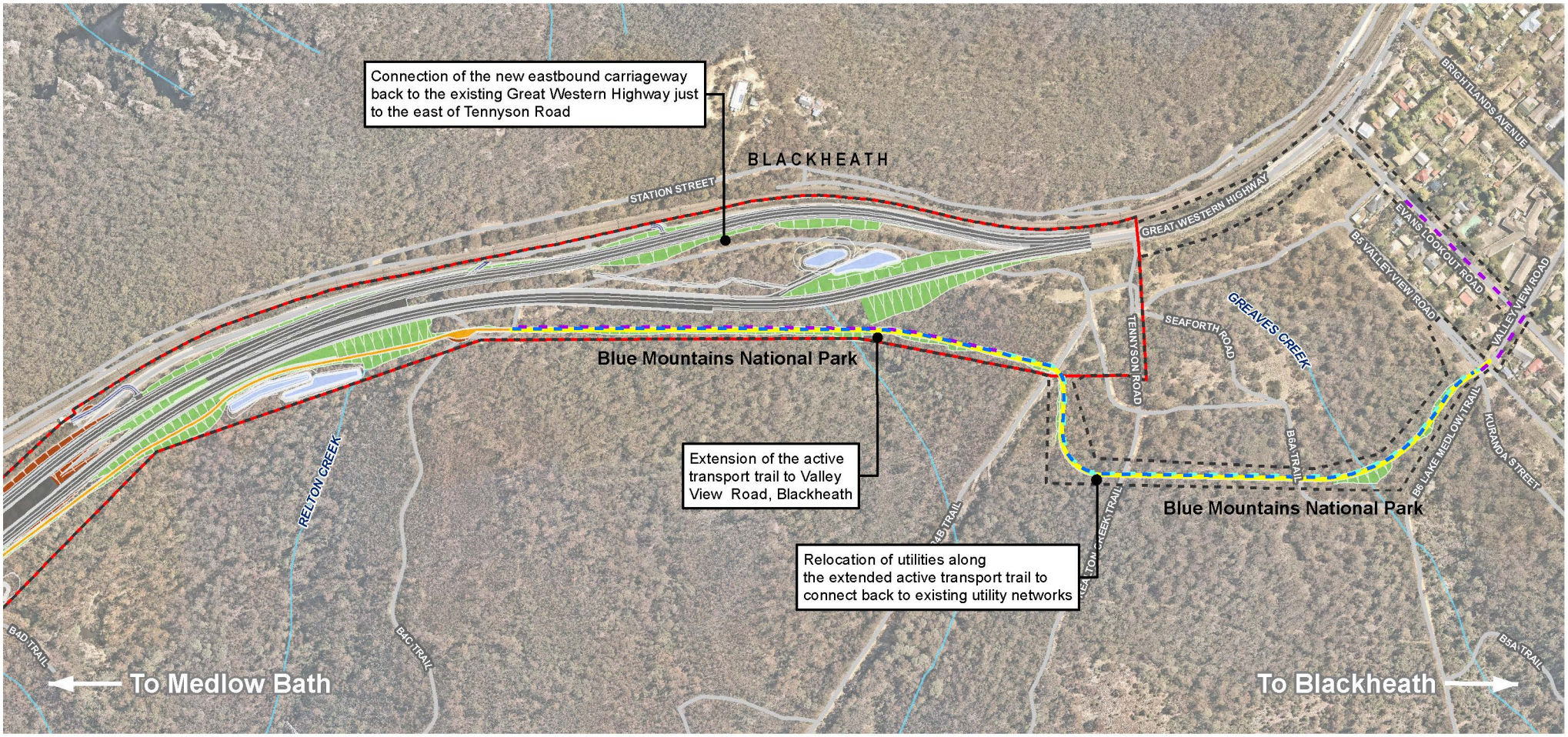
Projection: GDA2020 MGA Zone 56

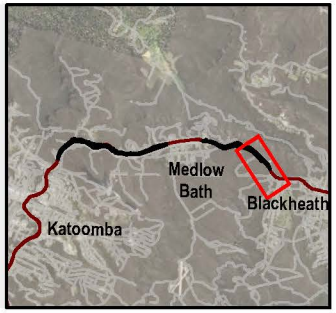
FIGURE 4-1b: The revised design - Medlow Bath to Blackheath section



REF proposal area
Revised proposal area

Revised design

Active transport trail - proposed
Maintenance access
Cut
Fill
Pavement
Drainage basin
Extension to the active transport trail
Overhead 11kV high voltage electricity
Underground 11kV high voltage electricity
Underground optical fibre and water main



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Source: Aurecon, Mott MacDonald, LPI, Nearmap

1:6,000 @A4
0 50 100m

Projection: GDA2020 MGA Zone 56

FIGURE 4-2: Design changes to the proposal following exhibition of the REF

4.1 Extending the highway upgrade

4.1.1 Description

The REF identified that the dual carriageway of the highway would extend to around chainage 5800, where a crossover would be included to re-join the carriageways to the existing Great Western Highway lanes.

The design has been amended so that the eastbound lane continues as a separate carriageways until about chainage 7000 (near Tennyson Road). This would provide over an extra one kilometre of dual carriageway. This connection is a temporary connection until the Blackheath to Little Hartley Upgrade is constructed.

In addition, with the extension of the eastbound carriageway, the westbound lanes (which under the REF, would have transitioned back to one lane at chainage 5800), would also have two lanes until chainage 7000. This would result in improved traffic flow through the area. Further west of chainage 7000, the highway would maintain one lane in each direction as per the existing highway.

The crossover location at chainage 5800 would be maintained for emergency access only.

Works for this design change are all contained within the REF proposal area.

4.1.2 Justification for the change

This would deliver more dual carriageway earlier and offer a better outcome for constructability and provide improved traffic flow into the town of Blackheath.

4.2 Extension of the active transport trail

4.2.1 Description

In the REF, the active transport trail ended at around chainage 6400 to connect into the existing B4 Realton Creek Trail that would run outside of the Blue Mountains National Park (once the revocation is approved).

As part of the design changes, the active transport trail would be extended from chainage 6400 to Valley View Road and generally offset from the Blue Mountain National Park boundary. The trail would be sealed with bitumen, asphalt or surfaced with concrete as appropriate along the length.

The active transport trail would also serve as a maintenance access trail to utilities, water quality basins and other walking trails in the area.

The extension of the active transport trail would extend outside to the west of the REF proposal area and occur within the revised proposal area.

4.2.2 Justification for the change

In the REF, the active transport trail in the Medlow Bath to Blackheath section commenced at Coachhouse Lane and travelled outside the National Park to the east of Tennyson Road, where it would have connected into existing fire trails. The fire trails were not of the same standard as what the active transport trail would be and could potentially deter users. By extending the length of the trail to Valley View Road, it provides a continuous active trail between Medlow Bath and Blackheath and improved emergency and maintenance access to utilities and the national park.

4.3 Utility connections

4.3.1 Description

Utility relocations required for the proposal need to be connected back into existing utility networks. Between Medlow Bath and Blackheath, this would require installation of:

- High voltage electricity cables overhead and underground along the new active transport trail, connecting into Valley View Road and Evans Lookout Road
- Optical fibre underneath the alignment of the new active transport trail
- Water main underneath the alignment of the new active transport trail.

Where possible the relocations have been sited under the active transport trail to avoid additional vegetation clearing. These public utility relocations would be required for the revised design that extend to the west of the REF boundary.

4.3.2 Justification for the change

Further consultation with utility authorities and design work undertaken identified that the relocation of utilities would need to extend further west to connect into existing networks in Blackheath.

4.4 Twin bridge construction

4.4.1 Description

Further consideration of the construction of the twin bridges has been carried out from the concept detailed in the REF. Another potential construction methodology has been identified as being feasible for the twin bridges.

The features from the REF that would remain the same as the REF include the general length and the cross section of the bridge deck, being over 400 metres long and having two separate bridges (one for eastbound and one for westbound traffic). Each bridge would consist of two traffic lanes and a shoulder. The road carriageway on each bridge would be about 10.5 metres wide, comprising two 3.5-metre-wide traffic lanes, a one-metre-wide inner shoulder and 2.5-metre-wide outer shoulder. The bridge structures would have a maximum spacing of 100 millimetres between each bridge for safety reasons. The maximum height of the bridge deck over ground would be about 32 metres.

The potential alternative construction methodology would include:

- Balanced cantilever structure with only two piers (as opposed to the REF concept of box girders with eight piers)
- More traditional form of construction involving works from the ground up, and not incrementally launched.

All construction works would be undertaken within the REF proposal area. As per the REF construction methodology, no construction works, activities or piers would be located in proximity to the Blue Mountains Swamp threatened ecological community (TEC).

4.4.2 Justification for the change

This alternative construction methodology could provide better longer-term environmental outcomes and reduce direct vegetation impacts.

4.5 Minor National Park and rail corridor access refinements

4.5.1 Description

Further design work in conjunction with stakeholders have identified a range of refinements to access to adjacent properties including rail corridor and the Blue Mountains National Park.

These are minor adjustments that have resulted from consultation with property owners and understanding of operational requirements.

All these works fall within the REF proposal area and are generally in the same location as identified in the REF.

4.5.2 Justification for the change

Adjustments to access have been undertaken to provide an optimum access solution to property owners, ensuring that effective operational access can be maintained.

4.6 Optimising the lane alignment tie-in near Coachhouse Lane

4.6.1 Description

The lane alignment west of the Great Western Highway / Railway Parade intersection has been shifted as much as practicable (between 0.5 metres and one metre) on the existing highway pavement towards the rail corridor and away from residents on Coachhouse Lane. This has provided a better tie-in with the existing highway lane alignment at this location.

This design change falls within the REF proposal area and is generally in the same area as identified in the REF.

4.6.2 Justification for the change

The options assessment carried out for the proposal (refer to Section 2.4 of the REF) noted the constraints at the eastern end of the Medlow Bath to Blackheath section near Coachhouse Lane. While the concept design avoided acquisition of private property on Coachhouse Lane and minimised impact to the rail corridor and retaining wall near Coachhouse Lane, further design work has been carried out to better connect the proposal with the existing highway at this tie-in.

While this design change has also resulted in a reduction in number of receivers recommended for at-property treatment due to operational noise impacts (refer to Section 5.6), Transport would adopt a conservative approach and still offer at-property treatment to all properties identified in Appendix H to the REF.

4.7 Sealing of unsealed sections of active transport trail

4.7.1 Description

The REF proposal would relocate, upgrade and connect with existing sections that make up the Great Blue Mountains Trail along the Katoomba to Medlow Bath section as well as provide a new publicly accessible trail in the Medlow Bath to Blackheath section.

Following display of the REF, the active transport trail design has been refined so that sections of unsealed existing trail within the proposal area would be upgraded. Some sections of the existing trail would remain as per the current scenario as they are suitable for use and would avoid further environmental impacts and construction work.

Any sections of trails which would now be sealed would maintain their existing alignment and fall within the REF proposal area.

4.7.2 Justification for the change

This design change would allow safe travel and a consistent pavement quality along the length of the active transport trails between Katoomba and Blackheath. The upgraded trail would be of a grade suitable for pedestrians and cyclists to use for travel between the villages.

5. Environmental assessment

As a result of the changes to the proposal outlined in Chapter 4, additional environmental assessment was required. This chapter describes the additional assessment carried out for the revised design since the exhibition of the REF and identifies changes in potential impacts of the proposal compared to those identified in Chapter 6 of the REF. The following sections assess changes due to the revised design against each environmental assessment discipline. As the revised design is generally located within or immediately adjacent to the REF proposal area, there would be negligible change to the existing environment as outlined in the REF.

5.1 Surface water and groundwater

Due to the location of the changes at the western end of the revised proposal area located within the Blackheath Special Area, further detailed assessment of drainage impacts was carried out.

5.1.1 Methodology

Additional construction and operational drainage design work (including MUSIC modelling) was carried out for the extension of highway upgrade.

The construction drainage assessment was carried out in accordance with Section 4.1 of Transport PN143P Erosion and Sedimentation Management Procedure and consisted of the:

- development of revised Erosion and Sediment Control Plans (ESCPs) which outline major erosion and sedimentation control measures for the revised design
- preparation of an addendum Erosion and Sediment Management Report (ESMR) which determines how the construction of the revised design may impact on soils and surface water and appropriate mitigation or management measures where impacts are identified.

Results of this assessment are found in Appendix B.

The operational drainage assessment consisted of:

- development of a revised operational drainage design for the Medlow Bath to Blackheath section to capture all runoff from the revised design
- MUSIC modelling of the revised operational drainage design with the following parameters (which are consistent with the REF):
  - Rainfall data as per Zone 7 Lower Cox River, Water NSW climate zones.
  - Soil parameters and associated data as per Sandy Clay.
- a review of the Neutral or Beneficial Effect assessment carried out for the proposal (refer to Appendix C to the REF) to confirm whether a beneficial effect would still be achieved with the revised operational drainage design.

Results of this assessment are found in Appendix C.

5.1.2 Description of existing environment

The revised proposal area is within the study area adopted for the surface water and groundwater assessment carried out to inform the REF. As such, the existing environment of the revised design is consistent with that outlined in Section 6.1.2 of the REF.

5.1.3 Potential impacts

In general, the revised design would be consistent with the construction and operational impacts as identified in Section 6.1.3 of the REF.

Construction

The key potential construction impacts of the revised design on surface water and groundwater include:

- surface water quality impacts due to sediment laden runoff being released to waterways during construction activities such as vegetation removal, earthworks, stockpiling, bridge construction (Katoomba to Medlow Bath section only) and transportation of materials
- potential localised interception of groundwater and resulting groundwater quality impacts to GDEs near construction activities
- surface water and groundwater quality impacts as a result of accidental leaks and spills.

However, due to the location with the Blackheath Special Area, further assessment was undertaken to identify any additional controls required to make sure that there are minimal impacts from the works.

A revised Preliminary Erosion and Sedimentation Assessment (PESA) was carried out to assess the erosion hazard of the revised proposal area. The PESA found that the revised design represents a high erosion risk (refer to Section 2.4 of Appendix D). This is consistent with the PESA carried out to inform the REF.

The downstream environment of the revised design is within the Blackheath Special Area, which is a sensitive receiving environment and at high risk of contamination without appropriate safeguards. Construction activities, including the construction of drainage basins, are expected to occur near or adjacent to waterways within the revised proposal area, including Greaves Creek and other unnamed tributaries which drain into Lake Medlow. This work may impact these waterways. Unmitigated, there is a risk of blockages of the waterways and drainage lines due to earthworks and other construction activities. Diversion of drainage lines may also create localised areas of flooding and scour. Overland flow could wash construction materials, fuels and chemicals into the natural drainage line from the areas of road work construction if not appropriately managed. Removal of vegetation and the construction work would also increase the area of impervious surfaces increasing the possibility of scouring for the tributaries downstream of the section. Safeguards SGW1 – SGW3, SGW5 and SGW6 have been designed to manage the potential impacts of construction near and across waterways.

In addition, five construction basins were proposed along the length of the Medlow Bath to Blackheath section in the ESCPs prepared for the REF proposal to capture runoff to manage this potential impact. The revised ESCPs include minor adjustments to the location and size of these basins and propose an additional basin on the western end of the revised proposal area. These adjustments would capture the runoff associated with the revised design.

The ESMR and ESCPs produced for the REF proposal and revised design would be updated during the detailed design phase to confirm the erosion and sedimentation controls required for proposal (Safeguard SGW 2).

Operation

The operational surface water and groundwater impacts for the revised design would be consistent with the REF. These include:

- increased impervious surfaces as a result of the highway upgrade, including roadway and pavements, resulting in increased stormwater runoff volume, frequency and rate and associated increases in pollutant loading to receiving waterways.
- scour and erosion at new drainage outlets, downstream of new culverts and within grass drains and channel realignment work if poorly stabilised or if scour protection is poorly constructed

- accidental spills from motorists and personnel undertaking management tasks.

The increase in pollutants could result in water quality impacts such as sedimentation, reduced water clarity, increased toxicant and nutrient concentrations and lower dissolved oxygen levels within the receiving waterways. Increases in frequency, rate and volume of flows due to an increase in impervious area may also impact waterway health.

However, due to the location with the Blackheath Special Area, further assessment was carried out to identify any additional controls required to make sure that there are minimal impacts from the works. Further design work identified that with the additional impervious area of the highway upgrade and active transport trail extension, additional water storage would be required to make sure that surface water is captured and treated prior to release.

As such, the existing basin at chainage 6800 would be increased in size to accommodate the increase in impervious area. The proposed bioretention basin is oversized for the proposal and provides greater nutrient reduction. At this location, sections of the catchment are proposed to bypass the bioretention basin due to topographic constraints. Runoff is instead captured within grass lined swales and directed to the discharge point from the proposal. There would also be sheet flow runoff to the east from the proposed extension to the active transport trail via a buffer strip to the natural ground level. The entire operational drainage network, including the new proposed grass lined swales and buffer strips, was factored into the MUSIC modelling carried out for the revised design.

A high-level MUSIC model was developed to estimate the change in pollutant load and annual runoff volume as a result of the revised design with consideration to the proposed stormwater treatment strategy. These results are outlined for each basin in the Medlow Bath to Blackheath section in Appendix C. The modelling found that that the revised design with no treatment would result in a major increase in total suspended solids (TSS), total phosphorus (TP), total nitrogen (TN) and gross pollutant loads from the local drainage catchments. However, when the proposed water quality treatments were included in the modelling, the results identified a net beneficial effect on water quality. This is consistent with neutral or beneficial effect on water quality (NorBE) assessment carried out for the REF proposal (refer to Appendix C of the REF).

The revised operational drainage design would maintain the expected major reduction in gross pollutant, TSS, TP and TN loads due to the proposal identified in the REF. In the Medlow Bath to Blackheath section, this would comprise reductions of about:

- 94.7 per cent in total gross pollutant loads
- 85.6 per cent in TSS pollutant loads
- 66.1 per cent in TP pollutant loads
- 45.5 per cent in TN pollutant loads.

Transport's Sustainable Design Guidelines targets would be met and exceeded by the revised design, consistent with the REF proposal.

5.1.4 Revised safeguards and management measures

The safeguards and management measures included in the REF are applicable to the revised design. No additional safeguards and management measures would be required due to the revised design. Safeguard SGW2 has been amended as outlined in Table 5-1.

Table 5-1 Revised surface water and groundwater safeguard and management measure

ID	Impact	Environmental safeguard	Responsibility	Timing	Reference
SGW2	Soil and water	The preliminary Erosion and Sedimentation Management Plan (ESMR) and Erosion and Sedimentation Control Plans (ESCP) produced for the **REF** proposal (Appendix D to the REF) **and revised design (Appendix B to the submissions report)** will be updated **and consolidated** during the detailed design phase to confirm the erosion and sedimentation controls for both sections of the proposal, including the construction of progressive ESCPs and the continual updating of these plans.	Transport / Contractor	Detailed design / Pre-construction	Section 2.2 of QA *G38 Soil and Water Management*

5.2 Soils and contaminated lands

The revised design is located within the study area of the soils and contaminated lands assessment, assessment of the revised design has derived from the assessment undertaken in the REF.

5.2.1 Potential impacts

The impacts associated with the revised design are consistent with those areas that fall within the REF proposal area.

For the works located to the west of the REF proposal area within the revised proposal area, the contaminated lands risk assessment is similar to that in the Medlow Bath to Blackheath section. This identified that potential sources of contamination includes:

- Roads and associated emissions from vehicle exhausts and runoff sediments
- Filling and incidental renovations within rural living properties, road reserves and nature strips.
- Stockpiles

While the works for the extension of the highway upgrade, utility connections and extension to the active transport trail are within what is currently the Blue Mountains National Park, there is some evidence of previous historical uses as well as maintenance trails used by vehicles. All this can contribute to contamination risk.

Similar to the REF, during construction, areas of cut and / or any spoil produced for the revised design would be assessed to inform necessary waste management practices.

In addition, further contamination studies would be undertaken across the alignment to confirm whether there are any contamination deposits of concern, as part of the Contaminated Land Management Plan (Safeguard SC1).

5.2.2 Revised safeguards and management measures

The safeguards and management measures included in the REF are applicable to the revised design. No additional safeguards and management measures would be required due to the revised design.

5.3 Biodiversity

The Biodiversity Assessment Report (BAR) carried out for the REF did not assess impacts to biodiversity outside the REF proposal area. Additional biodiversity assessment was required to assess the biodiversity impacts of the revised design. As such, the REF BAR was updated to provide a whole of project (REF proposal area and revised proposal area) assessment. The revised BAR is attached as Appendix D.

5.3.1 Methodology

The methodology for the revised BAR included:

- a review of relevant literature, databases and existing vegetation mapping (as outlined in Section 6.3.1 of the REF) to identify vegetation, threatened flora and fauna and Threatened Ecological Communities (TECs) that are listed under both NSW and Commonwealth legislation, with potential to occur within a 10 kilometre radius of the study area
- additional field surveys of the extended western section of the revised study area to identify and assess biodiversity values in accordance with the Biodiversity Assessment Methodology (BAM) and relevant threatened biodiversity survey guidelines

- reviewing and updating the assessment of 'likelihood of occurrence' following the collation of database records and species and community profiles
- assessing the potential impacts to flora, fauna and migratory species within the revised proposal area including assessments of significance where required
- reviewing and updating construction and operational management measures as well as the need for biodiversity offsets due to the revised design.

Additional biodiversity field campaigns were carried out in Winter 2022 (29 July 2022 and 3 – 5 August 2022) for the revised design.

These surveys were carried out in accordance with the BAM and included:

- spotlighting for nocturnal mammals and birds
- opportunistic fauna observations.

The field survey methodology for the proposal is explained further in Section 2 of the revised BAR, attached to this report as Appendix D.

5.3.2 Description of existing environment

The revised proposal area occurs partially within a section of the Blue Mountains National Park which is in the process of being revoked. As such, it is predominately a vegetated area. The vegetation in the extended proposal area comprises of the Plant Community Type (PCT) 1248 *Sydney Peppermint – Silvertop Ash heathy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin Bioregion*.

Condition of the vegetation is mostly moderate, with areas of low conditions observed adjacent to the highway and a patch of degraded quality in the vicinity of existing maintenance paths.

Threatened species that were observed on site in the extended section of the revised proposal area and nearby in the REF proposal area include the Brown Tree Creeper and foraging Gang-gang Cockatoos.

The additional field investigations did not identify additional threatened flora or fauna within the revised proposal area beyond those identified in Section 6.3.2 of the REF.

5.3.3 Potential impacts

Biodiversity impacts associated with the twin bridge construction and minor access refinements have been adequately covered in the REF as these activities are already within the area of vegetation clearing and disturbance.

Changes to the biodiversity impacts are associated with the works at the western end of the revised proposal area are associated with the extension of the highway upgrade and active transport trail and the utility connection into Blackheath. The main impacts would be associated with vegetation clearing. These works would result in an increase in 2.45 hectares of vegetation loss. In addition, it is expected that an additional 13 hollow bearing trees could be affected by the revised design, bringing the total habitat bearing trees that would be impacted by the proposal to 220.

Table 5-2 summarises the changes in the magnitude of impacts in hectares expected as a result of the revised design.

Table 5-2 Summary of changes in biodiversity impacts expected from revised proposal area

Vegetation zone	Vegetation condition (BAM-C)	REF direct impacts (ha)	Revised direct impact area (ha)	Difference (ha)
PCT 1248 – Sydney Peppermint – Silvertop Ash heathy open forest on sandstone ridges of the upper Blue Mountains, Sydney Basin Bioregion	Moderate	27.74	29.37	1.63
	Low	19.06	19.88	0.82
	Degraded	0.00	0.00	0.00
PCT 967 – Narrow-leaved Peppermint – Silvertop Ash – Mountain Grey Gum shrubby open forest of the upper Blue Mountains, Sydney Basin Bioregion	Moderate	0.70	0.70	0.00
	Low	0.06	0.06	0.00
PCT 1078 – Prickly Tea-tree – sedge wet heath on sandstone plateaux, central and southern Sydney Basin Bioregion. (Blue Mountains Swamps (BC Act listed))	Moderate	0 (NB: 0.12ha in the REF proposal area would not be impacted)	0 (NB: 0.12ha in the revised proposal area would not be impacted)	0.00
TOTAL		47.56	50.01	2.45

However, the final vegetation clearance boundary subject to impacts during construction would be confirmed during detailed design, with the aim to continue minimising impacts on biodiversity where possible. No other changes to the biodiversity impacts compared to those outlined in the REF have been identified.

In addition, the increase in vegetation removal would also increase the amount of fauna habitat that would be affected. The changes in impact to fauna habitat is detailed in Table 5-3.

Table 5-3 Potential impacts to threatened species

Threatened species	Habitat or individuals to be impacted (as per the REF)	Revised impact
Flora		
Needle Geebung (*Persoonia acerosa*)	1 individual identified within the REF proposal area	1 individual identified within the revised proposal area
Superb Midge Orchid (*Genoplesium superbum*)	Up to 0.76 ha of potential habitat	Up to 0.76 ha of potential habitat
Klaphake's Sedge (*Carex klaphakei*)	Indirect impacts to 0.12 ha of potential habitat	Indirect impacts to 0.12 ha of potential habitat
Fauna		
Large-eared Pied Bat (*Chalinolobus dwyeri*)	Up to 47.56 ha potential foraging habitat	Up to 50.01 ha potential foraging habitat

Threatened species	Habitat or individuals to be impacted (as per the REF)	Revised impact
Koala (*Phascolarctos cinereus*)	Up to 47.56 ha potential foraging habitat	Up to 50.01 ha potential foraging habitat
Grey-headed Flying fox (*Pteropus poliocephalus*)	Up to 47.56 ha potential foraging habitat	Up to 50.01 ha potential foraging habitat
Gang-gang Cockatoo (*Callocephalon fimbriatum*)	Up to 47.56 ha confirmed foraging habitat	Up to 50.01 ha confirmed foraging habitat
Spotted-tailed Quoll (*Dasyurus maculatus*)	Up to 47.56 ha potential foraging habitat and impacts to connectivity across the widened road corridor	Up to 50.01 ha potential foraging habitat and impacts to connectivity across the widened road corridor
Rosenberg's Goanna (*Varanus rosenbergi*)	Up to 47.56 ha potential habitat (foraging, sheltering, breeding)	Up to 50.01 ha potential habitat (foraging, sheltering, breeding)
Eastern Pygmy Possum (*Cercartetus nanus*)	Up to 47.56 ha confirmed foraging habitat and up to 207 hollow-bearing trees (which provide potential nesting/breeding resources)	Up to 50.01 ha confirmed foraging habitat and up to 220 hollow-bearing trees (which provide potential nesting/breeding resources)
Greater Glider (*Petauroides volans*)	Up to 47.56 ha of potential foraging habitat, and up to 207 hollow-bearing trees (which may provide potential nesting/breeding resources)	Up to 50.01 ha of potential foraging habitat, and up to 220 hollow-bearing trees (which may provide potential nesting/breeding resources)
Squirrel Glider (*Petaurus norfolcensis*)	Up to 47.56 ha of potential foraging habitat, and up to 207 hollow-bearing trees (which may provide potential nesting/breeding resources)	Up to 50.01 ha of potential foraging habitat, and up to 220 hollow-bearing trees (which may provide potential nesting/breeding resources)
Threatened hollow-dependant bats • **Eastern Coastal Free-tailed Bat (*Micronomous norfolkensis*)** • **Greater Broad-nosed Bat (*Scoteanax rueppellii*)** • **Yellow-bellied Sheath-tailed Bat (*Saccolaimus flaviventris*)** • **Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)**	Up to 47.56 ha confirmed foraging habitat and 63 hollow-bearing trees that are considered suitable as potential roosting habitat for these species.	Up to 50.01 ha confirmed foraging habitat and 63 hollow-bearing trees that are considered suitable as potential roosting habitat for these species.
Threatened cave-dependant bats • **Little Bent-winged Bat (*Miniopterus australis*)** • **Large Bent-winged Bat (*Miniopterus orianae oceanensis*)** • **Eastern Cave Bat (*Vespadelus troughtoni*)**	Up to 47.56 ha of confirmed foraging habitat	Up to 50.01 ha of confirmed foraging habitat
Threatened woodland birds • **Brown Treecreeper (eastern subspecies) (*Climacteris picumnus*)** • **Varied Sittella (*Daphoenositta chrysoptera*)** • **Diamond Firetail (*Stagonopleura guttata*)** • **Gilbert's Whistler (*Pachycephala inornate*)**	Up to 47.56 ha of confirmed foraging habitat and removal of potential nesting habitat (including up to 207 hollow-bearing trees to be removed and cup nests)	Up to 50.01 ha of confirmed foraging habitat and removal of potential nesting habitat (including up to 220 hollow-bearing trees to be removed and cup nests)

Threatened species	Habitat or individuals to be impacted (as per the REF)	Revised impact
• **Black-chinned Honeyeater (*Melithreptus glumaris gularis*)** • **Little Lorikeet (*Glossopsitta pusilla*)**		
Threatened woodland robins • **Flame Robin (*Petroica phoenicea*)** • **Scarlet Robin (*Petroica boodang*)** • **Hooded Robin (*Melanodryas cucullate*)**	Up to 47.56 ha of potential foraging habitat and indirect removal of potential nesting habitat (e.g., cup-nests, sheltered sites and shallow tree cavities)	Up to 50.01 ha of potential foraging habitat and indirect removal of potential nesting habitat (e.g., cup-nests, sheltered sites and shallow tree cavities)

The revised design would also result in minor increases in edge effects and weed incursion for surrounding vegetated areas compared to the REF proposal. This would be associated with the western extension of the active transport trail and utilities relocations towards Blackheath outside the REF proposal area.

Regardless of this increase in biodiversity impact, the proposal would still have a non-significant biodiversity impact.

5.3.4 Biodiversity offsets

Although efforts have been made to avoid, minimise and mitigate potential ecological impacts associated with the proposal, some residual impacts would occur. Transport would provide biodiversity offsets or, where offsets are not reasonable or feasible, supplementary measures for impacts that exceed the thresholds listed under Transport's *Guideline for Biodiversity Offsets* (Transport, 2016b).

Based on impact to 50.01 hectares of native vegetation, as per the BAM-C, the revised design requires:

- 924 ecosystem credits for impact to known habitat of seven NSW listed threatened ecosystem credit species (Gang-gang Cockatoo, Brown Treecreeper, Large Bentwing-bat, Little Bentwing-bat, Greater Broad-nosed Bat, Eastern Coastal Free-tailed Bat, Yellow-bellied Sheathtail-bat). This is consistent with the ecosystem credits required for the REF proposal.
- 1281 species credits for impacts to known habitat for the Eastern Pygmy-possum (species credit species under the BAM). This is an increase of 48 species credits compared to the REF proposal.

Refer to Section 7 of the revised BAR (Appendix D) for further details.

5.3.5 Revised safeguards and management measures

The safeguards and management measures included in the REF are applicable to the revised design. One additional management measure is proposed to address the additional impacts from the revised design.

ID	Impact	Environmental safeguard	Responsibility	Timing	Reference
B17	Threatened flora	Targeted surveys (parallel transects 5-metres apart) for Small Pale Grass-lily (*Caesia parviflora var. minor*) and *Acacia baueri subsp. aspera* will be undertaken between the months of October to February (during the recommended survey period) during the detailed design phase to confirm whether these species are present.	Transport	Detailed design	Additional safeguard

5.4 Non-Aboriginal heritage

While some of the design changes are within the REF proposal area, the western extension of the active transport trail and utilities relocation included within the revised proposal area was outside the area assessed in the Statement of Heritage Impact prepared for the REF. As such, an additional non-Aboriginal heritage assessment has been carried out. Results of this assessment are presented in an Addendum Statement of Heritage Impact (SOHI), attached as Appendix E.

5.4.1 Methodology

The methodology for the addendum Statement of Heritage Impact included:

- a review of the literature review, database searches and desktop assessment carried out to inform the proposal's Statement of Heritage Impact (Appendix F of the REF) and
- additional desktop assessment of literature and databases as outlined in Section 6.4.1 of the REF where required for the western extension of the revised proposal area
- a site inspection on 4 and 5 August 2022 of the western extension of the revised proposal area and:
  - confirmed places already identified from previous studies or re-evaluating those lists
  - identified physical evidence that could indicate archaeological evidence, structures or other work that may not have been identified in other sources within or near the revised proposal area
- assessment of the potential non-Aboriginal heritage impacts during construction and operation of the revised design
- the provision of additional mitigation measures to manage the potential impacts on non-Aboriginal heritage identified.

This Addendum SOHI has been prepared in accordance with the conservation principles and methodology contained in The Burra Charter: *The Australia ICOMOS Charter for Places of Cultural Significance* (2013) and in accordance with the best practice standards set out by the Heritage NSW. The relevant best practice guidelines include:

- *Statement of Heritage Impact* (Heritage Council of NSW, 2002)
- *NSW Heritage Manual*
- *Assessing Heritage Significance* (Heritage Office (former), 2001)
- *Assessing Significance for Historical Archaeological Sites and 'Relics'* (Heritage Council of NSW, 2009)
- *Cultural Heritage Guidelines* (TfNSW, 2015).

5.4.2 Description of existing environment

Historical context

The historical context of the revised design is generally consistent with that identified in Section 3.4.2 of the REF. The local historical themes of *Early Exploration*, *The Western Road*, *The Railway*, *Recreation, Health and Tourism* and *Industry* have influenced the local historical context of the proposal area. Table 5-4 outlines additional historical context of the revised design related to the western extension of the revised proposal area towards Blackheath.

Table 5-4 Additional historical context of the revised design

Year	Event
1889	The 1889 plan of the Village of Blackheath (refer to Plate 2 in Section 3.1.1 of Appendix E) shows the subdivision of land carried out along the Great Western Highway to the east of Blackheath towards Medlow Bath. Many of these lot and property boundaries are still legally in force for this land. This land division is also recorded on Parish Maps of the area.

Year	Event
1902	The alignment of the Great Western Highway was modified to the east of Blackheath to form the current alignment of the highway.
1907	The revised proposal area has been associated with water catchment areas from the beginning of the 20th century which supplied the upper Blue Mountains communities with drinking water. The State Heritage Registered Medlow Dam located to the east of the revised proposal area was built in 1907. This dam has tributaries (such as Greaves Creek) which run through the revised proposal area.
1940	Control of the water catchment area for the Medlow Dam was invested in council.
1980	Control of the water catchment area for the Medlow Dam was transferred to Metropolitan Water Sewerage and Drainage Board.
Present day	The water catchment area is managed by WaterNSW.

Heritage items

While the extended western section of the revised proposal area is currently located in the Blue Mountains National Park, there is some evidence of historical use of part of the area near Tennyson Road, Blackheath. There is one listed heritage item within the extended western section of the revised proposal area, as described in Table 5-5. The potential heritage items within and near the revised proposal area identified in the historical assessment, previous assessments and the site inspection are listed in Table 5-6. These are not listed heritage items but could have heritage significance.

Table 5-5 Heritage item within the revised proposal area

Item	Listing number	Level of significance	Description
Greater Blue Mountains Area – Additional Values (Nominated)	105696	National – Nominated	The Greater Blue Mountains Area is a sandstone tableland that encompasses 1.03 million hectares of eucalypt-dominated landscape inland from Sydney. It is one of the largest and most intact tracts of protected bushland in Australia. Its exceptional biodiversity values are complemented by numerous others, including indigenous and post-European-settlement cultural values, geodiversity, water production, wilderness, recreation and natural beauty. The item Greater Blue Mountains Heritage Area – Additional Values is a nominated heritage item only, and not officially listed on the National Heritage List, however, it has been assessed for impacts due to the proposal to follow best practice.

Table 5-6 Non-listed heritage items within and near the revised proposal area

Item	Description
Great Western Highway	The Great Western Highway is historically significant as the primary historical route west from Sydney, following the earliest European lines of exploration and migration over the Blue Mountains. The associated elements such as culverts, retaining, road cuttings and kerbing contribute to the significance of the road.
Convergence of tracks	The large-scale clearing and the series of tracks near the Convergence of tracks is indicative of industrial activities in the area. Further assessment carried out following display of the REF indicated that the tracks are related to rural patterns of settlement near the revised proposal area. This item was found to have no historic value.
Former building remains	Demolished remains of rural housing.

Item	Description
Former settlement remains (scattered)	Remains of garden edging associated with historical settlement.

Archaeological potential of the revised proposal area

There is low potential for subsurface archaeological deposits of significance to be located within the revised proposal area. While there is moderate potential of archaeological deposits to be associated with sites of former settlement; these are largely outside of the revised proposal area.

5.4.3 Potential impacts

Design refinements that are located in the revised proposal area would result in impacts to the Greater Blue Mountains Area – Additional Values (Nominated). There would be direct impacts due to vegetation clearance, road widening, extension of the active transport trail, utilities relocation and construction of associated drainage basins along the western periphery of the Greater Blue Mountains Area - Additional Values area. It would involve the removal of established native trees that contribute to the overall significance of the heritage item however the loss of these elements would not reduce the overall significance of the item. These impacts are considered to be minor partial physical impacts.

Construction of the revised design would not directly impact the former building or settlement remains. Table 5-7 outlines the predicted impacts of the construction of the proposal on other non-listed heritage items.

Table 5-7 Potential impacts on the identified heritage items during construction of the proposal

Item	Description
Great Western Highway	**Minor partial physical impacts** The proposed works will involve duplication and modification of the Great Western Highway between Katoomba to Medlow Bath, and Medlow Bath to Blackheath.
Archaeological potential within the revised proposal area	**Minor partial physical impacts** The revised design would involve trenching and modification to subsurface geology within the revised proposal area. This work is mostly limited to previously disturbed areas. However, the areas where archaeological potential has been identified are not near the revised design.

5.4.4 Revised safeguards and management measures

The safeguards and management measures included in the REF are applicable to the revised design. One additional non-Aboriginal heritage safeguard (Safeguard NA12) would be required due to the revised design (refer to Table 5-8) in addition to Safeguards NA1 to NA11.

Table 5-8 Additional non-Aboriginal heritage safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
NA12	**Former settlement remains**	**The revised design should avoid the former settlement remains (identified as BH001, BH002 and BH005 in Appendix E to the submissions report). If design changes result in the revised design being closer to these remains, potential heritage impacts to these areas should be re-assessed.**	**Transport**	**Detailed design**	**Additional safeguard**

5.5 Landscape character and visual impacts

Design refinements in the revised proposal area, particularly the extension to the highway upgrade and the active transport trail, would result in permanent visual impacts from additional infrastructure on the land. In addition, extension to overhead utilities in the area could also change the visual environment. As such, an additional landscape character and visual impact assessment has been carried out. Results of this assessment are found in Appendix F.

5.5.1 Methodology

The additional landscape character and visual impact assessment (LCVIA) was carried out in accordance with the *Practice Note: Guideline for landscape character and visual impact assessment* (EIA-N04).

The revised design occurs within landscape character zone (LCZ) 5 and LCZ 6 (as identified in Figure 6-5 in the REF). As such, the landscape character assessment assessed the overall impact of the revised design on the character and sense of place within LCZ 5 and LCZ 6. It also compared the landscape character impacts in these LCZ to those identified in the REF.

The visual impact assessment reviewed the eight viewpoints assessed in the REF through a desktop assessment of the Visual Envelope Map of the revised design and identified the need to assess an additional viewpoint (VP 9) facing south-west from Valley View Road towards the revised design.

The LCVIA identified the sensitivity of individual LCZ and viewpoints and the magnitude of change at each associated with the proposal. Sensitivity refers to how susceptible the environment is to the proposed change. Magnitude refers to the type of proposal and its compatibility with existing landscape character, including scale, form and material composition of elements, as well as their location or setting. Impacts were determined by assessing sensitivity and magnitude using the matrix shown in Table 5-9.

Table 5-9 Landscape character and visual impact rating matrix

Sensitivity		Magnitude			
		High	**Moderate**	**Low**	**Negligible**
	High	High	High-moderate	Moderate	Negligible
	Moderate	High-moderate	Moderate	Moderate-low	Negligible
	Low	Moderate	Moderate-low	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

5.5.2 Description of existing environment

The description of the existing environment of LCZ 5 and LCZ 6 is consistent with the REF (refer to Table 6-24 in Section 5.5.2).

Viewpoint nine is shown in Figure 5-1. The receivers in VP 9 include residents and recreational walkers and cyclists on Valley View Road and residents on Evans Lookout Road. The view is made up mostly of bushland with scattered tree plantings providing thick screening of the existing highway. While the view offers a pleasant outlook into the Blue Mountains National Park, it also contains existing overhead wires, electrical poles and fencing which is seen in the foreground of the view.

Figure 5-1 VP 9 – Valley View Road looking south-west toward the revised design

5.5.3 Potential impacts

Construction

The potential landscape character and visual impacts during construction of the proposal are generally consistent with those identified in Section 6.5.3 of the REF. However, due to the extension of work further west than identified in the REF to Valley View Road and the re-stringing of utilities along Evans Lookout Road, residents on Valley View Road and Evans Lookout Road would now experience visual impacts during construction.

There are no anticipated residual landscape or visual impacts resulting from the construction phase of the revised design.

Operation

Landscape character impacts

The landscape character impact assessment of the revised design is summarised in Table 5-10. The changes between the REF proposal and revised design would not result in a change in sensitivity, magnitude or impact during operation in both LCZ 5 and LCZ 6.

Table 5-10 Landscape character impacts during operation of the revised design

Zone	Sensitivity	Magnitude	Impact
LCZ 5 – Ridgeline Transition	**Moderate** • Well established natural bushland that provides an enclosed character through mature bushland to the east and the rail corridor to the west. • The revised design would impact a larger area of bushland to the east than the REF proposal. • Existing built elements and landscaping design provides an opportunity for this LCZ to absorb greater change.	**Moderate** • The revised design would increase the hard surface to the east of the existing Great Western Highway. • Existing vegetation removal to accommodate the expansion of the roadway, active transport trail and earthworks and adjacent multi use access path. • While the changes would impact the spatial character given the existing conditions along the Great Western Highway, the impacts	**Moderate**

Zone	Sensitivity	Magnitude	Impact
		would be reduced over time by vegetation proposed as part of the landscape design.	
LCZ 6 – Blackheath Approach	**Moderate** • Consists of a mix of natural bushland with steep slopes away from the transport corridor in the west and single-storey dwellings to the east. • While there are existing built elements near the road corridor, this LCZ would find it difficult to absorb changes.	**Moderate** • The revised design would slightly increase the hard surface to the east of the existing Great Western Highway and require localised vegetation removal. • While the existing environment along the Great Western Highway is similar to the revised design, the vegetation removal and new hardstand would result in a high magnitude impact to the existing LCZ character. These changes would reduce slightly over time as part of the proposed landscape design.	**Moderate**

Visual impacts

The assessment of visual impacts of the revised design at VP 9 is summarised in Table 5-11 and shown in Figure 5-1.

Table 5-11 Visual impact assessment summary of VP 9

Sensitivity	Magnitude	Impact
Moderate • **The view contains mostly scattered tree plantings and areas of thick bushland. There is existing overhead electrical infrastructure in the foreground.** • **Residential receivers are sensitive to change.** • **Work for the revised design would occur near these receivers.**	**Moderate** • The revised design would introduce a new sealed active transport trail to the foreground and mid-distance of the viewpoint. • Some of the existing trees in the mid-distance would be removed to accommodate the revised design. • The landscape design would revegetate areas that have had vegetation removed with endemic bushland planting. This would reduce impact and maintain the bushland character of this view. • These impacts would be reduced due to the existing utilities infrastructure in the viewpoint.	**Moderate**

Figure 5-2 Visual impact assessment of VP 9

5.5.4 Revised safeguards and management measures

The safeguards and management measures included in the REF are applicable to the revised design. No additional safeguards and management measures would be required due to the revised design.

5.6 Noise and vibration

Extension to the highway upgrade would move the operational traffic lanes closer to residences in Blackheath. As such, further noise assessment has been undertaken to assess construction and operational noise impacts of the highway upgrade. Results of this assessment is found in Appendix G.

5.6.1 Methodology

The methodology for the addendum noise and vibration assessment involved:

- confirming ‘realistic worst-case’ construction scenarios and representative plant and equipment for each scenario required for the revised design
- predicting and assessing construction noise levels for the construction scenarios associated with the revised design using CadnaA software in accordance with the Interim Construction Noise Guideline (ICNG) (DECC, 2009) and Construction Noise and Vibration Guideline (CNVG) (Transport, 2016a)
- calculating and assessing construction vibration associated with the revised design using source vibration levels and minimum working distances in accordance with relevant guidelines
- assessing the predicted operational road traffic noise levels associated with the revised design using CadnaA software in accordance with the Road Noise Policy (RNP) (DECCW, 2011)
- recommending safeguards and management measures to be implemented to minimise noise and vibration impacts associated with the revised design during construction and operation of the proposal, with reference to the CNVG and Noise Mitigation Guideline (NMG) (Transport, 2015c).

The addendum noise and vibration assessment adopted the results of the noise monitoring and validation carried, noise catchment areas (NCA) and assessment criteria identified for the REF proposal.

The noise and vibration assessment for the Katoomba to Medlow Bath section remains the same as identified in the REF and is not discussed further in this report.

5.6.2 Description of existing environment

The nearest sensitive receivers to the revised design are residential properties in the Medlow Bath to Blackheath section near:

- Coachhouse Lane, Medlow Bath (NCA02)
- Valley View Road, Blackheath (NCA01)
- Evans Lookout Road, Blackheath (NCA01).

Receivers in Blackheath would be closer to construction work associated with the extension of the active transport trail and utilities relocations than would have occurred under the REF proposal.

The section of the revised design with adjustments to the operational road alignment is in NCA01, NCA02 and NCA03. These NCAs are shown in Figure 6-7a-b in Section 6.6.4 of the REF.

Existing noise levels in the proposal area are generally dominated by road traffic noise from the Great Western Highway as well as noise from the rail corridor when trains pass by. The background noise levels adopted in the addendum noise and vibration assessment are consistent with those identified in Section 6.6.1 of the REF.

5.6.3 Potential impacts

Construction

Similar to the REF proposal, the construction noise impact assessment for the revised design is conservative in nature as it assumes:

- several items of construction equipment are in use simultaneously. In reality, there would frequently be periods when construction noise levels are much lower or where no noise- generating equipment would be in use.
- construction equipment is at the closest point to each receiver. For most work, the construction noise impacts would frequently be lower than predicted as the worst-case situation typically only occurs for a relatively short period.

Standard construction hours

During standard construction hours, there would be exceedances of the daytime construction noise management levels (NMLs) where work is occurring near receivers. A summary of exceedances for the revised design per scenario during standard construction hours for the Medlow Bath to Blackheath section is presented in Table 5-12.

The greatest change in construction noise impacts compared to the REF would occur in NCA01. This NCA covers the western end of the Medlow Bath to Blackheath section between about 600 metres west of Medlow Bath and Blackheath as well as the township of Blackheath itself. In this NCA, there would be an increase in the number of exceedances associated with construction of the extended active transport trail and utilities relocations. The assessment adopted a conservative approach by assessing trenching for utility relocations to the south of residential properties on Evans Lookout Road. This is not part of the scope of the revised design and so exceedances for receivers would in reality be lower than predicted in this assessment.

Up to 11 residences in NCA01 are predicted to be highly noise affected during the site preparation and establishment stages of work associated with the revised design. Up to three residences are predicted to be highly noise affected during work on the new active transport trail where it connects to Valley View Road.

Consistent with the REF proposal, up to six receivers in NCA02 are predicted to be highly noise affected at the western end of Medlow Bath due to site establishment, bulk earthworks, and road paving stages of work in the Medlow Bath to Blackheath section. No receivers in NCA03 are predicted to be highly noise affected during construction work in the Medlow Bath to Blackheath section.

Table 5-12 Summary of construction noise exceedances for all scenarios (revised design) – Day standard hours, Medlow Bath to Blackheath section

NCA	dB(A) above NML ($L_{Aeq,15min}$)	Number of exceedances per scenario (revised design)					
		Site preparation	Site establishment	Bulk earthworks	Drainage infrastructure	Pavement / asphalting	Finishing work
01	0 to 10	16	33	32	4	17	4
	>10	8	7	6	2	2	1
	>75dBA	3	11	3	1	3	
02	0 to 10	11	34	34	9	16	4
	>10	7	9	9	6	6	5
	>75dBA	1	6	6		3	
03	0 to 10	7	12	13	3	9	1
	>10		3	3		1	
	>75dBA						

Out of hours

The conservative construction noise assessment identified that the revised design may result in greater out of hours impacts to receivers along Evans Lookout Road and Valley View Road compared to those assessed in the REF if work was to occur during these periods. However, out of hours work is not anticipated to be required in this area and so these potential impacts would be avoided.

Construction traffic

The revised design would result in no change to construction vehicle haulage routes and require negligible additional vehicle movements. Work occurring on the new active transport trail up to Valley View Road, would not require access from Evans Lookout Road. All heavy vehicles would access the revised proposal area from the east via the Medlow Bath to Blackheath section of the proposal (in accordance with revised Safeguard TT2).

As such, the revised design would not result in a change to construction traffic noise impacts compared to the negligible construction traffic noise impacts identified in Section 6.6.4 of the REF.

Construction vibration

Consistent with the REF proposal, the worst-case item of vibration intensive equipment during construction would be high vibration 11-tonne padfoot rollers.

The revised design would not result in any additional structures being within the minimum working distance for cosmetic damage compared to the REF proposal. While the garage structure of 31 Evans Lookout Road would be about 15 metres from the western end of the active transport trail, the minimum working distance for this type of structure is 10 metres.

Table 5-13 shows the change in number of residential receivers that have been identified within the minimum working distances for human annoyance between the REF proposal and this REF. Occupants of affected buildings may be able to perceive vibration impacts at times when vibration intensive equipment is in use.

Table 5-13 Change in number of affected receivers within the minimum working distance for human annoyance

NCA	Number of affected receivers (day-time)		Number of affected receivers (night-time)	
	REF proposal	Revised design	REF proposal	Revised design
01	0	13	1	23
02	8	8	8	8
03	18	17	28	25

Operation

Table 5-14 assesses the expected operational noise impacts of the revised design in each NCA without consideration of any mitigation measures. These impacts are for the 2026 and 2036 operational scenarios during the daytime and night-time.

The greatest predicted noise levels are adjacent to the new road corridor. Changes in noise impacts due to the proposal would be highest where the proposal is located away from the current alignment and where topographic and other environmental features impact road noise levels.

Table 5-14 Operational noise impacts of the revised design

NCA	Revised design description	Potential impacts due to the revised design
01	The revised design would shift the eastbound carriageway about an additional 100 metres away from sensitive receivers on Station Street on the western side of the Great Western Highway compared to the REF proposal.	• Consistent with the REF proposal, receivers in Blackheath are not expected to experience a noticeable increase of more than 2dB(A) due to the revised design. • The 3 residences on Station Street would experience an additional decrease of 1dB(A) due to the revised design shifting the lane alignment further away from the receivers than the REF proposal. When considered with the REF proposal, the revised design would result in a total decrease of 2dB(A) for these receivers. These decreases would be realised in the day and night scenarios in 2026 and 2036.
02	Compared to the REF proposal, the revised design would shift the highway alignment between about 0.5 metres and one metre towards the rail corridor and away from residents on Coachhouse Lane.	• Consistent with the REF proposal, receivers are not expected to experience a noticeable increase (more than 2dB(A)) in traffic noise in any operational scenario due to the revised design. • Two residences on Coachhouse Lane in this NCA would experience a reduction in predicted noise level of 1dB(A) compared to the REF proposal. • Residential receivers in this NCA along Coachhouse Lane and Station Street are exposed to existing traffic noise and future traffic noise which would exceed the NCG criteria by 5dB(A).
03 – 07	No change compared to the REF proposal (refer to Section 6.6.4 of the REF).	

Receivers eligible for consideration of ‘additional noise mitigation’

The REF proposal identified a total of 31 sensitive residential receiver buildings are predicted to have exceedances of the NCG operational road traffic noise criteria. However, due to the shift in alignment near Coachhouse Lane, the revised design has predicted that a total of 29 sensitive residential receiver buildings predicted would have exceedances of the NCG operational road traffic noise criteria. All of these receivers were identified for additional noise mitigation as part of the REF proposal.

Transport would adopt a conservative approach and offer at-property treatment to the 31 sensitive residential receiver buildings identified as being eligible for consideration of ‘additional noise mitigation’ under the REF proposal.

5.6.4 Revised safeguards and management measures

The safeguards and management measures included in the REF are applicable to the revised design. No additional safeguards and management measures would be required due to the revised design.

5.7 Traffic and transport

5.7.1 Description of existing environment

The description of the existing environment is consistent with the REF, however as works are being undertaken closer to Blackheath, there are a number of local roads that now are within the study area. These include:

- Evans Lookout Road: a local road that provides local community access to facilities such as the Blue Mountains National Park and Evans Lookout, a range of accommodation facilities other local roads and residences. Evans Lookout Road also services the bus route 698 – loop service between Katoomba and Blackheath.
- Valley View Road: extends between Hargraves Road and Wentworth Street in the west towards the Blue Mountains National Park in the east. It crosses over Evans Lookout Road and becomes a residential only street between Evans Lookout Road and the national park.

5.7.2 Potential impacts

Construction

Construction impacts of the revised design, would be mostly the same as what has been described in the REF. However, for the utility connections, there would be some impacts in Blackheath.

The electrical cables to be relocated as part of the proposal could connect into existing power poles along Valley View Road and Evans Lookout Road. As a result of this, there may be temporary disruption to Valley View Road and Evans Lookout Road where the kerbside or traffic lane needs to be closed for a period of time to make sure there is a safe working environment for workers. The works would generally be done in one shift which would limit these traffic impacts. Traffic would be maintained for residents and the local community on these roads through two-way single lane traffic controls in accordance with the Traffic Management Plan (as per safeguard TT1).

Operation

Road network impacts

There are not anticipated to be any changes to the overall network performance as a result of the extension to the highway upgrade. However, with the additional one kilometre of dual carriageway, it is anticipated that there is improved capacity for westbound lanes over this distance (as under the REF proposal, it would only be one lane over this distance).

Active transport

Under the REF proposal, the active transport trail would create a new active transport link between Medlow Bath and Blackheath which currently only exists to the western side of the rail corridor along Station Street. However, the new pavement trail would end at chainage 6400, where it would connect to existing dirt tracks. This would provide an inconsistent journey across the Medlow Bath to Blackheath section. As part of the design refinements, this active transport trail would be extended through to Valley View Road. This would provide an improved experience for active transport users.

Fire trails

The active transport trail would also serve as emergency access and would facilitate access (via locked gates) to the existing fire trails in the Blue Mountains National Park. In improving the surface of the active transport trails, it would also provide improved access to the fire trails within the National Park.

5.7.3 Revised safeguards and management measures

The safeguards and management measures included in the REF are applicable to the revised design. No additional safeguards and management measures would be required due to the revised design.

5.8 Socio-economic, property and land use

The impacts associated with the design refinements are mostly consistent with the socio-economic, property and land use section of the REF.

5.8.1 Potential impacts

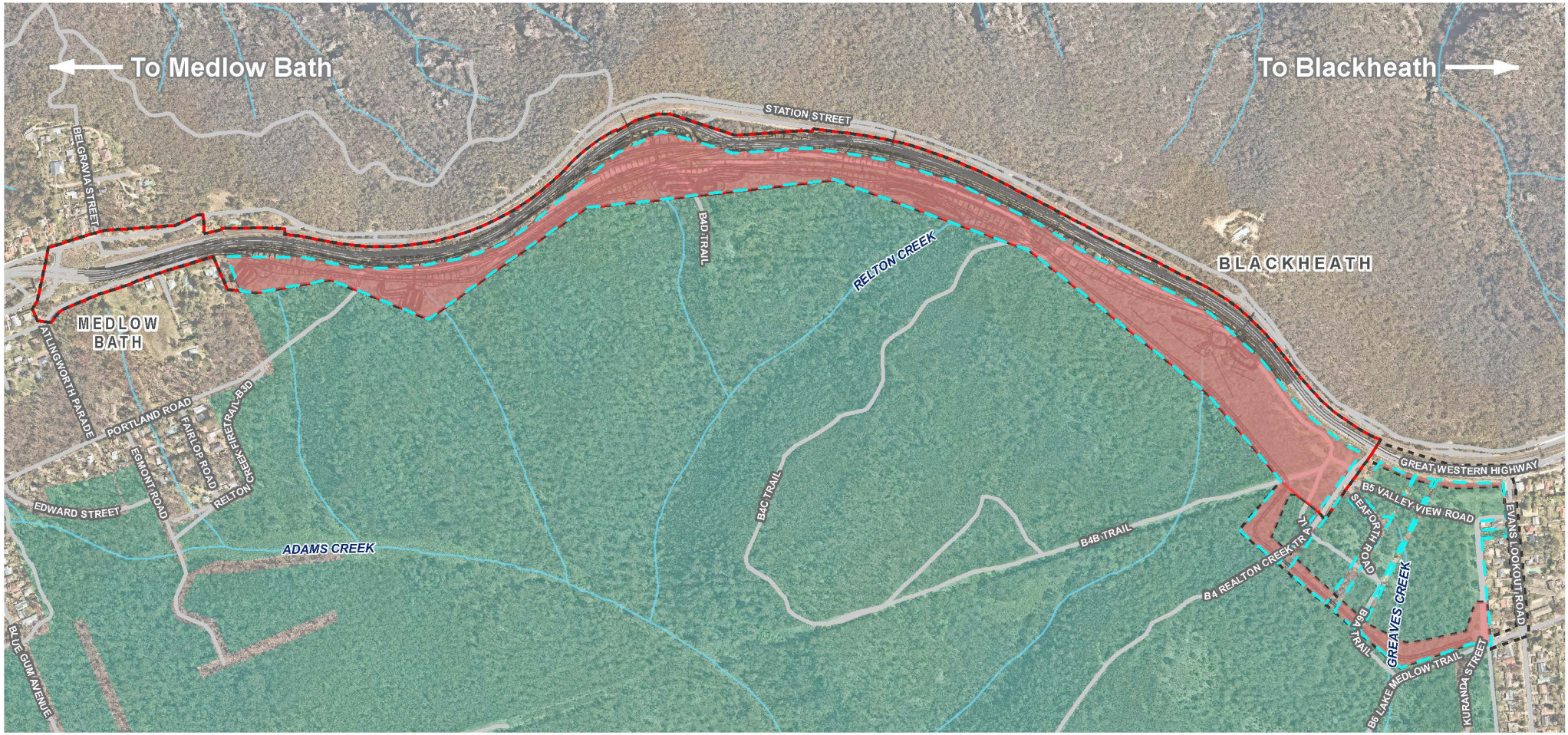
Construction

Property acquisition and adjustments

The revised design would occur within a section of land currently owned by the NSW Department of Planning and Environment (DPE) and managed by the National Parks and Wildlife Service (NPWS) as part of the Blue Mountains National Park. The western section of the revised proposal area would partially occur on an additional section of national park that was not identified in the REF as being subject to acquisition for the proposal (refer to Figure 5-3). This area was discussed in Section 4.1.1 of the REF as being subject to revocation as part of the Great Western Highway Upgrade Program, however work for the REF proposal did not encroach into that area.

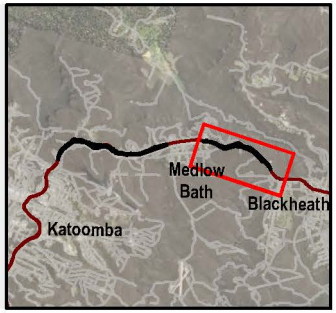
This land is not currently publicly accessible due to its location within the Water NSW Blackheath Special Area so there would not be a loss of recreation land due to this revocation.

Property acquisition and adjustments for the revised design, where works are in the revised proposal area would be low due to the fact the land is in the process of being revoked and is not accessible to the general public.



P:\GIS\Project-4\project511168_GWH\GWHE_REF_Fig_4_1_BlueMountainsNationalParkRevocationBoundary.mxdJOB No.\12-08-22\Virgil.Robinson\Rev 0

The design
Original REF proposal area
Revised REF proposal area
Proposed Blue Mountains National Park revocation - Great Western Highway Upgrade Program
Proposed Blue Mountains National Park revocation boundary - Medlow Bath to Blackheath section
Blue Mountains National Park



Source: Aurecon, Mott MacDonald, LPI, Nearmap

1:10,000@A4
0 100 200m

Projection: GDA2020 MGA Zone 56

FIGURE 5-1: Proposed Blue Mountains National Park revocation boundary

Land use

The land use on part of the Blue Mountains National Park would change the land use from C1 – National Parks and Nature Reserves to SP2 – Infrastructure. While this was foreshadowed in the REF, the revised design would actually result in the infrastructure being located on the site. This land would also become publicly accessible with the extended active transport rail allowing the public to traverse between Medlow Bath and Blackheath on the western side of the Great Western Highway. There would be moderate magnitude of the changes, resulting in the overall significance of the impact being moderate-low.

Access and connectivity

The proposal would result in some minor changes to emergency and maintenance access in the Blue Mountains National Park. Access to the National Park would be maintained through the construction period. The impact would be low due to the limited users that would be impacted.

Amenity and community values

The proposal would result in a reduction of amenity and community values. This would be due to the high sensitivity of the area and moving of construction activities closer to residences in Blackheath. Highway construction would move over one kilometre closer to residents on Evans Lookout Road with works associated with this proposal, at their closest being around 500 metres away. In addition, active transport trail construction and utility connections would be in closer proximity to residents. Impacts could involve:

- noise or vibration intensive equipment resulting in noisy environments and vibration impacts for receivers
- visual impacts of construction plant and machinery, including lighting for nightworks would also impact those living within, visiting and travelling through the direct study area
- partial removal of the bushland in the revised proposal area
- air quality impacts, including an increase in dust levels from vegetation removal, stripping of topsoil and excavations associated with earthworks, as well as from heavy vehicle movements.

As noted in Section 3.2.3 of the REF, the proposal has been designed to align with a future tie-in to the Blackheath to Little Hartley Upgrade. The socio-economic, property and land use impacts of that upgrade would be assessed in the Environmental Impact Statement being prepared for the upgrade.

The Blue Mountains City Council CSP identified that the community values the natural environment. The revised design would require additional vegetation removal, impacting the natural backdrop for recreational users within this area. This may result in a loss of vegetation (refer to Section 5.3) and a sense of loss and impacts to feelings of community character.

The overall level of significance of impacts would be moderate due to high-moderate sensitivity of the community to changes in amenity and values and moderate magnitude of the impacts.

Operation

Land use

As mentioned in the REF, the new recreational trail to the east of the Great Western Highway between Medlow Bath and Blackheath would provide a new publicly accessible trail for local community and tourists. The revised design would extend this trail for a continuous level of service between Medlow Bath and Blackheath. The overall significance would be moderate for the revised proposal area due to the moderate sensitivity of land occupiers, owners and the community to permanent changes in land use and moderate magnitude of these changes.

Access and connectivity

The proposal would result in substantial access and connectivity benefits. Extending the dual carriageway for around another kilometre will result in additional length where the project objectives can be realised:

- improved resilience of the road corridor during breakdowns, crashes, extreme weather events or other emergencies, with the ability to maintain traffic flow during these events
- reduction in congestion for emergency vehicles along the road corridor
- improved safety of vehicles overtaking.

Extending the paved section of the active transport trail would also have a positive impact on the community with an improved level of service across the trail that would encourage more pedestrians and cyclists to use the trail.

The overall level of significance of impacts would be moderate- low due to moderate sensitivity of road and active transport users to changes in access and connectivity and low magnitude of the impacts.

Amenity and community values

While the impacts of the operation of the revised design are covered in the REF, it would result in an increased area of vegetation removal which would impact on the visual amenity of the area and perceived loss of community character.

The overall level of significance of impacts would be moderate due to moderate sensitivity of the community to changes in amenity and values and moderate magnitude of the impacts.

5.8.2 Revised safeguards and management measures

The safeguards and management measures included in the REF are applicable to the revised design. No additional safeguards and management measures would be required due to the revised design.

5.9 Aboriginal heritage

A Stage 2 PACHCI Addendum Aboriginal Cultural Heritage Assessment Report (ACHAR) was undertaken for the Great Western Highway Upgrade Program that captured the revised proposal area.

5.9.1 Methodology

As part of the Stage 2 Addendum ACHAR, further field investigations were undertaken in conjunction with Aboriginal stakeholders. The revised proposal area was walked over on the 23 May 2022 by archaeologists and Aboriginal representatives from:

- Waawaar Awaaa Aboriginal Corporation
- Dharug Ngurra Aboriginal Corporation.

The survey was carried out in accordance with the Code of Practice. A handheld Global Positioning System (GPS) was used to track the path of the survey team and record the coordinates of identified features and disturbances. Detailed aerial maps marked with grid coordinates for the survey unit was carried by the survey team. The coordinate system projection used for all data recording was GDA94 MGA 56.

A photographic record was kept during the survey. Photographs were taken to record aspects of each survey unit including disturbance and recorded Aboriginal sites. Scales were used for photographs where appropriate.

5.9.2 Description of existing environment

The area investigated to cover the revised proposal area included Brightlands Avenue, Evans Lookout and Valley View Roads and then south into the Blue Mountains National Park through the revocation area.

The survey area was found to be a gently sloping landscape with rises and falls associated with water movement across the landscape. Areas of visibility were restricted to the exposure encountered on the various tracks Outside of the tracks, the survey area was composed of densely forested areas, where the leaf litter and overgrowth of bushes and trees, covered the ground entirely. These forested areas were also very slippery given the recent rain, fallen trees and cut branches which also littered the ground and reduced visibility. The open areas were limited to the western boundary of the forested areas, to the south of Valley View Road Fire Trail, a clearing 150 metres south of the fire trail, the area associated with B4 Relton Creek Trail, B4B Trail and B6 Lake Medlow Trail.

The B4B Trail is a corridor built to accommodate the construction and maintenance of power lines. The area is thus cleared of vegetation. The other tracks are also cleared and have mostly tall grasses growing on either side of the tracks.

One new Aboriginal site, being Scar Tree 1 was identified. This tree is located in the south-western section of the survey area, in a cleared area along a dirt track (Figure 5.2). It is a Bloodwood Eucalyptus Corymbia. It has a south facing, oval-shaped scar, approximately 0.6m from the ground. The scar faces south and measures 45 centimetres across, 550 millimetres long, 18 millimetres wide and 200 millimetres long on the outside of the scar, 4 centimetres thick scar, and is located 60 centimetres off the ground. The tree has been assessed as having an overall significance of moderate.

5.9.3 Potential impacts

The Scar Tree 1 site would be harmed by the extension of the highway upgrade. Due to the investigations undertaken as part of the addendum ACHAR, this site will be listed on the AHIMS database and as such, would require a permit to harm the site.

[Aurecon note: to be updated should the ACHAR be finalised in time]

5.9.4 Revised safeguards and management measures

The safeguards and management measures included in the REF are applicable to the revised design. Two additional management measures are proposed to address the additional impacts from the revised design.

ID	Impact	Environmental safeguard	Responsibility	Timing
A4	Scar Tree removal	Harm to Scar Tree 1 must not occur until an AHIP is in place. Appropriate management and mitigation measures should be developed prior to the submission of the AHIP application and conditioned through the AHIP	Transport for NSW / Construction contractor	Pre-construction
A5	Scar Tree salvage	Scar Tree 1 would be salvaged from the site prior to mainline construction work. Salvage would entail the recording of the site by an archaeologist and the collection of all visible artefacts.	Construction contractor	Pre-construction

6. Environmental management

The REF for the Great Western Highway Upgrade East section identified the framework for environmental management, including safeguards and management measures that would be adopted to avoid or reduce environmental impacts (section 7 of the REF).

After consideration of the issues raised in the public submissions and changes to the proposal, the safeguard and management measures have been revised. Changes to the safeguards including further controls around fencing of the national park boundary, storage of liquids to avoid accidental spills, adopting additional landscape and urban design suggestions from the community.

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

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

The CEMP will be prepared prior to construction of the proposal and must be reviewed and certified by environment staff, Western region, 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 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*, QA Specification *G10 – Traffic Management*.

6.2 Summary of safeguards and management measures

The REF for the Great Western Highway Upgrade East section 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 REF) have been revised. Should the proposal proceed, the environmental management measures in Table 6-1 will guide the subsequent phases of the proposal. Additional and/or modified environmental safeguards and management measures to those presented in the REF have been bolded and underlined and deleted measures, or parts of measures, have been struck out.

Table 6-1 Summary of environmental safeguards and management measures

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
GEN1	General - minimise environmental impacts during construction	A CEMP will be prepared and submitted for review and endorsement of the Transport for NSW Environment Manager prior to commencement of the activity. As a minimum, the CEMP will 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 will be implemented during the undertaking of the activity.	Contractor	Pre-construction / detailed design	Additional safeguard
GEN2	General – notification	All businesses, residential properties and other key stakeholders (eg schools, local councils **and government agencies**) affected by the activity will be notified at least five days prior to commencement of the activity.	Contractor / Transport project manager	Pre-construction	Standard safeguard
GEN3	General – environmental awareness	All personnel working on site will receive training to ensure awareness of environment protection requirements to be implemented during the project. This will include up-front site induction and regular "toolbox" style briefings. Site-specific training will be provided to personnel engaged in activities or areas of higher risk. These include: • areas of **Aboriginal and** non-Aboriginal heritage sensitivity • threatened species habitat • adjoining residential areas requiring particular noise management measures • **construction water quality management**	Contractor	Pre-construction / detailed design	Standard safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		• **clearing of vegetation to ensure approved extents of clearing in sensitive areas are strictly adhered to** • Blue Mountains National Park boundary protocols.			
GEN4	General – Blue Mountains National Park	A Blue Mountains National Park Management Framework will be prepared and submitted for review and endorsement of the Transport for NSW Environment Manager prior to commencement of the activity.. As a minimum the strategy will: • collate and manage potential impacts to the national park • ensure the determined REF is submitted to National Parks and Wildlife Services • ensure demarcation of the national park boundary **and consider opportunities to appropriately remediate the park interface, including stabilisation of batter slopes and inclusion of native vegetation** • outline water quality controls to be implemented during construction (refer to the Erosion and Sedimentation Control Plans (ESCP) prepared for the proposal) • identify requirements for ongoing management of stormwater runoff through operational water quality controls • apply tree protection protocols on the national park interface in accordance with Australian Standard 4970-2009 Protection of Trees on Development Sites **including full time supervision of clearing works on location by an independent contractor Environmental officer** • establish hygiene protocols for machinery, vehicles, equipment and materials working near the national park boundary to avoid introduction of any pests or diseases • require access to be maintained to the adjoining national park entry roads and management trails • inform communication between Transport and the NSW National Parks and Wildlife Service, including notice periods for construction work and notices of park access closure	Contractor	Detailed design / Pre-construction / Construction	

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		• identify additional risks to the national park and opportunities to maintain the conservation values of the national park during construction and operation of the proposal.			
GEN5	**General - minimise environmental impacts during construction**	• **Mainline construction works, including vegetation clearance, in the Medlow Bath to Blackheath section must not commence until the permanent fence and water quality control devices are in place along the Blue Mountains National Park boundary.**	**Contractor**	**Pre-construction / detailed design**	**Additional safeguard**
Surface water and groundwater					
SGW1	Soil and water	A Soil and Water Management Plan (SWMP) will be prepared and implemented as part of the CEMP. The SWMP will: • identify all reasonably foreseeable risks relating to soil erosion and water pollution, including runoff and the design and construction of waterway crossings • describe how these risks will be addressed during construction • include a construction surface water quality monitoring plan prepared in accordance with the Guideline for Construction Water Quality (Transport, n.d.) and Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (NSW EPA, 2004) • include a construction groundwater monitoring plan, which will provide information on groundwater conditions for design, construction and operation of water quality basins and enable monitor pollution originating from the stormwater seeping into the groundwater The Soil and Water Management Plan (SWMP) will be reviewed by a soil conservationist on the Transport for NSW list of Registered Contractors for Erosion, Sedimentation and Soil Conservation Consultancy Services. The SWMP will then be revised to address the outcomes of the review.	Contractor	Detailed design / pre-construction	Section 2.1 of QA *G38 Soil and Water Management*

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
SGW2	Soil and water	The preliminary Erosion and Sedimentation Management Plan (ESMR) and Erosion and Sedimentation Control Plans (ESCP) produced for the **REF** proposal (Appendix D to the REF) **and revised design (Appendix B to the submissions report)** will be updated **and consolidated** during the detailed design phase to confirm the erosion and sedimentation controls for both sections of the proposal, including the construction of progressive ESCPs and the continual updating of these plans.	Transport / Contractor	Detailed design / Pre-construction	Section 2.2 of QA *G38 Soil and Water Management*
SGW3	Soil and water	An assessment of construction sediment basin discharges will be prepared during detailed design to assess the appropriate water quality limits for sediment basin discharges and ensure consistency with the Water Quality Objectives for this location or agreed upon guideline values in consultation with Blue Mountains City Council.	Transport	Detailed design	Additional safeguard
SGW4	Soil and water	An assessment to determine appropriate water quality limits for sediment basin discharges will be undertaken as part of detailed design, with reference to the Water Discharge and Reuse Guideline (Transport, 2016b).	Transport	Detailed design	Additional safeguard
SGW5	Soil and water	Periodic wet weather monitoring will be undertaken within the tributaries of Back Creek and Megalong Creek (Katoomba to Medlow Bath section) and Relton Creek and Adams Creek (Medlow Bath to Blackheath section) that intercept the proposal and the sedimentation discharge points, before and during construction.	Contractor	Pre-construction / Construction	Additional safeguard
SGW6	Soil and water	Where possible, permanent drainage structures will be installed as early as possible to facilitate effective separation of clean offsite and dirty onsite water.	Contractor	Construction	Additional safeguard
SGW7	Soil and water	The **operational** water quality treatment system will be developed further during detailed design in consultation with WaterNSW and Blue Mountains City Council. This will include: • layout and detail of the drainage system including outlet design • minimisation of discharge flows ~~**should also be minimised**~~ in the basin outflows, to limit scouring in the drainage channels • design within and around the waterways	Transport	Detailed design	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		• assessment of culverts and stormwater inlets in the local waterways and recommendation for scour protection within the Medlow Bath to Blackheath section.			
Soils and contamination					
SC1	Contaminated land	A Contaminated Land Management Plan will be prepared in accordance with the *Guideline for the Management of Contamination* (Transport, 2013a) and implemented as part of the CEMP. The plan will include, but not be limited to: • capture and management of any surface runoff contaminated by exposure to the contaminated land • further investigations required to determine the extent, concentration and type of contamination • management of the remediation and subsequent validation of the contaminated land, including any certification required • an unexpected finds protocol for incidental potential contamination finds during earthworks (such as illegally dumped wastes and stockpiles) • the work methodology to identify, manage, handle and dispose of any contaminated materials or wastes as part of the work • measures to ensure the safety of site personnel and local communities during construction.	Contractor	Detailed design / Pre-construction / Construction	Section 4.2 of QA *G36 Environment Protection*
SC2	Accidental spill	A site-specific emergency spill plan will be developed and include spill management measures in accordance with the Transport for NSW *Code of Practice for Water Management* (Roads and Traffic Authority, 1999) and relevant EPA guidelines. The plan will address measures to be implemented in the event of a spill, including initial response and containment, notification of emergency services and relevant authorities (including Transport for NSW and EPA officers).	Contractor	Detailed design / Pre-construction	Section 4.3 of QA *G36 Environment Protection*
SC3	Contaminated land	Ancillary facility sites **or work areas proposed for use** that have been historically developed **including existing rail access tracks and stockpile areas** should be subject to intrusive investigations to identify any contaminants of potential concern	Contractor	Pre-construction / Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		on the site to assess the suitability of the site and whether activities that would be undertaken on the site will warrant additional controls. **Historic sites such as overgrown fire trails, access roads, stockpile areas and demolished building sites are to be reviewed via existing historic aerial photographs and assessed for risk and intrusively investigated to identify any contaminants of potential concern.**			
SC4	Contaminated land	Areas of cut **or existing road embankment** material **to be disturbed** in the proposal area will be assessed through an intrusive investigation to inform a likely waste classification of materials to be excavated (if required), suitability for reuse and/or if offsite disposal is required.	Contractor	Pre-construction / Construction	Additional safeguard
SC5	Waste management	Any spoil produced during the construction phase will be assessed in accordance with the NSW EPA (2014) *Waste Classification Guidelines* and *Resource Recovery Order / Exemption under the Protection of Environment (Waste) Operations Act 2000* to determine necessary waste management practices. The CEMP will include the following hierarchy for reuse, recycling or disposal of spoil produced during construction: • If spoil produced during construction will remain within the Lot and DP from which it was produced, it can be reused if CoPC concentrations are below the applicable NEPM 2013 Tier I screening values for evaluation of potential risk to human health and the environment. • Spoil produced during construction can be reused within the Lot and DP boundaries from which it was produced or on another Transport or third party site if it meets the definition of virgin excavated natural material / excavated natural material in accordance with the applicable *Resource Recovery Order / Exemption under the Protection of Environment (Waste) Operations Act 2000*. • Spoil that does not meet either of the above definitions should be transported to an appropriately licenced facility for recycling if all CoPC concentrations are below the NSW EPA	Contractor	Pre-construction / Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		(2014) Waste Classification Guidelines contaminant threshold 1 (CT1) values for General Solid Waste. The soil can be recycled at an appropriately licenced facility in accordance with any current Transport contractual arrangements. • If CoPC concentrations are above the CT1 values, the soil waste should be classified per the Waste Classification Guidelines and disposed at an appropriately licenced facility			
SC6	Contaminated land	The risk of potentially impacted soil migrating from the future upgrade work including dust generation and runoff will be minimised utilising standard practices such as dust suppression, and erosion and sedimentation control. These measures along with other measures will be included in the CEMP. Other controls will include proper use of work health and safety equipment and monitoring of work where asbestos or other contamination is identified.	Contractor	Pre-construction / Construction	Additional safeguard
SC7	**Material storage**	**All chemicals, fuels and liquids will be appropriately stored in a bunded area.**	**Contractor**	**Construction**	**Additional safeguard**
SC8	**Material storage**	**Refuelling will take place at designated appropriately bunded areas in ancillary facilities or at off-site commercial facilities**	**Contractor**	**Construction**	**Additional safeguard**
Biodiversity					
B1	Biodiversity	A Flora and Fauna Management Plan will be prepared in accordance with Transport's *Biodiversity Guidelines: Protecting and Managing Biodiversity on Projects* (Roads and Traffic Authority, 2011a) and implemented as part of the CEMP. It will include, but not be limited to: • plans showing areas to be cleared and areas to be protected, including exclusion zones around the proposal (including a five-metre exclusion zone around the Blue Mountains Swamp TEC), protected habitat features and revegetation areas • **procedures to ensure clearing only occurs within the approved footprint**	Transport / Contractor	Detailed design / pre-construction / construction	Section 4.8 of QA *G36 Environment Protection*

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		• requirements set out in the *Landscape Guideline* (Roads and Maritime, 2008) • pre-clearing survey requirements, vegetation removal and habitat removal in line with Transport's vegetation clearance protocol • directions for survey, monitoring and management of key threatened species known or considered to be potentially impacted by the proposal • development of a habitat replacement or nest box strategy • procedures for re-establishment of native vegetation • 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) • commitments relating to threatened species management, pest and weed management, and site hygiene practices.			
B2	Biodiversity	Measures to further avoid and minimise the construction footprint and native vegetation or habitat removal **and the need to clear vegetation** will be investigated during detailed design and implemented where practicable and feasible.	Transport / Contractor	Detailed design / pre-construction	Additional safeguard
B3	Biodiversity	Fencing and/or the use of highly visible rope or tape boundaries will be used to delineate the boundary of vegetation clearing at the edge of the proposed construction boundary. A buffer area of at least five metres will be established between the proposal area and boundary of the swamp. Signposting will be used to inform project personnel and site visitors of areas of conservation value to restrict entry or inform behaviour that will reduce incidental interactions with fauna. **Tree protection protocols on the national park interface would be implemented in accordance with Australian Standard 4970-2009 Protection of Trees on Development Sites. This would include full time supervision of clearing works on location by an independent contractor Environmental officer**.	Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
B4	Biodiversity	The Needle Geebung (*Persoonia acerosa*) individual identified during field surveys will be translocated prior to construction.	Contractor	Pre-construction	Additional safeguard
B5	Biodiversity	For flora species such as Needle Geebung (*Persoonia acerosa*), seed collection will be carried out in an effort to minimise impacts to the species and aid in re-establishment of individuals within protected areas in the vicinity of the study area. This would form part of the seed collection planned by Transport to occur across the Great Western Highway Upgrade Program.	Contractor	Construction / pre-construction	Additional safeguard
B6	Vehicle strike	Transport will monitor road kills along Great Western Highway before, during and after commencement of the proposal.	Transport	Pre-construction / construction / operation	Additional safeguard
B7	Indirect impacts on native vegetation and habitat	Measures to further avoid and minimise the area of direct impact on all native vegetation will be investigated during detailed design and implemented where practicable and feasible, especially in sensitive environments and near the Blue Mountains National Park.	Transport	Detailed design	Additional safeguard
B8	Indirect impacts on native vegetation and habitat	Installation of stormwater/sediment and erosion control mechanisms to prevent sediment or dirty water discharging into the Blue Mountain Swamp TEC.	Contractor	Construction	Additional safeguard
B9	Wildlife connectivity, habitat fragmentation and fauna injury and mortality	A Fauna Connectivity Strategy will be developed for the proposal during detailed design to minimise the impacts of the proposal on connectivity. This will include consideration of: • fauna mitigation measures to provide safe passage across the road **for birdlife, gliders and arboreal species** • fauna fencing **for species such as the Eastern Pygmy-Possum**. • **a plan for early installation of fauna fencing where possible to limit potential for roadkill during construction**	Transport	Detailed design	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
B10	Changes to hydrology	Changes to existing surface water flows will be minimised during detailed design and mitigated via preparation and implementation of the following: • preparation of progressive Erosion and Sediment Control Plans (ESCPs) and their continual revision and update • preparation of a Storm Water Management Plan and other aspects of the Construction Environment Management Plan to manage water quality impacts during construction of the proposal • preparation of Water Quality Management Plan (surface and groundwater) to describe water quality monitoring before and during construction • design of scour protection at new stormwater outlets and culverts and drainage basins • stormwater drainage design which incorporated a treatment ~~**trains**~~ **process** and drainage basin~~**s**~~ to achieve a neutral or beneficial effect on the surrounding waterways.	Transport	Detailed design	Additional safeguard
B11	Fragmentation of identified habitat corridors	Connectivity measures will be **designed and** implemented in accordance with the *Wildlife Connectivity Guidelines for Road Projects* (Roads and Traffic Authority, 2011c). Any connectivity measures implemented will be installed under the supervision of an experienced ecologist.	Contractor	Detailed design / pre-construction / construction	Additional safeguard
B12	Invasion and spread of pathogens and disease	• Any excavated earth will be either disposed or reused appropriately with care taken to avoid spreading propagules of weeds or infested soil or plant material. • Correct plant hygiene will be minimised to minimise spread of weeds, Phytophthora and other contaminants, including wash down when moving between weedy and non-weedy parts of the proposal. • All weed material removed during the construction works will be disposed of in a suitable waste facility and not mulched onsite to avoid the reintroduction and further spread of weeds and pathogens in the area.	Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
B13	Noise, light and vibration	Shading and artificial light impacts on sensitive areas or areas adjacent to the Blue Mountains National Park will be minimised during detailed design.	Transport	Detailed design	Additional safeguard
B14	Threatened ecological community (TEC)	• During construction, dirty water from the bridge deck would be drained away from the Blue Mountains Swamp TEC and not flow over into the swamp. • pH levels of water in the nearby water quality basins will be monitored near the Blue Mountains Swamp TEC during construction. **pH will be adjusted as required to ensure discharges are at an appropriate pH level.**	Contractor	Construction	Additional safeguard
B15	Groundwater dependent ecosystems	Interruptions to water flows associated with groundwater dependent ecosystems (e.g. Upland Swamp) will be minimised through detailed design.	Transport	Detailed design	Additional safeguard
B16	Biodiversity offsets	Where required, Transport would offset vegetation removal in accordance with the Transport 'Guideline for Biodiversity Offsets' (Roads and Maritime, 2016b). Offsets would be sought for both this proposal and any other projects within the Great Western Highway Upgrade Program for which biodiversity impacts have not separately been offset.	Transport	Detailed design	Additional safeguard
B17	**Threatened flora**	**Targeted surveys for Small Pale Grass-lily (*Caesia parviflora var. minor*) and *Acacia baueri subsp. aspera* were not possible within the revised proposal area. Therefore, pre-clearance surveys (parallel transects 5-metres apart) in the revised proposal area are required between the months of October to February (during the recommended survey period) during the detailed design phase to confirm whether these species are present.**	**Transport**	**Detailed design**	**Additional safeguard**
Non-Aboriginal heritage					
NA1	Non-Aboriginal heritage	A Non-Aboriginal Heritage Management Plan (NAHMP) will be prepared and implemented as part of the CEMP. It will provide specific guidance on measures and controls to be implemented to avoid and mitigate impacts to Non-Aboriginal heritage.	Transport / Contractor	Detailed design / pre-construction	Section 4.10 of QA *G36 Environment Protection*

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
NA2	Non-Aboriginal heritage	The *Standard Management Procedure - Unexpected Heritage Items* (Transport, 2015d) 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.	Transport / Contractor	Detailed design / pre-construction	Section 4.10 of QA *G36 Environment Protection*
NA3	Non-Aboriginal heritage	The proposed design will be further refined during detailed design to avoid and/or minimise non-Aboriginal heritage impact. Should detailed design result in changes to non-Aboriginal heritage impacts, **these~~isthis~~** will be re-evaluated at that stage.	Transport	Detailed design	Additional safeguard
NA4	Non-Aboriginal heritage	A Photographic Archival Record of the current state of the Great Western Highway will be prepared prior to the commencement of construction. The archival recording will be submitted to Transport, local historical societies and Blue Mountains City Council.	Contractor	Pre-construction	Additional safeguard
NA5	Greater Blue Mountains Area – Additional Values	Removal of vegetation within the Greater Blue Mountains Area – Additional Values areas will be minimised as much as possible.	Transport	Detailed design	Additional safeguard
NA6	Pulpit Hill and Environs	A Conservation Management Plan (CMP) will be prepared for Pulpit Hill and Environs to manage the heritage significance of the site and provide for ongoing management. The proposed concept design will be further refined during detailed design to minimise adverse heritage impact on the Pulpit Hill and Environs curtilage (including Stone Arrangements site) and interpret the heritage significance of this site, including the role the Explorers Tree played as a waypoint. If it is not possible to completely avoid the Stone Arrangements, then further information will be required to better understand the constraints and significance of the heritage site. This further study will include: • An Historical Archaeology Assessment including a Historical Research Study • An Archaeological Research Design (ARD) for archaeological work	Contractor	Detailed design / pre-construction / Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		• An archaeological test excavation targeting a portion of the Stone Arrangements and a soil analysis of excavated soil to confirm the presence of graves • Further remote sensing studies to verify previous study results. The archaeological test excavation will be carried out to confirm whether a permit under Section 140 of the *Heritage Act 1977* will be required for the proposal. A heritage interpretation strategy for the Pulpit Hill area will be developed to reinterpret the existing heritage interpretation area and communicate the heritage significance of the Pulpit Hill area. This will be integrated with the cultural interpretation strategy for the Great Western Highway Upgrade Program. The existing interpretation area will be retained as much as possible.			
NA7	Bonnie Doon Reserve	Vegetation removal within the Bonnie Doon Reserve curtilage will be limited to as little as needed and **as** unobtrusive as possible.	Transport	Detailed design	Additional safeguard
NA8	Culvert XA6, XA7 and XA7a	A further vibration assessment will be prepared to assess the indirect impacts of the proposal near Culvert XA6, XA7 and XA7a.	Transport	Detailed design	Additional safeguard
NA9	House and Orchards (former Glenara Cottage)	An Historic (non-Aboriginal) Archaeological Assessment (HAA) will be carried out to the determine the nature, extent and significance of any archaeological resources associated with the House and Orchards (former Glenara Cottage) in this area and identify appropriate management measures.	Contractor	Pre-construction	Additional safeguard
NA10	The Pines and The Gatekeeper's Cottage	A further vibration assessment will be prepared to assess the indirect impacts of the proposal near The Pines and The Gatekeeper's Cottage. Should detailed design result in changes to the proposal near The Pines and The Gatekeeper's Cottage, visual impacts will be revaluated upon completion of detailed design.	Transport	Detailed design	Additional safeguard
NA11	**Former settlement remains**	**The revised design should avoid the former settlement remains (identified as BH001, BH002 and BH005 in Appendix E to the submissions report). If design changes result in the revised**	**Transport**	**Detailed design**	**Additional safeguard**

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
	design being closer to these remains, potential heritage impacts to these areas should be re-assessed.				
Landscape character and visual impacts					
V1	Landscape character and visual impact	An Urban Design Plan will be prepared to support the final detailed project design and implemented as part of the CEMP. The Urban Design Plan will present an integrated urban design for the project, providing practical detail on the application of design principles and objectives identified in the environmental assessment. The Plan will include design treatments for: • location and identification of existing vegetation and proposed landscaped areas, including species to be used • built elements including retaining walls, bridges and noise walls • pedestrian and cyclist elements including footpath location, paving types and pedestrian crossings • fixtures such as seating, lighting, fencing and signs • details of the staging of landscape work taking account of related environmental controls such as erosion and sedimentation controls and drainage • procedures for monitoring and maintaining landscaped or rehabilitated areas.	Contractor	Detailed design/pre-construction	Standard safeguard
V2	Proposal design	• Rail infrastructure will be screened using shrubs and trees, where possible • Cut and fill batters will be rounded to help integrate into the existing landform and create a more naturalised appearance. • Opportunities to reduce the proposal footprint will be explored during detailed design • Connectivity and access to the existing and proposed heritage interpretation area will be enhanced. • Exposed rock faces will be retained in the rock cuttings. • **Use of landscaping to mitigate potential headlight impacts including a line of pencil pine planting along the road/rail interface opposite the Gatekeepers Cottage.**	Transport	Detailed design	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		• **Where possible, engage local artists to contribute to urban design features of the proposal.**			
V3	Bridges	The bridge design and the design of peripheral elements will be refined to reduce its visual impact.	Transport	Detailed design	Additional safeguard
V4	Bicycle and pedestrian	• Cyclist and pedestrian access will be improved through new and upgraded, multi-use access tracks • Visibility of proposed multi-use access tracks and adjoining residential properties will be improved **for good safety and passive surveillance**.	Transport	Detailed design	Additional safeguard
V5	Structures	Design of new retaining walls will have finishes of a high standard and quality that is in keeping with the Great Western Highway character.	Transport	Detailed design	Additional safeguard
V6	Landscape implementation	• Fill batters will be screened where possible using seeding, shrubs and trees, as well as bushland reconstruction techniques. • Buffer planting will be introduced in front of the retaining wall at the southern entry into Medlow Bath to minimise visual impacts. • Bushland reconstruction and bushland seeding will be maximised where possible. • Native and endemic plantings will be used along the highway outside of the village. • Revegetation with appropriate species will be maximised along the highway to reduce perceived corridor width. • The selection of plant species will complement and integrate with the existing environment. • Opportunities for additional tree plantings along the proposal corridor will be investigated. • **Mulch would not be used in areas adjoining the Blue Mountains National Park to avoid bushfire risk and release of Phytophthora and tannins into the Blackheath Special Area.**	Transport	Detailed design	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
V7	Construction visual impact	The layout of ancillary facility sites will be designed to limit impact. The design will consider: • screening of boundaries facing sensitive receivers or views • careful placement of structures and buildings to maintain viewpoints **for residents** or provide additional screening of site activities.	Contractor	Pre-construction / Construction	Additional safeguard
V8	Construction visual impact	Ancillary facilities will be maintained, kept tidy and well-presented including ~~**sorting**~~ regular removal of excess materials to reduce visual impact.	Contractor	Construction	Additional safeguard
V9	Construction visual impact	Ancillary facility sites and temporary construction areas will be progressively restored to at least their pre-construction conditions when no longer required.	Contractor	Construction	Additional safeguard
Noise and vibration					
NV1	Noise and vibration	A Construction Noise and Vibration Management Plan (CNVMP) will be prepared and implemented as part of the CEMP. The CNVMP will generally follow the approach in the Interim *Construction Noise Guideline* (ICNG) (DECC, 2009) and identify: • all potential significant noise and vibration generating activities associated with the activity • feasible and reasonable mitigation measures to be implemented, taking into account *Beyond the Pavement: urban design policy, process and principles* (Transport, 2014). • a monitoring program to assess performance against relevant noise and vibration criteria • arrangements for consultation with affected neighbours and sensitive receivers, including notification and complaint handling procedures • contingency measures to be implemented in the event of non-compliance with noise and vibration criteria.	Contractor	Detailed design / pre-construction	Section 4.6 of QA *G36 Environment Protection*
NV2	Noise and vibration	All sensitive receivers (e.g. schools, local residents) likely to be affected will be notified at least seven days prior to commencement of any works associated with the activity that	Contractor	Detailed design / pre-construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		may have an adverse noise or vibration impact. The notification will provide details of: • the project • the construction period and construction hours • contact information for project management staff • complaint and incident reporting • how to obtain further information.			
NV3	Noise and vibration	Less vibration emitting construction methods will be used where feasible and reasonable, for example vibratory rollers can, where practicable, be operated with the vibratory mode switched off to reduce vibration impact.	Contractor	Construction	Additional safeguard
NV4	Out of hours work	Out of hours works will be undertaken in accordance with the Construction Noise and Vibration Guideline (Roads and Maritime 2016). This includes: • Offer respite and/or restricted construction hours where noise intensive works are planned over extended periods, especially where they occur outside of standard hours. This may include moving the construction work front to different areas so that sensitive receivers are not impacted for longer than two consecutive days • No more than two consecutive nights of noise with special audible characteristics and/or vibration generating work may be undertaken in the same NCA over any 7-day period, unless otherwise negotiated with affected receivers.	Contractor	Construction	Additional safeguard
NV5	Out of hours work	Noisiest activities will be limited to standard construction hours, where practicable	Contractor	Construction	Additional safeguard
NV6	Noise and vibration	A register of most affected noise and vibration sensitive receivers (NVSRs) will be kept on site and maintained. The register will include the following details for each NVSR: • Address of receiver • Category of receiver (e.g. Residential, Commercial etc.) • Contact name and phone number.	Contactor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		The register is to be included as part of the Proposal's Community Liaison Plan or similar document and maintained in accordance with the requirements of this plan.			
NV7	Noise and vibration	Source controls will be employed to minimise noise impacts, such as using noise screens and mufflers, maximising offset distance, and orienting plant away from sensitive receivers.	Contractor	Construction	Additional safeguard
NV8	Noise and vibration	The selection of plant and machinery will consider noise emissions, operated to reduce maximum noise levels, maintained regularly and turned off when not in use	Contractor	Construction	Additional safeguard
NV9	Operational road traffic noise	Further assessment of operational road traffic noise impacts will be carried out to inform consideration of appropriate noise mitigation during detailed design. Where a parcel of land would be impacted by multiple projects within the Great Western Highway Upgrade Program, noise treatment options will be considered for the greater of the predicted noise impacts.	Transport	Detailed design	Additional safeguard
NV10	Operational road traffic noise	Implement at-property noise mitigation treatments as early as feasible in the construction program in consultation with the property owner.	Transport / Contractor	Pre-construction / construction	Additional safeguard
NV11	Woodlands Road ancillary facility	During detailed design, further investigation will be carried out to confirm the **appropriate types of** use of the Woodland Road ancillary facility as well as traffic movements.	Transport	Detailed design	Additional safeguard
Traffic and transport					
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 Transport *Traffic Control at Work Sites Manual* (Transport, 2020c) and *QA Specification G10 Control of Traffic* (Transport, 2020b). The TMP will include: • confirmation of haulage routes • measures to maintain access to local roads and properties • a provision for the monitoring of delays or queues forming at access points with a suitable response such as temporary detours or cessation of construction access movements to clear the queue	Transport / Contractor	Detailed design / Pre-construction	Section 4.8 of QA *G36 Environment Protection*

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		• construction traffic control plans outlining site-specific traffic control measures (including signage) to manage and regulate traffic movement • measures to maintain pedestrian and cyclist access where possible • requirements and methods to consult and inform the local community of impacts on the local road network • construction vehicle movements scheduled in consideration of peak hours and school drop-off and pick-up periods • emergency service access to be maintained along local roads in line with temporary local road access arrangements • 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 • monitoring, review and amendment mechanisms.			
TT2	Construction site access	Construction site access will be designed and implemented in consideration of: • road design guidelines and turning paths for heavy vehicles • appropriate sight distances to allow traffic to safely enter and exit • visibility of compliant warning and way finding signs • use of accredited traffic controllers, where appropriate and/or other controls to separate, slow down or temporarily stop traffic for safe entry/exit • minimising use of local roads, where practical • provision of deceleration lanes at accesses next to highly trafficked roads. **Heavy vehicles are to access the active transport trail from within the revised proposal area and not from Valley View Road or Evans Lookout Road in Blackheath.**	Contractor	Pre-construction/ construction	Additional safeguard
TT3	Impact on bus stops or routes	For the Katoomba to Medlow Bath section, temporary and permanent bus stop relocation will be discussed with the relevant bus operator.	Transport / Contractor	Detailed design / Pre-construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		Transport will discuss the temporary relocation of the Bonnie Doon Reserve and Foy Avenue bus stops. Transport will inform the community of the temporary relocation of the bus stops prior to the relocation.			
TT4	Temporary access changes	Detours during temporary access changes will be implemented with directional signage along alternate routes.	Contractor	Construction	Additional safeguard
TT5	Traffic management measures	Any temporary traffic diversions or road closures will be implemented in accordance with Transport Management Centre (TMC) and Blue Mountains City Council requirements and notified to emergency services.	Contractor	Construction	Additional safeguard
TT6	Property access	Property access will be maintained where feasible and reasonable and property owners will be consulted well in advance of work starting that may temporarily restrict or control access.	Contractor	Construction	Additional safeguard
TT7	Local road or shared path closures	Blue Mountains City Council will be consulted with prior to any local road or shared path closures to identify suitable mitigation measures such as detour routes.	Contractor	Construction	Additional safeguard
TT8	Damage to local roads	Any damage to the local road network identified to be caused by construction vehicles for the proposal will be remediated by the contractor to be similar to the existing road condition.	Contractor	Construction	Additional safeguard
TT9 **Coachhouse Lane**	**Auxiliary light construction vehicle parking will not be permitted in Coachhouse Lane.**	**Contractor**	**Construction**	**Additional safeguard**	
Socio-economic, property and land use					
SE1	Socio-economic	A Communication Plan (CP) will be prepared and implemented as part of the CEMP to help provide timely and accurate information to the community during construction. The CP will include (as a minimum): • people**,** ~~**or**~~ organisations **and government agencies** to be consulted during the delivery of the proposal • procedures and mechanisms for the regular distribution of information about the proposal • mechanisms to keep relevant stakeholders updated on construction activities, schedules and milestones	Contractor	Detailed design / pre-construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		• avenues for the community to provide feedback (including a 24-hour, toll free proposal information and complaints line) or to register complaints through which Transport will respond to community feedback • a process to resolve complaints and issues raised. • The CP will be prepared in accordance with the *Community Involvement and Communications Resource Manual* (Roads and Traffic Authority, 2008).			
SE2	Community consultation	Transport will continue to consult with the community until the completion of the proposal. Discussions would include the nature and timing of construction work.	Transport	Pre-construction / construction	Additional safeguard
SE3	Property acquisition	Land acquisition will occur in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* and the *Local Government Act 1993*. Transport will continue to consult with Blue Mountains City Council regarding council owned land and assets. The design for the proposal will also be refined during detailed design to minimise impacts on community land, where possible.	Transport	Pre-construction	Additional safeguard
SE4	Amenity	Amenity impacts will be managed through other safeguards for the proposal (including those related to noise and vibration, visual changes, heritage and traffic)	Transport	Pre-construction / construction	Additional safeguard
SE5	Changes in access	Temporary and permanent changes in access will be discussed with impacted land occupiers (including Sydney Trains and NPWS) prior to commencement of construction and during construction activities should arrangements change. This includes properties which may be impacted by intersection upgrades at Nellies Glen Road, Explorers Road and Foy Avenue.	Transport	Pre-construction / construction	Additional safeguard
SE6	Social infrastructure	Transport will consult with local community groups that use facilities including the walking/ hiking trails throughout construction.	Transport	Pre-construction/ construction	Additional safeguard
SE7	Relocation of bus stops	Public transport users will be notified in advance of any changes to bus stop locations through signage at the existing bus stop during construction. Public transport users will also be notified of permanent bus stop relocations.	Transport	Pre-construction / construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		Adequate way finding signage will be installed. Consultation with the relevant bus authorities will be undertaken to mitigate potential impacts to bus routes.			
SE8	Traffic management for all road users, including pedestrians and cyclists	Transport will consider opportunities for alternative transport arrangements to provide access for vulnerable community members who would normally access the Great Blue Mountains Trail. Alternative routes for active transport users during construction will be clearly identified by signage and the use of traffic controllers where required.	Transport	Pre-construction / construction	Additional safeguard
SE9	Provision of parking	Transport will develop a car parking strategy to inform the operation of upgraded car parking opportunities (including near the Pulpit Hill interpretation area) in conjunction with the Great Western Highway Upgrade – Medlow Bath.	Transport	Detailed design / pre-construction	Additional safeguard
Aboriginal cultural heritage					
A1	Aboriginal heritage	An Aboriginal Heritage Management Plan (AHMP) will be prepared in accordance with the Procedure for Aboriginal cultural heritage consultation and investigation (Roads and Maritime, 2011) and Standard Management Procedure - Unexpected Heritage Items (Transport for NSW, 2015d) and implemented as part of the CEMP. It will provide specific guidance on measures and controls to be implemented for managing impacts on Aboriginal heritage. The AHMP will be prepared in consultation with all relevant Aboriginal groups.	Contractor	Detailed design / pre-construction	Section 4.9 of QA *G36 Environment Protection*
A2	Aboriginal heritage	The Standard Management Procedure - Unexpected Heritage Items (Transport for NSW, 2015d) will be followed in the event that an unknown or potential Aboriginal object/s, including skeletal remains, is found during construction. Work will only re-commence once the requirements of that Procedure have been satisfied.	Contractor	Construction	Section 4.9 of QA *G36 Environment Protection*

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
A3	Aboriginal heritage	Transport will develop a cultural interpretation strategy across the Great Western Highway Upgrade Program. This cultural interpretation strategy will look to interpret both Aboriginal and non-Aboriginal heritage along the highway alignment. The Pulpit Hill heritage interpretation area **and a separate site for Aboriginal cultural education** will be further developed as part of this strategy, in consultation with the Blue Mountains City Council, **Department of Planning and Environment,** Heritage NSW, Aboriginal knowledge holders and the local community. **Any additional environmental assessment required due to design features identified as part of this strategy would occur during detailed design.**	Transport	Detailed design	Additional safeguard
A4	**Scar tree removal**	**Harm to Scar Tree 1 must not occur until an AHIP is in place. Appropriate management and mitigation measures should be developed prior to the submission of the AHIP application and conditioned through the AHIP.**	**Transport**	**Pre-construction**	**Additional safeguard**
A5	**Scar tree salvage**	**Scar Tree 1 would be salvaged from the site prior to mainline construction work. Salvage would entail the recording of the site by an archaeologist and the collection of all visible artefacts.**	**Contractor**	**Pre-construction**	**Additional safeguard**
Other Impacts					
O1	Air quality	An Air Quality Management Plan (AQMP) will be prepared and implemented as part of the CEMP. The AQMP will include, but not be limited to: • potential sources of air pollution • air quality management objectives consistent with any relevant published EPA and/or Energy, Environment and Science (EES)/Department of Planning, Industry and Environment guidelines • mitigation and suppression measures to be implemented • methods to manage work during strong winds or other adverse weather conditions • a progressive rehabilitation strategy for exposed surfaces.	Transport / Contractor	Detailed design / pre-construction	Section 4.4 of QA G36 Environment Protection

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
O2	Waste and resource management	A Waste Management Plan (WMP) will be prepared and implemented as part of the CEMP. The WMP will include but not be limited to: • measures to avoid and minimise waste associated with the project • classification of wastes and management options (re-use, recycle, stockpile, disposal) • statutory approvals required for managing both on and off-site waste, or application of any relevant resource recovery exemptions • procedures for storage, transport and disposal of spoil and waste • monitoring, record keeping and reporting. The WMP will be prepared taking into account the *Environmental Procedure - Management of Wastes on Roads and Maritime Services Land* (Roads and Maritime, 2014) and relevant Transport for NSW Waste Fact Sheets.	Transport / Contractor	Detailed design / pre-construction	Section 4.2 of QA G36 Environment Protection
O3	Waste and resource management	If vegetation is to be mulched and transported off site for beneficial reuse, it is to be assessed for the presence of weeds, pest, and other disease and a Mulch Management Plan prepared in accordance with the Roads and Maritime Technical Procedure: Mulch Management	Transport / Contractor	Detailed design / pre-construction	Additional Safeguard
O4	Waste and resource management	Recycling facilities will be provided at site compounds for recycling paper, plastic, glass and other re-useable materials. Liquid wastes, such as paints and solvents, will be disposed of in accordance with the Waste Classification Guidelines Part 1: Classifying Waste (DECCW, 2009) and the POEO Act.	Transport / Contractor	Detailed design / pre-construction	Additional Safeguard
O5	Bushfire hazards and risk management	The CEMP will include a bushfire management plan prepared in accordance with Planning for Bush Fire Protection 2019 (NSW Rural Fire Service, 2019). Measures to be implemented to manage bushfire risk include: • monitoring of weather and local bushfire ratings • consultation requirements for community notifications in the event of a bushfire • maintaining equipment in good working order	Contractor	Pre-construction / construction	Additional Safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		• ensuring plant and equipment are fitted with appropriate spark arrestors, where practicable • ensuring site workers are informed of the site rules including designated smoking areas and putting rubbish in designated bins. • obtaining hot work permits and implementing total fire bans as required • implementing adequate storage and handling requirements for potentially flammable substances in accordance with the relevant guidelines.			
O6	Bushfire hazards and risk management	Consultation with emergency services, including the Rural Fire Service and Fire and Rescue NSW to: • ensure emergency access is maintained during construction • co-ordinate any bush fire emergency actions as outlined in the project's Bushfire Management Plan.	Contractor	Construction	Additional Safeguard
Cumulative impacts					
C1	Cumulative impacts	Ongoing consultation will be carried out between proponents and construction contractors of nearby projects to identify **and mitigate** the potential for cumulative impacts to occur should construction occur concurrently with the proposal.	Transport / Contractor	Detailed design / Pre-construction / Construction	Additional Safeguard
C2	Cumulative impacts	Co-ordination of traffic management controls will be considered to minimise cumulative traffic impacts, particularly during **daily** peak **travel times and during** holiday periods.	Transport / Contractor	Detailed design / Pre-construction / Construction	Additional Safeguard
C3	Cumulative impacts	Co-ordination of out of hours work will be considered across the Great Western Highway East – Katoomba to Blackheath and the Great Western Highway Upgrade – Medlow Bath in Medlow Bath to minimise out of hours work periods and minimise ongoing out of hours work noise to sensitive receivers and ensure respite periods are achieved where required.	Transport / Contractor	Detailed design / Pre-construction / Construction	Additional Safeguard

6.3 Licensing and approvals

Table 6-2 provides a summary of the licensing and approvals required for the proposal.

Table 6-2 Summary of licensing and approval required

Instrument	Requirement	Timing
Protection of the Environment Operations Act 1997 (s43)	Environment protection licence (EPL) for road construction within the Katoomba to Medlow Bath section from the EPA.	Prior to start of the activity.
Water Management Act 2000 (s304)	Notice to the Minister for Agriculture and Western NSW to exercise functions in special areas within the catchment area.	14 days prior to exercising functions.
Crown Land Management Act 2016 (Division 3.4, 5.5 and 5.6)	Lease or licence to occupy areas of Crown land.	Prior to start of the activity
National Parks and Wildlife Act 1974	Revocation of land reserved as a National Park to occur via an Act of Parliament.	Prior to the determination of any land reserved under the *National Parks and Wildlife Act 1974*
Roads Act 1933 (s138)	A Road Occupancy Licence would be required from the relevant roads authority by the contractor for prior to work on public roads	Prior to start of the activity.
Water NSW Act 2014 (s50)	Notice to WaterNSW to exercise functions in the Katoomba and Blackheath special areas.	28 days prior to exercising functions.
National Parks and Wildlife Act 1974 (s90)	Aboriginal heritage impact permit from the Coordinator General of EES under DPIE	Prior to start of the activity.

7. Next steps

Transport as the determining authority will consider the information in the Great Western Highway East – Katoomba to Blackheath REF and this submission report and make a decision whether or not to proceed with the proposal.

As part of this process, this assessment and determination process would be undertaken jointly with the assessment and determination of the Great Western Highway – Medlow Bath Upgrade.

Transport for NSW will inform the community and stakeholders of this decision and where a decision is made to proceed will continue to consult with the community and stakeholders prior to and during the construction phase.

As discussed in the REF, the revocation process for a portion of land reserved as the Blue Mountains National Park is currently in progress. Transport intends to exclude from its determination any works requiring revocation until such time that a decision has occurred, via an Act of Parliament. The revocation process is currently ongoing.

8. References

Aurecon, 2022a. Great Western Highway Upgrade – East Project Socio-economic impact assessment, Sydney: Aurecon.

Aurecon, 2022b. Surface Water and Groundwater Technical Assessment Working Paper, Sydney: Aurecon.

Aurecon, 2022c. Traffic and Transport Assessment Report, Sydney: Aurecon.

DECC, 2006. Assessing Vibration: a technical guideline, Sydney: DECC.

DECC, 2009. Interim Construction Noise Guideline, Sydney: DECC.

DECCW, 2011. Road Noise Policy, Sydney: DECCW.

Jacobs, 2020. Great Western Highway Duplication – Katoomba to Lithgow Archaeological Survey Report, Sydney: Jacobs.

Jacobs, 2021. Great Western Highway Duplication – Katoomba to Lithgow PACHCI Stage 3: Aboriginal Cultural Heritage Assessment Report, Sydney: Jacobs.

Niche Environment and Heritage, 2022. Statement of Heritage Impact – Great Western Highway East, Sydney: Niche Environment and Heritage.

NSW DPE, 2021. Cumulative Impact Assessment Guidelines for State Significant Projects, Sydney: NSW Department of Planning and Environment.

Renzo Tonin, 2022. Noise and Vibration Technical Paper, Sydney: Renzo Tonin.

Roads and Maritime, 2016a. Construction Noise and Vibration Guidelines, Sydney: Roads and Maritime.

Spackman Mossop Michaels, 2022. Urban Design, Landscape Character and Visual Impact Assessment, Sydney: Spackman Mossop Michaels.

Transport, 2015a. Cultural Heritage Guidelines, Sydney: Transport for NSW.

Transport, 2015b. Noise Criteria Guideline, Sydney: Transport for NSW.

Transport, 2015c. Noise Mitigation Guideline, Sydney: Transport.

Transport, 2016. Construction Noise and Vibration Guideline, Sydney: Transport for NSW.

Transport, 2018d. Road Safety Plan 2021, Sydney: Transport for NSW.

Transport, 2020a. Environmental Impact Assessment Practice Note – Socio-economic Assessment (EIA-N05), Sydney: Transport for NSW.

Transport, 2022a. Great Western Highway Upgrade East Biodiversity Assessment Report, Sydney: Transport for NSW.

Transport, 2022b. Great Western Highway Upgrade Program Road Freight in the Blue Mountains. Sydney: Transport for NSW.

Appendix A

Summary table of respondents, submission numbers and responses

Respondent	Submission No.	Section number where issues are addressed
Individual	1	2.8.4, 2.10.1, 2.19.1
Individual	2	2.6.3, 2.17.1, 2.17.8, 2.19.5
Individual	3	2.4.5
Individual	4	2.19.8, 2.22.2
Individual	5	2.12.1, 2.19.8
Individual	6	2.19.5, 2.22.2
Individual	7	2.5.4, 2.6.1, 2.19.8, 2.22.3
Individual	8	2.3.2, 2.3.3, 2.4.3, 2.4.5, 2.5.1, 2.5.4, 2.7.3, 2.17.6, 2.19.4, 2.19.8, 2.22.3
Individual	9	2.3.2, 2.8.1
Individual	10	2.3.2, 2.8.1
Individual	11	2.3.2, 2.8.1
Community group: The Walking Volunteers Inc	12	2.5.1, 2.13.2, 2.22.2
Individual	13	2.9.2
Individual	14	2.4.5, 2.17.8
Individual	15	2.5.2, 2.19.5
Individual	16	2.4.1, 2.4.4, 2.6.3, 2.7.1, 2.8.2, 2.10.1, 2.11.1, 2.13.1, 2.17.6, 2.19.9
Individual	17	2.12.3
Individual	18	2.4.4, 2.12.1, 2.19.8, 2.21.1
Individual	19	2.4.4, 2.13.4
Individual	20	2.3.3, 2.4.2, 2.4.4, 2.12.2, 2.16.2, 2.19.7
Individual	21	2.12.1
Individual	22	2.9.2
Individual	23	2.12.1, 2.19.8
Individual	24	2.19.5
Individual	25	2.3.4, 2.4.4, 2.17.8
Individual	26	2.19.8
Individual	27	2.4.4, 2.5.5, 2.10.1, 2.10.2, 2.13.2, 2.14.2, 2.17.2, 2.19.5, 2.21.1, 2.21.3
Individual	28	2.2.1, 2.3.2, 2.4.2, 2.4.4, 2.5.2, 2.5.3, 2.5.5, 2.8.4, 2.12.1, 2.13.2, 2.15.2, 2.19.2, 2.19.8, 2.21.1, 2.22.4
Individual	29	2.6.2, 2.10.1, 2.12.1, 2.19.7

Respondent	Submission No.	Section number where issues are addressed
Individual	30	2.9.2, 2.10.1
Individual	31	2.2.1, 2.3.2, 2.4.1, 2.7.3, 2.8.4, 2.10.1, 2.11.2, 2.12.1, 2.19.8, 2.22.3
Individual	32	2.3.2, 2.4.4, 2.10.1
Individual	33	2.8.4, 2.12.1, 2.19.9
Individual	34	2.9.2, 2.9.3, 2.10.1, 2.19.10
Individual	35	2.8.4, 2.12.1, 2.19.9
Individual	36	2.6.3, 2.12.1, 2.17.3
Individual	37	2.2.1, 2.4.4, 2.8.4, 2.12.1, 2.19.8, 2.20.1, 2.21.3
Individual	38	2.8.4, 2.10.1, 2.12.3, 2.17.6, 2.19.2, 2.19.9, 2.19.10, 2.20.2, 2.21.3, 2.22.2
Individual	39	2.3.2, 2.12.1, 2.19.9
Individual	40	2.4.4, 2.8.4, 2.10.1, 2.20.2
Individual	41	2.4.1, 2.4.4, 2.10.1, 2.12.1, 2.12.3, 2.13.1, 2.19.2, 2.19.8, 2.21.3
Individual	42	2.9.2, 2.19.6
Individual	43	2.17.3
Individual	44	2.6.3, 2.19.7
Individual	45	2.2.1, 2.3.1, 2.4.1, 2.6.3, 2.7.1, 2.8.2, 2.8.4, 2.9.2, 2.10.1, 2.12.1, 2.12.3, 2.17.1, 2.17.3, 2.19.5, 2.19.8, 2.21.3, 2.22.3
Individual	46	2.8.4, 2.12.1, 2.17.5, 2.19.9, 2.22.4
Individual	47	2.8.4, 2.12.1, 2.19.8
Individual	48	2.8.1
Individual	49	2.8.4, 2.12.1, 2.19.8
Individual	50	2.6.3, 2.8.4, 2.9.3, 2.19.2, 2.19.3, 2.19.4, 2.19.7, 2.22.1, 2.22.4
Individual	51	2.6.2, 2.8.4, 2.9.3, 2.10.1, 2.12.1, 2.17.6, 2.19.6, 2.19.8
Individual	52	2.8.4, 2.12.1, 2.19.9, 2.22.4
Individual	53	2.8.4, 2.12.1, 2.19.9
Individual	54	2.6.3, 2.8.4, 2.12.1, 2.17.5, 2.19.9, 2.22.4
Individual	55	2.6.3, 2.8.4, 2.12.1, 2.17.5, 2.19.9, 2.22.4
Individual	56	2.6.3, 2.8.4, 2.17.5, 2.19.9, 2.22.4
Individual	57	2.13.2, 2.13.4, 2.15.1, 2.16.4, 2.17.5, 2.19.2, 2.19.5, 2.22.4

Respondent	Submission No.	Section number where issues are addressed
Individual	58	2.6.2, 2.8.4, 2.9.3, 2.10.1, 2.12.1, 2.17.6, 2.19.6, 2.19.8
Individual	59	2.8.4
Individual	60	2.3.4, 2.4.5, 2.9.1, 2.10.1, 2.10.2, 2.17.2, 2.21.4
Individual	61	2.8.4, 2.12.1
Individual	62	2.7.3, 2.8.4, 2.12.1, 2.19.8
Individual	63	2.6.3, 2.8.4, 2.9.2, 2.10.1, 2.11.2, 2.12.1, 2.19.1, 2.19.2, 2.19.8
Individual	64	2.8.4, 2.9.2, 2.12.1, 2.19.2, 2.19.8
Individual	65	2.3.1, 2.3.2, 2.4.3, 2.5.1, 2.6.4, 2.7.3, 2.8.4, 2.10.1, 2.12.1, 2.14.1, 2.19.8, 2.20.3, 2.20.4, 2.22.3
Individual	66	2.8.1
Individual	67	2.3.2, 2.4.5, 2.6.3, 2.7.2, 2.7.3, 2.9.3, 2.9.4, 2.10.1, 2.12.1, 2.16.2, 2.17.4, 2.20.3
Individual	68	2.19.8
Individual	69	2.2.2, 2.4.5, 2.5.2, 2.15.1, 2.16.2, 2.16.3, 2.19.5, 2.19.8, 2.20.3
Individual	70	2.19.5
Individual	71	2.16.1, 2.17.3, 2.19.7
Individual	72	2.12.3, 2.19.5
Individual	73	2.4.1, 2.4.2, 2.5.1, 2.5.3, 2.12.3, 2.17.5, 2.18.1
Individual	74	2.16.3, 2.19.5
Individual	75	2.4.5, 2.5.2, 2.16.3, 2.17.1
Individual	76	2.13.2
Individual	77	2.19.8
Individual	78	2.6.2, 2.12.1, 2.12.3, 2.16.3, 2.17.4, 2.17.5, 2.19.6, 2.19.7, 2.19.8
Individual	79	2.19.5
Individual	80	2.19.8
Individual	81	2.19.5
Individual	82	2.5.2, 2.19.5
Individual	83	2.19.6
Individual	84	2.12.1
Individual	85	2.2.1, 2.3.2, 2.10.1
Individual	86	2.12.2, 2.19.6

Respondent	Submission No.	Section number where issues are addressed
Individual	87	2.12.2, 2.14.1, 2.19.8
Individual	88	2.12.2
Individual	89	2.19.8
Individual	90	2.19.5
Individual	91	2.19.8
Individual	92	2.19.5
Community group: Medlow Bath Action Group	93	2.4.1, 2.6.1, 2.6.3, 2.6.4, 2.7.1, 2.8.3, 2.8.4, 2.10.1, 2.12.1, 2.15.2, 2.17.7, 2.19.1, 2.19.3, 2.19.9, 2.20.3, 2.20.4, 2.21.1, 2.21.2, 2.21.3, 2.22.2, 2.22.3
Community group: Medlow Bath Residents Association	94	2.4.1, 2.6.1, 2.6.3, 2.6.4, 2.7.1, 2.8.3, 2.8.4, 2.10.1, 2.12.1, 2.15.2, 2.17.7, 2.19.1, 2.19.3, 2.19.9, 2.20.3, 2.20.4, 2.21.1, 2.21.2. 2.21.3, 2.22.2, 2.22.3
Individual	95	2.12.1
Community group: Blue Mountain Cycling Safety Forum Inc	96	2.6.2, 2.12.1, 2.12.3, 2.13.2, 2.12.3, 2.13.4, 2.17.9, 2.19.7
Individual	97	2.6.2, 2.8.4
Individual	98	2.12.1
Individual	99	2.3.2, 2.8.4, 2.12.1, 2.19.9
Individual	100	2.3.2, 2.8.4, 2.12.1, 2.19.8
Community group: Blue Mountains Conservation Society Inc	101	2.8.4
Individual	102	2.6.3, 2.19.7
Government agency	National Parks and Wildlife Service	3.2
Government agency	Crown Land	3.3
Government agency	Blue Mountains City Council	3.5
Government agency	WaterNSW	3.4
Government agency	National Trust Blue Mountains Branch	3.6
Government agency	Blue Mountains Heritage Advisory Committee	3.7

Appendix B

Addendum Erosion and Sedimentation Management Report

Appendix C

Revised MUSIC modelling

Water quality

Water draining from the revised proposal area via the Grose River and Coxs river catchments are subject to controls under the Sydney Drinking Water Catchment. The requirements of the State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011 for proposals within drinking water catchment must have a neutral or beneficial effect on water quality (NorBE).

Further to the above, as outlined in the TfNSW "*Sustainable Design Guidelines*" it states that you are required to provide water quality to the following treatment levels:

- 85% retention of the average annual load of suspended solids
- 65% retention of the average annual load of Total Phosphorus
- 45% retention of the annual load of Total Nitrogen

These removal targets are also to be considered as part of the proposed water quality treatment requirements.

The proposed water quality treatment measures are located on the eastern side of the rail alignment. The proposed treatment utilised to meet the NoRBE targets are as outlined below:

- Gross Pollutant Trap: Baramy GPT, or approved equivalent;
- Bioretention system incorporated within the onsite detention basin (OSD);
- The proposed basins will incorporate sandstone step walls and will be fenced to ensure access to the public is limited; and
- At the discharge point from the basin erosion protection is to be provided at the outlet via a meandering erosion protection system to slow down the runoff velocity and promote infiltration to the existing low point/overland flow path.

The proposed water quality management process is shown in Figure 3-12 and a typical cross-section of a basin is shown in Figure 3-13 in Section 3.2.3 of the REF.

A summary of the discharge locations and the provided treatment at each outlet with respective bioretention surface areas and associated volumes required to meet onsite detention flow management requirements are summarised in Table C-1 below.

Table C-1 Basin summary

Basin no. and location to carriageway	Basin reference chainage	Base area (m2)	Basin volume (m3)
8. Southbound	4910	195	270
9. Southbound	5240	205	350
10. Southbound	5700	405	780
11. Southbound	6100	380	590
12. Southbound	6800	400	650

Analysis of the proposed works was undertaken using MUSIC (Model for Urban Stormwater Improvement Conceptualisation) Version 6 software. In undertaking the assessment on the proposed water quality measures, the following guidelines were utilised:

- Water NSW, 'Using MUSIC in the Sydney Drinking Water Catchment' (2018b).
- Water NSW 'Neutral or Beneficial Effect on Water Quality Assessment Guideline' (2021).

A summary of the modelling methodology and results are outlined in the following sections.

Parameters and methodology

The following methodology and parameters were incorporated into the MUSIC modelling as outlined below:

- Rainfall data has been adopted as per Zone 7 Lower Cox River, Water NSW climate zones.
- The soil parameters and associated data have been adopted for Sandy Clay.

The existing and proposed catchment properties are as summarised in Table C-2 for each respective basin.

Table C-2 MUSIC catchment breakdown

Basin ref chainage	MUSIC sub-catchment	Total area (Ha)	Percentage impervious (%)
4910	Existing	3.30	37
	Proposed	4.08	44
5240	Existing	2.14	24
	Proposed	2.59	60
5700	Existing	6.06	22
	Proposed	6.58	41
6100	Existing	3.92	28
	Proposed	5.14	37
6800	Existing	5.24	22
	Proposed to Basin #	3.85	18
	Proposed Bypass Basin #	1.99	36

- It is noted that for Basin 12, there are portions of the catchment that bypass the bioretention basin due to level constraints and being unable to drain this runoff through the bioretention basin. Therefore, runoff is captured within grass lined swales and directed to the discharge point from the proposed works. The proposed bioretention basin is oversized for the revised design and provides greater nutrient reduction.

The proposed and existing catchments were classified as “Sealed Road” and “Mixed Use” respectively, with the pollutant concentration parameters used within the model based on the recommended model defaults from the Water NSW Guidelines. These are outlined in Table C-3.

Table C-3 MUSIC Node – Rainfall Runoff Parameters

Classification		TSS		TP		TN	
		Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
“Sealed Road”	Base flow	1.20	0.17	-0.85	0.19	0.11	0.12
	Storm flow	2.43	0.32	-0.30	0.25	0.34	0.19

Source: Water NSW, ‘Using MUSIC in the Sydney Drinking Water Catchment’ (2018b)

The soil properties for the pervious areas of the catchment were defined based on the recommended default parameters listed in Water NSW’s guidelines and are summarised in Table C-4.

Table C-4 MUSIC Soil Properties

Soil properties	Value
Impervious threshold (mm)	1.5
Soil storage capacity (mm)	142
Initial storage (% of capacity)	25
Field capacity (mm)	94
Infiltration coefficient ‘a’	180
Infiltration coefficient ‘b’	3
Initial groundwater depth (mm)	10
Daily recharge rate (%)	25
Daily base flow rate (%)	25

Soil properties	Value
Daily deep seepage rate (%)	0

Source: Water NSW, 'Using MUSIC in the Sydney Drinking Water Catchment' (2018b)

Proposed Treatment Measures

To achieve the required pollutant reductions to satisfy the NoRBE requirements, the following water quality treatment train is proposed. A Baramy GPT will be used as the primary treatment followed by a combined bioretention basin/storage as a secondary treatment. In addition to this, buffer strips (approximately 0.5m wide) will be implemented to treat runoff from maintenance paths along the alignment, these flows bypass the main water quality treatment measures, however, are considered as part of the treatment target calculations.

The proposed treatment train measures and MUSIC modelling parameters are summarised in the following sections.

Gross Pollutant Trap

For primary treatment of the stormwater runoff, a Baramy Gross Pollutant Trap is to be provided. The Baramy GPT is a pollution control device specifically designed to remove gross pollutants and coarse sediments from stormwater runoff. The parameters used for the MUSIC node are as per the input parameters outlined in the Water NSW to utilise the input data for a GPT as summarised in Table 5-7 in 'Using MUSIC in the Sydney Drinking Water Catchment' (2018b). The proposed input data is as summarised in Table C-5.

Table C-5 GPT MUSIC Input Parameters

Pollutant	Input	Output
Suspended solids (mg/L)	0	0
	75	75
	1000	350
Phosphorus (mg/L)	0	0
	0.5	0.5
	1	0.85
Nitrogen (mg/L)	0	0
	0.5	0.5
	5	4.3
Gross pollutants (kg/ML)	0	0
	15	1.5

Source: Water NSW, 'Using MUSIC in the Sydney Drinking Water Catchment' (2018b)

Bioretention Basin

A bioretention system is proposed as an end of line treatment prior to discharge. Bioretention systems typically contain an extended detention zone above a filter layer 600mm in depth and contain water tolerant plant species to facilitate additional nutrient removal. Sediments and attached pollutants (including nutrients, metals, and other soluble pollutants) are removed via filtration through the vegetative surface layer and filter media below. In developing the MUSIC model for the developed site, the following parameters were used in the MUSIC model in accordance with the requirements outlined in 'Using MUSIC in the Sydney Drinking Water Catchment' (2018b).

Table C-7 Bioretention Properties

Bioretention basin properties	Value
Low flow bypass (m3/s)	0
High flow bypass (m3/s)	Varies - (50% of 1EY flow) Refer to Table C-7
Extended detention depth (m)	0.3
Surface area (m2)	Varies - Refer to Table C-7
Filter area (m2)	Varies - Refer to Table C-7
Unlined filter media perimeter (m)	0.01
Saturated hydraulic conductivity (mm/hr)	100
Filter depth (m)	0.6
TN content of filter media (mg/kg)	400
Orthophosphate content of filter media (mg/kg)	40
Exfiltration rate (mm/hr)	0
Overflow weir width (m)	Varies - (surface area divided by 10) Refer to Table C-7

In addition to the table above, Table C-7 has been produced to further summarise the varying basin properties.

Table C-7 Basin Varying Properties

Bioretention basin reference	High flow bypass (m3/s)	Surface area / filter area (m2)	Overflow weir width (m)
Basin 8, Ch. 4910	0.180	195	19.5
Basin 9, Ch. 5240	0.146	205	20.5
Basin 10, Ch. 5700	0.261	405	40.5
Basin 11, Ch. 6100	0.238	380	38
Basin 12, Ch. 6800	0.100	220	22

Grass Lined Swales

For Basin No. 12 at Ch. 6800, there are portions of the catchment that bypass the bioretention basin due to level constraints and being unable to drain this runoff through the bioretention basin. Therefore, runoff is captured within grass lined swales and directed to the discharge point from the proposed works. In developing the MUSIC model for the developed site, the following parameters were used in the MUSIC model in accordance with the requirements outlined in 'Using MUSIC in the Sydney Drinking Water Catchment' (2018b). It is noted that the swale size was consistent throughout the area of Basin 12.

Table C-8 Grass lined swale properties

Grass lined swale properties	Value
Low flow bypass (m3/s)	0
Length (m)	Varies – depending on length of swale per catchment
Bed Slope (%)	Varies – depending on slope of swale per catchment
Base width (m)	0.5
Top width (m)	2.1
Depth (m)	0.4
Vegetation height (m)	0.25
Exfiltration rate (mm/hr)	0

In addition to the Table C-8, Table C-9 has been produced to further summarise the varying grass lined swale properties.

Table C-9 Grass lined swale varying properties

Grass lined swale reference	Chainage reference	Length (m)	Bed slope (%)
Swale north to bio basin	6920 to 6760	160	2.4
Swale south to bio basin	6510 to 6760	250	3
Swale to OSD	6890 to 6840	50	3.5
Swale north to 6800-I-1	6760 to 6750	10	3.2
Swale south to 6800-D-1	6660 to 6700	40	1.8
Swale south to 6800-E-1	6665 to 6700	35	10
Swale south to 6800-H-1 A	6710 to 6740	30	3.8
Swale south to 6800-H-1 B	6740 to 6750	10	3.8
Outlet swale - 6800-I-1 to 6800-J-1	N/A	35	10

Buffer Strips

For the proposed maintenance paths runoff sheet flows from the path via a buffer strip to the natural ground on the downstream side. In developing the MUSIC model for the developed site, the following parameters were used in the MUSIC model in accordance with the requirements outlined in 'Using MUSIC in the Sydney Drinking Water Catchment' (2018b). It is noted that for the area of maintenance path that extends beyond the project boundary at the northern extent of the project works, has been included in the water quality analysis.

Table C-10 Grass lined swale properties

Buffer strip properties	Value
Percentage of upstream area buffered (%)	100
Buffer area (% of upstream impervious area)	16
Exfiltration rate (mm/hr)	0

MUSIC Results

Results of the MUSIC analysis indicate that by including the nominated treatment train as described in this report, the mean annual loads for the total phosphorus, nitrogen, suspended solids, and gross pollutants generated on the developed subject site are less than the pollutants generated in the existing state and achieve the NoRBE and TfNSW sustainability guideline requirements. The results from the MUSIC model are displayed in the Table C-8 to Table C-16.

Table C-11 MUSIC model results – Basin 8

	Total suspended solids (kg/yr)	Total phosphorous (kg/yr)	Total nitrogen (kg/yr)	Total gross pollutants (kg/yr)
Existing generation	7,020	36.3	51.5	521
Developed generation (without treatment)	9,510	17.1	71.1	773
Developed output	1,220	5.84	39	16.8
% Removal in average annual loads	87.2%	65.8%	45.1%	97.8%

Table C-12 MUSIC Model Results – Basin 9

	Total suspended solids (kg/yr)	Total phosphorous (kg/yr)	Total nitrogen (kg/yr)	Total gross pollutants (kg/yr)
Existing generation	3,760	25.5	28.9	249
Developed generation (without treatment)	7,550	12.8	53.5	587
Developed output	764	3.57	26.4	31.9
% Removal in average annual loads	89.9%	72.1%	50.7%	94.6%

Table C-13 MUSIC Model Results – Basin 10

	Total suspended solids (kg/yr)	Total phosphorous (kg/yr)	Total nitrogen (kg/yr)	Total gross pollutants (kg/yr)
Existing generation	10,600	72.9	79.4	659
Developed generation (without treatment)	14,900	25.8	110	1,160
Developed output	1,760	8.07	56.7	30.7
% Removal in average annual loads	88.2%	68.7%	48.5%	97.4%

Table C-14 MUSIC Model Results – Basin 11

	Total suspended solids (kg/yr)	Total phosphorous (kg/yr)	Total nitrogen (kg/yr)	Total gross pollutants (kg/yr)
Existing generation	7,380	45.7	55.3	512
Developed generation (without treatment)	10,900	19	82.4	842
Developed output	1,150	5.45	41.1	45.1
% Removal in average annual loads	89.4%	71.3%	50.1%	94.6%

Table C-15 MUSIC Model Results – Basin 12

	Total suspended solids (kg/yr)	Total phosphorous (kg/yr)	Total nitrogen (kg/yr)	Total gross pollutants (kg/yr)
Existing generation	9,110	63.3	68.2	570
Developed generation (without treatment)	8,790	17.3	100	731
Developed output	2,540	8.23	64	93.1
% Removal in average annual loads	71.1% #	52.4% #	36% #	87.3% #

- It is noted that the TfNSW targets are not being met, however the NoRBE targets are being exceeded which is the governing factor for water quality design within this catchment. To meet the required TfNSW targets extremely large treatment areas are required.

Table C-16 provides a summary of the overall treatment train performance for the entire length of the Medlow Bath to Blackheath section.

Table C-16 MUSIC Model Results – Medlow Bath to Blackheath summary

	Total Suspended Solids (kg/yr)	Total Phosphorous (kg/yr)	Total Nitrogen (kg/yr)	Total Gross Pollutants (kg/yr)
Existing Generation	37,870	244	283	2,511
Developed Generation (without treatment)	51,650	92	417	4,093
Developed Output	7,434	31	227	218
% removal in average annual loads	85.6	66.1	45.5	94.7

Appendix D

Revised Biodiversity Assessment Report

Appendix E

Addendum Statement of Heritage Impact

Appendix F

Addendum Landscape Character and Visual Impacts Assessment

Appendix G

Addendum Noise and vibration impact assessment

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