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<td>Allan Winchcombe</td>
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<td>Final LCVA</td>
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2 | Mulgoa Road Upgrade - Landscape Character, Visual Impact Assessment + Urban Design Study
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| 7. Mitigation Recommendations | |
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1. Introduction

1.1 Project Overview

Roads and Maritime Services (Roads and Maritime) proposes to upgrade Mulgoa Road from Jeanette Street, Regentville (south of the interchange with the M4 Motorway) to the north of Blaikie Road, Jamisontown.

The proposal forms the first stage of a broader program to upgrade the Mulgoa Road/Castlereagh Road corridor between Glenmore Parkway, Glenmore Park and Andrews Road, Penrith located within the Western Sydney region of the Roads and Maritime network and the local government area (LGA) of Penrith. The proposal (also known as ‘Mulgoa Road Stage 1’) was identified as the first priority based on traffic modelling carried out by Roads and Maritime across the Mulgoa Road/Castlereagh Road corridor.

Mulgoa Road is a regionally important traffic route for both the Penrith Central Business District (CBD) and the broader Western Sydney region and is one of two main access points from Penrith to the M4 Motorway. The proposal is driven by the existing road congestion and the anticipated population and local employment growth in the region, including the North West Priority Growth Area and Western Sydney Priority Growth Area.

The proposal would include widening the existing Mulgoa Road carriageway from two travel lanes to three travel lanes in each direction between Jeanette Street and Blaikie Road, extending the slip lanes entering the M4 Motorway, and modifying access to the Homemakers Centre at Wolseley Street. Upgrading the intersections at Factory Road, Jeanette Street, M4 Motorway, Wolseley Street, Glenbrook Street, Blaikie Road and Hatchinson Crescent and Peter Court service roads.
The works identified would ease congestion, improve travel times and improve performance around the M4 Motorway interchange.

The proposal is located south of the Penrith CBD and is characterised by a mixture of residential, business and commercial land uses, including the Penrith Homemaker Centre. There are a range of transport uses throughout the proposal area, including public and private bus routes and pedestrian and cycling infrastructure.

Construction of the proposal would be staged to minimise disruption to local traffic flows and to maintain access to residences and businesses. Construction staging would be further investigated as the project is developed, however it is anticipated work would first be carried out on either side of the existing traffic lanes and behind the existing piers beneath the M4 Motorway overbridge followed by work within the existing road corridor and decommissioning of the Wolseley Street access tunnel.

1.2 The Proposal

The proposal includes the following key features:

- Widening a 1.3km section of Mulgoa Road between Jeanette Street and Blaikie Road (including tie-ins) to allow for three travel lanes in each direction
- Extending the slip lanes on Mulgoa Road entering the M4 Motorway
- Interface with the M4 Smart Motorway project ramp designs
- Provision of retaining walls to support widening under the existing M4 bridges
- Removal of the grade separated access to the Homemakers Centre at Wolseley Street
- Provision of an active transport corridor, including a 3.5m wide shared path along the eastern side of Mulgoa Road
- Re-construction of Huron Place to become a shared transit zone (low speed environment)
- Provision of bus prioritisation measures at the Blaikie Road, Glenbrook Street and Wolseley Street intersections
- Upgraded drainage to manage increased surface runoff and flows to local waterways
- A noise wall between Mulgoa Road and Hatchinson Crescent, extending between Glenbrook Street in the north and the M4 eastbound entry ramp in the south
- Relocation of underground utilities
- Tree planting and landscaping to match the vision for the whole of the Mulgoa Road corridor
- Temporary establishment of a construction compound site.

Construction of the proposal would commence in early-2020 (subject to planning approval) and would be completed by mid-2021, weather permitting.

1.3 Proposal Objectives

The primary objective of the proposal is to improve road safety and traffic flow along Mulgoa Road between Blaikie Road and Jeanette Street by reducing congestion. Specifically, the proposal objectives are to:

- Improve journey time and reliability for road users
- Ease traffic congestion and achieve a level of service of E or better on Mulgoa Road up to 2036
- Improve road safety for all road users, including reduced fatalities and serious injury crash numbers
- Support and encourage active transport and public transport use
- Ensure Mulgoa Road Stage 1 is consistent with the Mulgoa Road/Castlereagh Road corridor upgrade strategy.

1.4 Purpose of this Landscape Character, Visual Impact Assessment and Urban Design Study

Arup has been engaged by Roads and Maritime to prepare a Landscape Character, Visual Impact Assessment (LCVIA) and Urban Design Study for the proposal. The purpose of this report is to:

- Develop and present an integrated engineering, landscape and urban design solution that:
  - Fits sensitively into the built, natural, and community environments through which it passes, is well designed and contributes to the character and function of the area.
  - Contributes to the accessibility and connectivity of people within the region and communities.
  - Contributes to the character and function of the area.
  - Contributes to the overall quality of the public domain for the community and all road users.

The results of the LCVIA and urban design study is iteratively fed into the design development process and REF to ensure an integrated and coordinated design response.
1.5 Methodology

1.5.1 Approach

The study follows an iterative process where key issues, constraints and mitigation related to the LCVIA are integrated into the engineering and landscape and urban concept design.

The study comprises the following key components:

1. Context Analysis | An analysis of the local context is undertaken with a focus on landscape and urban features, visual amenity and landscape character.

2. Urban Design Strategy | The development of core landscape and urban objectives that align with the vision study, Roads and Maritime guidance, and the overall proposal aspirations. Each objective is supported by clear principles to articulate how the objective will be achieved through the landscape and urban concept design.

3. Urban Concept Design | Delivery of an overarching illustrative landscape and urban design plan, which outlines a proposal that responds to opportunity and site.

4. Landscape Character Assessment | An analysis of the existing character of Mulgoa Road to capture the baseline conditions to assess the anticipated effects as a result of the proposal.

5. Visual Impact Assessment | An analysis of the existing visual amenity of Mulgoa Road and selection of representative viewpoints to comprehensively illustrate and assess the anticipated effect as a result of the proposal.

6. Mitigation Recommendations | Identification of mitigation measures to reduce adverse impacts where possible


1.5.2 Landscape Character Zones

A Landscape Character Zone is an area of distinct and consistent character and the impact of the proposal within it may differ from that within another zone. Landscape Character Zones for the proposal are mapped and described in Section 5.

Two primary factors are used to determine Landscape Character Zone impacts:

- Sensitivity of the character zone.
- Magnitude of the proposal in that zone.

Sensitivity of the character zone

The sensitivity of a Landscape Character Zone is used in both Landscape Character Zone Impact Assessment and in the subsequent Visual Impact Assessment. The Roads and Maritime Service Environmental Impact Assessment Guidance Note (2013) defines sensitivity as: “The sensitivity of a Landscape Character Zone or view and its capacity to absorb change. Combined with magnitude, sensitivity provides a measure of impact.” (Roads and Maritime Service, EIA-N04, p.6). It further states: “Sensitivity refers to how sensitive the character of the setting is to the proposed change. For example a pristine natural environment will be more sensitive to change than an industrial area.” (Roads and Maritime Service, EIA-N04, p.9). The more pristine the landscape, the greater the consequence of introducing new development and therefore the higher the sensitivity of the zone.
Magnitude of the proposal in that zone
The magnitude of a proposal in a Landscape Character Zone depends firstly on the scope of that proposal. Widening an existing road at ground level would typically have a lesser magnitude than a new elevated road on a viaduct, for example. The location of the proposal in relation to the character zone also influences magnitude.

The Landscape Character Zone Impact is determined using the matrix shown in Table 1. Rankings for sensitivity and magnitude are combined to generate the impact in the body of the table. It is important to note that Landscape Character Zone Impact Assessment has to do with the way and extent to which a proposal alters the perceived nature or sense of place of a zone.

1.5.3 Visual Impact Assessment

To assess the likely visual impact of the proposal, the following tasks were undertaken:

- A desktop analysis to ascertain the visual catchment of the proposal and potential receptors of the visual impact determined through topographic analysis and Google Maps. This provides the basis for the establishment of the Visual Envelope Map (VEM), view corridors, and key viewpoints.

- An on-site field inspection to confirm the visual catchment, gain an understanding of the proposal within the context of the study area and to identify and confirm key viewpoints and the sensitivity of potential visual receptors. Refer to section 6 for the location of representative viewpoints.

- Assessment of the sensitivity of each viewpoint based on the sensitivity ranking of the Landscape Character Zone in which it is located and the transient or permanent natures of the receptor.

- Assessment of the magnitude of change as a result of the proposal.

- In a process similar to that used for Landscape Character Zone impact assessment, the visual impact is assessed by combining the viewpoint sensitivity and the magnitude of the proposal in the matrix in Table 1.

<table>
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<tr>
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Table 1. Landscape Character and Visual Impact Grading Matrix, Roads and Maritime Services (2013)
2. Contextual Analysis

2.1 Regional context

Mulgoa Road is a key north-south link in Penrith and the Western Region of Sydney, providing access to key development areas in and around Penrith CBD including Penrith Lakes, Parkview, Penrith Panthers and Thornton. Broader connection to the region, including growth centres around Western Sydney (North & South Growth Centres), greater Sydney, and Sydney CBD, is provided through the intersection with the M4 Motorway.

The proposal area is located south of the Penrith CBD extents, which encompasses the intersection for the M4 Motorway. This presents a major gateway entry to Penrith, both from the south on Mulgoa Road and the east / west via the M4 Motorway.

Figure 2. Regional Context Map
Figure 3. Site Contextual Analysis
2.2 Site context

Land Use

The proposal comprises of two main uses, including commercial and residential. This clear allocation of land use is created due to the corridor servicing as a transition between the more rural (large lot) and residents of the southern plains and the urban Penrith CBD to the north. This results in low density residential blocks located to the south of the M4 Motorway and to the north on the eastern side of Mulgoa Road. The remainder of the corridor comprises a mix of retail, vital services (emergency respondents), and early child education facilities.

In addition to these two main uses, there are a number of green elements / natural corridors that intersect the site, bringing the green from the surrounding hills into Mulgoa Road. The two main green influences are the heavily vegetated batters of the M4 Motorway and natural corridor associated with Surveyors Creek.

Urban / Landscape features

The following provides a summary of the key urban and landscape features, as shown in Figure 3: Contextual Analysis.

- The Mulgoa Road / M4 Motorway intersection is the major gateway entry, as identified in ‘Mulgoa Road Strategic Urban Design Report’. A heavily vegetated batter on either side of all entry and exit ramps.
- The topography of the corridor is generally flat.
- Surveyors Creek intersects the corridor to the north, running a in a east-west direction, adjacent to Super Amart furniture store.
- Mulgoa Road is located on the edge of Cumberland Plain with views to the Blue Mountains to the west from multiple locations.
- Vegetation scattered throughout the proposal area provides an informal parkland character, extending the informal character of the M4 Motorway and southern rural setting north. This includes larger Eucalyptus trees, particularly on the western retail edge, to provide a strong natural character.
- Pathways on either side of Mulgoa Road provides the main pedestrian connection along the corridor to Penrith CBD.

Visual Amenity

The Mulgoa road corridor is generally of high visual amenity, particularly adjacent to key features including the M4 Motorway Intersection and Surveyors Creek. This is supported by Penrith City Council in their Development Control Plan (DCP), which have designated large sections of the corridor as having scenic and landscape value. All land on the north-west of the alignment, and generally around Surveyors Creek has been designated in the DCP to be of High Scenic Value.

High Scenic Value views to the Blue Mountains are apparent to the south-west. Mature trees occur in natural groupings along Mulgoa Road which contribute positively to the arrival experience from the south.
2.3 Issues and Opportunities

A range of issues and opportunities associated with the proposal have been identified during the site analysis and are summarised below and illustrated on Figure 4 ‘Issues and Opportunities.’

1. Existing Eucalyptus trees planted on the western footpath in front of the Penrith Homemaker Centre currently present a strong parkland character, are to be retained where possible. New similar woodland species to be planted as compensatory for trees removed to strengthen this character element.

2. Existing street trees removed by the widening are to be replaced where possible, planted in regular intervals, both informally and formally, to strengthen the Mulgoa Road corridor as a gateway boulevard.

3. Ensure existing views out to the surrounding green hills are retained and supported by a planting approach which will frame these views.

4. Existing retaining wall along the shared user path is in a good condition and should be kept with planting incorporated behind to provide visual separation between the residents and road corridor.

5. Opportunity to Introduce planting between the residents and road corridor to provide visual separation.

6. Vegetation utilised to provide visual screening of the road corridor from residents.

7. Tree placement on the property side of the footpath, with agreement from residents, could allow for a larger and more natural canopy and work to present Mulgoa Road as a gateway boulevard to Penrith.

8. Opportunity to utilise the larger traffic islands to introduce feature planting and create a gateway to key nodal points.

9. Mature vegetated batters to the M4 Motorway. Retain this character where possible.

10. Ensure urban design approach is consistent with the Mulgoa Road strategic design report.

11. Important views to the Blue Mountains to the west from the Mulgoa Road corridor.

12. There is an opportunity to provide an improved green edge to the commercial zones within the corridor with tree and under story planting along the property edges.

13. Scattered mature trees and green areas around the Wolseley Street intersection offer an informal natural character moving along the corridor. Retain and build on the informal character of this area.

14. The M4 Motorway overpass has an existing urban design solution for the parapet. The proposed urban design solutions for the noise walls and retaining walls will incorporate a connection to the existing urban design solution while also referencing local significance to support a sense of place.

15. Widening of Mulgoa Road reduces the space between the road and residents. Noise walls to relate to the residential scale and character.

16. Median planting along the corridor to support the green gateway to Penrith in consultation with Penrith City Council.

17. Shared user path to incorporate a light tint of oxide to minimise ‘bright’ appearance.

18. Opportunity to introduce a designed element on the surface of the two-way shared transit zone, either through colour or texture, to indicate the change of environment for road users. This is in conjunction with the raised element, and should have correlation with other urban design elements to provide consistency within the corridor.

19. Define key nodes along Mulgoa Road at the M4 Motorway intersection and Surveyors Creek crossing with feature planting.

20. Opportunity to provide visually permeable segments to the noise walls adjacent to pedestrian crossing points to improve pedestrian safety and casual surveillance.

21. Existing underground parking access point removed to allow for consolidation of the traffic systems in the roadway, including pedestrian mid crossing point.

22. Endemic planting to announce entry into the natural Surveyors Creek. Tall canopy trees and low ground covers will maintain sightlines and visual connections to future gateway and art elements at the start to the crossing points.

23. Consolidate pedestrian crossing points, using planting areas to direct pedestrian movement to crossing points, and creating a safe corridor.

24. Mulgoa Road is a designated flood evacuation route. Ensure upgrade works retains flood evacuation function.

25. Lower scale residential buildings allow for a strong connection to the surrounding Blue Mountains. Future consideration to frame these views with trees located in groups allowing for larger view corridors between tree groups.

26. Large collections of existing trees are to be retained to support the green corridor.
3. Urban Design Strategy

This chapter outlines the landscape and urban design vision for the proposal and sets urban design objectives and principles to guide the proposal.

Mulgoa Road is a vital north-south arterial road in the Western Sydney region. It serves as a freight, light vehicle and cycling route and caters in places for localised pedestrian movements. The road extends from Wallacia to the south to Penrith CBD, continues on to Castlereagh Road at the Great Western Highway intersection, and up to Richmond in the north. A separate strategy for the whole length of Mulgoa Road/Castlereagh Road has been prepared by CM+ for Roads and Maritime called the Mulgoa Road Strategic Urban Design Report.

The section of Mulgoa Road that forms the proposal is a 1.3km stretch that transitions from the rural character to the south, intersecting with the M4 Motorway which provides links to Sydney CBD and greater Sydney, and connecting to the commercial hub of Penrith. The upgrade is intended to be consistent with the overall strategy for the length of Mulgoa Road/Castlereagh Road identified in the Mulgoa Road Strategic Urban Design Report.

The design approach prepared for this section of Mulgoa Road will be instrumental in setting the scene for the remainder of the corridor, with it the character on approach to Penrith. A key focus which drives all proposed outcomes is how this corridor will assimilate within the surrounding natural environment of the Blue Mountains.

3.1 Urban Design Corridor Vision

The following Vision adapts the vision and strategy articulated for the whole of Mulgoa Road/Castlereagh Road in the Mulgoa Road Strategic Urban Design Report, combining the strategic thinking with the unique elements of this proposal area.

The Mulgoa Road upgrade will be an attractive green corridor gateway to Penrith, linking the regional and southern rural character as it transitions in both scale and density. The corridor will take its identity and character from its unique relationship to the regional geography of the mountains, while providing for various modes of movement that promote universal accessibility and sustainability.

The road journey offers a variety of experiences, designed in response to the adjacent built and landscape context. This responsiveness to context provides a degree of legibility along the road for local people as well as wider regional users. These landscape experiences include distant views to the Blue Mountains via southern views from Mulgoa Road and across intersecting roads on the north-west edge of Mulgoa Road, and local views to the natural character of Surveyors Creek, and the residential character which presents a contrast to the commercial and CBD located to the north. With this section being the transition point of Mulgoa Road from the natural and rural to the city there are many instances of natural character elements, which is supported by informal planting within the road corridor to establish the road as a natural link to Penrith CBD and city centre.

3.2 Urban Design Strategy

The urban design strategy for the road corridor recognises the existing urban and landscape character and seeks to integrate the widened road sensitively into its setting. The design aims to reinforce and reveal the attributes of the surrounding landscape, localities and natural character while introducing new structures and elements where needed. The urban design approach is to maintain a level of consistency with the adjacent existing landscape character while introducing a less formal design approach in the road corridor to establish this section of Mulgoa Road and transition from the natural and rural as the gateway to Penrith CBD. Urban design elements, such as the retaining walls, noise walls, and other treatments will continue this consistency present in the natural landscape, while linking with existing urban design elements.

Key Blue Mountain and local park/green spaces views, as well as views of existing features, will be maintained. Disturbance to the natural and built environment is planned to be minimised through careful consideration of the most appropriate alignment while the suite of proposed landscape and urban elements will contribute to the route’s distinctiveness and legibility, and mitigate any potential impacts on residents.
3.3 Urban Design Objectives and Principles

**Objective 1: Recognise and reinforce the green natural corridors and surrounding landscape.**

Ensure that the urban, landscape and engineering design are well integrated, respond to the context, and create legibility in the journey.

The principles to achieve this are:

- Maximise tree planting opportunities and reduce tree removal.
- Reinforce the informal ‘Natural Boulevard’ character of the road corridor through more natural planting groupings (less formalised).

**Objective 2: Reinforce Mulgoa as the gateway to Penrith CBD through a strong green corridor.**

The principles to achieve this are:

- Provide entry treatment planting that comprises a variety of texture and colour at key nodes to create a sense of arrival.
- Entry treatment planting within the road corridor highlight transition zones at key nodes such as the M4 Motorway and entry points into the Homemaker Centre.

**Objective 3: Promote, enhance and frame views out from the corridor to distant significant landscape context.**

The principles to achieve this are:

- Maintain views to the built form to establish a sense of place along Mulgoa Road, particularly views to built elements which display the typical character of the area.
- Maintain views to landscape landmarks to support a sense of place along Mulgoa Road particularly the views to the surrounding green hills and M4 Motorway gateway.
- Maintain and enhance existing views to the Blue Mountains and ensure new views are exploited to improve the road user experience.

**Objective 4: Acknowledge Mulgoa Road as an active transport corridor and green link connecting open spaces.**

The principles to achieve this are:

- Improve pedestrian and cyclist experience along and across the corridor by providing a convenient connective path network, linking Penrith CBD to the north with residential areas, employment zones and open space/recreation areas.
- Consider walking, cycling, and public transport modes as part of the proposal scope and design.

- Provide clear and defined crossing points through the use of vegetation to control pedestrian and cycle movement.
- Maintain clear, safe vehicle crossings at driveways and local road connections.
- Optimise the shared path route to create a stimulating experience for users and design to coordinate with local road connections; consider shade provision and visual interest as well as sight lines in planting design.

**Objective 5: Define places and character zones through an appropriate landscape approach.**

The principles to achieve this are:

- Ensure planting reinforces the landscape character zones described within the Strategic Urban Design report within an overall structure.
- Maintain consistency in design for the length of Mulgoa Road.
- Respond sensitively to the heritage, cultural and natural sites and elements that occur adjacent to the road corridor.
- Incorporate design elements that help create a unique identity for Mulgoa Road that reflect the natural / rural edge transitioning into the commercial in the northern section.
- Use standard road elements such as safety barriers, pedestrian fencing, shared path fencing, bus stops, traffic management, street lighting and signage in a neat, uncluttered and well-articulated manner, ensuring ease of maintainence.
Objective 7: Soften hard elements within the corridor, including adjoining building to lift the aesthetic appeal of the corridor.

The principles to achieve this are:

• Utilise a combination of trees and understorey treatments which respond to the existing adjacent context.
• Respond to existing land form in the horizontal and vertical alignment of the road and road related structures.
• Minimise as far as possible the use of retaining walls.
• Carefully consider the form, colour and texture of retaining walls in relation to the predominantly urban setting in which they are proposed.
• Built form that establishes a consistent and strong urban design language.
• Minimise the road footprint and promote a considered design response to the residential and natural edges.

Surveillance and Safety

The design development phase of the proposal should consider Safety in Design and Crime Prevention Through Environmental Design (CPTED) in accordance with the guidelines as set out in the following document: ‘Crime prevention and the assessment of development applications: Guidelines under section 79C of the Environmental Planning and Assessment Act (1979)’, NSW Department of Urban Affairs and Planning (2001).
4. Urban Design Concept

4.1 Concept Design Overview

The urban and landscape design principles outlined in Section 3 have been applied to develop a concept design that will be further discussed and refined with Penrith City Council during the detailed design stage to ensure a collective design response.

As part of the proposal, a gas main will be diverted along Hatchinson Crescent, Warragamba Crescent and Glenbrook Street. It is assumed that the relocation will occur within the street verges with no impact on existing vegetation. It is assumed that the landscape works will be limited to grass reinstatement, the extent of which would be subject to detailed design development and has not been illustrated on the concept design plans.

The Mulgoa Road urban design concept comprises four plans that illustrate the response for the upgrade with Section 4.2 providing an indication of the anticipated species selection.

Figure 5. Key Plan
Landscape approach to include existing driveway access including required sightlines.

Landscape treatment to entry-ramps of the M4 Motorway are to be densely vegetated to reinforce the green gateway to Penrith and respond to the aspirations of the urban design strategy.

Planting to traffic island, including frangible trees, work to create a green corridor linking Penrith CBD to the surrounding green context. Sightlines maintained for safety.

Planting to verge restricts pedestrians crossing outside of designated crossing areas.

Retaining wall to be planted where possible and consistent with the overall planting approach.

Informal tree planting. Species to respond to existing boulevard character. Trees to be positioned to avoid impact on existing underground utility.

3.5m shared path
Landscape treatment to batters of the M4 Motorway are to be densely vegetated to reinforce the green gateway to Penrith and respond to the aspirations of the urban design strategy.

A higher level planting treatment comprising a variety of texture, form, and seasonal colour creates a gateway entry statement and improved user experience.

Existing mature vegetation to be retained where possible.

Planting to traffic island, including frangible trees, work to create a green corridor linking Penrith CBD to the surrounding green context. Sightlines maintained for safety.

Planting to verge restricts pedestrians crossing outside of designated crossing areas.

Informal tree planting. Species to respond to existing boulevard character. Trees to be positioned to avoid impact on existing underground utility.

A higher level planting treatment comprising a variety of texture, form, and seasonal colour creates a gateway entry statement and improved user experience.

Proposed street trees along Hatchinson Crescent, in agreement with local residents, aids in softening the proposal and provides separation between the two-way shared transit zone and residents.

Noise walls finished with concrete panels with pattern/texture which visually reference the strong character of the surrounding green hills. This links to the noise walls and shared zone treatments to provide a consistent urban design approach for the corridor.

Provision for pedestrian crossing.

Noise walls finished with concrete panels with pattern/texture which visually reference the strong character of the surrounding green hills.

Retaining walls finished concrete panels with pattern/texture which visually reference the strong character of the surrounding green hills. This links to the noise walls and shared zone treatments to provide a consistent urban design approach for the corridor.

Two-way shared transit zone catering for pedestrian, cycle to continue along Mulgoa Road, while providing vehicle access to residents along Hatchinson Crescent.

Concrete to cater for pedestrian crossing.

Informal tree planting. Species to respond to existing boulevard character. Trees to be positioned to avoid impact on existing underground utility.

PROPOSED

Existing trees to be removed (shown indicatively, detailed survey is required to determine canopy extent and trees affected)

Existing trees to be maintained (where possible - arborist to be consulted)

Garden / Planting (sightlines maintained)

Grass / Tuf
Informal tree planting. Species to respond to existing boulevard character. Trees to be positioned to avoid impact on existing underground utility.

Appropriate tree planting proposed where possible to reinstate the existing eucalyptus character of this area to replace existing eucalyptus trees removed by the proposal.

Existing mature vegetation to be retained where possible. Consultation with an arborist to confirm any mitigation measures.

Concrete footpath around the bus station where pedestrian movements occur, planting in other areas to provide visual interest and greening.

A higher level of treatment through planting selection for corners and key nodes creates an entry statement and improved user experience.

Proposed street trees along Hatchinson Crescent, in agreement with local residents, aids in softening the proposal and provide separation between the two-way shared transit zone and residents.

Walking path

Noise walls finished with concrete panels with pattern/texture which visually reference the strong character of the surrounding green hills.

Concrete to cater for pedestrian crossing

Planting to traffic island, including frangible trees, work to create a green corridor linking Penrith CBD to the surrounding green context. Sightlines maintained for safety.

Footpath

5m wide two-way shared transit zone for vehicles and cyclists with a 1.2m wide footpath is provided for pedestrians.

Planting to verge restricts pedestrians crossing outside of designated crossing areas.

Informal tree planting, species to respond to existing boulevard character. Trees to be positioned to avoid impact on existing underground utility.

Smooth transitions at tie in points along the existing road corridor.

Consultation with an arborist to confirm any mitigation measures.

Appropriate tree planting proposed where possible to reinstate the existing eucalyptus character of this area to replace existing eucalyptus trees removed by the proposal.

Existing mature vegetation to be retained where possible. Consultation with an arborist to confirm any mitigation measures.

Concrete footpath around the bus station where pedestrian movements occur, planting in other areas to provide visual interest and greening.

A higher level of treatment through planting selection for corners and key nodes creates an entry statement and improved user experience.

Proposed street trees along Hatchinson Crescent, in agreement with local residents, aids in softening the proposal and provide separation between the two-way shared transit zone and residents.

Walking path

Noise walls finished with concrete panels with pattern/texture which visually reference the strong character of the surrounding green hills.

Concrete to cater for pedestrian crossing

Planting to traffic island, including frangible trees, work to create a green corridor linking Penrith CBD to the surrounding green context. Sightlines maintained for safety.

Footpath

5m wide two-way shared transit zone for vehicles and cyclists with a 1.2m wide footpath is provided for pedestrians.

Planting to verge restricts pedestrians crossing outside of designated crossing areas.

Informal tree planting, species to respond to existing boulevard character. Trees to be positioned to avoid impact on existing underground utility.

Smooth transitions at tie in points along the existing road corridor.

Consultation with an arborist to confirm any mitigation measures.

Appropriate tree planting proposed where possible to reinstate the existing eucalyptus character of this area to replace existing eucalyptus trees removed by the proposal.

Existing mature vegetation to be retained where possible. Consultation with an arborist to confirm any mitigation measures.

Concrete footpath around the bus station where pedestrian movements occur, planting in other areas to provide visual interest and greening.

A higher level of treatment through planting selection for corners and key nodes creates an entry statement and improved user experience.

Proposed street trees along Hatchinson Crescent, in agreement with local residents, aids in softening the proposal and provide separation between the two-way shared transit zone and residents.

Walking path

Noise walls finished with concrete panels with pattern/texture which visually reference the strong character of the surrounding green hills.

Concrete to cater for pedestrian crossing

Planting to traffic island, including frangible trees, work to create a green corridor linking Penrith CBD to the surrounding green context. Sightlines maintained for safety.

Footpath

5m wide two-way shared transit zone for vehicles and cyclists with a 1.2m wide footpath is provided for pedestrians.

Planting to verge restricts pedestrians crossing outside of designated crossing areas.

Informal tree planting, species to respond to existing boulevard character. Trees to be positioned to avoid impact on existing underground utility.

Smooth transitions at tie in points along the existing road corridor.
Existing mature vegetation to be retained where possible. Consultation with an arborist to confirm any mitigation measures.

Informal tree planting. Species to respond to existing boulevard character. Trees to be positioned to avoid impact on existing underground utility.

Smooth transitions at tie in points along the existing road corridor.

Existing mature vegetation to be retained where possible.

Boulevard tree planting in an informal arrangement to respond to the aspirations of the wider corridor urban design strategy.

A higher level of treatment through planting selection for corners and key nodes creates an entry statement and improved user experience.

Planting to traffic island, including frangible trees, work to create a green corridor linking Penrith CBD to the surrounding green context. Sightlines maintained for safety.

Planting to verge restricts pedestrians crossing outside of designated crossing areas.

Concrete to cater for pedestrian crossing.

3.5m shared path

Footpath

PENRITH HOMEMAKER CENTRE

LEGEND

- Proposed non-frangible tree planting (sightlines maintained)
- Proposed frangible tree planting (sightlines maintained & frangible species in clear zones)
- Existing trees to be maintained (where possible - arborist to be consulted)
- Existing trees to be removed (shown indicatively, detailed survey is required to determine canopy extent and trees affected)
- Garden / Planting (sightlines maintained)
- Grass / Turf
4.2 Indicative planting palette

Planting selection based on endemic species to support and build on the existing character.

*Figure 6. Planting Palette*

**Trees**
- Corymbia maculata
- Eucalyptus crebra
- Eucalyptus eugenioides
- Eucalyptus fibrosa
- Eucalyptus moluccana
- Eucalyptus tereticornis

**Shrubs and ground cover**
- Callistemon viminalis ‘Hannah Ray’
- Dianella caerulea
- Dodonaea viscosa
- Grevillea sp. ‘Superb’
- Hardenbergia violacea
- Kunzea ambigua
- Leptospermum ‘Copper Glow’
- Lomandra longifolia
- Melaleuca linearifolia

**Feature planting**
- Dietes grandiflora
- Grevillea ‘Royal Mantle’
- Raphiolepis indica
- Tracheleospermum jasminoides

4.3 Design Criteria for Retaining Walls, Noise Walls, and Two-Way Shared Transit Zone

4.3.1 Design Criteria for the Retaining Walls

Retaining walls are expected in the following location:

- RW01 & 02: Underneath the M4 Motorway bridge, along the eastern and western side of Mulgoa Road, to replace the existing wall that is required to be removed for the road widening (approximately 70 metres long and a maximum height of approximately 2.0 metres, with splays on either side).

The new retaining walls, located below the M4 motorway, will be a highly visible and continuous built element along Mulgoa Road and provide one of the few opportunities within this stretch of Mulgoa Road to create a recognisable identity. The walls will be viewed as a pair, and in the context of the existing M4 parapet walls. The form and patterning playing a major role in relating the walls to their context. The conceptual thought process is derived from the sloping lines and angles associated with the Blue Mountains. When simplified to abstract curvilinear line work, the pattern will deliver a common identity along the length of the road corridor. The proposed colour scheme will provide an overlay that responds to the surrounding landscape precinct and National Park identity. The design will integrate with the existing urban design solutions for the parapets along the M4 Motorway, providing a cohesive and unifying design treatment that can be rolled out in other stages of the Mulgoa Road upgrade. The common linking elements include similar formed concrete patterns, and curved lines representing the mountain ranges.
Outlined below are the urban design requirements for the retaining walls which will be explored and developed further during the detailed design stage. Pedestrians and traffic will be in close proximity to these walls and the surface finish must be tactile and of high quality. A distinctive high quality finish is required to enhance the gateway journey of Mulgoa Road from the M4 Motorway and greater Sydney. This is further emphasised as the precedent to other urban design solutions for the entire Mulgoa Road corridor.

The following design criteria will be explored further during the detailed design process:

- Tilt walls outwards at no less than 5 degrees from the vertical to reduce the perceived height.
- Ensure a smooth top edge to walls in elevation, with no steps.
- Ensure bridge abutment and retaining walls either side provide a seamless presentation.
- Utilise pre-cast concrete facing panels with a strong pattern / texture and anti-graffiti treatment to discourage graffiti, and reduce the visual scale of the walls.
- Provide fixings that are concealed and discreet.
- Dish drains at the rear of the wall are to be set lower than the top of the wall by a minimum of 200mm.
- Extend the pre-cast concrete panels higher than the required retained height by a minimum of 1m to avoid the need for maintenance handrails or fencing. If safety fencing is unavoidable, it is to be integrated with the visual design of the wall and follow the geometry of the top of the wall with smooth flowing lines.
- Consider splaying retaining walls in plan to provide planting to the base of the walls as far as practicable given clear zone, shared user path and maintenance requirements.

4.3.2 Design Criteria for the Noise Walls

The noise wall is proposed to run from the M4 Motorway corridor through to Glenbrook Street adjacent to Hatchison Crescent, Huron Place and Peter Court.

The noise walls are to be pre-cast concrete panels formed with similar patterns pressed into the surface to display a consistent urban design language for the Mulgoa Road corridor. Refer to images to the right.

4.3.3 Design Criteria For The Two-Way Shared Transit Zone

The two-way shared transit zone, catering for cycle and pedestrian as well as vehicles is located the length of Hatchinson Crescent. Just like other urban design elements, the surface treatment should display a consistent urban design language for the Mulgoa Road corridor. Refer to images to the right.
Figure: 8. Landscape Character Zones
5. Landscape Character Assessment

5.1 Landscape Character Zones (LCZ)

An analysis of the landscape character of Mulgoa Road was carried out to provide a baseline against which to assess the likely change resulting from the proposal. The analysis involved the identification of a number of LCZs. These are mapped in Figure 8: Landscape Character Zones.

The character of the Mulgoa Road proposal area is heavily influenced by the existing land use and built form, marked and clearly defined by road and natural corridors that intersect and divide the area.

A summary of the LCZs and contributing characteristics has been provided below with the anticipated impacts documented on the following pages.

**LCZ 1 | Residential**
- Low scale residential development
- Verge between Mulgoa Road and Hatchinson Crescent is densely planted to provide screening.
- Trees planted between the residential land and the road verge provide a green street, which softens the corridor and provides separation between uses.
- With the exception of the south-western corner of the proposal area, no residents enter onto Mulgoa Road.

**LCZ 2 | Urban Green Space**
- The urban green space offers informal recreation to local residents with open grass areas and tree planting
- The space provides relief to the hard built elements within the road corridor.

**LCZ 3 | Green / Forrest - gateway**
- M4 Motorway and Mulgoa Road interchange with associated entry and exit ramps.
- Mature native planting integrate the road corridors and provide a vegetative gateway from the north along Mulgoa Road, and regionally via M4 Motorway.
- Provides connections to the surrounding green hills

**LCZ 4 | Commercial / Retail / Infrastructure**
- This zone comprises commercial premises adjacent to the Mulgoa road corridor
- Signage is constant along Mulgoa Road for these premises.
- Current verges that front these tenancies are large and contain a strong vegetative component of mature endemic trees.

**LCZ 5 | Green User Experience**
- These trees assist in contributing to a green corridor and provide visual connections to the surrounding ‘Green Hills’.
- Trees provide shade and amenity to footpaths, adjoining car parks, and bus stops.
- Sensitive Eucalyptus trees (Grey Gums) occur along the northern verge.
- Native under story, such as Lomandras, support the native trees.
5.1.1 LCZ 1 | Residential

The low height residential built fabric to the south-western section of the corridor avails view to the surrounding Blue Mountains, with natural tree groupings framing long vistas. Mature trees are present in both private and public land and introduce the natural character present in the surrounding context. The residential zone north of the M4 Motorway corridor are visually separated from Mulgoa road through screen planting. These areas provide provision for landscape amenity, eg. street trees or landscape verges.

Description of proposed works

The extent of proposed works associated with the proposal within the LCZ include:

- Widening of Mulgoa Road will provide minor encroachment to the southern portion of Mulgoa Road.
- Noise walls introduced in the verge between Hatchinson Crescent and Mulgoa Road will be highly visible from residential homes. Hatchinson Crescent will be transformed into a two-way shared transit zone with flush kerbs, catering for all modes of transport.
- Introduction of a 3.5m shared path to the eastern side of Mulgoa Road.
- Additional tree planting introduced to screen views to the road corridor, increase amenity and the ‘green corridor’ appearance, and build on the natural character with a native palette.

Sensitivity: Moderate

- Residential built form is low density and small in scale, surrounded and enclosed by trees.
- The existing Mulgoa Road and M4 alignment bound the built form areas and reduce the level of sensitivity.

Magnitude of change: Moderate

- Street trees and the occasional tree on private property may be impacted by the proposal in the south-western section to accommodate the minor encroachment of road. Tree planting will endeavour to replace any trees removed as part of this proposal.
- Screen trees visually separating Mulgoa Road will be removed and replaced with a noise wall as part of the widening of Mulgoa Road.
- Hatchinson Crescent would be aligned closer to adjoining residents.

Landscape Character Impact: Moderate

Moderate sensitivity and moderate magnitude of change results in a moderate landscape impact.
5.1.2 LCZ 2 | Urban Green Space

The zone is characterised by the open space and the building / property boundaries being set back from the existing carriageway. The areas offer local amenity value through the space allowing for trees and planting, while also supporting recreation use by local residential.

Description of proposed works

The extent of proposed works associated with the proposal within the LCZ include:

• Widening of Mulgoa Road, which would involve tree removal. New planting introduced, including street trees to support the existing natural character.
• Allowance for a 3.5m wide shared footpath to the east of Mulgoa Road.

Sensitivity : Moderate

• Predominantly native tree vegetation, mature trees, under story planting and turf.
• Tall Eucalyptus trees have local importance.
• Assists with transitioning from the business district to the north and the rural character of the south.
• Space contributes to an open road corridor.
• Supports a landscape setting that is similar to natural surrounding ‘green hills’.

Magnitude of change : Low

• The works would result in localised vegetation removal along Mulgoa Road and an incremental enlargement of road pavement adjacent to this character area.
• New tree planting to replace the trees removed.

Landscape Character Impact : Low

Moderate sensitivity and low magnitude of change resulting in a low landscape impact.
5.1.3 LCZ 3 | Green / Forrest - Gateway Zone

This LCZ provides a vegetative gateway to announce the entry into the Mulgoa Road corridor, crossing over the Surveyors Creek from the north, and in the southern section from the main arterial of the M4 Motorway which connects Penrith to greater Sydney. In addition to providing a gateway response, the vegetated interchange around the M4 Motorway overpass provides a transition point from the mainly rural / residential character to the south, to the commercial character north of the M4 Motorway. Both these natural gateways support the natural character of the region.

Description of proposed works

The extent of proposed works associated with the proposal within the LCZ include:

- Minor modification to kerbs from tying in the proposed works with the existing kerbing.
- Removal of mature vegetation as required and replanting.
- Introduction of retaining walls under the M4 Motorway overpass where widening has occurred, including alterations to batters for the entry and exit ramps.
- Storm water works being included on the edge of this character zone.
- Introduction of a noise wall to the east of the M4 Motorway entry ramp.

Sensitivity : Low

- Natural landscape comprising trees, shrubs, and understorey planting provides a green edge extending along the entry and exit ramps to the M4 Motorway.
- Similar natural setting occurs around the Surveyors Creek corridor, providing a green gateway where it intersects Mulgoa Road, although of a smaller scale in comparison to the M4 Motorway.

Magnitude of change : Low

- The works would have a minor impact on these character zones, with replanting occurring to disturbed areas.

Landscape Character Impact : Low

Low sensitivity and magnitude of change result in a low landscape impact.
5.1.4 LCZ 4 | Commercial / Retail / Infrastructure

The tall endemic trees running the length of this character area supports the natural gateway boulevard character leading into the Penrith CBD. This natural character is reminiscent of the rural landscape to the south and surrounding ‘green hills’, softening the commercial / retail built form. Views from Mulgoa Road to the Blue Mountains to the west are framed by mature vegetation.

Description of proposed works

The extent of proposed works associated with the proposal within the LCZ include:

- Removal of mature vegetation to the north west of Mulgoa Road. Removal of vegetation along Mulgoa Road would impact on the natural character of this area.
- Widening of Mulgoa Road and intersections, encroaching along the length of this character area.
- Modification of footpath and bus shelter location to accommodate existing tree locations.

Sensitivity : Low-Moderate

- Predominantly native tree vegetation, mature trees and under story planting.
- Tall Eucalyptus trees have local importance. Commercial premises are considered to have low sensitivity, with the mature vegetation marking the boundary of the commercial sites increasing the level of sensitivity.
- The mature vegetation assists with transitioning from the business district to the north and the rural character of the south.

Magnitude of change : High

- The works would result in large number of mature trees being removed and an incremental enlargement of road pavement within this character area.
- Character of the street will change from a parkland road corridor to an enlarged road corridor bound to the north by commercial warehouse buildings.

Landscape Character Impact : Moderate - High

A low-moderate sensitivity and a high magnitude of change resulting in a moderate-high landscape impact.
5.1.3 LCZ 5 | Green / Forrest - Gateway Zone

This LCZ provides a vegetative Mulgoa Road corridor, extending from the M4 Motorway up to and around the Blaikie Road intersection. This green corridor, not only softens the built elements, it provides amenity for users through shade and visual interest. The green corridor supports the natural character of the region.

Description of proposed works

The extent of proposed works associated with the proposal within the LCZ include:

- Removal of mature vegetation to the north west of Mulgoa Road. Removal of vegetation along Mulgoa Road would impact on the natural character of this area.
- Widening of the Mulgoa Road and intersections, encroaching along the length of this character area.
- Relocation of footpath and bus shelters to accommodate tree locations.
- Noise walls introduced in the verge between Hatchinson Crescent and Mulgoa Road.
- Introduction of a 3.5m shared path to the eastern side of Mulgoa Road. This is separated by the noise wall located between Mulgoa Road and Hatchinson Crescent.

Sensitivity : Low - Moderate

- Natural landscape comprising trees, shrubs and understorey planting provides a green edge extending along the north-west verge of Mulgoa Road.

Magnitude of change : High

- The works would result in the removal of a large number of mature trees that bound the road corridor to the north, altering character of the area and resulting in a high magnitude of change.
- Replanting would occur where space allows and to disturbed areas.

Landscape Character Impact : Moderate

Low - Moderate sensitivity and high magnitude of change resulting in a moderate landscape impact.
5.2 Summary of Impacts

Table 2 ‘Landscape Impacts’ captures the anticipated impact on each of the Landscape Character Zones.

<table>
<thead>
<tr>
<th>LCZ No.</th>
<th>Description</th>
<th>Sensitivity</th>
<th>Magnitude</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Residential</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>2</td>
<td>Urban Green Space</td>
<td>Moderate</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>3</td>
<td>Green / Forest - Gateway Zone</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>4</td>
<td>Commercial / Retail / Infrastructure</td>
<td>Low - Moderate</td>
<td>High</td>
<td>Moderate-High</td>
</tr>
<tr>
<td>5</td>
<td>Green User Experience</td>
<td>Low - Moderate</td>
<td>High</td>
<td>Moderate</td>
</tr>
</tbody>
</table>
6. Visual Impact Assessment

6.1 Visual Envelope

The VEM (Figure 9) illustrates the visual catchment of the study area. It generally describes the area surrounding the proposal from which directional views towards it are possible. Based on existing land form, the visual catchment also takes into account vegetation, landscape use and structures.

Key viewpoints from which potential visual impacts are assessed were determined on site and from further desktop analysis. Viewpoints include:

1. Viewpoint 1 - School House Road / Mulgoa Road (residential edge)
2. Viewpoint 2 - Local Park / Council Reserve (recreational)
3. Viewpoint 3 - Factory Road (Childcare Centre)
4. Viewpoint 4 - Hatchinson Crescent (residential)
5. Viewpoint 5 - Penrith Homemaker Centre (shopping centre)
6. Viewpoint 6 - Peter Court (residential)
7. Viewpoint 7 - Blaikie Road (shopping centre edge)
8. Viewpoint 8 - Mulgoa Road / Fairfield Place (residential)
6.2 Visual Impact Assessment

The following section documents the anticipated visual impact from each of the viewpoints during operation.

6.2.1 Viewpoint 1

Description of anticipated visible elements

- This is the location where the widening for Mulgoa Road ties into the existing road alignment, transitioning from a two lane carriageway to three lanes each way (most impacts occur in the distance in this shot).
- Removal of existing vegetation to the western footpath (as shown on the left side in this image) for the road widening.

Impacts

Residential properties experience a view across and along the existing Mulgoa Road corridor and are considered to have a moderate sensitivity.

Magnitude of change is judged to be low due the localised widening and transitioning at this location.

The overall visual impact is Low - Moderate.
6.2.2 Viewpoint 2

Description of anticipated visible elements

- This is the location where the widening for Mulgoa Road starts to increase, transitioning from a two lane carriageway to three lanes each way. At this location, both sides of Mulgoa Road would be increased in width, transiting back to the existing alignment as Mulgoa Road.
- Localised removal of existing vegetation to the western footpath for the road widening.

Impacts

The view has moderate sensitivity due to the recreational land use. Works are considered to be localised to the road verge, resulting in a negligible magnitude of change. The overall visual impact will be Negligible.
6.2.3 Viewpoint 3

Description of anticipated visible elements

- Widening of Mulgoa Road and encroachment into the road verge. Slip through lane introduced on both sides of Mulgoa Road, with the opposing side from the photo including a shared footpath. Traffic island and an extra lane on either side concludes the extent of expansion.
- Vegetation removed between the kids academy and Mulgoa Road as necessitated by expansion works.
- 1.5m wide footpath installed along the verge.

Impacts

The view is considered to be of moderate sensitivity. Vegetation buffer separating the Kids Academy from Mulgoa Road is marked for removal, judged to result in a high magnitude of change. The overall visual impact is Moderate - High.
6.2.4 Viewpoint 4

Description of anticipated visible elements

- Widening of Mulgoa Road from a two lane carriageway to three lanes each way.
- Mature hedge dividing Hatchinson Crescent and Mulgoa Road will be removed.
- Hatchinson Crescent would be converted into a two-way shared transit zone. This will remove the current shared path (bottom left of the image) and introduce a new path.
- Removal of mature vegetation along the residents side of Hatchinson Crescent, including the tall Eucalyptus in the distance.
- Noise wall to be included in the new verge between Hatchinson Crescent and Mulgoa Road.

Impacts

Properties along Hatchinson Crescent experience filtered views towards the existing Mulgoa Road corridor and are considered to have moderate sensitivity. The magnitude of change will be high due to the removal of the mature hedge, introduction of a noise wall and encroachment in to private gardens. The overall visual impact will be Moderate - High.
6.2.5 Viewpoint 5

Description of anticipated visible elements

- Widening of Mulgoa Road from a two lane carriageway to three lanes each way, including left turn lanes on either side.
- Removal of mature vegetation on the western verge (right of image), and the eastern verge between Hatchinson Crescent and Mulgoa Road.
- Median would increase in size and vegetation treatment would be applied.
- Noise wall to be included in the new verge between Hatchinson Crescent and Mulgoa Road, and will be highly visible in this view. It will run the length of the Hatchinson Crescent (left of image).

Impacts

Sensitivity is considered to be low due to the momentary interest of road users entering the commercial/business park. Magnitude of change is considered to be high due to the removal of the mature vegetation, altering the parkland character of the road corridor and introducing further urbanising features, including the noise wall. The overall visual impact will be Moderate.

<table>
<thead>
<tr>
<th>Visual sensitivity</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnitude of change</td>
<td>High</td>
</tr>
<tr>
<td>Visual impact</td>
<td>Moderate</td>
</tr>
</tbody>
</table>
6.2.6 Viewpoint 6

Description of anticipated visible elements

- Widening of Mulgoa Road from a two lane carriageway to three lanes each way, including turning and slip lanes in this shot.
- The western verge / footpath (left of image) will be widened to accommodate three lanes wider.
- Median would increase in size and vegetation treatment would be applied.
- Peter Court remains broadly in place and is converted into a two-way shared transit zone with Hutchinson Crescent as part of an active transit corridor.
- Removal of mature vegetation on the western verge (left of image), and the verge between Peter Court and Mulgoa Road.

Impacts

The residential view is considered to have moderate sensitivity. The widening and the removal of the taller endemic trees (that support the existing character) which have local importance, would result in a high magnitude of change. The overall visual impact will be Moderate - High.
6.2.7 Viewpoint 7

Description of anticipated visible elements

- Widening of Mulgoa Road and clearance of mature vegetation on the opposing side of the road around the intersection.
- The western verge / footpath (closest verge to the viewer) will be widened to accommodate 2.5 lanes (one lane is for a bus stop). This widening will include a new footpath to replace the existing, and the concrete space for a new bus stop.
- Vegetation treatment to the median.

Impacts

Sensitivity is considered to be low due to the momentary interest of road users entering the commercial/business park and pedestrians moving along the corridor. The magnitude of change is considered to be moderate due to the localised removal of mature vegetation which have local importance. The overall visual impact will be Low - Moderate.
6.2.8 Viewpoint 8

Description of anticipated visible elements

- The start of the widening for Mulgoa Road (heading north in this photo), transitioning from a two lane carriageway to three lanes each way.
- The start of the widening for 3.5m shared path from the 3.1m wide one shown.
- Removal of existing tall mature vegetation to the western footpath (as shown on the left in this image) for the road widening.
- Vegetation treatment to the median.

Impacts

The residential view is considered to have moderate sensitivity. The localised widening and vegetation removal is considered to result in a low magnitude of change. The overall visual impact will be Low-Moderate.

<table>
<thead>
<tr>
<th>Visual sensitivity</th>
<th>Moderate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnitude of change</td>
<td>Low</td>
</tr>
<tr>
<td>Visual impact</td>
<td>Low-Moderate</td>
</tr>
</tbody>
</table>
6.3 Summary of Visual Impact

The visual impacts are considered to vary between low to moderate-high, reflecting the highly modified nature of the proposal area on the commercial / industrial and residential areas either side of the road upgrade. More moderate impacts are found where adjoining land use is residential or where large numbers of existing vegetation with cultural significance has been removed. The table below summaries the preceding viewpoints analysis indicating the overall visual impact without mitigation.

Table 3. Overall visual impact for each viewpoint

<table>
<thead>
<tr>
<th>Viewpoint number</th>
<th>Sensitivity</th>
<th>Magnitude</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Moderate</td>
<td>Low</td>
<td>Low - Moderate</td>
</tr>
<tr>
<td>2</td>
<td>Moderate</td>
<td>Negligible</td>
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<td>3</td>
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<td>4</td>
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<td>Moderate - High</td>
</tr>
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<td>5</td>
<td>Low</td>
<td>High</td>
<td>Moderate</td>
</tr>
<tr>
<td>6</td>
<td>Moderate</td>
<td>High</td>
<td>Moderate - High</td>
</tr>
<tr>
<td>7</td>
<td>Low</td>
<td>Moderate</td>
<td>Low - Moderate</td>
</tr>
<tr>
<td>8</td>
<td>Moderate</td>
<td>Low</td>
<td>Low - Moderate</td>
</tr>
</tbody>
</table>
7. Mitigation Recommendations

The landscape and urban concept design responds to the overall proposal objectives and is underpinned by a set of specific landscape and urban design principles. The concept design under Section 4 of this report illustrates the application of the proposal principles. In addition to the proposal principles the concept design adopts the mitigation measures detailed in Table 4 below, integrating them into a coherent urban and landscape composition for the corridor.

The Landscape and Visual Impact Assessment process brings to light a variety of mitigation measures that have the potential to reduce adverse impacts that may arise. Some measures will help to better integrate the road with its surroundings and others should help to reduce its visual impact.

**These mitigation measures include:**
- Reinstate vegetation lost during construction in accordance with the landscape and urban concept design and wider Mulgoa Urban Design Strategy.

**Table 4: Recommended Mitigation Measures**

<table>
<thead>
<tr>
<th>Location</th>
<th>Visible elements</th>
<th>Impact / Issue</th>
<th>Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viewpoint 1&lt;br&gt;School House Road / Mulgoa Road (residential edge)</td>
<td>• This is the location where the widening for Mulgoa Road ties into existing, transitioning from a two lane carriageway to three lanes each way. &lt;br&gt;• Removal of existing vegetation to the western footpath for the road widening.</td>
<td>• Incremental expansion of the Mulgoa Road corridor.&lt;br&gt;• Potential localised impacts to residents on the western side of Mulgoa Road through batters and level changes.&lt;br&gt;• Areas of vegetation clearance.</td>
<td>• Provide tree planting, taking into account requirements for clear zones, to replace trees removed as a result of works, and provide shade for footpath users. Trees planted at regular intervals to provide ‘boulevard’ treatment.&lt;br&gt;• Low height planting used to informally direct pedestrian movement and provide separation between the road corridor and footpaths.</td>
</tr>
<tr>
<td>Viewpoint 2&lt;br&gt;Local Park / Council Reserve (Recreational)</td>
<td>• This is the location where the widening for Mulgoa Road starts to increase, transitioning from a two lane carriageway to three lanes each way. At this location both sides of Mulgoa Road would increase in width.&lt;br&gt;• Removal of existing vegetation to the western footpath for the road widening.</td>
<td>• Incremental expansion of the Mulgoa Road corridor.&lt;br&gt;• Potential localised impacts to residents on the western side of Mulgoa Road through batters and level changes.&lt;br&gt;• Adequate rehabilitation of disturbed areas to not introduce unintended weed species.</td>
<td>• Provide tree planting, taking into account requirements for clear zones, to replace trees removed as a result of works, and provide shade for footpath users. Trees planted at regular intervals to provide ‘boulevard’ treatment.&lt;br&gt;• Trees planted in clumps to maintain views across green space.&lt;br&gt;• Low height planting used to informally direct pedestrian movement and provide separation between the road corridor and footpaths.&lt;br&gt;• Treatment to all disturbed areas, turfed or landscaped, to better integrate the proposal into the existing context.</td>
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| Viewpoint 3                    | • Widening of Mulgoa Road and encroachment into the road verge on either side. Slip through lane introduced on both sides of Mulgoa Road, with the opposing side from the photo including a shared footpath. Traffic island (to house existing columns) and an extra lane on either side concludes the extent of expansion.  
  • Localised vegetation removed as necessitated by expansion of Mulgoa Road.  
  • 1.5m wide footpath installed along the western verge.  
  • Retaining walls under the bridge.                                                                 | • Removal of mature trees to the exit ramp batters.  
  • Incremental expansion of Mulgoa Road corridor, and modification to the intersections.  
  • Batters (and spillway) reduced to allow for additional lanes and shared user path.                                                                 | • Provide tree planting, taking into account requirements for clear zones, to replace trees removed as a result of works.  
  • Trees planted closely to create dense coverage to support the ‘Vegetated Gateway’, which is supported by densely planted under story and to provide screen planting to childcare centre.  
  • Low height planting used to informally direct pedestrian movement and provide separation between the road corridor and footpaths.  
  • Median planting to support the gateway and arrival experience as outlined in the Mulgoa Road Strategic Urban Design Report. |
| Factory Road (Childcare Centre)|                                                                                  |                                                                               |                                                                                                                                              |
| Viewpoint 4                    | • Widening of Mulgoa Road from a two lane carriageway to three lanes each way. The eastern verge / footpath (right of shot), along with Hatchinson Crescent, will be relocated approx 4.5m to accommodate the widening. Vegetable to be removed.  
  • Hatchinson Crescent converted into a two-way shared transit zone. This will remove the current shared path (bottom left) and introduce a new path in the space shown as bottom right.  
  • Removal of mature vegetation along the residents side of Hatchinson Crescent, including the tall Eucalyptus in the distance.  
  • Noise wall to be included in the new verge between Hatchinson Crescent and Mulgoa Road.                                                                 | • Expansion of the Mulgoa Road corridor, moving Hatchinson Crescent towards the residential properties.  
  • Vegetation cleared to areas separating Mulgoa Road.  
  • New noise wall introduced.  
  • Hatchinson Crescent changed to two-way shared transit zone.                                                                 | • Provide tree planting, taking into account requirements for clear zones, to replace street trees removed as a result of works.  
  • Planting used around the noise wall to screen views from the residents of Hatchinson Crescent. Urban design solution applied to the noise walls to soften impacts.  
  • Treatment to all disturbed areas (turfed) to assist with integrating proposed work into existing context. |
| Hatchinson Crescent (residential)|                                                                                  |                                                                               |                                                                                                                                              |
| Viewpoint 5                    | • Widening of Mulgoa Road from a two lane carriageway to three lanes each way, including left turn lanes on either side.  
  • Median increased in size and vegetation treatment applied.  
  • Removal of mature vegetation on the western verge and the verge between Hatchinson Crescent and Mulgoa Road.  
  • Noise wall to be included in the new verge between Hatchinson Crescent and Mulgoa Road, visible in this view along the length of Hatchinson Crescent                                                                 | • Expansion of the Mulgoa Road corridor.  
  • Removal of mature vegetation along the western Mulgoa Road verge.  
  • New noise wall introduced.                                                                 | • Provide tree planting, taking into account requirements for clear zones, to replace trees removed as a result of works, and provide shade for footpath users. Trees planted at regular intervals to provide ‘boulevard’ treatment and strengthen connection with the surrounding mountains.  
  • Trees planted in clumps to represent more natural character, and to frame views out from the road corridor.  
  • Low height planting used to informally direct pedestrian movement and provide separation between the road corridor and footpaths.  
  • Treatment to all disturbed areas, turfed or landscaped, to integrate proposed work into existing context.  
  • Median planting to support the gateway and arrival experience as outlined in the Mulgoa Road Strategic Urban Design Report. Low maintenance frangible small trees planted within median to re-introduce more vegetation in response to the number of trees lost. |
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| Viewpoint 6                      | • Widening of Mulgoa Road from a two lane carriageway to three lanes each way, including turning and slip lanes in this shot.  
• The western verge / footpath will be widened to accommodate three lanes.  
• Median increased in size and vegetation treatment applied.  
• Mulgoa road has encroached slightly into the verge with the verge reducing in width towards Peter Court.  
• Peter Court converted into a shared zone which joins with Hatchinson Crescent. This will remove the current shared path visible in view.  
• Removal of mature vegetation on the western verge and the verge between Peter Court and Mulgoa Road.                                                                                                                                                   | • Expansion of the Mulgoa Road corridor, moving Peter Court towards the residential properties.  
• Vegetation clearance to areas separating Mulgoa Road.  
• New noise wall introduced.  
• Peter Court changed to shared zone (and renamed to Hatchinson Crescent).  
• Removal of mature vegetation along the western Mulgoa Road verge.                                                                                                                                                                                                 | • Provide street tree planting, taking into account requirements for clear zones, to replace trees removed as a result of works.  
• Planting used around the noise wall to screen any visual impacts from the residents of Peter Court. Urban design solution applied to the noise walls to soften impacts.  
• Feature planting at the entrance to Peter Court and around the bus stop to soften any potential impacts.  
• Treatment to all disturbed areas (turfed) to better integrate proposed work into existing context.  
• Low height planting used to informally direct pedestrian movement and provide separation between the road corridor and footpaths.                                                                                       |
| Peter Court                      | (residential)                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                             |
| Viewpoint 7                      | • Widening of Mulgoa Road and clearance of mature vegetation on the opposing side of the road around the intersection.  
• The western verge / footpath will be widened. This widening will include a new footpath to replace the existing, and the concrete space for a new bus stop.  
• Vegetation treatment to the median.                                                                                                                                                                                                                                        | • Expansion of the Mulgoa Road corridor.  
• Removal of mature vegetation along Mulgoa Road.  
• Reconfiguration of intersections due to the additional lanes.                                                                                                                                                                                                                  | • Provide tree planting, taking into account requirements for clear zones, to replace trees removed as a result of works, and provide shade for footpath users. Trees planted at regular intervals to provide ‘boulevard’ treatment and strengthen connection with the surrounding mountains.  
• Trees planted in clumps to represent more natural character, and to frame views out from the road corridor.  
• Treatment to all disturbed areas, turfed or landscaped, to better integrate proposed work into existing context.  
• Median planting to support the gateway and arrival experience as outlined in the Mulgoa Road Strategic Urban Design Report. Low maintenance frangible small trees planted within median to reintroduce more vegetation in response to the number of trees lost.                                                                                     |
| Blaikie Road (shopping centre edge) | (residential / cycle link)                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                             |
| Viewpoint 8                      | • The start of the widening for Mulgoa Road transitioning from a two lane carriageway to three lanes each way.  
• The start of the widening for 3.5m shared path from the 3.1m wide one shown.  
• Removal of existing tall mature vegetation to the western footpath for the road widening.  
• Vegetation treatment to the median.                                                                                                                                                                                                                                        | • Transition from significant expansion of the Mulgoa Road corridor to existing.  
• Removal of mature vegetation along the western Mulgoa Road verge.                                                                                                                                                                                                                                                                     | • Provide tree planting, taking into account requirements for clear zones, to replace trees removed as a result of works, and provide shade for footpath users. Trees planted at regular intervals to provide ‘boulevard’ treatment.  
• Low height planting used to informally direct pedestrian movement and provide separation between the road corridor and footpaths.  
• Treatment to all disturbed areas (turfed) to better integrate proposed work into existing context.                                                                                                                  |
Mulgoa Road from Jeanette Street, Regentville to Blaikie Road, Jamisontown

Landscape Character, Visual Impact Assessment + Urban Design Study