7.6 Landscape character and visual amenity

This chapter provides an assessment of landscape and visual amenity impacts, which were nominated in the DGR's as a key environmental issue for the project. It represents a summary of the *Urban Design, Landscape Character and Visual Amenity Technical Paper* (AECOM 2012), which was prepared for the project with consideration of the DGR's.

The technical paper is provided at **Appendix I**. The relevant extract from the DGR's is presented below.

Director-General's requirements	Where addressed
Landscape and Visual Amenity *- including but not limited to:*	
Assessment of visual significance of the area, including the escarpment and ridges and the township of Berry, and impact of the proposed alignment.	Section 7.6.2 Section 7.6.3 Appendix I
Design of the project (including noise barriers, retaining walls and landscaping) consistent with the existing (and desired) character of affected localities, including consideration of the Noise Wall Design Guideline (RTA 2006). The assessment should also consider highway/street lighting and the potential lightspill impacts on nearby residents.	Section 7.6.3 Section 7.6.4 Appendix I

7.6.1 Approach to assessment

The assessment of landscape character and visual impacts has been based on the RMS 'Environmental Impact Assessment Guidance Note: Guidelines for landscape character and visual impact assessment'. In accordance with these guidelines, the following assessments have been undertaken:

- Visual assessment – to evaluate the impact of the project on views.
- Landscape character assessment – to evaluate the impact of the project on the areas combined built, natural and cultural character or sense of place.

In order to assess landscape character and visual impacts, the study area was broken down into four landscape character units- Toolijooa Ridge, Broughton Creek, North Berry and Berry (refer to **Figure 7-20**). The landscape character units have been defined based on broadly similar characteristics or strongly defined spatial qualities. Three additional zones were also assessed within the Berry landscape character unit (refer to **Figure 7-21**). The three zones within the Berry landscape character unit were developed in order to determine the visual significance of the township of Berry and the visual connection between Berry and the surrounding ridges and escarpment.

The assessment of landscape character and visual impacts has been based on an evaluation of the sensitivity of the area and the magnitude of the project within the landscape character units. Sensitivity refers to the quality of the view and how sensitive that view or character is to the proposed change. Magnitude refers to the nature and scale of the project and its proximity to the viewer.

The combination of sensitivity and magnitude has been used to provide an overall rating of the landscape character and visual impact of the project as displayed in **Table 7-58**.

Given the close proximity of the project to Berry and the associated high level of expected impacts on town, CM+ were engaged to undertake a series of community workshops and an independent urban design study focused on the three zones identified in **Figure 7-21** (refer to **Appendix I**). Feedback gathered during that community engagement process was developed by the project team and carried through into the concept design and the mitigation measures documented in **Section 7.6.4** and **Appendix I**.

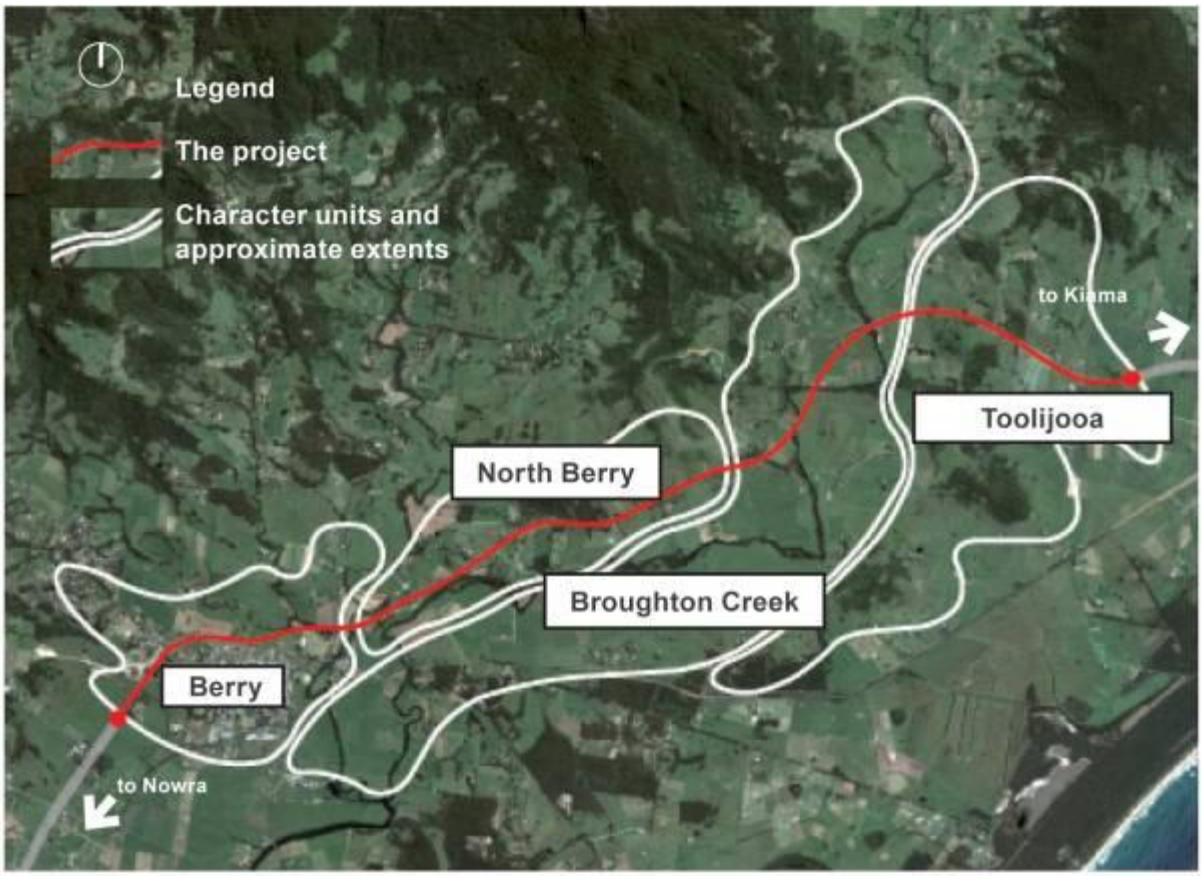

Figure 7-20 Landscape character units

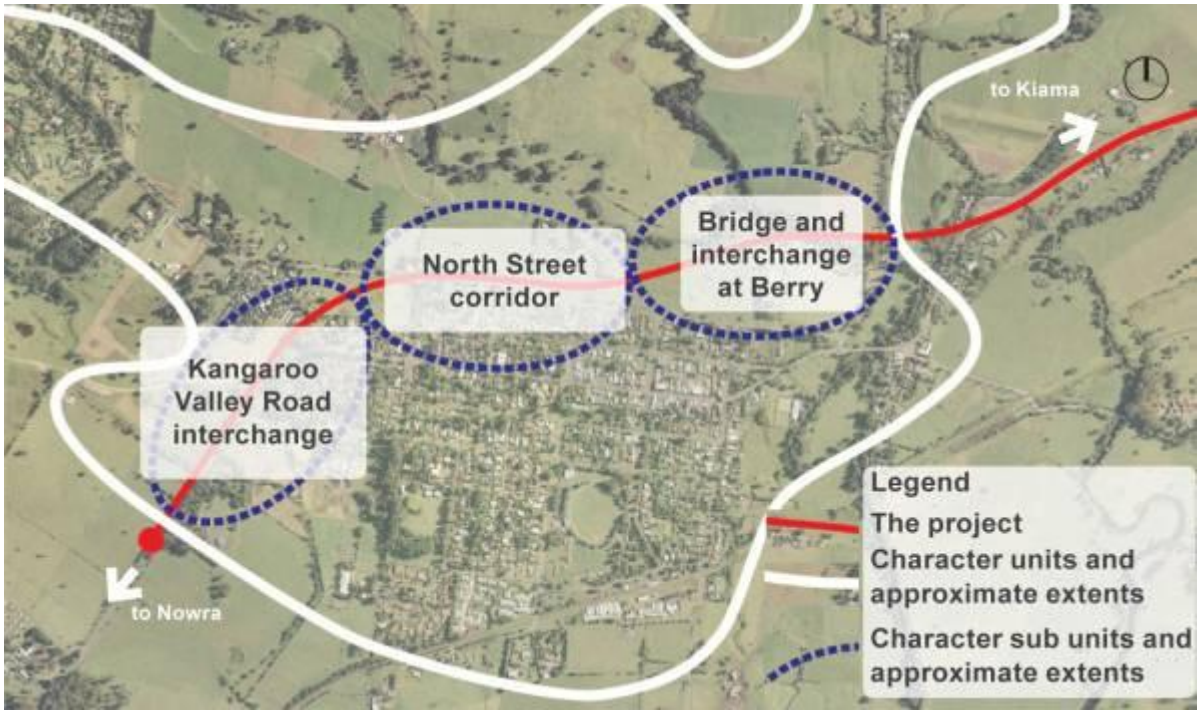

Figure 7-21 Landscape character sub units around Berry

Table 7-58 Landscape character and visual impact grading matrix

Potential visual impact		Magnitude of change				
		High	High to moderate	Moderate	Moderate to low	Low
Sensitivity	High	High impact	High impact	High to moderate impact	High to moderate impact	Moderate impact
	High to moderate	High impact	High to moderate impact	High to moderate impact	Moderate impact	Moderate impact
	Moderate	High to moderate impact	High to moderate impact	Moderate impact	Moderate impact	Moderate to low impact
	Moderate to low	High to moderate impact	Moderate impact	Moderate impact	Moderate to low impact	Moderate to low impact
	Low	Moderate impact	Moderate impact	Moderate to low impact	Moderate to low impact	Low impact

7.6.2 Existing environment

Within the study area, the combination of the natural and cultural landscape forms a uniquely rich and engaging experience for both residents and visitors. Local residents strongly identify with this landscape and its character and it is widely recognised as a key regional asset.

The naturally occurring interaction between ocean, beaches and rocky headlands, narrow coastal floodplains, rolling hills, ridges and escarpments has greatly influenced the settlement patterns and land use types. Within the study area the combination of the natural and cultural landscape forms a uniquely rich, engaging and tangibly enjoyable experience. This harmonious and attractive character is strongly identified with by local residents and widely recognised as a key regional asset.

To the north and west, the forested ridgelines and escarpment have a prominent visual presence from many locations along the existing highway and within Berry. The route constantly interacts with existing creeks and drainage lines with crossings proposed at a number of locations.

Corridors of native vegetation are often retained along drainage lines within the pastureland, while isolated native trees, particularly larger specimens of fig, remnant gum trees and cabbage tree palms, also occur. The extent of vegetation cover appears much more substantial when experienced from ground level rather than viewed in plan. This is likely due to the scale of the existing trees many of which are mature and greater than 15 metres in height.

The landscape surrounding the project is strongly influenced both culturally and physically by the dairy industry. This activity has defined the general pattern of vegetation clearance, defined rural boundaries with linear cultural planting and influenced the distribution of rural houses and farm buildings. The road user also experiences constantly changing open and enclosed views including broad expansive pasture, well vegetated portals and valleys.

As described below, the nature of the terrain varies greatly between the four landscape character units identified as part of the assessment. It changes from the steep slopes on Toolijooa Ridge through to the flat floodplain of Broughton Creek. From there it progresses to the quickly changing and variable slopes north of Berry and the flatter flood prone land around the northern and western sides of the Berry township.

Toolijooa Ridge

At the northern end of the project, the prominent Toolijooa Ridge extends south from Currys Mountain. Travelling south west from Gerringong, the open pastoral landscape extends to the north and south of the existing highway as it makes its way along the eastern spur of Toolijooa Ridge. Here, the ridge contains the view and separates the coastal plain from Broughton Creek to the west. Its landscape consists of a mix of agricultural land and larger tracts of remnant vegetation, including some endangered ecological communities (refer to **Section 7.3**). A small number of rural residences are located mostly to the north of the existing highway.

Broughton Creek

Broughton Creek and its adjacent floodplain form the valley between the western side of Toolijooa Ridge and the east facing lower slopes of the Cambewarra Range. The Broughton Creek valley runs in a north-south direction, while the creek line meanders back and forth across the floodplain. Its landscape is characterised by small rural residences, working farms, isolated clumps of native vegetation and cultivated landscapes featuring hedge rows and avenues set within broad open pastoral fields. The main areas of remnant vegetation, in particular mature River She Oaks, are located adjacent to Broughton Creek which divide the open pasture. Small rural dams punctuate the landscape and the patterns of land ownership, reinforced by fence lines, access drives and other cultural plantings, providing an organised element.

North Berry

To the east of the Broughton Creek floodplain, the existing highway follows the ridgeline that separates the Broughton Creek catchment to the east and the Broughton Mill Creek catchment to the west. The landscape is comprised of open rolling pasture, remnant trees and isolated stands of forest. The existing trees are large in stature, including a number of isolated large Eucalypts that provide scale and frame views. The terrain varies from undulating to steep, changing quickly in terms of slope steepness and aspect, and provides occasional views across the valley to the escarpment. Travelling south into Berry, the ridge line becomes narrower and views from the highway become more restricted.

Berry

Berry is recognised as the first truly rural town south of Sydney with its heritage visibly cultivated to promote it as a popular stopover point and destination for tourists and travellers. The town originally developed to support rural activities that were occurring within the area.

Presently the town can be considered as having three component parts, these being:

- Original Berry or the Pulman Street Heritage Precinct.
- Established Berry, the main area of town which follows the traditional street grid pattern.
- West Berry, where the majority of future expansion and growth is planned to occur.

The original section of Berry is a small area occupying a narrow piece of flood free land just upstream of the confluence of Broughton Creek and Broughton Mill Creek.

The established section of Berry occupies the area of flat land west of Broughton Creek, just above the flood prone pasture of Bundewallah Creek, Broughton Creek and Broughton Mill Creek. Its overall growth has been restricted to the north and south by the limits of flood immunity and to the south east by the railway line which forms a physical barrier.

The town is a rich mix of traditional European cottage style gardens, hedges and isolated deciduous ornamental trees set against a back drop of remnant large Eucalypts, and has a grid street pattern representative of early development patterns. The escarpment to the north and west is visually prominent and serves as a reference point within the town.

To maintain the town's growth, development is occurring on the higher ground along Kangaroo Valley Road to the north-west. Here, the landscape is less rigid in its street layout, and responds to existing topography.

North Street forms a clear boundary between the northern edge of town, the adjacent rural landscape to the north and the sports grounds to the east. This land is flood prone and has limited the expansion of the town in this area. North Street is well used by locals as a walking or jogging track and as a connection between the town and the Berry sports grounds and Camp Quality Memorial Park. It also experiences uninterrupted views across the rural landscape to the escarpment beyond.

Town Creek is a small ephemeral watercourse that passes directly through the Berry township. Upstream from the area around North Street, Town Creek is a degraded channel through highly modified grazing lands that only flows during or following a rainfall event.

To the north and west, the forested ridgelines and escarpment have a prominent visual presence from many locations within Berry. They provide a strong connection with the surrounding natural environment influencing the character of the town (particularly that of Queen Street). Views towards the flatter pastureland to the east and south east are generally less prominent from within town, being most evident from the southern and eastern fringes of town.

Mark Radium Park is located at the corner of the Princes Highway and Victoria Street and features a large stand of tall mature Eucalypt trees. The park incorporates a small pond, picnic tables, playground, public toilets and a small car park area.

7.6.3 Assessment of potential impacts

Assessment of the potential impacts considers a representative and a worst case level of impact. A representative scenario corresponds to the proposed mitigation measures and landscape treatments performing as designed. A worst case scenario considers the project being undertaken without the implementation of mitigation measures to minimise visual impacts or the mitigation measures implemented failing to achieve the desired outcome. The worst case scenario is unlikely to occur with the implementation of appropriate mitigation measures, as outlined at **Section 7.6.4**.

Construction impacts

Landscape character and visual impacts would be likely to occur as a result of construction activities undertaken in both offline and online sections of the project.

Offline works would involve active construction sites located in areas where there is currently no major infrastructure or interruptions to the landscape. Online works occur in areas where infrastructure or interruptions to the landscape currently exist, such as following the existing highway alignment. Offline construction would generally occur through the Toolijooa Ridge and Broughton Creek landscape character units and also to the north of North Street. Therefore, a reduction of visual amenity as a result of offline construction activities would be experienced by isolated and clustered rural residences and the properties in the vicinity of North Street.

Construction activities that would occur in online sections of the project would predominantly occur in the North Berry landscape character unit where the project tracks along the existing highway alignment. Works associated with online construction activities would result in reduced visual amenity for a small number of rural residences. However, changes to landscape character would be reduced given the presence of the existing highway in these sections. Online construction works would also impact on the users of the existing highway. Construction activities would be highly visible to road users and they may experience a loss of views to the adjacent rural landscape during the construction period.

Major project elements in the vicinity of Berry would be highly visible during the construction of the project. These elements would include the bridge at Berry, construction in the vicinity of North Street, including the diversion of Town Creek and the large cutting and bridge required at the southern interchange for Berry. Construction activities associated with these elements would have landscape character and visual impacts within Berry and also when Berry is viewed from the adjacent rural landscape. The extent of these impacts would be similar to those that would be experienced during the operation of the project and are discussed in more detail within the operational impacts section below.

During construction, the greatest visual impacts would occur following the removal of existing vegetation and prior to landscaping works. Construction works and new road infrastructure would be clearly visible during this stage of the project.

Visual amenity and landscape character impacts would also be associated with the establishment and operation of temporary ancillary facilities such as site offices and compounds during construction. The ancillary facilities would be located directly adjacent to the project alignment and in places, would increase the extent of the project footprint and clearing temporarily during construction.

Operational impacts

The project would result in landscape character and visual impacts along the length of the project. These impacts would be different for each landscape character unit as described below.

Toolijooa Ridge

The project elements that would impact landscape character and visual amenity in the Toolijooa Ridge landscape character unit include:

- New project alignment through Toolijooa Ridge.
- Large cut batters through Toolijooa Ridge.
- Introduction of new infrastructure into a landscape where there presently is none.
- Loss of vegetation due to corridor widening in online sections of the project.
- Lighting of interchanges and intersections.

The nature of the Toolijooa Ridge terrain means that the majority of the cutting would not be exposed to surrounding rural residents, minimising the visual impacts. The cutting would cross Toolijooa Ridge in a perpendicular fashion which would minimise the extent of exposure to the east and west, where most viewers are located. The cutting would be most visible to road users and a small number of rural residences. The introduction of new road infrastructure, the cutting and light spill from the Toolijooa Road interchange would impact the rural character of the landscape. This impact is expected to be moderate given the viewer distance from the project and the orientation of the project with respect to the location of the majority of viewpoints.

The scale of the project would cause a moderate change to the Toolijooa Ridge profile and form. However, the landscape character of Toolijooa Ridge would be maintained and it would continue to function as the divide between the immediate coastal landscape and the broader rural valley and escarpment.

The sensitivity to and magnitude of impacts arising from the project would be moderate. Therefore, the overall landscape character and visual impacts of the project within the Toolijooa Ridge landscape character unit would be **moderate**. These impacts would be diminished with the implementation of mitigation measures provided in **Section 7.6.4**.

An artist's impression of the concept design within the Toolijooa Ridge landscape character unit is provided in **Figure 7-22**.

Figure 7-22 Artists impression of the concept design within the Toolijooa Ridge landscape character unit.

Broughton Creek

The project elements that would impact landscape character and visual amenity in the Broughton Creek landscape character unit include:

- Large embankments and bridges in a generally flat landscape.
- Three large bridges over Broughton Creek.
- Elevated embankments across the floodplain between bridges 1 and 3.
- Introduction of new infrastructure into a landscape where there presently is none.

The project would be highly visible within the landscape due to the elevation of the road deck across the whole Broughton Creek landscape character unit. Local residents with existing views of the Broughton Creek floodplain would experience a reduction in visual amenity. The removal of some existing riparian vegetation would further contribute to this reduction. However, the number of residences within this visual catchment is relatively low, as the catchment is contained by the western slope of Toolijooa Ridge and the slopes south of Broughton Village.

The visual dominance of the project within the Broughton Creek landscape character unit would result in landscape character impacts. These impacts would include the severance of some larger agricultural properties and a change in character of the Broughton Creek floodplain, which is historically a flat landscape. The three large bridges over Broughton Creek within this landscape character unit would increase the visual scale of the project as the structures would sit within this flat landscape and would be visually dominant in places. The bridges would be designed to provide refined and elegant forms in accordance with RMS Bridge Aesthetics Design Guidelines (RTA 2003).

There would be minimal visual amenity impacts associated with light spill in the Broughton Creek landscape character unit given that there would be no major intersections or interchanges and lighting is generally not proposed along the alignment, except at major intersections and interchanges.

The sensitivity of the landscape within the Broughton Creek landscape character unit to the impacts of the project would be high to moderate. The magnitude of the project within the area would be high to moderate. Therefore, the overall landscape character and visual impact of the project would be **high to moderate**. These impacts would be alleviated with the implementation of mitigation measures provided in **Section 7.6.4**.

An artist's impression of the concept design within the Broughton Creek landscape character unit is provided in **Figure 7-23** and an artist's impression of the refined and elegant form that would be applied to the design of the three bridges within this landscape character unit is provided in **Figure 7-24**.

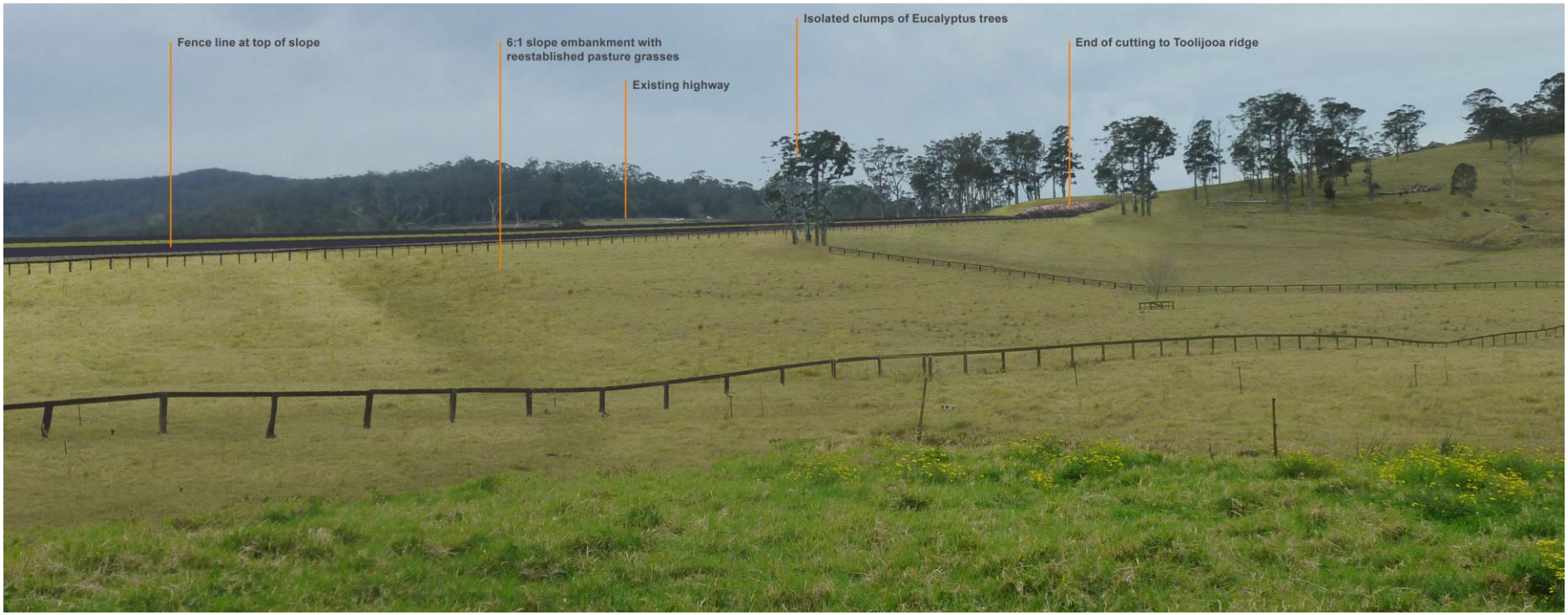

Figure 7-23 **Artists impression of the concept design within the Broughton Creek landscape character unit.**

Figure 7-24 **Artists impression of the proposed refined and elegant bridge form within the Broughton Creek landscape character unit.**

North Berry

The project elements that would impact landscape character and visual amenity in the North Berry landscape character unit include:

- Areas of significant earthworks (cut and fill) required to improve the vertical alignment of the highway.
- Removal of vegetation along the roadside and along the ridgeline just north of Berry.
- Alteration to property accesses along the existing highway.
- Two bridges on the top of ridgelines at Austral Park Road and Tindalls Lane.
- Lighting of interchanges and intersections.

Through this section of the study area, the project would generally involve widening and straightening of the existing alignment, with the development of some large embankments that would quickly transition from cut to fill through the undulating landscape. Visual impacts associated with the project would generally be moderate given the screening nature of the landform, surrounding vegetation cover and the relatively low numbers of surrounding rural residences. Primary viewing locations would be from rural residences along Austral Park Road and Tindalls Lane. Widening along the existing alignment would require the removal of some screening vegetation, including large trees, which would result in the project being more visible, particularly to the south west.

There would be two grade-separated interchanges at Austral Park Road and Tindalls Lane which would increase the visual scale of the project. Both interchanges would include bridges on top of ridgelines and would be well lit for safety reasons. These features would be visually dominant in the surrounding landscape.

The North Berry landscape character unit would have moderate sensitivity to impacts associated with the project. The magnitude of the project within the area would be high to moderate. Therefore, the overall landscape character and visual impact of the project would be **high to moderate**. These impacts would be mitigated with the implementation of mitigation measures provided in **Section 7.6.4**.

An artist's impression of the concept design within the North Berry landscape character unit is provided in **Figure 7-25**

Figure 7-25 Artists impression of the concept design within the North Berry landscape character unit

Berry

In general, Berry's character is one of an intimate historic rural town. This strong and well established identity suggests that a bypass of the town should enhance its visitor and resident experience, by eliminating through traffic and in particular heavy vehicles from the town centre.

However, the project would be highly visible when viewed from within Berry or from the surrounding area. The project elements that would impact landscape character and visual amenity in the Berry landscape character unit include:

- A bypass of Berry involving a large bridge and new alignment directly to the north of North Street.
- Introduction of new road infrastructure into a landscape where there presently is none.
- A new interchange requiring major earthworks and structure, located to the north east of town.
- A new interchange requiring a large cutting and bridge structure, located to the south west of town at Kangaroo Valley Road.
- Loss of existing vegetation, mainly around creek crossings.
- Noise attenuation structures, including planted earth formations, along North Street and near the northbound off-ramp at the southern interchange.
- The diversion of Town Creek to the north of the highway to connect into Bundewallah Creek.
- Partial loss of parkland area at Mark Radium Park.
- Closure and introduction of a new cul-de-sac at the western end of Victoria Street.
- Lighting of interchanges and intersections.

Key viewing locations for the project within Berry include North Street, the Berry sports grounds, around Kangaroo Valley Road, Huntingdale Park Road and Mark Radium Park. These areas are all key elements of the landscape identity and functionality of Berry and would be sensitive to the landscape character and visual impacts associated with the project. The Berry sports grounds and the Camp Quality Memorial Park, located just to the north-west of the playing fields, are focal points for the local community.

An artist's impression of the concept design with the proposed southern interchange for Berry to the left is provided in **Figure 7-26**.

Discussion of each of the sub units around Berry is provided below to inform the assessment of the impacts for the overall Berry landscape character unit.

Figure 7-26 Artist's impression of the concept design with proposed southern interchange for Berry to the left. **Image by CM+ (2012)**

The bridge and northern interchange at Berry

The design of this interchange, its footprint and elevation and the adjoining bridge has been the focus of community workshops undertaken as part of the independent urban design study. Feedback has been incorporated into the concept design. The development of this process and the urban design principles applied to this zone in response to community feedback are documented in detail in **Appendix I**.

As discussed in **Section 3.3.6**, during the evaluation of the preferred access options for Berry, the footprint and bulk of the northern interchange was reduced by consolidating the ramps and passing the northbound ramp exiting Berry under the highway. However, the interchange would still be relatively large in scale and located on a narrow ridge, meaning that it would likely be seen from a number of locations to the east, south and west. Significant earthworks would also be required for the construction of the interchange, resulting in changes to the visual landscape. An artist's impression of the interchange from the west is provided in **Figure 7-27**.

The bridge at Berry would introduce a large length of new road infrastructure into the visual landscape.

The elevated nature of the bridge would have a visual impact when viewed from the north and south. The visual dominance of the bridge would be somewhat reduced by existing vegetation along Bundewallah Creek, which would filter views towards the bridge when viewed from north of Berry (Bong Bong Road) looking south as displayed in the artist's impression in **Figure 7-28**. North of town, the longest unbroken view of the bridge would be from Woodhill Mountain Road as there would be minimal cover from existing vegetation. **Figure 7-29** provides an artist's impression of the bridge at Berry from Woodhill Mountain Road based on the current concept design.

The impacts outlined for the bridge and northern interchange for Berry are considered as part of the overall assessment for the Berry landscape character unit that follows the discussion of each of the sub units.

Figure 7-27 **Artists impression of the northern interchange concept design at Berry from the west.**
(Woodhill Mountain Road is approximately below the viewer)
Image provided by CM+ (2012)

Figure 7-28 Artist's impression of the concept design looking south from Bong Bong Road towards the bridge at Berry

Figure 7-29 Artist's impression of the concept design looking south from Woodhill Mountain Road towards the proposed bridge at Berry

North Street corridor

The project would impact on existing views and the landscape character of Berry and would alter existing pedestrian access and movement patterns along North Street. A 2.5metre shared cyclist and pedestrian pathway would be incorporated along the northern side of North Street and would provide for connectivity between Kangaroo Valley Road, the southern interchange and the sports ground at the eastern end of North Street. Landscape character impacts in this area would be reduced by maintaining as much open space as possible between North Street and the project and screening the required noise attenuation measures with a gentle embankment. This would maintain the visual connectivity to the escarpment and ridgelines where possible.

The noise attenuation measures associated with the project, which would be approximately four metres in height above the proposed highway road surface, would be visible from North Street and north-south cross-streets in Berry including Alexandra, Albany, Edward and George Streets. North Street is a quiet street that provides delineation between the edge of town, the rural foreground and the background of the escarpment. The closeness of the project and associated noise attenuation structures as well as the loss of the pastoral foreground and middle ground views would alter the character of North Street and surrounding streets on the northern side of Berry, and their relationship with the surrounding landscape. **Figure 7-30** shows the existing view from North Street looking to the north west. **Figure 7-31** shows the likely view from North Street following completion of the project and the extent of the visual and landscape character impact that would be expected following establishment of landscaping. **Figure 7-32** and **Figure 7-33** show cross sections of North Street at various locations with the project and noise attenuation structures.

The impacts associated with the diversion of Town Creek are expected to be low and would only be viewed from the north of the project by a limited number of receivers.

The proposed new infrastructure required for this zone has been the focus of the community workshops undertaken as part of the independent urban design study and feedback has been incorporated into the concept design. The development of this process and the urban design principles applied to this zone in response to community feedback are documented in detail in **Appendix I**.

The urban design principles applied to the zone have considered RMS' '' (RTA, 2006), as illustrated in **Figure 7-33**. This included consideration of the existing landscape context and character in the potential design solutions for the noise attenuation structures, the use of available space for design treatments (such as mounding), and the use of landscaping. The design of the noise attenuation structures are subject to further detailed design and consultation with the community. The design guidelines would continue to be considered as part of that process.

The impacts outlined for the North Street corridor are considered as part of the overall assessment for the Berry landscape character unit that follows the discussion of each of the sub units.

Figure 7-30 Existing view from North Street looking north west

Figure 7-31 Artist's impression of the concept design looking north west from North Street, following the establishment of landscaping. Image by CM+ (2012)

Figure 7-32 **North Street cross sections as illustrated in Figure 7-33**
Image by CM+ (2012).

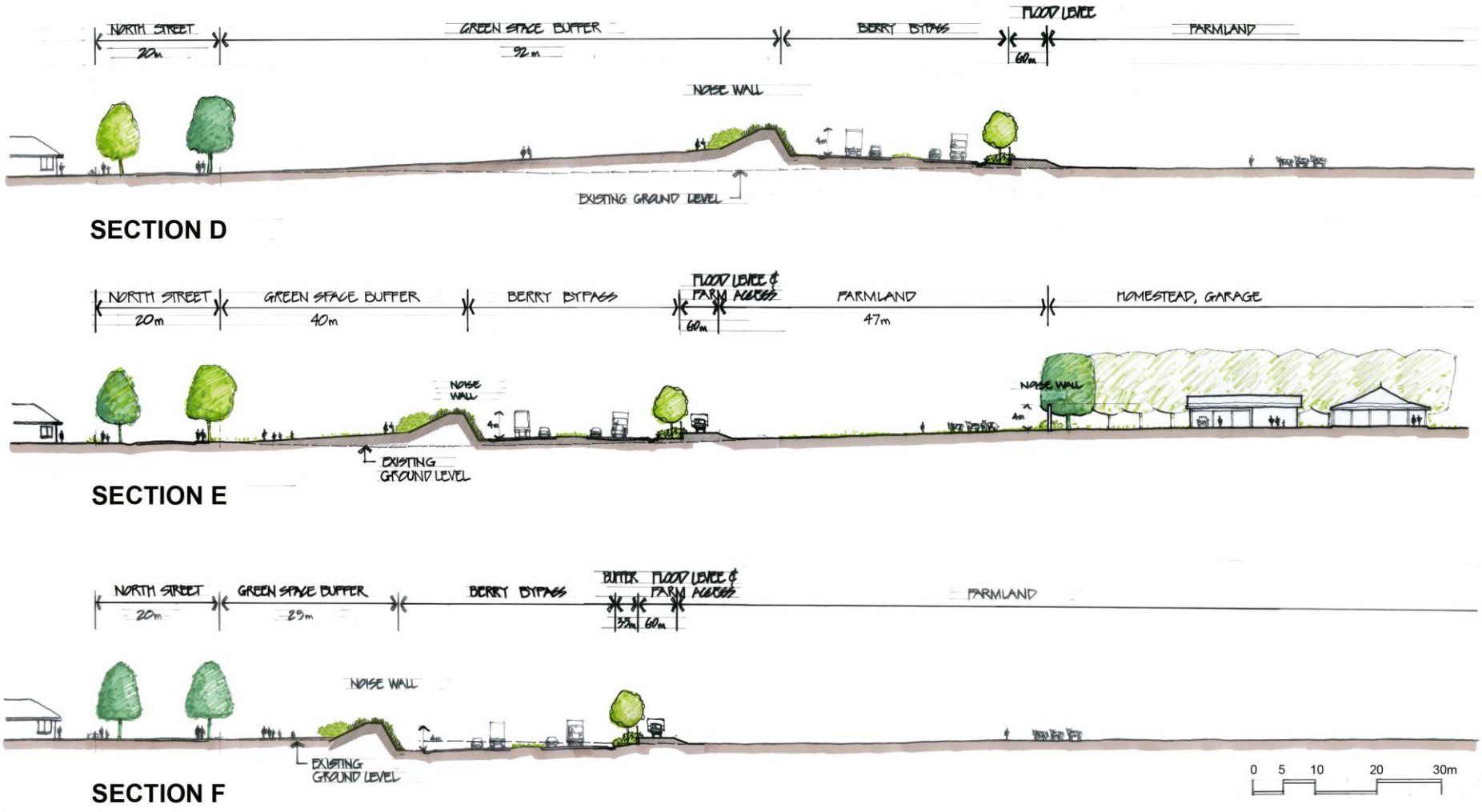

Figure 7-33 **North Street cross sections with the project and associated noise attenuation structures Image by CM+ (2012).**

The ridges and escarpment

Given the value placed on the views to the ridges and escarpment by the Berry, further assessment was undertaken which particularly focussed on the landscape character and visual impacts associated with the northern side of Berry and the proximity of the project to the North Street corridor. This assessment looked at the visual connection from Berry to the ridges and escarpment and the visual significance of the township of Berry.

Interruptions to the views of ridges and the escarpment from Berry would be due to two main factors. Firstly, the introduction of the new highway infrastructure in the vicinity of North Street, which would be elevated in parts above the existing ground level. Secondly, noise attenuation measures would be required in the vicinity of North Street.

A relative impact intensity map has been produced to show the level of impacts on the views to the ridges and escarpments to the west and north of Berry (refer to **Figure 7-34**). When considered on a block by block basis the level of impact would decrease exponentially moving further south and further east. Based on the level of impact, three zones were established and the results of the assessment are provided below.

Figure 7-34 Relative impact intensity map for views to the ridges and escarpment from Berry

Zone 1 – North Street observer location A

For North Street residents in Zone 1, the sensitivity to and magnitude of change would both be considered moderate. With regard to the impacts on views to the ridges and escarpments and the visual significance of township of Berry, the project would:

- Have **moderate impact** for residents and users of the western end of North Street as the scale of the noise attenuation measures would alter the foreground and middle ground views. Views to the ridges and escarpments would only be partially impacted. A before and after comparison is illustrated in **Figure 7-35** below. It should be noted that observer view point illustrations do not show landscape and urban design treatments that would be implemented.

Figure 7-35 Before and after illustration from observer location A on North Street, zone 1

Zone 2 – Edward Street observer location B

For Albert Street residents and some residents of George, Edward, Albany and Alexander Streets in Zone 2, the sensitivity to and magnitude of change would both be considered moderate to low. With regard to the impacts on views to the ridges and escarpments and the visual significance of township of Berry the project would:

- Have **moderate to low impact** on residents and users of Albert Street. Views to the ridges and escarpment would not be impacted but foreground and middle ground views would experience some impact, especially at the north - south cross streets. A before and after comparison is illustrated in **Figure 7-36** below.

Figure 7-36 Before and after illustration from observer location B on Albert Street, zone 2

Zone 3 – Queen Street observer location C

For Queen Street residents and the commercial core in Zone 3, the sensitivity and magnitude of change would both be considered low. With regard to the impacts on views to the ridges and escarpments and the visual significance of township of Berry, the project would:

- Have **low impact** to residents, commercial property owners and users of Queen Street and the commercial core. A before and after comparison is illustrated in **Figure 7-37** below.
- There would be some impact associated with the loss of open vistas along the streets that run north-south as views would be partially obstructed by the noise attenuation measures. This would include views from Queen Street along George, Edward, Albany and Alexandra Streets. However, the impact would be relatively minor in comparison to the Zone 1 and 2 impacts. The overall landscape character and visual impact would be **moderate to low**.

Figure 7-37 Before and after illustration from observer location C on Queen Street, zone 3

Kangaroo Valley Road and southern interchange precinct

The southern interchange at the western end of North Street requires road, ramp, overbridge; and noise attenuation infrastructure of substantial scale. A substantial cutting that is up to seven metres deep is also required as the main alignment passes under Kangaroo Valley Road. Feedback gathered during community consultation suggests that this cutting has the potential to create a feeling of severance between established Berry and the developing areas of west Berry along the Kangaroo Valley Road corridor. **Figure 7-38** shows an artist's impression of the southern interchange and the new infrastructure required. The design of this significant infrastructure has been the focus of the workshops undertaken as part of the independent urban design study and feedback gathered through that community engagement process has been incorporated into the concept design.

A 20 metre wide bridge would be built over the main alignment incorporating formal pedestrian and cyclist access physically separated from the traffic lanes by planting and landscaping in order to lessen any sense of severance between Berry and the Kangaroo Valley Road corridor. It would maintain Kangaroo Valley Road at its current level in relation to the surrounding landscape in order to minimise landscape character and visual impacts. Two roundabouts, one at each end of the overbridge would be required.

Figure 7-39 and **Figure 7-40** show the expected views of this infrastructure from a road user viewpoint and from a pedestrian viewpoint on Kangaroo Valley Road. The development of the concept design and the urban design principles applied to this zone in response to community feedback are documented in detail in **Appendix I**.

Figure 7-38 Artist's impression of the Kangaroo Valley Road and southern interchange precinct. Image by CM+ (2012)

Figure 7-39 Artist's impression of the expected view from the southbound lanes of the upgrade to the Kangaroo Valley Road overbridge following the establishment of landscaping. Image by CM+ (2012)

Figure 7-40 Artist's impression of the pedestrian view looking east across the Kangaroo Valley Road overbridge following the establishment of landscaping. Image by CM+ (2012)

Victoria Street would be closed at its western end and a new cul-de-sac would be introduced to the landscape adjacent to Mark Radium Park. This closure is not expected to have a substantial visual impact, but it would affect the distribution of traffic in Berry as discussed in **Section 7.1**.

South of Berry, on the western side of the upgrade, between the southern Berry interchange and Schofield's Lane, a permanent variable message sign (VMS) that would service northbound traffic would be installed. The VMS would be around 6.1 metres in height and would be designed and constructed in accordance with the *Guidelines for the location and placement of variable message signs* (RTA, 2008). The VMS would introduce a large element into the visual landscape. There would be a requirement for the VMS to be located so that it is conspicuous, legible and comprehensible to road users. However, the impact to surrounding receivers would be minimal following the implementation of mitigation measures provided in **Section 7.6.4**.

The impacts identified for the Kangaroo Valley Road and southern interchange precinct are considered as part of the overall assessment for the Berry landscape character unit that follows.

Overall assessment of impacts for the Berry landscape character unit

Considering the impacts in each of the sub units around Berry as discussed above, the Berry landscape character unit as a whole would experience high to moderate sensitivity to impacts associated with the project and the magnitude of the project within the character unit would be high. Therefore, the overall landscape character and visual impact of the project would be **high**. These impacts would be managed with the implementation of mitigation measures provided in **Section 7.6.4**.

7.6.4 Environmental management measures

Mitigation and management measures would be implemented to avoid, minimise or manage landscape character and visual amenity impacts. These mitigation and management measures are listed in **Table 7-59** and incorporated in the draft statement of commitments in **Chapter 10**.

Table 7-59 Mitigation and management measures

Potential impacts	Mitigation and management measures
Construction	
Loss of visual amenity	Avoid excessive clearing of vegetation by clearly demarcating areas to be cleared. Progressively stabilise cut batters and exposed areas with appropriate sprayed seed mixes for cover crop and install landscape plantings as soon as practicable. Use fast-growing species such as wattles for vegetative screening for permanent ancillary facility sites and other facilities.
Loss of landscape character and visual amenity of the project area due to unsuccessful revegetation	Review plantings and supplement where necessary. Produce and implement an approved stockpile management procedure to maintain soil and seed health; and minimise weed and dust issues.
Operation	
General loss of landscape character and visual amenity along the project	With reference to the mitigation measures and reference design parameters in **Appendix I**: Utilise RMS owned land along the corridor to facilitate flattening out of batters. Replace, at a minimum, any tree and/or large shrub planting lost as a result of the project in this corridor.

Potential impacts	Mitigation and management measures
	Integrate new vegetation with the existing landscape character by using culturally relevant species planted to existing patterns. Engage with the local community to gather feedback as the design develops and foster broader community support and ownership for the design outcome. Define the transition points between the highway and local street networks, through landscaping and road design. Design retaining wall structures, noise attenuation, cut embankments, fill slopes and bridges and associated elements in accordance with the Urban and Landscape Design Strategy. Engage with adjacent land owners to determine whether early works mitigation (for example landscape planting) can be achieved to help reduce or soften the visual impacts of the upgrade. Ensure the detailed design meets the minimum reference design requirements of the following project components: • All bridges within the project, with consideration of the 'Bridge Aesthetics Design Guidelines' (RTA, 2003). • Noise attenuation measures along the length of the project, in accordance with the 'Noise Wall Design Guideline' (RTA, 2006). Light all intersections to 'flag' standard in accordance with *AS/NZS 1158 Code of Practice for Public Lighting* and direct the light source towards carriageway only.
Visual impacts at specific locations and precincts – Toolijooa Ridge	With reference to the mitigation measures and reference design parameters in Appendix I: Ensure close to vertical cuttings and steepened rock batters at the base of cuttings, where possible, to minimise the overall footprint of the cutting. Keep the cutting benches (the flattened parts of the cutting that provide stability) at a consistent profile and in parallel with the vertical geometry of the highway. Provide a smooth, rounded edge at the top of the cutting and re-establish pasture grasses and scattered trees. Establish vegetation to the edge of the cutting to provide visual integration with the adjacent landscape and to satisfy environmental requirements for fauna connectivity. Enclose the view at the end of the cutting to frame views.
Visual impacts at specific locations and precincts - Broughton Creek	With reference to the mitigation measures and reference design parameters in **Appendix I**: Decrease the apparent height of the large embankments at the interface between Toolijooa Ridge and Broughton Creek, where feasible. The embankments could be flattened by widening the project footprint, which would be returned to pastureland following construction.

Potential impacts	Mitigation and management measures
	Design the three bridges over Broughton Creek to provide refined and elegant forms in accordance with RMS Bridge Aesthetics Design Guideline. Flatten batters across the floodplain to 10:1 through 4:1 instead of 2:1, to utilise surplus spoil from Toolijooa Ridge and re-establish pasture landscape as close to the road edge as possible. Re-establish riparian vegetation adjacent to the bridges to maintain the viability of existing fauna corridors, to integrate bridges into the surrounding environment and to maintain the portal experience, transitioning from open pasture to the closed riparian vegetation. Re-establish pasture grasses and rural fencing to top of embankment slopes. Plant isolated clumps of Eucalypts consistent with the immediate local context.
Visual impacts at specific locations and precincts – North Berry	With reference to the mitigation measures and reference design parameters in **Appendix I**: Revegetate areas of existing highway left as residual landscape. Reinstate vegetation along cuttings and embankments to help reduce the visual scale of the works, particularly close to ridge lines. Establish the appropriate screening for adjacent rural residences. Plant single or small clumps of eucalypts to reinforce the broader landscape pattern. Provide a smooth, rounded edge at the top of cut slopes. Reinstate pasture grasses on flattened embankments where feasible. Use farm style fencing in residual spaces between the existing highway and the project. Integrate the water quality basins and swale systems within the landscape. Provide consistent detailing for the two over bridge structures. Use vegetation to soften the sudden transitions from cut to fill slope.
Visual impacts at specific locations and precincts – Berry (general)	With reference to the mitigation measures and reference design parameters in **Appendix I** and the findings of the CM+ Urban Design Study, also in **Appendix I**: Define the town entry at the northern and southern interchange for Berry with culturally relevant plantings. Provide an appropriate entry statement at the northern interchange for Berry and the roundabout at the intersection of Woodhill Mountain Road and the existing highway (such as the Alexander and David Berry memorial).

Potential impacts	Mitigation and management measures
	Ensure that the scale and rhythm of noise attenuation, street lighting and ornamental tree planting reflect the Berry street grid and unify the existing local road network with the new bridges and roundabouts. Design noise attenuation structures in accordance with 'Noise Wall Design Guideline' (RTA 2006). Consider and integrate the project with the overall pedestrian access mobility plan (PAMP) for Berry. This would include considering a shared path link from the western end of North Street through to the southern interchange at Berry and allowing for a 2.5 metre wide shared path on both sides of the Kangaroo Valley Road bridge.
Visual impacts at specific locations and precincts – the bridge at Berry	With reference to the mitigation measures and reference design parameters in **Appendix I** and the findings of the CM+ Urban Design Study, also in **Appendix I**: Reinforce existing vegetation, such as casuarinas and eucalyptus, to integrate the bridge within the landscape and minimise the lengths of unbroken façade, particularly around Bundewallah Creek. Provide minimum reference design requirements for the bridge structure. Design the bridge with as simply and elegantly as possible so that it best complements the surrounding landscape setting. Minimise the number of columns for the bridge by maximising the span length where reasonable and feasible. Minimise the loss of vegetation at the point where the bridge crosses Bundewallah Creek.
Visual impacts at specific locations and precincts – North Street	With reference to the mitigation measures and reference design parameters in **Appendix I** and the findings of the CM+ Urban Design Study, also in **Appendix I**: Consider the town grid layout and view corridors of the north-south streets in the layout and rhythm of noise attenuation measures (the form of which would be determined through detailed design in consultation with the local community). Use extensive mounding with maximum slopes of 2:1 at pinch points with a preferred maximum of 4:1 to reduce the overall free standing height of the noise walls. Blend the existing landscape up to the edge of the highway in the gazetted North Street road corridor by reducing the steepness of the embankments. Use clumped and or isolated vegetation to the top of mounding to break down the visual dominance of the road embankment and noise attenuation measures. Use plantings on the northern side of the noise attenuation that are consistent with RMS planting guidelines and include canopy and ground cover species consistent with the local landscape character.

Potential impacts	Mitigation and management measures
	Use plantings on the southern side of the noise attenuation that are consistent with the existing character along North Street.
Visual impacts at specific locations and precincts – Kangaroo Valley Road and southern interchange precinct	With reference to the mitigation measures and reference design parameters in **Appendix I** and the findings of the CM+ Urban Design Study, also in **Appendix I**: Consider the broader context of the project including the roundabouts and the connections into Queen Street and Kangaroo Valley Road. Allow for a 2.5metres wide shared path on both sides of the bridge that connects with the shared path along the North Street corridor and the broader PAMP for Berry. Include a planted verge between the shared path and the traffic lanes on both sides of the Kangaroo Valley overbridge. Ensure that lighting on the Kangaroo Valley Road bridge is of a scale that is consistent with the local road network and not the highway. Design plantings within roundabouts and landscaped verges to the Kangaroo Valley Road bridge that reinforce the landscape garden character of Berry.
Visual impacts associated with the VMS	With reference to the mitigation measures and reference design parameters in **Appendix I**: Locate the VMS on a gradual downslope between chainage 18650 and 18700 (as shown in **Figure 3.14** of the *Urban Design, Landscape Character and Visual Amenity Technical Paper* at **Appendix I**) to: • Reduce any affects associated with silhouetting against the sky. • Avoid impacts on any vistas or views to the ridges and escarpment to the north and north west. • Maximise the distance of the VMS from the southern interchange for Berry and signage and lighting associated with the Kangaroo Valley Road precinct.