Appendix C - Part B

5.2.1 TYPICAL CROSS-SECTIONS

The following typical cross-sections illustrate the potential extent and scale of the proposal and as well as physical impacts on the existing landscape. The landscape revegetation methodologies described above would be implemented across these different scenarios.

Refer Figures 5.7 - 5.13 for typical cross-sections showing potential landscape revegetation methodologies*.

*NOTE: PROFILES AND REVEGETATION METHODOLOGIES WOULD BE SUBJECT TO CHANGE DURING DETAILED DESIGN. ALL CROSS-SECTIONS LOOK SOUTH.
Figure 5.8: Dignams Creek bridge abutment (typical section)
Source: SMM.

Figure 5.9: Dignams Creek Road intersection (typical section)
Source: SMM.
Figure 5.12: Shallow cut (typical section)

Chainage 97,000

Figure 5.13: Large fill in National Park (typical section)

Chainage 96,500-96,650
### 5.2.2 REVEGETATION SPECIES

A planting and revegetation palette would be developed for the proposal, based on the species endemic to the proposal study area and site.

The species mixes would be categorised based on existing vegetation formations and communities and located closely to these original communities and where appropriate, in order to revegetate the areas affected by construction. Typically a diverse understory within an open tree canopy would be the desired outcome for much of the proposal (refer Plate 5.2).

The formations and communities are noted in Table 5.3, discussed in Section 2.7 and mapped in Figure 2.7.

The vegetation communities along the proposal corridor have been identified in the Upgrade of the Princes Highway, Dignams Creek Review of Environmental Factors, SKM (2013).

<table>
<thead>
<tr>
<th>FORMATION</th>
<th>COMMUNITY/ASSOCIATION</th>
<th>HABITAT &amp; SOILS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Riverbank/ Riverflat Forest</td>
<td>A1 River Peppermint - Rough-barked Apple - River Oak Herb Grass Riparian Forest of coastal lowlands, Southern Sydney Basin and South-east Corner.</td>
<td>Low-lying permanently wet depressions with poor drainage, near or on floodplains of creeks with permanent water or fringes of dams. Saline influences near the coast. Soils: Poorly drained, sandy or alluvial.</td>
</tr>
<tr>
<td>B Wet Gully Forest</td>
<td>B1 Mountain Grey Gum - Yellow Stringybark Moist Shrubby Open Forest in gullies of the coastal ranges, Northern South-east Corner (identified as Map Unit 3 in the REF).</td>
<td>Protected gullies of the upper slopes. Soils: Well-drained, weathered sandstone or clays.</td>
</tr>
<tr>
<td></td>
<td>B2 River Peppermint - Rough-barked Apple Moist Open Forest on sheltered sites, Southern South-east Corner (identified as Map Unit 4 in the REF).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B3 Coast Grey Box - Mountain Grey Gum - Stringybark moist shrubby open forest in coastal gullies, southern South East Corner (identified as Map Unit 2 in the REF).</td>
<td></td>
</tr>
<tr>
<td>C Dry Ridge Eucalypt Forest</td>
<td>C1 Silvertop Ash - Blue-leaved Stringybark - Woollybutt Shrubby Open Forest on coastal foothills central South-east Corner (identified as Map Unit 1 in the REF).</td>
<td>Protected gullies of the upper slopes. Soils: Well-drained, weathered sandstone or clays.</td>
</tr>
<tr>
<td>F Cleared Agricultural Land</td>
<td>F1 Cleared Open Grassland/Pasture with scattered trees.</td>
<td>Mostly on flat floodplains. Soils: Modified, poorly drained, sandy or alluvial.</td>
</tr>
</tbody>
</table>

---

**Plate 5.2:** Example of open forest with a diverse understory

---

**Table 5.3: REVEGETATION COMMUNITIES**
6 LANDSCAPE CHARACTER ASSESSMENT

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6.1 OVERVIEW

RMS’s ‘Guidelines for Landscape Character and Visual Impact Assessment’ (RMS, 2009) provides the following definition of landscape character:

‘Landscape character is the aggregate of built, natural and cultural aspects that make up an area and provide its unique sense of place. Landscape in this context is taken to include all aspects of a tract of land - the built, planted and natural topographical and ecological features.’

In applying this definition to the specific conditions within the study area and the features of the proposal, the landscape character assessment also considers how the highway is used and how it functions as a part of the region. The assessment has looked at both existing landscape character and landscape character post-completion.

6.1.2 LANDSCAPE CHARACTER ASSESSMENT METHODOLOGY

The landscape character zones facilitate detailed assessment of the character of the proposal study area, of the proposal within it, and of the magnitude, sensitivity and impact likely on the landscape character of each zone to be experienced as a result of these proposal works. Refer the following section for a description of the landscape character zones.

Magnitude

In landscape character assessment, magnitude refers to the type of proposal and its compatibility with the existing landscape character. All anticipated elements of the proposal, including the bridge, alignment, road infrastructure, shared paths, planting, lighting, etc, are considered. The scale of the element (height, length), as well as its location or setting (on floodplain, near the town), all have a bearing on the magnitude of the physical presence of the works.

A high magnitude results if the proposal is a major development or piece of road infrastructure and contrasts highly with the surrounding landscape, or entails heavy modification of the existing landscape, for example, the large scale removal of existing vegetation. A moderate magnitude rating would result if the proposal is moderately integrated into the landscape. A low magnitude rating would occur if the proposal is of a small scale and integrates well into the landscape.

The magnitude impact rating also considers whether the proposal has a positive or negative impact on the landscape character of the zone. For example, a proposal may be of a large scale but may provide beneficial outcomes such as increased open space, enhancement of the area ‘sense of place’, and better connectivity.

Sensitivity

Sensitivity is assessed on the perceived value of the existing landscape character. A judgement has been made as to the quality of the landscape, its cultural and historical importance to the community, scenic quality, and overall composition of the place and its inhabitants. The following sensitivity judgements have been used as the basis for this assessment:

• Places with high social, recreational, and historical significance to local residents have higher sensitivity.
• Generally, water and natural environments are more highly valued than modified areas.
• Areas of unique scenic quality have higher sensitivity.
• A pristine environment would have greater sensitivity with less ability to absorb new elements in the landscape than modified landscapes or those areas with contrast and variety of landscape types.
• The number and frequency of viewers effects sensitivity, with retail, residential and open space.

Impact

Impact is the combination of the magnitude and sensitivity rating in accordance with the Impact Assessment Grading Matrix (refer Table 6.1).
6.2 LANDSCAPE CHARACTER ZONES

From the north, the existing highway passes through forested areas before descending into the scenic rural valley associated with Dignams Creek. The valley comprises a number of private farms and rural residences and the creek is crossed via an existing heritage listed bridge. The southern section of the proposal climbs over forested ridges adjacent to the Kooraban and Gulaga National Parks then into Bega Valley Shire with rural characteristics similar to that of Dignams Creek.

Following field and desktop studies, the proposal study area has been divided into four landscape character zones (LCZ). The zones correspond to landscape character types in the area and allow for a more detailed discussion of the character of each precinct, of the proposal within it, and of the potential impact on the landscape character. Each zone has been defined through gaining an understanding of land use, topography, and vegetation in combination with other factors (refer Figure 6.1).

The four landscape character zones are:

- LCZ1 - Northern Forested Ridges (towards Tilba Tilba within Eurobodalla Shire).
- LCZ2 - Dignams Creek valley (including Dignams Creek valley Road intersection).
- LCZ3 - Southern Forested Ridges (Gulaga and Kooraban National Parks).
- LCZ4 - Narira Creek valley (towards Cobargo within Bega Valley Shire).

Source: Department of Lands. Additional data provided by RMS. Artwork: SMM.
LANDSCAPE CHARACTER ZONE 1 ASSESSMENT

Existing Landscape Character

Landscape character zone 1 is at the northern end of the study area and includes the first 500 metres of the proposal. The road in this section is comprised of a two lane highway with a northbound and southbound lane. The road corridor is enclosed on both sides by densely vegetated forest (refer Figure 6.2 and Plate 6.1).

Short steep cut batters and shallow fills are frequent due to the rolling nature of the topography. The closeness of the forest causes light and shade patterns across the road surface and reduces sight lines, however this also has the effect of creating interest for the road user. The winding nature of the road is symptomatic of the age of the road and the tighter geometries that prevailed. Access to two residential properties occurs at the top of the ridge in this zone, and neither is well marked.

Landscape Character Assessment

Stage 1 proposal works in this LCZ would include minor pavement widening, construction of the northern tie-in, a cut batter of up to 9 m in height. A construction access road would be built connecting the northern tie-in to the existing bridge. Once Stage 1 is complete the construction road would be removed in this zone. The landscape character in this section would retain where possible the enclosed, tree-lined nature of the highway. Table 6.2 provides a summary of the landscape character assessment.

Sensitivity

Due to the tightly enclosed forest and infrequent openings, the zone would have a High to Moderate sensitivity to the proposal. As shown on Plate 6.1 the highway is enclosed by dense forest with cleared valleys beyond. Property access tracks connect with the highway at the top of the main ridge.

Magnitude

Due to the relatively short length and minimal cutting in this zone, the proposal in this zone would not amount to a substantial increase in pavement width. The visual elements of the works would comprise the trimming of batters, line marking modifications, and a minor realignment of the road. In addition, a connection with the old alignment would be made to maintain access to properties in Dignams Creek valley. Overall, the magnitude of the proposal would be Moderate due to the relatively limited changes taking place.

Landscape Character Impact

The qualitative assessment indicates that the landscape character impact of the proposal in this zone is likely to be High to Moderate due to the High to Moderate sensitivity of the zone and the Moderate magnitude of the works.

Table 6.2: LANDSCAPE CHARACTER ZONE 1 IMPACT ASSESSMENT

<table>
<thead>
<tr>
<th>Character</th>
<th>Sensitivity</th>
<th>Magnitude</th>
<th>Landscape Character Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landscape Character Zone 1: Northern Forested Ridges</td>
<td>High to Moderate</td>
<td>Moderate</td>
<td>High to Moderate</td>
</tr>
</tbody>
</table>
6.2.2 LANDSCAPE CHARACTER ZONE 2 ASSESSMENT

Existing Landscape Character

Dignams Creek valley comprises a pastoral setting consistent with a typical dairy farming landscape of the south coast. Whilst the higher country around it is densely vegetated, the valley floor and lower ridges are predominantly cleared of native vegetation, and instead vegetated with occasional exotic trees and pasture grasses (refer Figure 6.3 and Plate 6.2). Poplar trees (Populus nigra) punctuate the visual landscape providing a strong contrast in form to other species. Their place-marking of the Dignams Creek bridge is typical of this type of landscape. The trees can also be found on property boundaries, driveway entries, and adjacent to farm buildings.

The creek line is generally well vegetated with predominantly native species. Revegetation programs have been previously undertaken in the area to exclude stock from the creek line and to vegetate a corridor along its banks. The result is a dark ribbon of vegetation winding its way along the valley floor in contrast to the lighter green pasture surrounding it.

The highway meanders through the valley in a series of tight curves which progressively reveal the valley to the road user. Dignams Creek Road which intersects with the highway south of the bridge, follows the creek line along the valley in a north-northwesterly direction. Also prominent are property access tracks, many of which are unsealed. Often these tracks follow localised ridge lines Figure 6.3: Landscape character zone 2 extent

Landscape Character assessment

Stage 1 proposal works in this LCZ would comprise the construction of fill batters up to 12 m in height projecting over the valley floor on either side of the creek. The fill batters would be linked across the creek by a new concrete pier and ‘Super-T’ bridge structure, some 8 m above the creek, and approximately 91 m long. The fill batters would be stabilised through a combination of revegetation with native vegetation species and rock revetment where the potential for inundation exists closer to the creek.

The landscape character in this section would further emphasise the open nature of the highway through the more elevated position of the road surface. The character of the existing culturally modified landscape would remain, however new areas of vegetation would become increasingly evident over time. Table 6.3 provides a summary of the landscape character assessment.

Sensitivity

The landscape character of this zone is an attractive rural setting, with an open valley form, and therefore has a high sensitivity to the proposal. As shown in Plate 6.2 the valley consistent with a dairying landscape of cleared native vegetation, rolling hills punctuated by exotic landmark trees. Further patterning is created across this zone by the revegetated creek line, property access tracks following subtle forms in the landscape, and contrasting foliage and forms of exotic trees.

Landscape character currently experienced by the road user is a visually attractive rural landscape with features such as the existing bridge, and importantly, the lower speed in which they are viewed.

Magnitude

The proposal in this zone would substantially alter the form of the valley due to the bridge structure and associated raising of road levels. Visual emphasis would be created at the valley opening through the reduction in the valley width at the bridge crossing. The North-South alignment of the raised road surface contrasts with the East-West alignment of the valley floor and parallel ridge lines. Overall, the magnitude of the proposal would potentially be High due to the bulk and scale of the proposal.

Landscape Character Impact

The qualitative assessment indicates that the landscape character impact of the proposal in this zone is likely to be High due to the High sensitivity to change of the precinct and the High magnitude of the works.

Table 6.3: LANDSCAPE CHARACTER ZONE 2 IMPACT ASSESSMENT

<table>
<thead>
<tr>
<th>Landscape Character Zone 2: Dignams Creek Valley</th>
<th>Sensitivity</th>
<th>Magnitude</th>
<th>Landscape Character Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
</tbody>
</table>

Figure 6.3: Landscape character zone 2 extent

Plate 6.2: Landscape character zone 2 character images
6.2.3 LANDSCAPE CHARACTER ZONE 3 ASSESSMENT

Existing Landscape Character

Landscape character zone 3 comprises the Gulaga and Kooraban National Parks through which the Princes Highway corridor currently passes. Dense vegetation fronts both sides of the existing road through this zone, and views to the broader landscape are limited to several locations (refer Figure 6.4 and Plate 6.3).

Consultation with the National Parks and Wildlife Service (NPWS), the Department of Environment, Conservation & Water (DECCW) (now Office of Environment & Heritage), and local indigenous groups was undertaken to inform the road designers of specific issues in relation to park values (RMS Realignment Options Report, 2010).

These park values include the potential impact on:

- Conservation/ ecological issues.
- Fauna movement corridors.
- Alteration to the park boundary.
- Road infrastructure.
- Walking trails.

6.2.4 LANDSCAPE CHARACTER ASSESSMENT

Table 6.4: LANDSCAPE CHARACTER ZONE 3 IMPACT ASSESSMENT

| Stage 1 proposal works consist of road widening work including cut and fill and line marking to the existing road pavement. |
| The Stage 2 works in this section of the proposal would comprise substantial cut and fill, impacting on forested slopes adjacent to the realignment. This would result in the removal of existing vegetation, due to clearing for the new alignment, cutting of existing slopes and filling over existing slopes. The overall footprint of the proposal would be bigger due to the increased pavement width, and flatter slopes to comply with current standards. |
| The existing highway, where decommissioned in this zone, would be stripped of pavement and revegetated. This would contribute positively to the landscape character, although it would remain visible for several years. There is also the option of retaining part or all of the surface as walking or cycling trails, or service and maintenance access, if it can be connected into a broader pedestrian/cycling network. More research and discussion with the NPWS is required in order to determine if this is viable. |
| The landscape character in this section would retain where possible the enclosed, tree-lined nature of the highway and exposed rock batters. Table 6.4 provides a summary of the landscape character assessment. |

Sensitivity

Due to the landscape character of this zone being predominately an attractive and visually uniform forested landscape, the zone would have High to Moderate sensitivity to the proposal (refer Plate 6.3).

Magnitude

The proposal in this zone would increase the pavement width, require new clearing, and would encroach into the national parks through cutting and filling works required to establish the road level.

Overall, the magnitude of the proposal would potentially be High due to the scale of the works footprint.

Landscape Character Impact

The qualitative assessment indicates that the landscape character impact of the proposal in this zone is likely to be High due to the High to Moderate sensitivity to change of the zone and the High magnitude of the works.
6.2.5 LANDSCAPE CHARACTER ZONE 4 ASSESSMENT

Existing Landscape Character

Landscape character zone 4 is defined as the Narira Creek valley, located at the southern end of the proposal and forms the gateway into the town of Cobargo in the Bega Valley Shire. This valley exhibits similar characteristics to the Dignams Creek valley in terms of a landscape typology; however, the geophysical features are substantially different (refer Figure 6.5 and Plate 6.4).

The valley is broad and undulating, and differs from the general east-west alignment of Dignams Creek valley and associated ridge lines. The ridge lines of LCZ 3 and beyond as far as Mount Dromedary ("Gulaga" - 768 m asl) form an impressive backdrop to the west and north.

Property access tracks, often unformed, tend to follow the smaller ridge lines, and the Cobargo-Bermagui Road follows a ridge line approximately 3 km to the south of the southern tie-in of the proposal.

Landscape Character Assessment

The proposal works in this LCZ are minimal, with only the southern tie-in being constructed. This would result in a small increase to pavement area, relatively minor vegetation removal and minor reshaping of batters.

The landscape character in this section would further emphasise the open nature of the highway through the more elevated position of the road surface. The character of the existing culturally modified landscape would remain, however, new areas of vegetation would become increasingly evident over time. Table 6.5 provides a summary of the landscape character assessment.

Sensitivity

The landscape character of this zone is defined by the contrast between the enclosed forested hillsides with the openness of the cleared valley floor. As shown in Plate 6.4 the raised slopes appear darker than the valley landscape due to the dense native vegetation contrasting with the cleared valley. Further patterning is created across this zone by the property access tracks and gullies following more subtle forms in the landscape. As a result, this LCZ would have a Moderate to High sensitivity to the proposal.

Magnitude

The proposal in this zone would not increase pavement width substantially nor require substantial cut and fill operations or loss of vegetation.

Overall, the magnitude of the proposal would potentially be Low.

Landscape Character Impact

This precinct is only impacted during the proposal Stage 2 works.

The assessment indicates that the landscape character impact of the proposal in this zone is likely to be Moderate due to the High to Moderate sensitivity to change of the zone and the Low magnitude of the works.

Table 6.5: LANDSCAPE CHARACTER ZONE 4 IMPACT ASSESSMENT

| Landscape Character Zone 4: Narira Creek Valley | Sensitivity | High to Moderate |
| Magnitude | Low |
| Landscape Character Impact | Moderate |
6.3 LANDSCAPE CHARACTER ZONE IMPACT SUMMARY

6.3.1 IMPACT SUMMARY

The landscape character impact assessment of the proposal described above represents a qualitative assessment of four Landscape Character Zones. The results of these assessments are largely dependant on the staging of the proposal and are summarised in Table 6.6.

OVERALL STUDY AREA IMPACTS

The predicted landscape character impacts for each zone reflect the corresponding local conditions. They further reflect the scale of the proposal within each zone’s setting.

Overall, the proposal would have an impact on landscape character. While the works would partially take place in an established road corridor, they would impact on all Landscape Character Zones to some degree. The most substantial impact is in LCZ 2: Dignams Creek valley due to the magnitude of the proposal and openness of the valley.

While it is expected that the works would streamline and improve safety for road users through the proposal, the impression of landscape character and roadside scenery in general, from the road user’s perspective would be altered in that the road would be less responsive to the physical features of the landscape. Increased speed limits reduce viewing time of cultural and natural features.

From the perspective of the road viewer i.e. local property owners, tourists, cyclists and pedestrians, the character of the landscape would also result in a substantial impact, again in LCZ 2: Dignams Creek valley, due to the magnitude of the proposal and openness of the valley.

Table 6.6: LANDSCAPE CHARACTER ZONES IMPACT SUMMARY

<table>
<thead>
<tr>
<th>LCZ</th>
<th>STAGE</th>
<th>SENSITIVITY</th>
<th>MAGNITUDE</th>
<th>VISUAL IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCZ 1: Northern Forested Ridges</td>
<td>1</td>
<td>High to Moderate</td>
<td>Moderate</td>
<td>High to Moderate</td>
</tr>
<tr>
<td>LCZ 2: Dignams Creek valley</td>
<td>1</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>LCZ 3: Southern Forested Ridges</td>
<td>1 &amp; 2</td>
<td>High to Moderate</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>LCZ 4: Narra Creek valley</td>
<td>2</td>
<td>High to Moderate</td>
<td>Low</td>
<td>Moderate</td>
</tr>
</tbody>
</table>
7 VISUAL IMPACT ASSESSMENT

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The potential visual impact of the proposal has been assessed in relation to a number of key viewpoints. It is based on the existing pattern of land use and development adjoining the works. The method of assessment involved:

- Defining the scale or size, form and type of the proposal within the context of the study area.
- Establishing an estimated visual catchment, through desktop analysis and groundtruthing on site.
- Identifying key viewpoints from where the proposal would be visible.
- Assessing the level of potential visual impact on viewers at these viewpoints from the proposal.

### 7.3.2 Visual Impact Assessment Methodology

The magnitude of change to existing views and the sensitivity of the viewer has been assessed for each of the chosen viewpoints (refer Table 7.1).

#### Magnitude

Magnitude refers to the nature and scale of the proposal, and the extent and proximity of the view to the works. Magnitude represents the contrast in scale, form and type of the proposal works to the location and context to which it is to be placed. A high magnitude results if the proposal works are of a major scale and are considered out of scale or uncharacteristic of the existing visual character; or if there is considerable modification to the existing landscape. A moderate magnitude would result if the proposal works are prominent but not considered to be substantially uncharacteristic with the existing visual character. A low magnitude results if there is minimal alteration to the existing view and the works are of a scale and nature that is consistent with the existing visual character.

#### Sensitivity

Sensitivity is the measure of the visual importance of the view and is dependent on the following:

- Distance between viewer and the works.
- The category of viewer such as resident, visitor or worker.
- The elements of the proposal that are visible.
- Importance of the view.

Visual sensitivity includes the consideration of the perceived cultural and historical values of the visual environment and the elements within it. Generally, viewers with the highest sensitivity include:

- Residents who have existing attractive views that would be affected by the proposal works.
- Users of public open space where their attention is focused on the visual landscape, for example, lookouts or other scenic natural areas.
- Communities that place high cultural and historical significance on the visual landscape.

Viewers with the lowest sensitivity are most likely to be:

- Employees focused on their work.
- Motorists whose attention is focused on driving.

#### Impact

Impact is the combination of the magnitude and sensitivity rating in accordance with the Impact Assessment Grading Matrix (refer to Table 7.1).

**Table 7.1: Impact Assessment Grading Matrix**

<table>
<thead>
<tr>
<th>Sensitivity</th>
<th>High</th>
<th>High to Moderate</th>
<th>Moderate</th>
<th>Moderate to Low</th>
<th>Low</th>
<th>Negligible</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>High impact</td>
<td>High to Moderate impact</td>
<td>Moderate impact</td>
<td>Moderate to Low impact</td>
<td>Low impact</td>
<td>Negligible</td>
</tr>
<tr>
<td>High to Moderate</td>
<td>High to Moderate impact</td>
<td>Moderate impact</td>
<td>Moderate to Low impact</td>
<td>Moderate to Low impact</td>
<td>Negligible</td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td>High to Moderate impact</td>
<td>Moderate impact</td>
<td>Moderate to Low impact</td>
<td>Moderate to Low impact</td>
<td>Moderate to Low impact</td>
<td>Negligible</td>
</tr>
<tr>
<td>Moderate to Low</td>
<td>Moderate to Low impact</td>
<td>Moderate impact</td>
<td>Moderate to Low impact</td>
<td>Moderate to Low impact</td>
<td>Negligible</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>Moderate impact</td>
<td>Moderate to Low impact</td>
<td>Moderate to Low impact</td>
<td>Negligible</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

7.1 **Overview**

The potential visual impact of the proposal has been assessed in relation to a number of key viewpoints. It is based on the existing pattern of land use and development adjoining the works. The method of assessment involved:

- Defining the scale or size, form and type of the proposal within the context of the study area.
- Establishing an estimated visual catchment, through desktop analysis and groundtruthing on site.
- Identifying key viewpoints from where the proposal would be visible.
- Assessing the level of potential visual impact on viewers at these viewpoints from the proposal.

### 7.3.2 Visual Impact Assessment Methodology

The magnitude of change to existing views and the sensitivity of the viewer has been assessed for each of the chosen viewpoints (refer Table 7.1).

**Magnitude**

Magnitude refers to the nature and scale of the proposal, and the extent and proximity of the view to the works. Magnitude represents the contrast in scale, form and type of the proposal works to the location and context to which it is to be placed. A high magnitude results if the proposal works are of a major scale and are considered out of scale or uncharacteristic of the existing visual character; or if there is considerable modification to the existing landscape. A moderate magnitude would result if the proposal works are prominent but not considered to be substantially uncharacteristic with the existing visual character. A low magnitude results if there is minimal alteration to the existing view and the works are of a scale and nature that is consistent with the existing visual character.

**Sensitivity**

Sensitivity is the measure of the visual importance of the view and is dependent on the following:

- Distance between viewer and the works.
- The category of viewer such as resident, visitor or worker.
- The elements of the proposal that are visible.
- Importance of the view.

Visual sensitivity includes the consideration of the perceived cultural and historical values of the visual environment and the elements within it. Generally, viewers with the highest sensitivity include:

- Residents who have existing attractive views that would be affected by the proposal works.
- Users of public open space where their attention is focused on the visual landscape, for example, lookouts or other scenic natural areas.
- Communities that place high cultural and historical significance on the visual landscape.

Viewers with the lowest sensitivity are most likely to be:

- Employees focused on their work.
- Motorists whose attention is focused on driving.

**Impact**

Impact is the combination of the magnitude and sensitivity rating in accordance with the Impact Assessment Grading Matrix (refer to Table 7.1).
7.2 VISUAL CATCHMENT ZONES

The physical characteristics of the site and the nature of the existing road corridor and the proposal define the visible area, or in other words the catchment of where the works are visible (refer Figure 7.1). This visual catchment has then been defined into three Visual Catchment Zones (VCZ) based on geographic proximity to the proposal and include:

- Primary VCZ approximately 0 - 500 m.
- Secondary VCZ approximately 500 m - 1.5 km.
- Tertiary VCZ & Long Range Views approximately 1.5 - 3+ km.

![Figure 7.1: Visual Catchment Zones](source: Base map Department of Lands; additional base data provided by RMS; artwork: SMM)
7.3 VIEWPOINT ASSESSMENT METHODOLOGY

Within the Visual Catchment Zones (VCZ), key viewpoints and potential viewpoints have been identified, with key viewpoints assessed in greater detail. Potential viewpoints are representative of locations including existing homesteads and property access roads that were unable to be inspected during site investigations; however, were seen as potential viewpoints through desktop analysis.

Mapping & Imagery

The chosen viewpoints are assessed using the following methods:

- Field investigations and imagery (Plate 7.1).
- AutoCAD generated perspective views based on survey data (Figure 7.3).
- Aerial views, perspective views and transects (Refer Figures 7.2 - 7.4) using Google Earth software. The road realignment was superimposed over aerial images generated in Google Earth and georeferenced with site survey, from which reasonably accurate levels can be determined.

Viewpoints assessment:

In measuring the impact of change, the following conditions are taken into account:

Key Viewpoints:

- Distance between viewer and road.
- Elevation change between viewer and road.
- A visual and desktop assessment made of the vertical & horizontal field of view impacted on by physical features.
- An assessment made of the type of intervention made by the proposal into the existing landscape.

Potential Viewpoints:

- Distance between viewer and road.
- Elevation change between viewer and road.
- A desktop assessment made of the vertical & horizontal field of view impacted on by physical features.
- An assessment made of the type of intervention made by the proposal into the existing landscape.

Assessment conditions:

The assessments are collated in order to determine the impact of the proposal against two primary conditions:

- The impact from private properties or other selected locations likely to be accessed by viewers where they fall within the visual catchment.
- The impact upon users of the highway itself or other connecting roads.
7.4 PRIMARY VISUAL CATCHMENT ZONE

7.3.1 DESCRIPTION
An assessment of the immediate terrain has determined the Primary VCZ as an approximate 500 m band around the proposal.

The definition of the zone is particularly relevant in Dignams Creek valley, where local residences tend to be located on localised high ground, some with views across the valley. Many of the residences are enclosed by vegetation, which in its current form would screen views of the proposal. However, vegetation density may change over time due to a variety of factors, such as fire. The primary VCZ is also relevant at the southern tie-in of Stage 2, where rural residences look up towards the proposal. For the remainder of the proposal the primary VCZ is not relevant as the proposal would not pass any view points within this range.

Another aspect of visual impact is its relationship to headlight glare and noise. Residences in close proximity to the proposal may also experience these changes in their environmental conditions. Refer to Section 4 of this report for strategies that deal with these issues.

7.3.2 VIEWPOINTS
Four key viewpoints and two potential viewpoints have been identified within the zone due to proximity to the proposal and their aspect (refer Figure 7.5). General characteristics of each of these viewpoints are provided in Table 7.2.

Refer Section 4 & 5 of this proposal for an outline of urban design and landscape revegetation strategies and locations of proposed treatments.
Table 7.2: PRIMARY VISUAL CATCHMENT ZONE IMPACT ASSESSMENT

<table>
<thead>
<tr>
<th>VIEWPOINT NO.</th>
<th>VIEW LOCATION &amp; ASPECT</th>
<th>ELEMENTS OF PROPOSAL POTENTIALLY VISIBLE BY STAGE</th>
<th>DISTANCE TO PROPOSAL (M)</th>
<th>VISUAL SENSITIVITY</th>
<th>MAGNITUDE OF VISUAL EFFECT</th>
<th>OVERALL RATING OF VISUAL IMPACT</th>
<th>DESCRIPTION / COMMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>V01a K</td>
<td>Private residence located to the west of the proposal on the western side of Dignams Creek Road (refer Plate 7.2). Looking east-north-east towards fill embankment which forms approach to bridge.</td>
<td>Stage 1: Revegetated fill embankment, road pavement. The viewpoint is largely unaffected by Stage 2 of the proposal as it is screened by landform and vegetation.</td>
<td>450</td>
<td>H-M</td>
<td>H-M</td>
<td>H-M</td>
<td>The top of bank would sit lower than viewer so road pavement would potentially be overlooked. Existing vegetation along the creek line and towards the fill embankment would potentially limit views. Provide strategic revegetation to supplement existing. No landform obstructions are present so proposal would potentially be visible where existing vegetation not present.</td>
</tr>
<tr>
<td>V01b K</td>
<td>Looking east-north-east towards elevated cutting in vegetated hillside at northern tie-in.</td>
<td>Stage 1: Exposed rock, vegetation removal, notched landform on visible horizon.</td>
<td>920</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>The top of cut would sit higher than viewer so cut rock face would potentially be visible. Rock face would darken over time and natural revegetation would occur to mitigate visual impact. Landform would partially limit view depending on exact viewpoint location.</td>
</tr>
<tr>
<td>V01c K</td>
<td>Looking east towards the proposed bridge at Dignams Creek from private residence and to the elevated cutting in vegetated hillside beyond.</td>
<td>Stage 1: New bridge, including concrete pier and headstock, parapet, and guard rails, rock lined and revegetated embankments.</td>
<td>250</td>
<td>H-M</td>
<td>H</td>
<td>H</td>
<td>The proposed bridge would sit lower than the viewer so would potentially be overlooked where existing vegetation not present. No landform obstructions are present so proposal would potentially be visible where existing vegetation not present.</td>
</tr>
<tr>
<td>V02a K</td>
<td>Viewpoint 2 is a private residence located to the west of the proposal on the eastern side of Dignams Creek Road (refer Plate 7.3). Looking east towards bridge and adjacent fill embankment.</td>
<td>Stage 1: Revegetated fill embankment, road pavement. The viewpoint is largely unaffected by Stage 2 of the proposal as it would be screened by landform and vegetation.</td>
<td>470</td>
<td>M</td>
<td>H-M</td>
<td>H-M</td>
<td>The top of bank would sit lower than viewer so road pavement would potentially be visible where existing vegetation not present. Landform obstructions would partially block view of fill embankment.</td>
</tr>
<tr>
<td>V02b K</td>
<td>Looking east towards elevated cutting in vegetated hillside at northern tie-in.</td>
<td>Stage 1: Exposed rock, vegetation removal, notched landform on visible horizon.</td>
<td>290</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>The top of cut would sit higher than viewer so exposed rock would potentially be visible where existing vegetation not present. No landform obstructions present so proposal would potentially be visible if existing vegetation not present.</td>
</tr>
<tr>
<td>V02c K</td>
<td>Looking south-east towards proposed bridge and adjacent fill embankment.</td>
<td>Stage 1: Bridge and bridge elements, revegetated fill embankment.</td>
<td>290</td>
<td>H-M</td>
<td>H</td>
<td>H</td>
<td>The bridge and top of bank would sit lower than viewer therefore bridge and embankments would potentially be visible. No landform obstructions are present so proposal would potentially be visible where existing vegetation not present.</td>
</tr>
</tbody>
</table>
### Table: PRIMARY VISUAL CATCHMENT ZONE IMPACT ASSESSMENT (continued)

<table>
<thead>
<tr>
<th>Viewpoint</th>
<th>Type</th>
<th>Description</th>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Impact Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>V03a K</td>
<td></td>
<td>Viewpoint 3 is a private residence located to the west of the proposal on the eastern side of Dignams Creek Road (refer Plate 7.4).</td>
<td>Revegetated fill embankment, road pavement.</td>
<td>The viewpoint would be largely unaffected by Stage 2 of the proposal.</td>
<td>The top of bank would lower than viewer therefore embankment and road pavement would potentially be visible where existing vegetation not present.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Looking east towards fill embankment and beyond to cutting in northern tie in.</td>
<td></td>
<td></td>
<td>Vegetation along the creek line and towards the fill embankment would potentially limit views.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Landform obstructions would block view of bridge and fill embankment.</td>
</tr>
<tr>
<td>V03b K</td>
<td></td>
<td>Looking south towards cutting on southern side of Dignams Creek valley.</td>
<td>Revegetated fill embankment, road pavement.</td>
<td>Notched landform on visible horizon.</td>
<td>The top of cut would sit higher than viewer therefore cut rock surface would potentially be visible.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No landform obstructions present so exposed rock surface would potentially be visible where existing vegetation not present.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No landform obstructions present so the proposal would potentially be visible where existing vegetation not present.</td>
</tr>
</tbody>
</table>

#### Plates

- **Plate 7.4**: Viewpoint 03.
- **Plate 7.5**: Viewpoint 10.

---

<table>
<thead>
<tr>
<th>Viewpoint</th>
<th>Type</th>
<th>Description</th>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Impact Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>V10a K</td>
<td></td>
<td>Viewpoint 10 is a former private residence (currently owned by RMS) located to the east of the proposal adjacent to the existing Princes Highway (refer Plate 7.5).</td>
<td>Revegetated fill embankment, road pavement.</td>
<td></td>
<td>The top of bank sits lower than viewer so the proposal would potentially be overlooked where existing vegetation not present.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Looking north-west towards fill embankment which forms approach to bridge.</td>
<td></td>
<td></td>
<td>Vegetation and landform would not obstruct views.</td>
</tr>
<tr>
<td>V10b K</td>
<td></td>
<td>Looking west towards the proposed bridge crossing at Dignams Creek from private residence.</td>
<td>Revegetated fill embankment, road pavement.</td>
<td></td>
<td>The proposed bridge and associated embankments and abutments would be highly visible from this viewpoint due to the high vantage point and the unobstructed view of the valley.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Stage 1: Bridge visible at a distance of 350 m, including concrete pier and headstock, parapet, and guard rails, cuttings, rock lined and revegetated embankments.</td>
<td></td>
<td>Vegetation along creek would not obstruct views towards bridge.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Landform would not obstruct views.</td>
</tr>
<tr>
<td>V10c K</td>
<td></td>
<td>Looking south-west towards cutting on southern side of Dignams Creek valley.</td>
<td>Revegetated fill embankment, road pavement.</td>
<td>Notched landform on visible horizon.</td>
<td>The top of cut would sit higher than viewer and is blocked by dense vegetation, so the proposal at a lower RL would potentially not be visible from this location.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Existing remnant vegetation between existing highway alignment and the proposal would potentially obstruct views.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Landform would partially obstruct views.</td>
</tr>
<tr>
<td></td>
<td>Viewpoint</td>
<td>Description</td>
<td>Stage 2: Revegetated fill embankment</td>
<td>Viewpoint would be largely unaffected by Stage 1 of the proposal.</td>
<td>Remarks</td>
</tr>
<tr>
<td>---</td>
<td>-----------</td>
<td>-------------</td>
<td>--------------------------------------</td>
<td>-----------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>V11</td>
<td>Viewpoint 11 is a private residence located on the southern tie-in of Stage 2 with the existing Princes Highway.</td>
<td>Looking north towards fill embankment at southern tie-in.</td>
<td>The top of fill would sit higher than viewer and would be blocked by dense vegetation, so the proposal would potentially not be visible from this location.</td>
<td>Existing vegetation and landform would not obstruct views.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V12</td>
<td>Viewpoint 12 is a private residence located on the southern tie-in of Stage 2 with the existing Princes Highway.</td>
<td>Looking east-north-east towards fill embankment at southern tie-in.</td>
<td>The top of cutting would sit higher than viewer and would be blocked by dense vegetation, so the proposal would potentially not be visible from this location.</td>
<td>Existing vegetation would potentially obstruct views.</td>
<td>Landform would not obstruct views.</td>
</tr>
</tbody>
</table>

**KEY:** Neg = Negligible VL = Very Low L = Low M-L = Medium Low M = Medium M-H = Medium High H = High
7.5 SECONDARY VISUAL CATCHMENT ZONE

7.4.1 DESCRIPTION
The Secondary VCZ has been determined as an approximate 1km wide band around the proposal works, between 0.5-1.5 km from the proposal.

This zone captures rural residences within Dignams Creek valley that are well away from the proposal, however some are in more elevated positions. As with the primary and secondary VCZs, many of the residences are enclosed by vegetation, however this can not be relied upon for long term visual mitigation due to the risk of fire destroying the vegetation and hence opening up views of the proposal. The secondary VCZ is also relevant at the southern tie-in of Stage 2, where rural residences in the Narira Creek valley would look up towards the major cutting along the main east-west ridgeline.

Another aspect of visual impact is the relationship to headlight glare. Some residences in close proximity to the proposal may experience changes in their environmental conditions.

Refer Section 4 for headlight glare related strategies.

7.4.2 VIEWPOINTS
Two key viewpoints in and 15 potential viewpoints in have been identified within the zone due to proximity to the proposal and their aspect (refer Figure 7.6). General characteristics of each of these viewpoints are provided in Table 7.3.

Refer Section 4 & 5 of this proposal for an outline of urban design and landscape revegetation strategies and locations of proposed treatments.
### Table 7.3: SECONDARY VISUAL CATCHMENT ZONE IMPACT ASSESSMENT

<table>
<thead>
<tr>
<th>VIEW LOCATION &amp; ASPECT</th>
<th>ELEMENTS OF PROPOSAL POTENTIALLY VISIBLE BY STAGE</th>
<th>DISTANCE TO PROPOSAL (M)</th>
<th>VISUAL SENSITIVITY</th>
<th>MAGNITUDE OF VISUAL EFFECT</th>
<th>OVERALL RATING OF VISUAL IMPACT</th>
<th>DESCRIPTION / COMMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>V04a</strong> K</td>
<td>Viewpoint 4 is a private residence located to the west of the proposal on the western side of Dignams Creek Road (refer Plate 7.6). Looking east-south-east towards fill embankment which forms approach to bridge.</td>
<td>Stage 1: Revegetated fill embankment, road pavement and bridge. The viewpoint would be largely unaffected by Stage 2 of the proposal.</td>
<td>650</td>
<td>M-L</td>
<td>M-L</td>
<td>The proposed bridge would sit lower than the viewer so the proposal would potentially be overlooked. Vegetation along the creek line and towards the fill embankment would not obstruct views. However foreground vegetation would potentially obstruct views. Landform would potentially obstruct views of the proposal generally.</td>
</tr>
<tr>
<td><strong>V04b</strong> K</td>
<td>Looking south towards cutting on southern side of Dignams Creek valley.</td>
<td>Stage 1: Exposed rock, vegetation removal, notched cutting on visible landform horizon.</td>
<td>820</td>
<td>M-L</td>
<td>M-L</td>
<td>Vegetation would potentially obstruct views towards proposed cutting. Landform would potentially obstruct views of the proposal generally.</td>
</tr>
<tr>
<td><strong>V05a</strong> K</td>
<td>Viewpoint 5 is a private residence located to the west of the proposal on the Eastern side of Dignams Creek Road. Looking south towards bridge and adjacent fill embankment.</td>
<td>Stage 1: Revegetated fill embankment, road pavement. The viewpoint is largely unaffected by Stage 2 of the proposal.</td>
<td>600</td>
<td>M-L</td>
<td>M</td>
<td>Vegetation along the creek line and towards the fill embankment would not obstruct views. Landform would not obstruct views of the proposal.</td>
</tr>
<tr>
<td><strong>V05b</strong> P</td>
<td>Looking south towards cutting on southern side of Dignams Creek valley.</td>
<td>Stage 1: Exposed rock, vegetation removal, notched cutting on visible landform horizon.</td>
<td>930</td>
<td>M-L</td>
<td>M</td>
<td>Vegetation would potentially obstruct views towards proposed cutting. Landform would generally not obstruct views.</td>
</tr>
<tr>
<td><strong>V06a</strong> P</td>
<td>Viewpoint 6 is a private residence located to the west of the proposal on the Eastern side of Dignams Creek Road (refer Plate 7.7). Looking south towards cutting on southern side of Dignams Creek valley.</td>
<td>Stage 1: Exposed rock, vegetation removal, notched cutting on visible landform horizon. The viewpoint would be largely unaffected by Stage 2 of the proposal.</td>
<td>1150</td>
<td>L</td>
<td>M-L</td>
<td>Vegetation along the creek line would not obstruct views, however existing vegetation closer to the proposal would potentially obstruct views. Landform would not obstruct views of the proposal generally.</td>
</tr>
<tr>
<td><strong>V06b</strong> P</td>
<td>Looking south towards cutting approaching southern tie in. Stage 2: View at cutting towards southern tie in.</td>
<td>Stage 2: Exposed rock, vegetation removal, notched cutting on visible landform horizon.</td>
<td>2240</td>
<td>M-L</td>
<td>M-L</td>
<td>Vegetation would potentially obstruct views towards the proposed cutting. Landform would generally not obstruct views of the proposal.</td>
</tr>
<tr>
<td><strong>V07a</strong> P</td>
<td>Viewpoint 7 is a private residence located to the west of the proposal on the Eastern side of Dignams Creek Road (refer Plate 7.8). Looking south towards bridge and adjacent fill embankment.</td>
<td>Stage 1: Revegetated fill embankment, road pavement. The viewpoint would be largely unaffected by Stage 2 of the proposal.</td>
<td>780</td>
<td>L</td>
<td>M-L</td>
<td>Vegetation along the creek line would not obstruct views. Landform would obstruct views of the proposal.</td>
</tr>
</tbody>
</table>
### Table: SECONDARY VISUAL CATCHMENT ZONE IMPACT ASSESSMENT (continued)

<table>
<thead>
<tr>
<th>Viewpoint</th>
<th>Description</th>
<th>Stage 1 Details</th>
<th>Stage 2 Details</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>V07b P</td>
<td>Looking south towards cutting on southern side of Dignams Creek valley.</td>
<td>Stage 1: Exposed rock, vegetation removal, notched landform on visible horizon.</td>
<td>1130 M-L M-L M-L</td>
<td>Vegetation would potentially obstruct views towards proposed cutting. Landform would not obstruct views of the proposal.</td>
</tr>
<tr>
<td>V08a K</td>
<td>Viewpoint 8 is a private residence located to the west of the proposal on the Eastern side of Dignams Creek Road (refer Plate 7.8).</td>
<td>Stage 1: Revegetated fill embankment, road pavement.</td>
<td>970 L L L</td>
<td>Vegetation along the creek line would not obstruct views of the proposal. Landform would obstruct views of the proposal.</td>
</tr>
<tr>
<td>V08b K</td>
<td>Looking south towards cutting on southern side of Dignams Creek valley.</td>
<td>Stage 1: Exposed rock, vegetation removal, notched cutting on visible landform horizon.</td>
<td>1050 L M-L M-L</td>
<td>Vegetation would potentially obstruct views towards proposed cutting. Landform would obstruct views of the proposal.</td>
</tr>
<tr>
<td>V09a K</td>
<td>Viewpoint 9 is a private residence located to the west of the proposal on the Eastern side of Dignams Creek Road (refer Plate 7.9).</td>
<td>Stage 1: Exposed rock, vegetation removal, notched landform on visible horizon.</td>
<td>1330 M-L M M</td>
<td>Vegetation along the creek line would not obstruct views. However vegetation toward proposed cutting batter would potentially obstruct views. Landform would not obstruct views of the proposal.</td>
</tr>
<tr>
<td>V09b K</td>
<td>Looking south towards cutting approaching proposed southern tie-in.</td>
<td>Stage 2: Exposed rock, vegetation removal, notched landform on visible horizon.</td>
<td>2300 M-L M M</td>
<td>Vegetation would potentially obstruct views towards cutting. Landform would generally obstruct views.</td>
</tr>
<tr>
<td>V13 P</td>
<td>Viewpoint 13 is a private residence located south-west of the proposed southern tie-in.</td>
<td>Stage 2: Revegetated fill embankment, road pavement.</td>
<td>730 M M M</td>
<td>Vegetation would potentially obstruct some views. Landform would generally not obstruct views of the proposal.</td>
</tr>
<tr>
<td>V14 P</td>
<td>Viewpoint 14 is a private residence located south-west of the proposed southern tie-in.</td>
<td>Stage 2: Revegetated fill embankment, road pavement.</td>
<td>1360 M-L M-L M-L</td>
<td>Vegetation may obstruct some views. Landform would generally obstruct views.</td>
</tr>
</tbody>
</table>
Viewpoint 15 is a private residence located south-east of the proposed southern tie-in.
- Looking north-east towards the southern tie-in fill embankment and the ridgeline cutting.
- Stage 2: Revegetated fill embankment, road pavement, Rock cutting and notch in visible horizon.
- The viewpoint would be largely unaffected by Stage 1 of the proposal.
- Vegetation would not obstruct views.
- Landform would generally not obstruct views.

Viewpoint 16 is a private residence located south-east of the southern tie-in.
- Looking north-east towards the southern tie-in fill embankment and the ridgeline cutting.
- Stage 2: Revegetated fill embankment, road pavement, Rock cutting and notch in visible horizon.
- The viewpoint would be largely unaffected by Stage 1 of the proposal.
- Vegetation would not obstruct views of the proposal.
- Landform would not obstruct views of the proposal.

Viewpoint 17 is a private residence located south-east of the southern tie-in.
- Looking north-east towards the southern tie-in fill embankment and the ridgeline cutting.
- Stage 2: Revegetated fill embankment, road pavement, Rock cutting and notch in visible horizon.
- The viewpoint would be largely unaffected by Stage 1 of the proposal.
- Vegetation would generally not obstruct views of the proposal.
- Landform would generally not obstruct views of the proposal.

**KEY:** Neg = Negligible  VL = Very Low  L = Low  M-L = Medium Low  M = Medium  M-H = Medium High  H = High
7.6 TERTIARY VISUAL CATCHMENT ZONE

7.5.1 DESCRIPTION
The Tertiary VCZ has been determined as an approximate 1.5 km wide band around the proposal works, between 1.5-3 km from the proposal. Beyond this, some potential longer-range viewpoints have also been assessed.

This zone captures rural residences that are well away from the proposal and visually disconnected due to local topography and vegetation. As with the primary and secondary VCZ, many of the residences are enclosed by vegetation, however this can not be relied upon for long term visual mitigation due to the risk of fire destroying the vegetation and hence opening up views of the proposal. Other long-range locations are the top of Gulaga (Mount Dromadery) and selected locations along the Cobargo-Bermagui Road.

Other views of the proposal may exist, however due to the surrounding topography and the distances involved, it is assumed the proposal would not substantially impact on longer range views. Residences and viewpoints in this range are not expected to be impacted on by headlight glare.

7.5.2 VIEWPOINTS
Four potential viewpoints have been identified within the zone due to proximity to the proposal and their aspect (refer Figure 7.7). General characteristics of each of these viewpoints are provided in Table 7.4.

Refer Section 4 & 5 of this proposal for an outline of urban design and landscape revegetation strategies and locations of proposed treatments.
## Table 7.4: Tertiary Visual Catchment Zone Impact Assessment

<table>
<thead>
<tr>
<th>VIEWPOINT NO.</th>
<th>KEY OR POTENTIAL (P)</th>
<th>VIEW LOCATION &amp; ASPECT</th>
<th>ELEMENTS OF PROPOSAL POTENTIALLY VISIBLE BY STAGE</th>
<th>DISTANCE TO PROPOSAL (M)</th>
<th>MAGNITUDE OF VISUAL EFFECT</th>
<th>OVERALL RATING OF VISUAL IMPACT</th>
<th>DESCRIPTION / COMMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>V18</td>
<td>P ¬</td>
<td>Viewpoint 18 is from Mount Dromaderry lookout. ¬ Looking south to cutting near southern tie-in.</td>
<td>¬ Stage 1: Cuttings, notched landform, exposed rock, revegetated fill embankments, widened road pavement. ¬ Stage 2: Substantial cut &amp; fill, notched landform, removal of vegetation, revegetated fill embankments, widened pavement.</td>
<td>8500</td>
<td>M-L</td>
<td>L</td>
<td>¬ Vegetation would generally obstruct views of Stage 1 of the proposal. ¬ Landform would generally not obstruct views of Stage 2 of the proposal. ¬ Distance of viewpoint would reduce visibility of the proposal.</td>
</tr>
<tr>
<td>V19</td>
<td>P ¬</td>
<td>Viewpoint 19 is a private residence at the foothills of Mount Dromaderry. ¬ Looking south to cutting near southern tie-in.</td>
<td>¬ Stage 1: Cuttings, notched landform, exposed rock, revegetated fill embankments, widened road pavement. ¬ Stage 2: Substantial cut &amp; fill, notched landform, removal of vegetation, revegetated fill embankments, widened pavement.</td>
<td>4600</td>
<td>M-L</td>
<td>L</td>
<td>¬ Vegetation would generally obstruct views of the proposal. ¬ Landform would generally obstruct views of the proposal. ¬ Distance of viewpoint would reduce visibility of the proposal.</td>
</tr>
<tr>
<td>V20</td>
<td>P ¬</td>
<td>Viewpoint 20 is typical view located south of the southern tie-in on Cobargo-Bermagui Road. ¬ Looking north towards the proposal from the Cobargo-Bermagui Road.</td>
<td>¬ Stage 2: Substantial cut &amp; fill, notched landform, removal of vegetation, revegetated fill embankments, widened pavement. ¬ The viewpoint would be largely unaltered by Stage 1 of the proposal.</td>
<td>4200</td>
<td>M-L</td>
<td>L</td>
<td>¬ Vegetation would not generally obstruct views of the proposal. ¬ Landform would not obstruct views of the proposal. ¬ Distance of viewpoint would reduce visibility of the proposal of the proposal.</td>
</tr>
<tr>
<td>V21</td>
<td>P ¬</td>
<td>Viewpoint 21 is a typical view located south of the southern tie-in on Cobargo-Bermagui Road. ¬ Looking north towards the proposal from the Cobargo-Bermagui Road.</td>
<td>¬ Stage 2: Substantial cut &amp; fill, notched landform, removal of vegetation, revegetated fill embankments, widened pavement. ¬ The viewpoint would be largely unaltered by Stage 1 of the proposal.</td>
<td>4200</td>
<td>L</td>
<td>L</td>
<td>¬ Vegetation would not obstruct views of the proposal. ¬ Landform would generally not obstruct views of the proposal. ¬ Distance of viewpoint would reduce visibility of the proposal.</td>
</tr>
</tbody>
</table>

**KEY:** Neg = Negligible  VL = Very Low  L = Low  M-L = Medium Low  M = Medium  M-H = Medium High  H = High
7.7 ROAD USER VIEWS

7.6.1 DESCRIPTION
Road user views have been assessed in order to better understand the visual changes which would be experienced with the proposal. The views and visual experience of road users need to be carefully considered in order to promote a visually attractive, stimulating and safe experience for the motorist. The relationship between road user views and urban design principles can improve this driver experience and contribute to a ‘sense of place’.

The road user would encounter distinct visual experiences on the proposal, which is summarised as follows:

• Enclosed forest experience with fleeting glimpses of vistas across farming land and vegetated areas.
• Open views across farming land punctuated with rural heritage, rural residences and landmark trees.
• View of road surface transitions at the northern and southern tie-ins.
• At night, views would be constrained to the road surface itself, with mitigation measures provided in order to reduce headlight glare from oncoming traffic.

7.6.2 VIEWPOINTS
A series of typical views were assessed in order to prepare a summary of the existing driving experience and indicate how these views would be impacted. During the analysis, the road realignment was superimposed over images generated in Google Earth and georeferenced with site survey, from which reasonably accurate levels could be determined. For areas of the proposal comprising off-line sections of highway, a desktop study has been utilised for these areas.

Tie-ins
The road user experience at the northern and southern tie-ins would be dramatically impacted by the proposal. This would result from substantial vegetation loss and exposure of rock cuttings as the alignment would deviate off its current path into the adjacent forest.

Approaches to Dignams Creek valley
The road user experience on approach to the valley would comprise broader views across the valley to the forested edges beyond due to the wider and higher road platform. This would result from:

• The northern approach would cross the valley from a higher elevation, affording views to the south, east and west before rising into the National Park.
• The southern approach would cross the valley from a relative vantage point, affording views to the north, east and west before rising into the foothills of Mount Dromaderry (Gulaga).

Whilst longer view distances would be experienced there would be a corresponding reduction in detailed foreground views due to the higher elevations and increased vehicle speeds.

Forested sections
The road user experience within the forested sections would be similar to the existing highway condition, in that the forest would visually enclose the road. This enclosure would be reduced however due to:

• Larger cuttings and fill embankments, which would result in longer sight distances on bends.
• Wider cuts would open up views.
• Higher elevations when on fill embankments would afford longer views across or through the forest in several locations.

Dignams Creek Road Intersection and local access
Dignams Creek Road is a typical local road within a rural area. It comprises sealed and unsealed sections and a sequence of tree-lined and open verges. For the most part this would remain unchanged due to minimal works to the road.

Western Approach:
• On approach to the intersection, Dignams Creek Road would alter course in order to achieve the required grade and curve radii. Retaining walls and earthworks would be required in order to achieve this.
• The views experienced by the local road user would be dramatically altered for this small length of road and the road user would become increasingly aware of the new highway conditions.
• The at-grade intersection would potentially become a local landmark through plantings of cultural tree species, which reflect the existing character of the valley. Views towards the south would comprise dense forest, whilst vistas of the rural valley would be possible to the north.

Eastern Approach:
• The eastern approach is from a single private farm and residence currently owned by the RMS. This private property access would cross Dignams Creek via the existing bridge, before passing underneath the new bridge to the western approach to the intersection.
• The experience of the local road user would be significantly improved, a result of incorporation of the heritage listed bridge and increased foreground viewing opportunities of Dignams Creek.
• The proposed cultural tree plantings south of the intersection would reinforce the sense of place experienced by the road user.

Plate 7.12: Southern tie-in
7.8 SUMMARY OF VISUAL IMPACTS

7.7.1 SUMMARY OF VISUAL IMPACT RATINGS

The visual impact assessment of the proposal described above represents a qualitative assessment based on Visual Catchment Zones, long-range viewpoints and road users of the proposal. Table 7.5 summarises the assessment results:

Table 7.5: VISUAL IMPACT ASSESSMENT SUMMARY

<table>
<thead>
<tr>
<th>VISUAL CATCHMENT ZONE</th>
<th>SENSITIVITY</th>
<th>MAGNITUDE</th>
<th>VISUAL IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Zone: 0-500 m</td>
<td>H-M</td>
<td>H</td>
<td>H-M</td>
</tr>
<tr>
<td>Secondary Zone: 500 m - 1.5 km</td>
<td>M</td>
<td>M-L</td>
<td>M</td>
</tr>
<tr>
<td>Tertiary Zone: 1.5 km - 3+ km</td>
<td>M-L</td>
<td>L</td>
<td>M-L</td>
</tr>
</tbody>
</table>

7.8.1 OVERALL STUDY AREA IMPACTS

The proposal would have an impact on views in and around the study area. While the works, for the most part, are to take place in an established road corridor; they would impact on all Visual Catchment Zones (VCZ) to some degree, with the greatest impact being on local residents within the Primary VCZ and Dignams Creek valley.

From the road users perspective, the proposal would be less responsive to the physical features of the landscape. When combined with increased speed limits, this would reduce the viewing time of cultural and biophysical features, which are distinct in this region.

The proposed cuttings provide an opportunity to reveal the underlying geology of the area and revegetation would be undertaken. The new bridge would afford sweeping views of Dignams Creek valley and when driving north, background views of Mount Dromadery (Gulaga).

Therefore, the overall visual impacts would be substantial depending on the range from which the proposal is viewed as well as the component of the proposal that is being viewed. These can be broadly described as follows:

- Views within the Primary VCZ of revegetated fill embankments and exposed rock cutting faces would be less of an impact than views of built structures and road pavement, which would comprise a substantial impact.
- Views from Secondary VCZ viewpoints of elevated road pavement and cuttings would comprise a substantial impact.
- Visual impacts from the Tertiary VCZ would be substantial where views of notched ridge tops occur.

Refer Section 4 & 8 for urban design principles and mitigation strategies.
8 MITIGATION MEASURES & CONCLUSIONS

8.1 Overview 76
8.2 Mitigation Measures 76
8.3 Conclusion 76
8.1 OVERVIEW

In order to generate a proposal outcome that integrates the engineering and performance objectives with urban and landscape design objectives, a two-stage process has taken place:

• Iterative engineering and urban design running in parallel, which optimises the integration of the road elements into the landscape.
• Development of mitigation measures to further reduce the impacts of the proposal’s road and associated structures and elements on areas adjoining the road corridor.

This process aims to produce a design outcome that has high visual quality, whilst also satisfying technical requirements. In order to achieve this, a range of mitigation measures must be incorporated into the proposal during the various stages of design, construction and ongoing maintenance.

These measures, when considered in combination and when implemented at the various stages, provide a robust urban and landscape design solution that protects and enhances the existing landscape character and visual quality of Dignams Creek.

8.2 MITIGATION MEASURES

Mitigation measures are treatments that are recommended to reduce the impact of the proposal. They include ways to lessen the visual effect of the proposal itself and also to identify treatments near critical view areas to reduce the visual impacts of the proposal.

Mitigation measures also aim to reduce impacts on existing landscape character through consideration of existing site features, cultural and environmental heritage. These mitigation measures are also designed to improve environmental conditions or lessen the physical impacts on the environment.

Therefore it is possible to implement these measures across all facets of the proposal, particularly road elements design, earthworks design and revegetation methodologies.

Table 8.1 summarises the means by which the mitigation measures would be incorporated into the proposal.

Refer to Section 4 of this report for urban and landscape strategy plans and concept plans for graphic representation of these recommendations.

Refer to Section 5 of this report for landscape implementation strategies to assist with visual impact mitigation.

8.3 CONCLUSION

The proposal for the realignment of the Princes Highway at Dignams Creek would involve the construction of a new road within a valued rural/bushland setting involving substantial earthworks and structures, the introduction of new roadside elements and the removal of existing vegetation. The staged proposal would tie in to the existing highway in three locations and a new intersection would be provided at Dignams Creek Road. Combined with the new bridge at Dignams Creek, a more streamlined and safer driving experience can be expected on this section of the Princes Highway.

The urban design principals and objectives take into account the existing and proposed urban design as well as the visual character of Dignams Creek and the surrounding area. The incorporation of the proposal elements and the landscape treatments would assist with the proposal integrating with the existing landscape character.

The proposal would impact the existing character of the place, however these changes are consistent with other upgrades along this section of the Princes Highway southern region and are to be expected from an proposal of this type. Mitigation measures, once implemented, would assist in reducing local resident and road user awareness of these changes.

Overall the proposal would have high to moderate visual impacts when viewed from locations within 500 m from the works, with substantially less impact from viewpoints further afield. The road user experience would be improved in terms of safety, uniformity and views due to the more elevated platform. There would be a potential reduction in road user awareness of local character due to higher speeds which result in reduced time to appreciate detailed views.

The proposal fulfils the identified urban design objectives and principles, when assessed in combination with the proposed mitigation measures.
### Table 8.1: SUMMARY OF MITIGATION MEASURES

<table>
<thead>
<tr>
<th>STRATEGY &amp; ISSUE</th>
<th>STAGE</th>
<th>RECOMMENDATION</th>
<th>RATIONALE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Quality of structures:</strong></td>
<td>Design</td>
<td>¬ The proposed bridge over Dignams Creek would be designed to the highest standard assigned to this category of bridge as defined in the RMS Bridge Aesthetics guidelines.</td>
<td>¬ The proposed bridge over Dignams Creek, whilst only partially visible from the road user perspective would be highly visible from several local viewpoints.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>¬ The bridge structure is to be well-integrated into adjacent landform so that it appears as an extension of the landform.</td>
<td>¬ The bridge would be designed to complement other bridges on this section of the Princes Highway in the souther region so that a level of visual consistency is attained.</td>
</tr>
<tr>
<td></td>
<td>Construction</td>
<td>¬ Construction work zones are to be strictly limited within the Dignams Creek corridor.</td>
<td>¬ Impacts to existing creek invert to be minimised to allow the protection of existing riparian vegetation, establishment of new vegetation and protection of habitat.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>¬ Concrete formwork is to be a high quality with parapets precast or cast-in-situ and blade piers formed with accurate tapers and clean edges.</td>
<td>¬ Quality construction techniques and outcomes improve the overall perception of the bridge.</td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
<td>¬ Bridge maintenance is to be provided for in terms of sufficient access to bridge bearings in accordance with RMS requirements in order for the bridge to be maintained correctly. Bridge access is to be well-integrated into the bridge abutments.</td>
<td>¬ High quality construction, materials and visual attractiveness of the bridge structure would reduce likelihood of vandalism, increase longevity and encourage local ‘ownership’ of structure.</td>
</tr>
<tr>
<td><strong>Integration of earthworks design with existing landform:</strong></td>
<td>Design</td>
<td>¬ The potential visual impact of these earthworks can be minimised by careful design that integrates with adjoining landform.</td>
<td>¬ Integration of existing and proposed landform provides a more visually appealing urban design outcome and reduces visual abruptness of the proposal.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>¬ This would be achieved through rounding of the top of cut batters, tailing-off of cut batters and a gradual flattening of grades at ends of fill embankments in order to avoid sharp transitions at ends.</td>
<td>¬ Retaining walls can often be imposing visual elements when viewed from below or if constructed of unsuitable or visually dominant materials.</td>
</tr>
<tr>
<td></td>
<td>Construction</td>
<td>¬ Retaining walls would be constructed of gabion system filled with regionally sourced quarry rock in order to better visually integrate with local geology. Provide screen planting below walls and visually recessive materials in order to minimise visual dominance.</td>
<td>¬ Construction techniques would be in accordance with design so that urban design and visual impact mitigation objectives are met.</td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
<td>¬ Ensure access to the wall is provided for so that the wall and wall materials can be maintained.</td>
<td>¬ Maintenance of structures improves longevity of the structure and the overall perception by road users and local residents.</td>
</tr>
<tr>
<td><strong>Retention of existing vegetation:</strong></td>
<td>Design</td>
<td>¬ Design the proposal to avoid impact to prominent trees and vegetation communities where possible.</td>
<td>¬ Retention of existing vegetation greatly assists with integrating the new work with the existing landscape, hence reducing visual impacts of the proposal.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>¬ Existing cultural/landmark trees are to be retained in Dignams Creek valley.</td>
<td>¬ Retention of cultural species eg. Poplars, maintains the cultural character of the place.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>¬ Retaining walls and batteries to be steepened to grades suitable for the proposed surface treatment in order to minimise the overall footprint of the proposal.</td>
<td>¬ Construction activities can increase impacts on existing vegetation where improperly managed.</td>
</tr>
<tr>
<td></td>
<td>Construction</td>
<td>¬ Work areas to be clearly defined, managed and supervised to ensure vegetation loss is minimised.</td>
<td>¬ Occasionally local or regional clear zone requirements may vary from standard RMS procedures. Existing precedents may be considered where relaxing clear zone requirements would assist with establishment and regeneration.</td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
<td>¬ Clear zones to be kept to the minimum required in order to allow regeneration to occur; particularly in parts of the proposal where regeneration would assist with screening and headlight glare control eg. on west facing fill embankments visible from Dignams Creek Road.</td>
<td>¬ Clear zones to be kept to the minimum required in order to allow vegetation to regenerate.</td>
</tr>
</tbody>
</table>
### SUMMARY OF IMPACT MITIGATION MEASURES (continued)

<table>
<thead>
<tr>
<th>STRATEGY &amp; ISSUE</th>
<th>STAGE</th>
<th>RECOMMENDATION</th>
<th>RATIONALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revegetation and planting methodologies and contingencies:</td>
<td>Design</td>
<td>Utilise a series of methodologies to ensure best outcomes in specific locations eg. Planting and mulch on 2H:1V fill embankments in Dignams Creek valley and Bushland Reconstruction south of Dignams Creek Road intersection.</td>
<td>Revegetation methodologies have been designed to make use of local conditions, availability of materials eg. mulch, and to make use of the offline forested environment of Stage 2.</td>
</tr>
<tr>
<td></td>
<td>Construction</td>
<td>Existing vegetation where removed to be re-used on the proposal in the form of mulch added to planting and bushland reconstruction areas; and coarse woody debris used in fauna crossings and creek lines (downstream of structures).</td>
<td>Contractor education on specialised revegetation methodologies is critical from the outset of the construction phase of the proposal.</td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
<td>Discuss specific maintenance procedures with RMS teams early so that regimes are specific to the revegetation methodologies employed.</td>
<td>Agency and public buy-in is also critical so that Day 1 impact in locations where this method is utilised.</td>
</tr>
<tr>
<td>Minimisation of road furniture and signage:</td>
<td>Design</td>
<td>Signage locations are to be coordinated with other roadside elements including structures, furniture, fencing and landscape treatments.</td>
<td>Reduce and integration of these elements would help to reduce visual clutter.</td>
</tr>
<tr>
<td></td>
<td>Construction</td>
<td>Maintain signage and other furniture elements in good order so that the road remains well-presented and a reflection of the local community.</td>
<td>High quality materials and visual appearance of roadside elements would reduce likelihood of vandalism, increase longevity and encourage local ‘ownership’.</td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
<td>Maintain signage and other furniture elements in good order so that the road remains well-presented and a reflection of the local community.</td>
<td>High quality materials and visual appearance of roadside elements would reduce likelihood of vandalism, increase longevity and encourage local ‘ownership’.</td>
</tr>
<tr>
<td>Use of “soft engineering” and well-integrated drainage facilities:</td>
<td>Design</td>
<td>Visible roadside channels and median channels would be vegetated or rock lined.</td>
<td>Drainage channels would be designed to visually integrate with their surroundings as much as possible.</td>
</tr>
<tr>
<td></td>
<td>Construction</td>
<td>Prepare drainage prototypes off-site or in non-visible areas.</td>
<td>Establish criteria for drainage linings that are acceptable from a visual perspective.</td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
<td>Maintain drainage structures where required noting that revegetation and darkening are emphasised as a positive outcome from an urban design perspective.</td>
<td>Ongoing settling-in and weathering would assist with visual integration.</td>
</tr>
<tr>
<td>Retention of vistas and visual links between local landmarks and elements:</td>
<td>Design</td>
<td>Planting of tree clusters in Dignams Creek valley would be positioned to allow vistas to rural scenes.</td>
<td>Local views assist with creating a ‘sense of place’ for the road user.</td>
</tr>
<tr>
<td></td>
<td>Construction</td>
<td>Ensure trees and revegetation areas are in conformance with the drawings and look for opportunities to ‘ground-truth’ planting locations for further adjustment.</td>
<td>Maintaining local vistas assists with retaining existing cultural landscape values.</td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
<td>Maintain important vistas during maintenance regimes.</td>
<td>Existing site features not always exactly replicated in site surveys.</td>
</tr>
<tr>
<td>Retention of local transport connections:</td>
<td>Design</td>
<td>Maintain connectivity principles throughout design development.</td>
<td>Regeneration would occur within landscape revegetation areas and these areas would evolve over time.</td>
</tr>
<tr>
<td></td>
<td>Construction</td>
<td>Avoid token ‘gateway’ elements, but provide landmarking devices such as advanced tree planting.</td>
<td>Ensure local residents can easily access the proposal and maintain local road network.</td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
<td>Maintain connectivity principles throughout design development.</td>
<td>Ensure local residents can easily access the proposal and maintain local road network.</td>
</tr>
</tbody>
</table>

**URBAN DESIGN REPORT AND LANDSCAPE CHARACTER AND VISUAL IMPACT ASSESSMENT - FINAL REPORT**
APPENDICES

A References and bibliography
REFERENCES AND BIBLIOGRAPHY

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