



Warrell Creek to Urunga Upgrading the Pacific Highway

ENVIRONMENTAL ASSESSMENT

VOLUME 1 ENVIRONMENTAL ASSESSMENT

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Sinclair Knight Merz
ABN 37 001 024 095
100 Christie Street
PO Box 164
St Leonards NSW
Australia 1590
Tel: +61 2 9928 2100
Fax: +61 2 9928 2500
Web: www.skmconsulting.com

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13. Visual amenity and design

Visual amenity and design is identified as a key issue in the Director-General's requirements. A detailed visual amenity and design assessment for the Proposal was undertaken and is presented in this chapter. This assessment is supported by Working paper 2 – Visual amenity and design.

Director-General's requirements	Where addressed in the EA
Visual amenity and design – including but not limited to: ■ Design and landscaping consistent with overall design of the PHUP and the existing (and desired) character of affected localities; ■ identification of impacts to local view sheds and source of impact including bridges, embankments, interchange and alterations to natural landscape features; and. ■ visual significance of the crossings at the Nambucca and Kalang Rivers (including district views across associated floodplains).	Section 13.3 Impacts of landscapes and views Section 13.3.4 Impacts on local view sheds Section 13.3.6 Crossings of Nambucca and Kalang Rivers Section 13.4.1 Consistency with Pacific Highway Upgrade Program guidelines

13.1 Assessment approach

The visual impact of the Proposal was determined by considering both the visual effect of the proposed works and the visual sensitivity of the surrounding areas. Table 13-1 identifies how various combinations of visual effect and visual sensitivity combine to result in high, medium or low visual impacts.

Table 13-1: Visual effect and visual sensitivity matrix

Visual effect				
Visual sensitivity		High	Medium	Low
	High	High	High	Medium
	Medium	High	Medium	Low
	Low	Medium	Low	Low

13.1.1 Viewshed analysis and visual impact

The extent to which the Proposal is visible within the landscape is the viewshed. An assessment of the extent of the view and the visibility of the Proposal has been made from field assessment, aerial photography and topographic data. To

Visual effect

The visual effect is the degree of contrast the Proposal will have within its setting. It is determined by the way the highway integrates with the topography, the amount of cut and fill required and the amount of contrast with the existing vegetation, local villages and towns, other land uses and the scale of the landscape.

Visual sensitivity

Visual sensitivity is the degree to which the Proposal is visible and is determined by the potential observer or viewer of the Proposal. Sensitivity is determined by the nature of the viewers' activity, the expectations of viewers whilst undertaking that activity and by the distance of potential viewers from the Proposal.

assess the potential views from residences, in some cases, the closest street or public area has been visited to estimate the extent of view, or an estimation of the view has been made by professional judgement utilising the data available.

The viewshed analysis has concentrated on the areas within 500 metres of the Proposal. For the purposes of the distances to potential viewers, the edge of the overall road corridor of the Proposal has been taken. Where potential views beyond 500 metres are possible, these have been identified in the viewshed analysis plans or descriptions. Where intervening vegetation may screen or partially screen the view, the extent of view shown on the viewshed analysis plans has assumed the larger viewshed as a precautionary measure. Where potential long distance views beyond one kilometre may be possible, these have been identified. Potential long distance views may occur from a high or prominent vantage point such as views along rivers to the proposed new bridges or from residences on a ridge which overlook the Proposal.

13.2 Existing landscape and views

The Proposal was categorised into six character areas to ensure that the character of the local environment and potential changes to it were considered in the concept design and the environmental assessment of the Proposal. These landscape character areas are listed in Table 13-2. Landscape character is generally determined through the combination of topography, vegetation and land use.

Table 13-2: Landscape character areas

Character	Landscape characteristics
1	River valley and open floodplain Undeveloped, semi-developed and scattered residences and buildings
2	Undulating and semi open rural areas, and villages and towns Undeveloped, semi-developed and scattered residences and buildings
3	Steep to moderately undulating forests – including State forests, parks, nature reserves, scenic destination areas Undeveloped
4	Semi-rural areas and rural residential Undeveloped
5	Villages and towns Developed
6	Industrial areas Developed

The landscape characteristics of the existing environment are shown in Table 13-3. Each character area has varied sensitivities to the siting of the Proposal and would experience different visual impacts.

Table 13-3 Landscape characteristics of the existing environment

Section	Landscape character
Allgomera deviation to Nambucca River	1, 2, 4, 5 and 6
Nambucca River to Nambucca Heads	1, 2, 3 and 4
Nambucca Heads to Ballards Road	2 and 3
Ballards Road to existing Waterfall Way interchange	1, 2, 3, 4 and 6

13.2.1 Allgomera deviation to Nambucca River

The Warrell Creek area is characterised by many visual changes and contrasts of vegetation patterns, topography, residential clusters, road and rail alignments within an enclosed river valley. This highly picturesque landscape is visually enclosed by the foothills of Mount Yarrahapinni to the south and east, and the Great Dividing Range mountains to the west. The existing Pacific Highway and the North Coast Railway Line are the main interventions in this landscape scene. Residences are scattered in the undulating rural areas to the east of the existing highway, and are more evenly spaced along the main access roads of Upper Warrell Creek Road to the west of the creek and Rosewood Road to the east. These residences are often sited to benefit from the valley views and are focused towards Warrell Creek and the grassed valley.

Donnellyville village is located in the middle of this section, and is characterised by a small subdivision of houses scattered around two main streets, located immediately east of the existing Pacific Highway. O'Dells Road is located to the south of Donnellyville with residences located along this ridgeline having views over the valley to the west.

The main character areas within the Warrell Creek area are character areas 1, 2 and 5 and beyond Warrell Creek, the landscape character is predominantly character area 1. The floodplain of the Nambucca River is much broader than the Warrell Creek valley, resulting in a larger scale within the landscape. Broad areas of open flood plain with scattered trees are present to the east of Macksville.

The Nambucca River is a wide river of high scenic quality, providing a recognisable feature on the journey along the existing Pacific Highway. Residences are clustered on both sides of the river with the southern sides more densely populated, particularly along River Street. The view for motorists from the existing traffic bridge at Macksville provides an important visual orientation along this portion of the Pacific Highway. This opportunity has been recognised for the new bridge over the Nambucca River where district views would be maximised.

Rural residential areas of clustered residences (character area 4), occur at Kerr Drive, Bald Hill Road and Wedgewood Drive. These occur in discrete clusters with undulating topography and tree clusters semi enclosing the views from many of the residences.

Macksville is the major town in the section, situated on both sides of the Nambucca River in a picturesque setting with views to the mountains to the west and towards the river. The existing Pacific Highway approach into Macksville provides a pleasant approach to the town with views to the golf course and treed areas of Liquidambers

along the east. The Nambucca Shire Council depot with associated buildings is located on River Street/Gumma Road on the river floodplain and represents character area 6. Additionally, the Donnelly Welsh Playing Fields are located to the east of Macksville.

13.2.2 Nambucca River to Nambucca Heads

To the north of the Nambucca River, the river valley and rural areas situated on the flood plain (character area 1) follow the river as it bends east and then north towards Nambucca Heads. The existing Pacific Highway follows the river, providing a highly scenic journey with frequent views over the river.

Some rural residential areas (character area 4) north of the river are located on the Old Coast Road, Letitia Close, Mattick Road and Florence Wilmont Drive. The houses in Letitia Close and Mattick Road are located to take advantage of the views over the rural landscape. Remaining areas to the east of the Old Coast Road in the southern section are undulating, semi-open rural areas with scattered residences (character area 2). The majority of the remaining area to the north is forested and undulating, particularly along the Old Coast Road and areas east of the road in the Nambucca State Forest (character area 3).

13.2.3 Nambucca Heads to Ballards Road

The landscape and visual character in this section consists predominantly of undulating semi open rural areas (character area 2) and dense steeply undulating forests (character area 3). Due to the varied topography and dense areas of vegetation it is not possible to obtain long views over the landscape in many areas within this section. Most views from the existing Pacific Highway are within 100 to 200 metres, therefore resulting in an enclosed landscape of frequently changing viewpoints and vistas.

13.2.4 Ballards Road to existing Waterfall Way interchange

The existing landscape character of this section varies considerably as the Proposal passes from the steeply undulating and densely forested areas of Little Newry State Forest (character area 3) to the Kalang River valley, (character area 1). Where the Proposal crosses the Kalang River valley, a landscape of high scenic value is enclosed on both sides of the river by the forested areas on the surrounding ridges. The side slopes of the valley are scattered with residences on rural properties (character area 2) taking advantage of the views and picturesque rural scene. This area has been identified by Bellingen Shire Council as a conservation area, and includes the South West Arm Road scenic road landscape. The sequence of views of the river and native vegetation contrasting with the cultural landscape of small dairy farms has been identified as having high local significance.

Approximately 900 metres north of the river, the landscape consists of dense forested areas of the Tarkeeth State Forest (character area 3). The northern portion of this section includes rural residential areas (character area 4), Raleigh industrial areas (character area 6) and small areas of open undulating semi-rural areas.

13.3 Impacts on landscape and views

13.3.1 Section impacts

13.3.1.1 Warrell Creek to Nambucca River

The high visual contrast of the Proposal within this predominantly rural valley and the high to very high visual sensitivity of residents within 150 metres of the Proposal, where views are available to the portions of the Proposal that are in fill, combines to create a very high visual impact. The residents identified as being impacted are located on the existing Pacific Highway south of Warrell Creek bridge, and near Donnellyville, Cockburns Lane, Albert Drive, Rosewood Road, Bald Hill Road, Kerr Drive, Gumma Road and River Street.

Residents in the vicinity of the proposed Bald Hill Road interchange are also highly sensitive to the visual changes associated with the interchange. High visual impacts would occur for some residents located between 150 metres and 300 metres of the Proposal on Cockburns Lane, Rosewood Road, Scotts Head Road and Wedgewood Drive. Some residents located within 250 to 500 metres of the Proposal on O'Dells Road would experience high visual impacts from an elevated position. Residents in Donnellyville would experience high visual impacts with views of the Proposal in fill.

All other residents located greater than 500 metres from the Proposal, such as at Upper Warrell Creek, the existing Pacific Highway in Warrell Creek and the Macksville township would experience low visual impacts due to their distance from the Proposal.

The viewshed analysis for Section 1 can be seen in Figure 13-1 and Figure 13-2.

13.3.1.2 Nambucca River to Nambucca Heads

The extent of the view of the Proposal in this section does generally extend beyond the foreground distance of 500 metres for most of the section. The high visual effect of the Proposal within the rural residential land north of the Nambucca River and the high to very high sensitivity of the area results in a high to very high visual impact. This area includes residents located within 150 metres of the Proposal where it is in fill and views are available from Nursery Road, Old Coast Road, Letitia Close and Mattick Road as they are located in an elevated position with views over the Proposal. Residences remaining between 150 and 300 metres of the Proposal in Letitia Close, Mattick Road and Old Coast Road would also experience a high visual impact. Some existing vegetation and undulating landform would reduce the extent of the view from residences at these distances. There is a low visual impact where the Proposal is located through the Nambucca State Forest.

The viewshed analysis for Section 2 can be seen in Figure 13-3 and Figure 13-4.

13.3.1.3 Nambucca Heads to Ballards Road

Residences located within small areas of clearing would obtain views of the Proposal and potentially would experience medium to high visual impacts. Some residents located within 150 metres of the Proposal at Auld Close, Valla Road, Deep Creek Road and East West Road would experience high visual impacts where foreground

views to areas in fill would be possible. The Oyster Creek subdivision is separated from the Proposal by the existing Pacific Highway, and therefore should not obtain views of the Proposal if the existing vegetation along the highway is retained. At Cow Creek Reserve, the visual impacts would be high due to the close proximity to the Proposal. The Proposal would have low visual impacts on the former stock route due to the existing dense vegetation adjacent to the Proposal.

The viewshed analysis for Section 3 can be seen in Figure 13-5 and Figure 13-6.

13.3.1.4 Ballards Road to existing Waterfall Way interchange

The visual impact for the majority of the Proposal in this section would be medium due to the combination of high to very high visual effect and low visual sensitivity. There are very few viewers located in these forested areas surrounding the Proposal. There would be high visual impacts by roads users travelling through the deep cuttings.

There are generally medium to high visual impacts on residents on the northern side of Short Cut Road and high impacts on residents on South Arm Road and Ridgewood Drive within 150 metres of the Proposal. Residents on the eastern side of Ridgewood Drive would obtain foreground views of the Proposal, although intervening vegetation would reduce some visibility. The modifications to the Waterfall Way interchange would result in medium visual impacts for residents within 150 metres.

The viewshed analysis for Section 4 can be seen in Figure 13-7 to Figure 13-9.

13.3.2 Future urban areas

The Nambucca Shire 20 Year Structure Plan, November 2006-2026, identifies Boggy Creek as a proposed future town centre with a proposed area dedicated to heavy industry, bulky goods and inter-modal transport. The proposed industrial area starts from where the Proposal crosses the existing North Coast Railway Line and extends on the western side of the Pacific Highway until Deep Creek. The area to the immediate east, around Cow Creek, is proposed as rural residential land. The visual impact of the Proposal on the future industrial area is low, and the rural residential area would experience medium visual impacts.

The Bellingen Shire Growth Management Strategy 2006-2026, identifies areas north of the Kalang River for rural residential land use. Areas adjacent to the Proposal in fill on Ridgewood Drive would potentially experience high visual impacts. The design of the Proposal, where it crosses Short Cut Road, considered the future rural residential areas with provision of screening and landscape works.



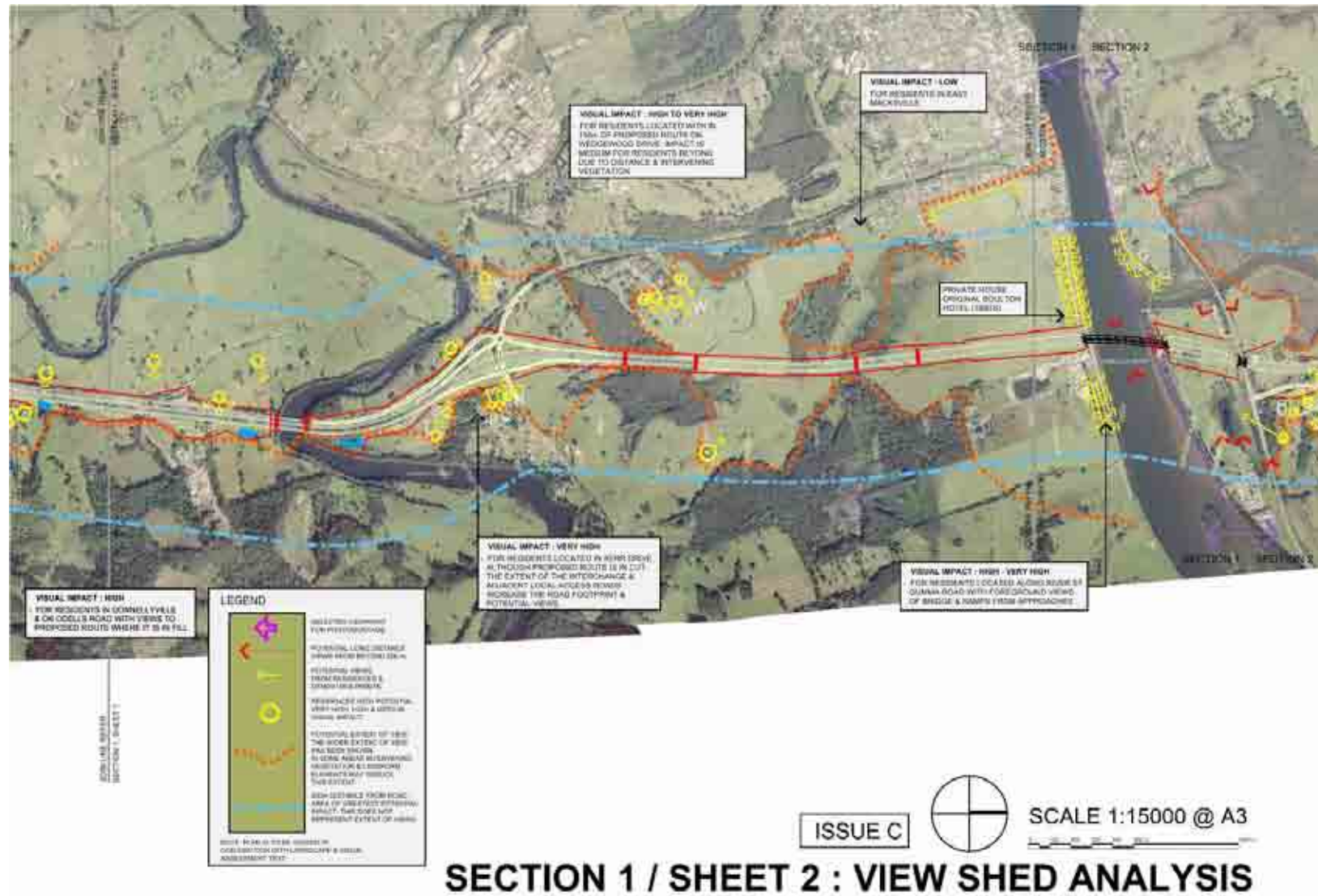


Figure 13-3 Viewshed for Section 2 (Nambucca River to Old Coast Road)

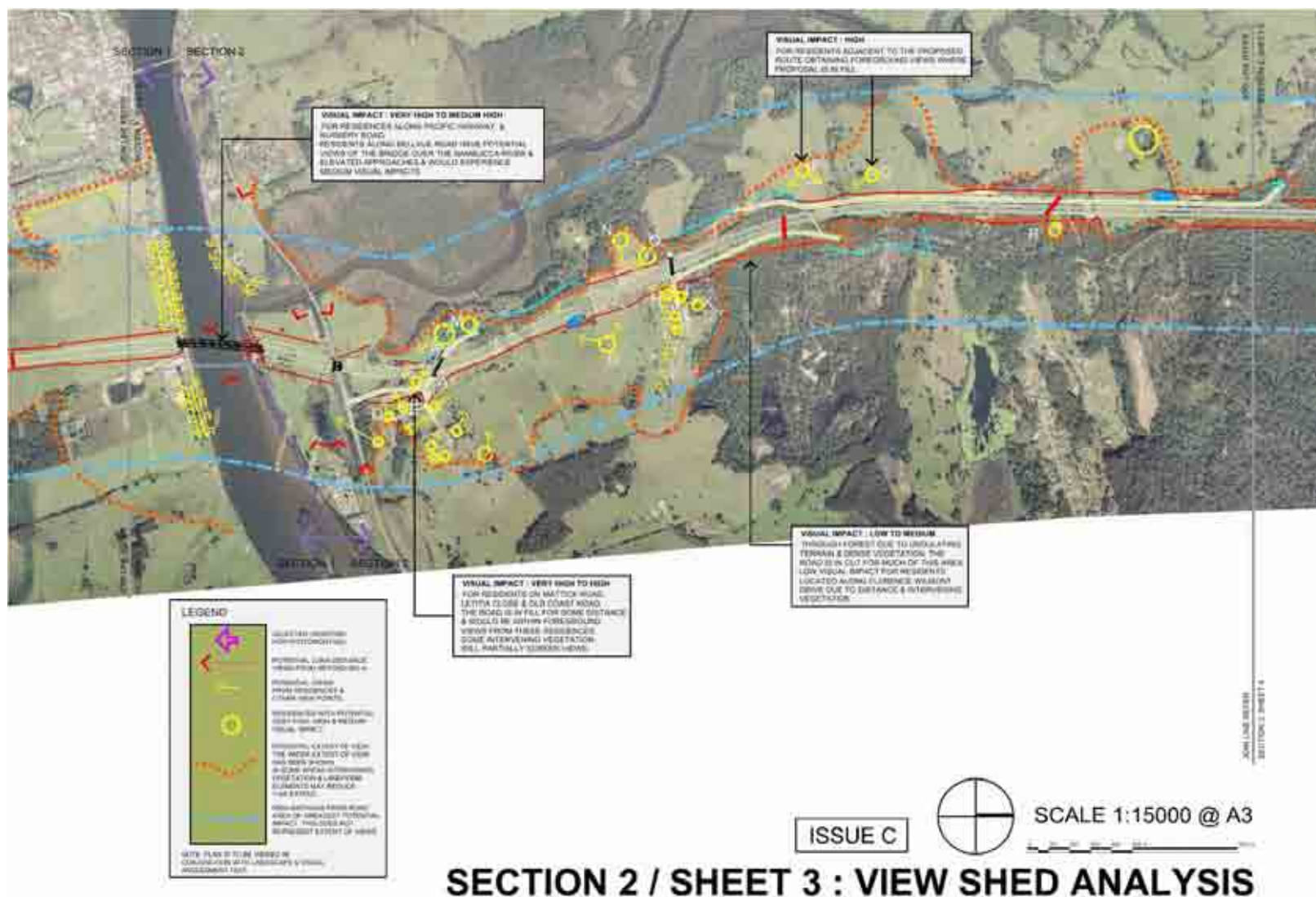


Figure 13-4 Viewshed for Section 2 (Old Coast Road to Nambucca Heads)

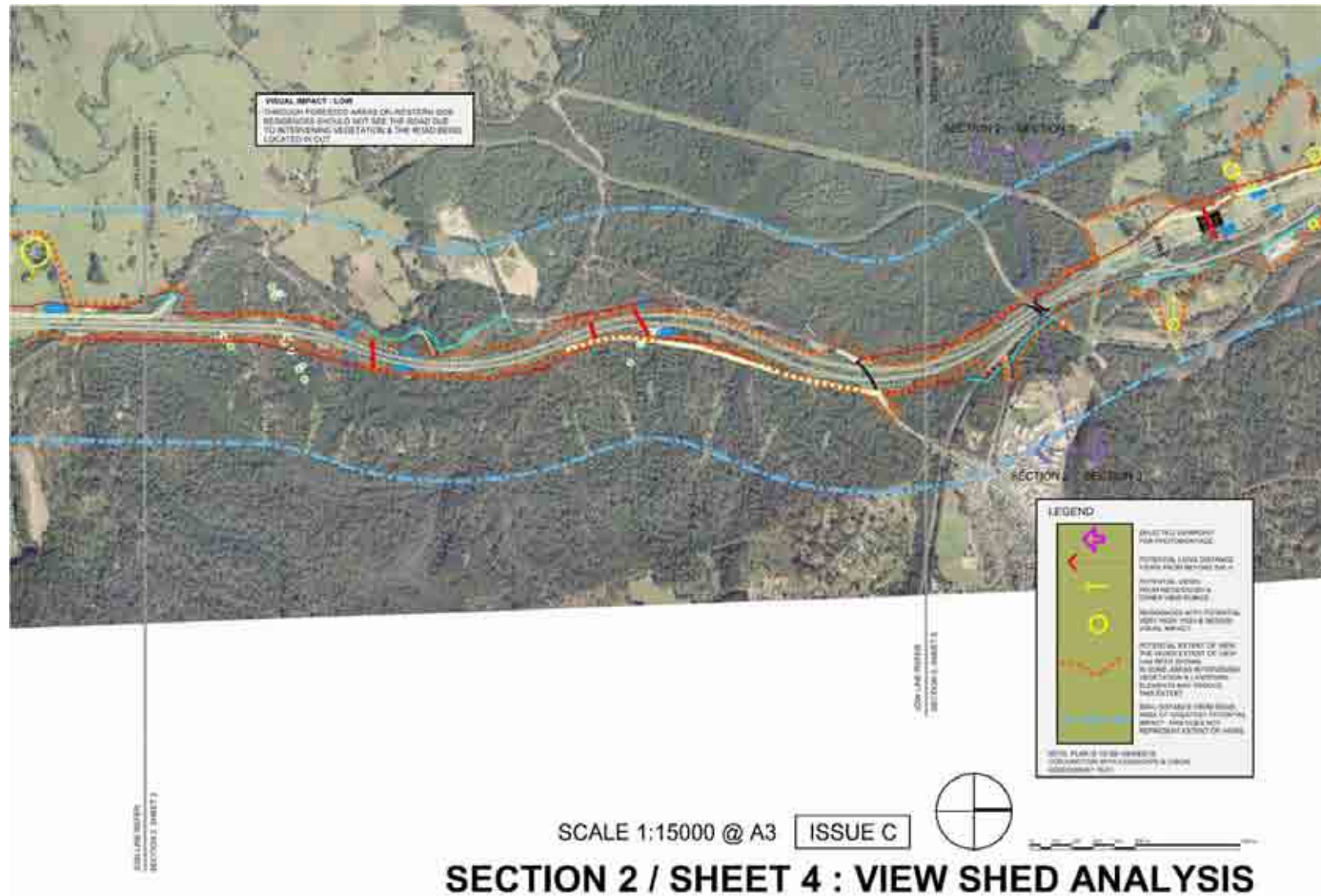


Figure 13-5 Viewshed for Section 3 (Nambucca Heads to north of Deep Creek)

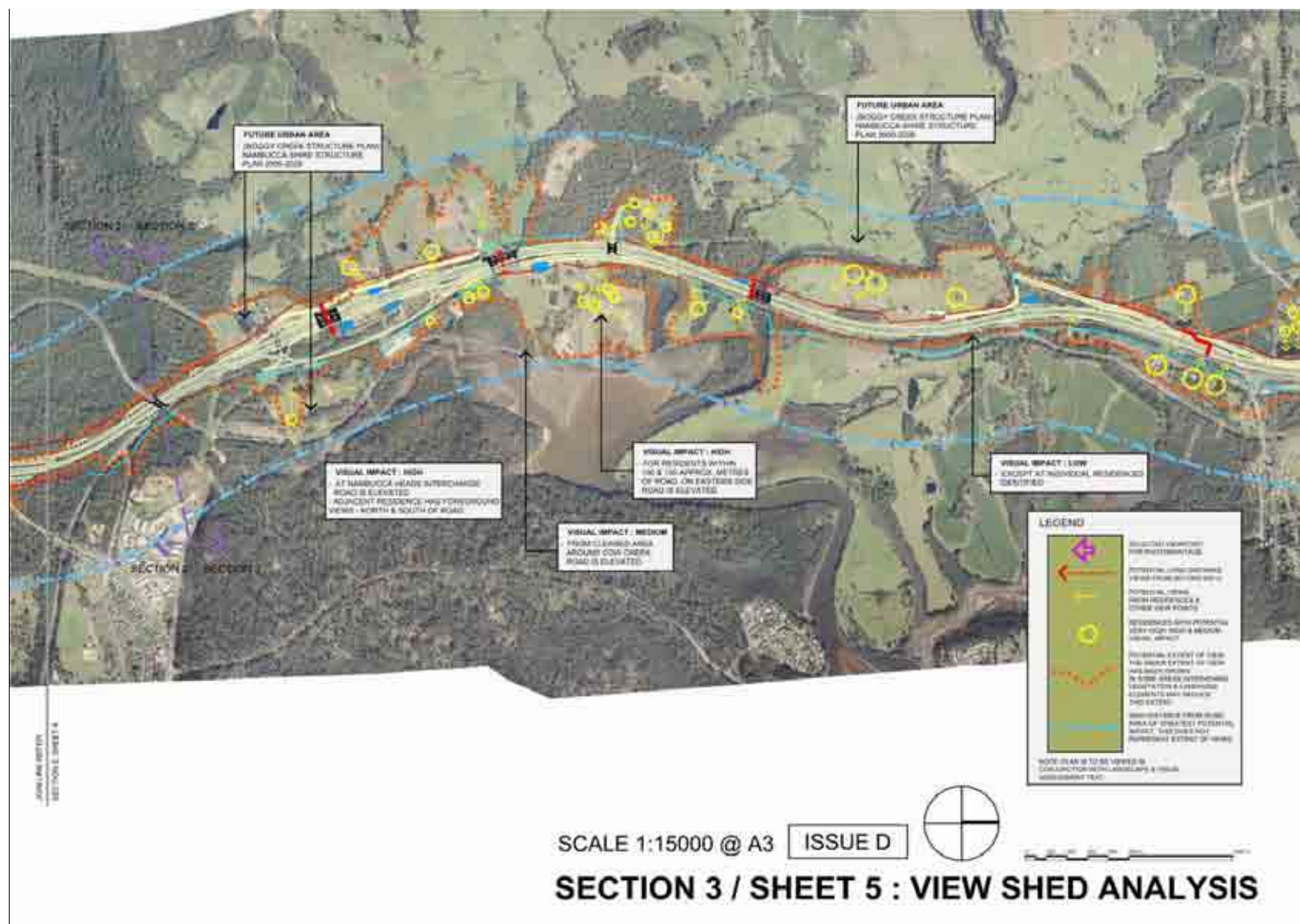


Figure 13-6 Viewshed for Section 3 (North of Deep Creek to Ballards Road)

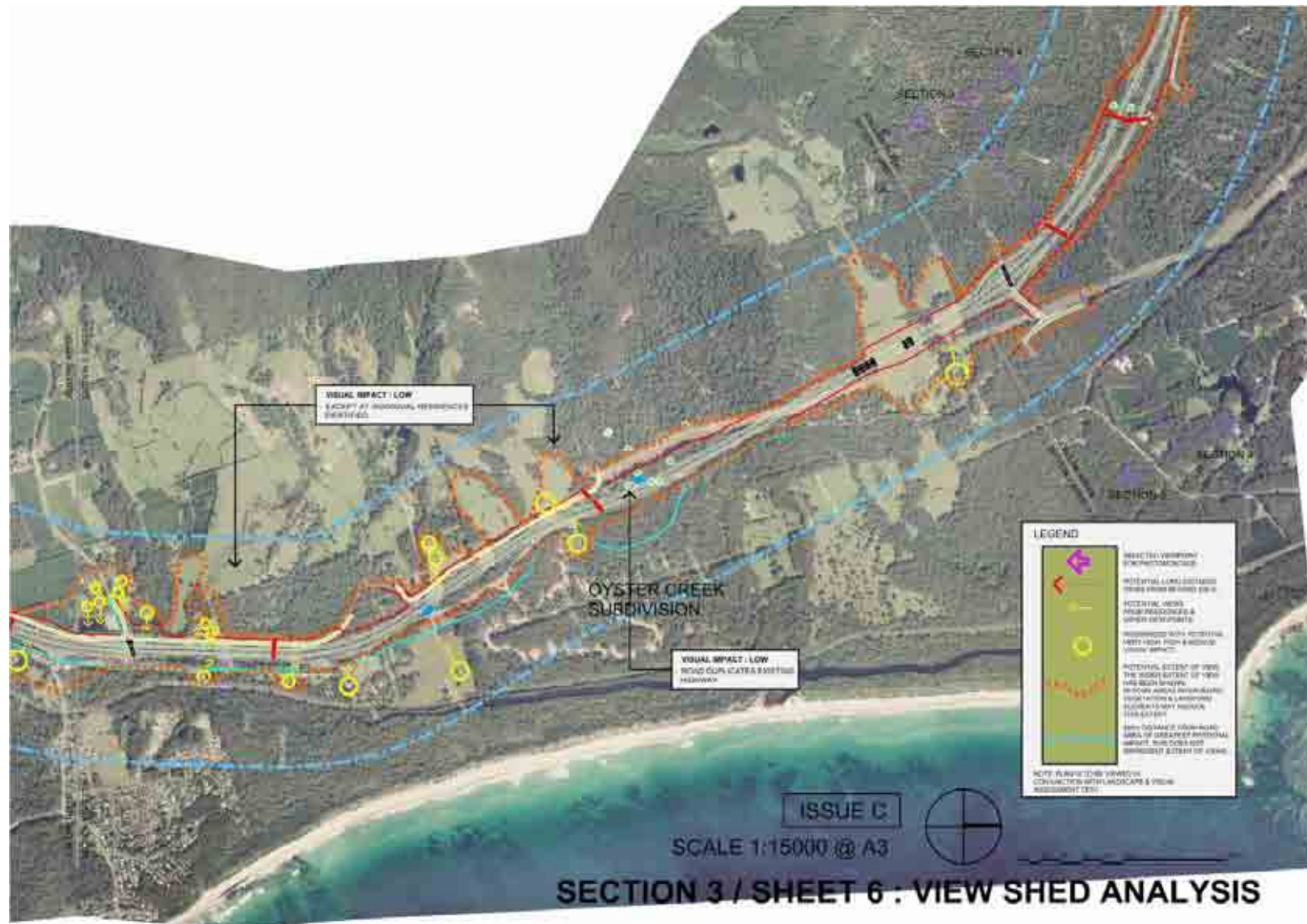


Figure 13-7 Viewshed for Section 4 (Ballards Road to top of Newry State Forest)

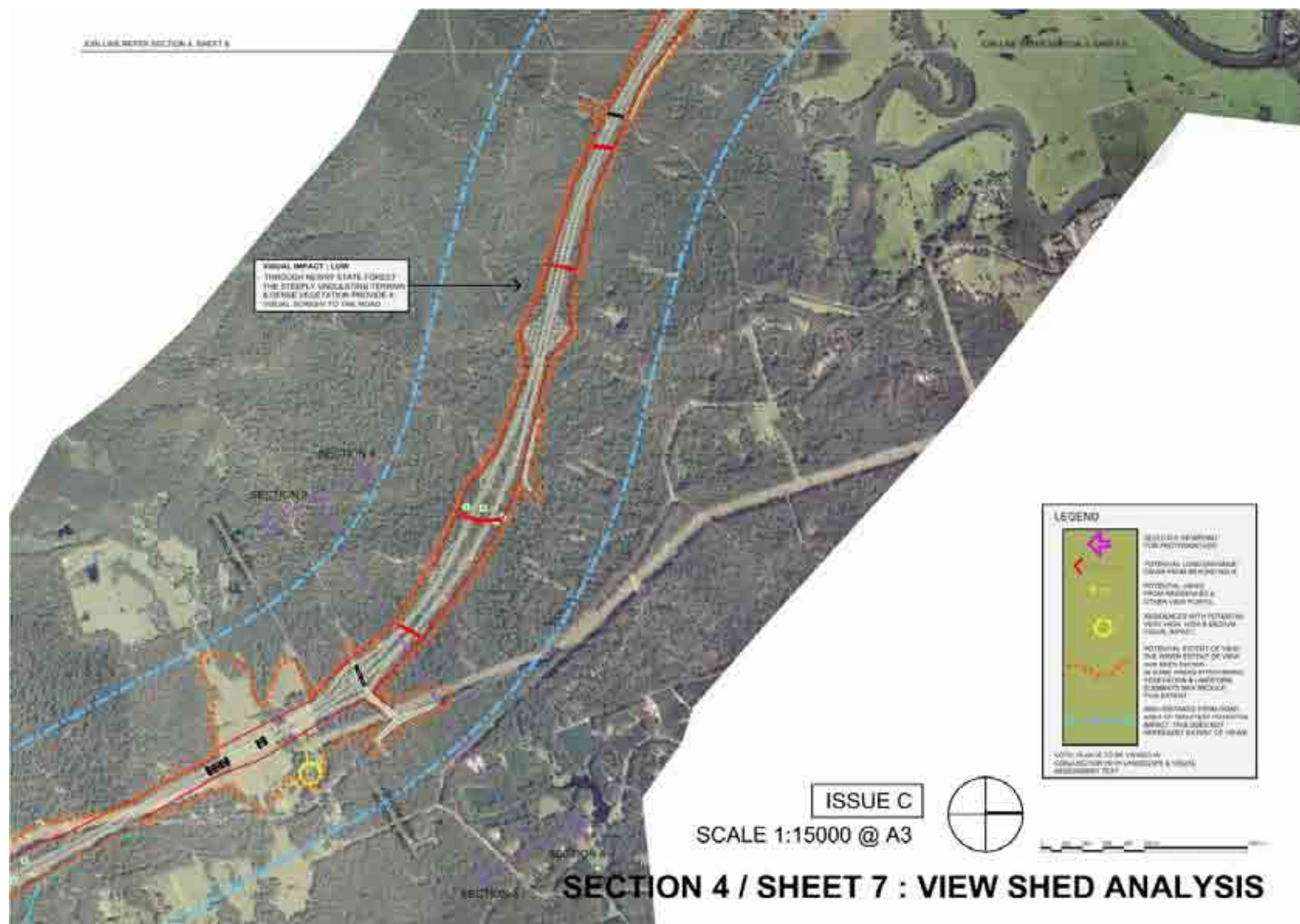


Figure 13-8 Viewshed for Section 4 (Newry State Forest to Kalang River)

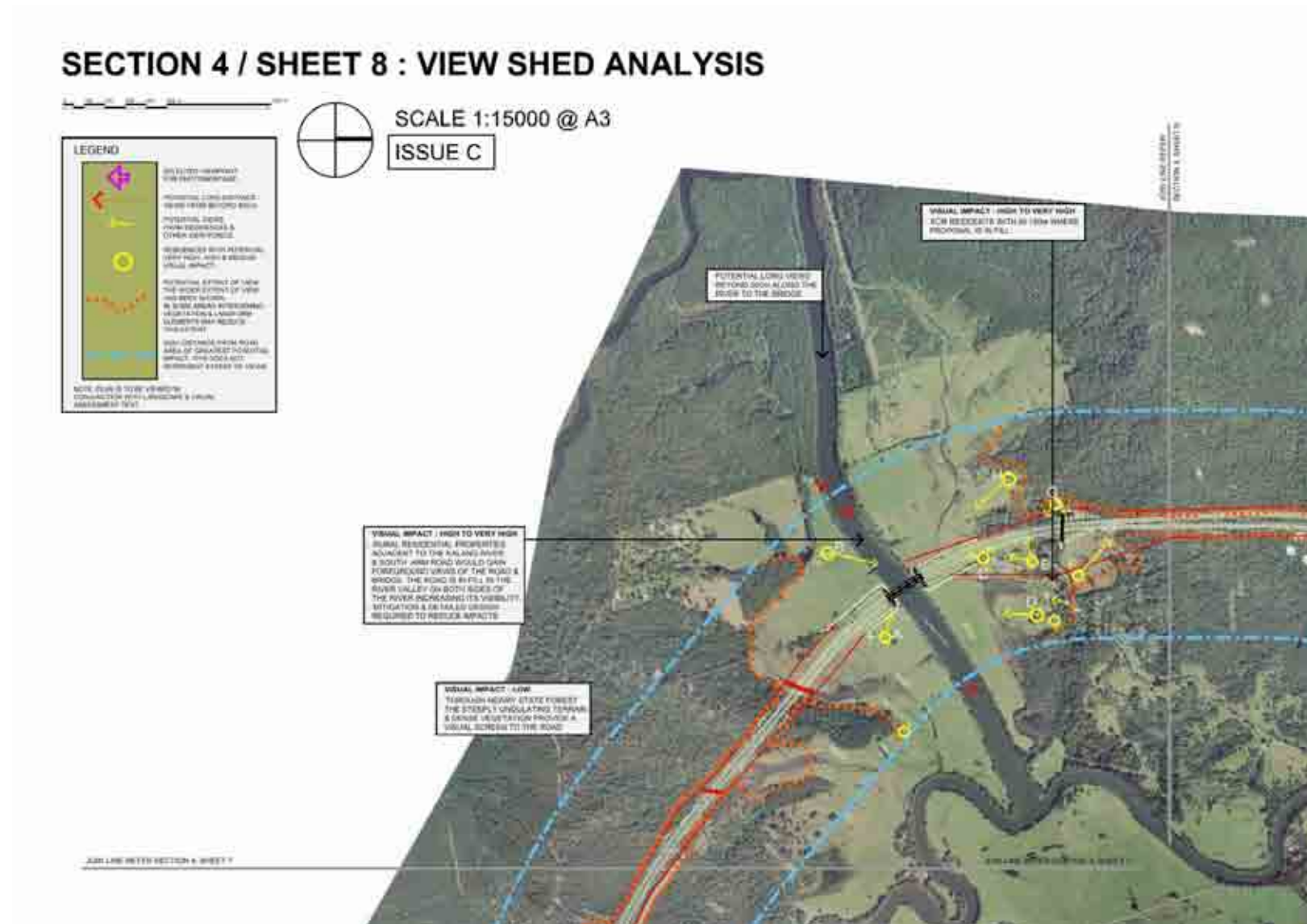
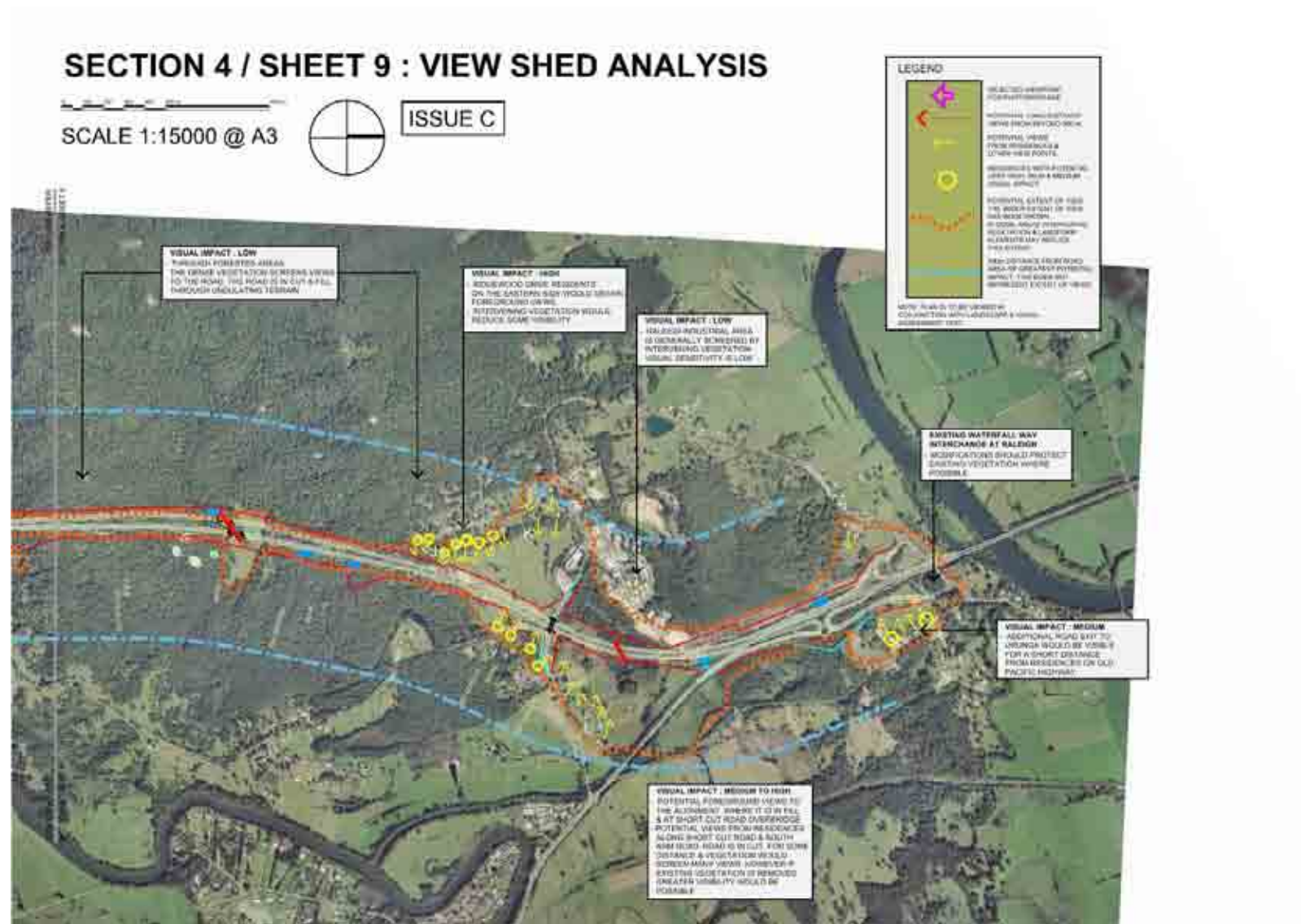


Figure 13-9 Viewshed for Section 4 (Kalang River to Waterfall Way interchange)



13.3.3 Landscape character areas

The Proposal has been designed to consider the existing landscape character areas in the ongoing development of the design to avoid impacts where possible and include mitigation measures where impacts cannot be avoided. While the Proposal would affect the existing character areas the impacts have been addressed by the design of the Proposal and the landscape measures proposed. In some cases the proposal would provide positive impacts. Visual benefits for the central township of Macksville would occur due to the reduced traffic passing through town.

This would improve the visual amenity of the streets, river side parks and existing bridge. The reduction in the noise, disruption and pedestrian hazard of the highway passing directly through Macksville would provide positive amenity impacts.

Where the Proposal passes through forested areas the existing character area is to be retained by continuing the dense vegetation within the road verges, whilst maintaining the required clear zones for safety. The Proposal passes through the wide open flood plain of the Nambucca River valley, as well as the more enclosed valleys of Warrell Creek and the Kalang River. While impacts on these character areas would occur, mitigation of these impacts has been addressed by the landscape treatment at the interchanges, bridges, cuttings and embankments. The Proposal follows existing landscape edges where possible or compatible land uses, such as the Nambucca Sewage Treatment works. Protection of the existing landscape pattern within these valleys has been addressed by extending the character of the existing landscape tree clusters and utilising the topographic features within the character area to screen the proposal. Maintaining the existing road connections and pedestrian networks would assist in reducing the character area impacts.

The character of the Valla Beach hinterland, Deep Creek, Cow Creek and Boggy Creek region consists of a highly varied landscape of undulating topography, residences set within treed enclosures and frequently changing views. The impacts on this character area are minimised by the varied nature of the landscape and its screening capabilities. By retaining existing vegetation and topographic enclosures within this area the impacts of the Proposal are reduced.

As the character areas are determined by the combination of the natural, built and cultural character of the area the impacts on these factors have been minimised where possible and mitigation measures proposed where necessary.

13.3.4 Impacts to local viewsheds

13.3.4.1 Potential views experienced by local residents and community

Photomontages showing the existing and artist's impression of the proposed views have been prepared for selected locations along the Proposal that were considered to have the greatest potential for impact:

- Existing and proposed view from the Pacific Highway south of Warrell Creek village looking east (see Figure 13-10a and b).
- Existing and proposed view from O'Dells Road looking west (see Figure 13-11a and b).

- Existing and proposed view from Donnelly Welsh Playing Fields, East Macksville, looking east (see Figure 13-12a and b).
- Existing and proposed view from Macksville traffic bridge looking east (see Figure 13-13a and b).
- Existing and proposed view from Leticia Close looking north-west (see Figure 13-14a and b).
- Existing and proposed view from the East West Road looking east (see Figure 13-15a and b).

The main sources of impacts to the local viewshed which would be experienced by the local residents and community would be the provision of bridges, embankments and interchanges as well as alterations to natural landscape features (provided in Section 13.3.5).

There would be 27 bridge or bridge sized structures included in the Proposal, including new or replacement bridges over existing creeks or for underpasses/overpasses associated with grade separations at interchanges, local road crossings or property accesses. Two substantial bridge structures would be constructed over the Nambucca River (390 metres in length) and the Kalang River (170 metres in length). A photomontage of the proposed bridge crossing at Nambucca River, from the existing bridge at Macksville is shown in Figure 13-13b. Proposed views across the Nambucca River floodplain are shown in Figure 13-12b.

For the Nambucca River bridge, there would be high visual impacts for residents located along Gumma Road with foreground views of the bridge and ramps from approaches, and very high visual impacts for residents along Bellevue Road. For the Kalang River Bridge, there would be high to very high visual impacts on rural residential properties adjacent to the Kalang River and South Arm Road which would gain foreground views of the bridge.

The interchanges along the Proposal are important nodes for the orientation of drivers and would be utilised to assist in maintaining driver concentration as well as provide clear legibility of signage. The interchange locations increase the road footprint and, therefore, potential views of the Proposal by residents. Residents in the vicinity of these interchange locations would experience high to very high visual impacts. The Ballards Road interchange also has an enlarged footprint due to the overbridge and five way roundabout.

Additionally, aerial views are presented in Figure 13-16 and Figure 13-17 to illustrate how the Proposal would integrate with its surroundings at the Kalang and Nambucca Rivers. Artist's impressions of aerial views along other areas of the Proposal are presented in Working paper 2 – *Visual amenity and design*.

Figure 13-10a Existing view from the Pacific Highway south of Warrell Creek village looking east



Figure 13-10b Artist's impression of potential view from the Pacific Highway south of Warrell Creek village looking east towards the Proposal

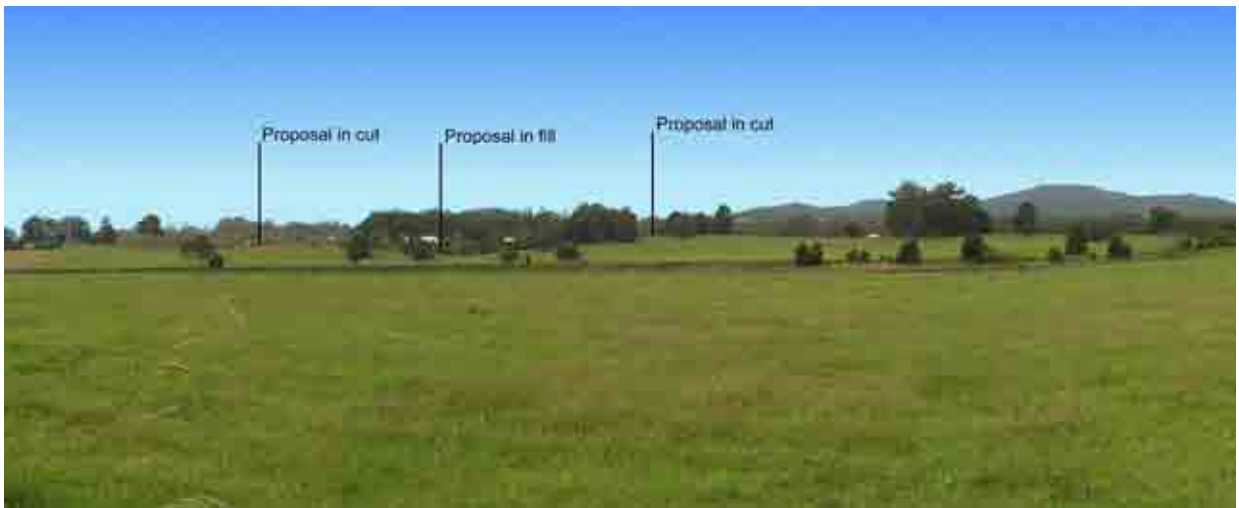


Figure 13-11a Existing view from O'Dells Road looking west



Figure 13-11b Artist's impression of potential view from O'Dells Road looking west at completion



Figure 13-12a Existing view from Donnelly Welsh Playing Fields, East Macksville, looking east



Figure 13-12b Artist's impression of potential view from Donnelly Welsh Playing Fields, East Macksville, looking east towards the Proposal



Figure 13-13a Existing view from Macksville traffic bridge looking east



Figure 13-13b Artist's impression of potential view from Macksville traffic bridge looking east towards proposed bridge over Nambucca River



Figure 13-14a Existing view from Letitia Close looking north-west



Figure 13-14b Artist's impression of potential view from Letitia Close looking north-west towards the Proposal



Figure 13-15a Existing view from East West Road, Valla, looking east



Figure 13-15b Artist's impression of potential view from East West Road, Valla, looking east towards the Proposal



Figure 13-16 Artist's impression of aerial views of the Proposal at Kalang River, looking south



Figure 13-17 Artist's impression of aerial views of the Proposal at Nambucca River, looking north



13.3.4.2 Potential views experienced by drivers

The views experienced by drivers are an important consideration of the RTA in the Pacific Highway Urban Design Framework (RTA 2005) with a design objective being to 'provide an enjoyable interesting highway'. The Proposal has been designed to provide safe driving that avoids monotony and is interesting and stimulating. The key components of the driver's experience are the maintenance of long views to the rivers, and mountains and enclosed forests. Uncluttered and clear interchange design has been provided with feature trees as visual cues. The interchange at Warrell Creek sets the proposed bridge in a forest setting to introduce the subtropical character of flooded gum forest for drivers, whilst the interchange at Bald Hill has been designed to create a recognisable approach to Macksville and Scotts Head. Other interchanges along the Proposal similarly introduce a visual character to mark the destinations along the highway. The purpose of the visual cues is to introduce the local character to drivers that may encourage them to visit the locality, as well as enhance the journey experience along this part of the Pacific Highway. The driver's experience has been considered in the development of the urban design, landscape strategy and concept plans for the Proposal.

From the Allomera Deviation in Section 1, drivers would experience intermittent views of the Warrell Creek valley and after the crossing of the Warrell Creek, panoramic views of the Nambucca River valley would become available with glimpses of Macksville. The views throughout Section 2 from the Nambucca River to Nambucca Heads would be mainly enclosed due to Nambucca State Forest, and from Nambucca Heads to Ballards Road interchange, views would be intermittent due to the cut and fill areas combined with the tree edges. In Section 3, from Ballards Road, the driver would enter the Little Newry State Forest, Newry State Forest and other forested areas and experience enclosed forested surroundings. There would be some panoramic and scenic district views for drivers over the Kalang River in Section 4.

13.3.5 Alterations to natural landscape features

The Proposal would impact on natural landscape features including state forests (Nambucca, Little Newry and Newry state forests), other forested areas and scenic landscapes such as river valleys and open floodplain areas and open and semi-open rural areas. This impact would occur through the interruption of these natural landscape areas as the Proposal passes through such areas. However, residents located within 300 metres of the bridges would experience visual impacts (see Section 13.3.6).

13.3.6 Crossings of Nambucca and Kalang Rivers

The proposed bridge over the Nambucca River and the approaches to the bridge on both sides of the river are elevated, with the bridge elevated approximately 10 to 11 metres. The contrast of the Proposal with the river valley and floodplain areas of the Nambucca River would be high, with the elevation of the Proposal increasing the contrast.

The visual impact on the northern side of the Nambucca River would be potentially high as the area is currently less developed. Residents located on River Street and Gumma Road on the southern side of the Nambucca River, within 150 metres of the Proposal would experience a very high visual impact due to the very high visual effect and visual sensitivity of views at this distance to the Proposal. Residences located on River Street and Gumma Road

between 150 and 300 metres of the Proposal would experience high visual impacts. Views from the rear of these properties to the Proposal would include the raised approaches to the bridge over the Nambucca River. Views from the front of these properties would be over the Nambucca River towards the bridge. As the residences have been sited to maximise their views over the river, the existing setting for these residences would be highly impacted by the Proposal. Very high potential visual impacts occur for one residence on Nursery Road where the Proposal is located in approximately 10 metres of fill on the northern approaches to the bridge. Residences in Bellevue Drive would have potential views of the bridge over the Nambucca River and would experience medium visual impacts. Residents near Glenmore Crescent may obtain some distant views of the bridge and the elevated approaches.

Long views to the new bridge would be available from the existing traffic bridge at Macksville and the boat ramp near the caravan park approximately 750 metres away. Recreational users of the Nambucca River itself would also have long views to the bridge.

The bridge over the Kalang River is at least 8.3 metres high with approaches on both sides in fill of approximately four to five metres. The visual impact of the Kalang River crossing would be high to very high due to the contrast of the Proposal with the rural scene, particularly for residents located within 150 metres of the Proposal. To the south of the Kalang River bridge residences would gain views of the approaches and bridge and would experience high to very high visual sensitivity and high to very high visual impact. Residences north of the Kalang River, located within 500 metres of the Proposal would potentially gain views of the bridge and its approaches. Residences within 150 metres of the Proposal are highly sensitive to the changes in the landscape from the Proposal and would experience a very high visual impact. Some residences, located on the hill slopes north of the Kalang River would gain oblique views through trees over the bridge and the approaches and would experience a high visual impact. The existing vegetation should reduce the extent of the Proposal that is visible from these residences.

Long views of the Kalang River bridge would be available to recreational users of the river. The bridge is a significant built intervention in this enclosed scenic rural landscape and would potentially produce a very high visual impact in this valley. Mitigation and management of these potential impacts is described in the next section.

The Kalang River at the location of the bridge and the South Arm Road is recognised in Bellingen Council's Planning provisions as a Conservation Area of highly scenic landscape. Mitigation measures are required to reduce the impacts on this landscape.

13.4 Management of Impacts

13.4.1 Consistency with Pacific Highway Upgrade Program guidelines

The urban design vision for the Pacific Highway is specified in the Pacific Highway Urban Design Framework (RTA 2005):

The upgrade should be a sweeping, vegetated highway, providing panoramic views to the Great Dividing Range and the rivers, forests, farmlands, and coastline of the Pacific Ocean; sensitively designed to fit into the landscape and be unobtrusive; and characterised by simple, attractive road infrastructure.

The RTA urban design objectives for the Pacific Highway follow in bold, with principles developed for this section of the highway upgrade included:

- **Provide a flowing road alignment that is responsive and integrated with the landscape**
 - Where possible use landscape edges, including forest edges, boundaries to properties or land uses, and saddles in valleys for road alignment.
 - Consider the landscape scale and integrate the Proposal with the surrounding landscape through sound landscape and urban design guidelines.
 - Avoid consistent slopes in favour of grading out and varying fencing boundaries and planting areas that are independent of the corridor of the Proposal.
 - Minimise contrast with the landscape by integrating the colour and form from the surrounding landscape within the road corridor of the Proposal.
- **Provide a well vegetated, natural road reserve**
 - Seed and plant the road corridor extensively using native seed and local provenance plant material where possible.
 - Seed and plant all cut batters, embankments and medians to integrate the Proposal with the local context.
 - Provide seeding and planting in conjunction with all built elements within the road corridor of the Proposal.
- **Provide an enjoyable interesting highway**
 - Maximise orientation for the motorist by providing visual connections with the scenery and locality beyond the Proposal.
 - Provide orientation by highlighting the approach to towns and interchanges through landscape and urban design treatment and visual cues.
 - Recognise the scenic potential and tourist opportunities that exist for the Pacific Highway, as well as encouraging drivers to visit the adjacent towns by clear interchanges.
- **Value the communities and towns along the Proposal**
 - Ensure the surrounding towns to the Proposal benefit from the upgrade through reduced through-traffic and increased amenity.
 - Provide clear visibility and orientation to town exits where this does not conflict with required reduction in visual impacts.
 - Ensure local access is retained and property access is not severed by the Proposal.
 - Minimise visual impacts on local residents and reduce the extent of the Proposal that is visible to residents

- **Provide consistency-with-variety in road elements**
 - Provide a coherent family of design elements that are consistent for the Proposal whilst reflecting the varied cultural, landscape and visual environment.
 - Utilise landscape tree species to reflect varied landscape characteristics.
- **Provide a simplified and unobtrusive road design**
 - Design elements to be functional and to achieve simplicity in their parts, and the whole.
 - Provide a coherent set of built elements that are linked by their detail, materials and colour.
 - Avoid significant statements in designs for bridges, walls, and underpasses as the Proposal needs to be perceived as a part of the Pacific Highway upgrade as a whole, and these statements usually increase the visual impact of these structures within the community.

These urban design objectives and principles have been applied throughout the development of the Proposal. They have been integral in shaping the Proposal design to minimise visual impact and to maximise opportunities for integrating the existing landscape characters. Guidelines for the detailed design of the Proposal have also been provided.

13.4.2 Urban design and landscape strategic and concept plan

The urban design and landscape strategic plans for the Proposal apply the design principles and objectives of the RTA's Pacific Highway Urban Design Framework, as described above, along the full length of the Proposal. The mitigation guidelines (listed below) are also considered and identified in the plans. The urban design and landscape strategic plans identify the design approach for each of the major interchanges and bridges, and provide for the Proposal to be integrated with the local environment. These plans also detail the extent of landscape revegetation required within cuttings and embankments, as well as proposed street trees for markers and orientation.

Figure 13-18 provides a summary of the landscape design for the Proposal. The landscape treatment types being developed for the Proposal are shown in Figure 13-19. The following guidelines have been applied within the urban design and strategic plans:

- **Interchanges and grade separation:** The interchanges provide connections to the surrounding community and are important nodes for orientation of drivers to assist in maintaining driver concentration. Guidelines for the interchange design ensure they are compatible with the landscape context and impacts are minimised.
- **Bridges, viaducts and road infrastructure:** The design of bridges and road infrastructure would complement the existing bridges and structures along the Pacific Highway and provide clean, uncluttered, and unobtrusive design elements.
- **Noise attenuation:** Noise attenuation has been considered in relation to acoustic and visual impacts of noise barriers. Where possible noise barriers have been achieved by planted mounds to reduce the built elements within the landscape and reduce the noise and visual impacts at some residences.

- Visual barriers and mounds: In some instances, landscaped mounds have been proposed to specifically achieve visual screening, rather than benefits to noise levels, where material is available for fill. Cuttings and embankments: Landscape planting and the profile of cuttings and embankments has been incorporated into the design to integrate these with the surrounding landscape
- Landscape and planting: Particular attention to the character areas has been included within the proposed landscape treatment to ensure the Proposal responds to the existing environment and contributes to the maintenance of the landscape character.

These guidelines are discussed in greater detail in Working paper 2 – *Visual amenity and design*.

Guidelines for mitigation measures have been developed to reduce the impacts on residents and to integrate the Proposal with its surroundings. Where the potential visual impact of bridges has been identified as high to very high, guidelines for addressing these impacts has been developed. The importance and high visibility of the Nambucca River bridge has been identified and visual reduction measures have been proposed. The approaches and embankments to the bridge have been integrated with the surrounding valley by clustered tree and shrub planting, reflecting the pattern and character of the existing tree clusters. The bridge is to be refined and uncluttered in its design to maintain visibility to the river for the surrounding residences. The abutments are to incorporate local stone.

The Kalang River bridge similarly is to include uncluttered design, whilst impacts of the approaches are to be reduced by protecting all existing vegetation immediately beyond the road works. The existing forested edges on the northern and southern approaches to the Kalang River valley are to be extended to the embankments and cuttings utilising similar plant species. The shaping and profiling of the embankments are also to be rounded and planted to reflect the colours of the surrounding valley landscape.

The landscape seeding and planting scheme has been developed having regard to the existing plant communities and species present along the alignment to ensure the new planting extends and integrates with the existing landscape pattern

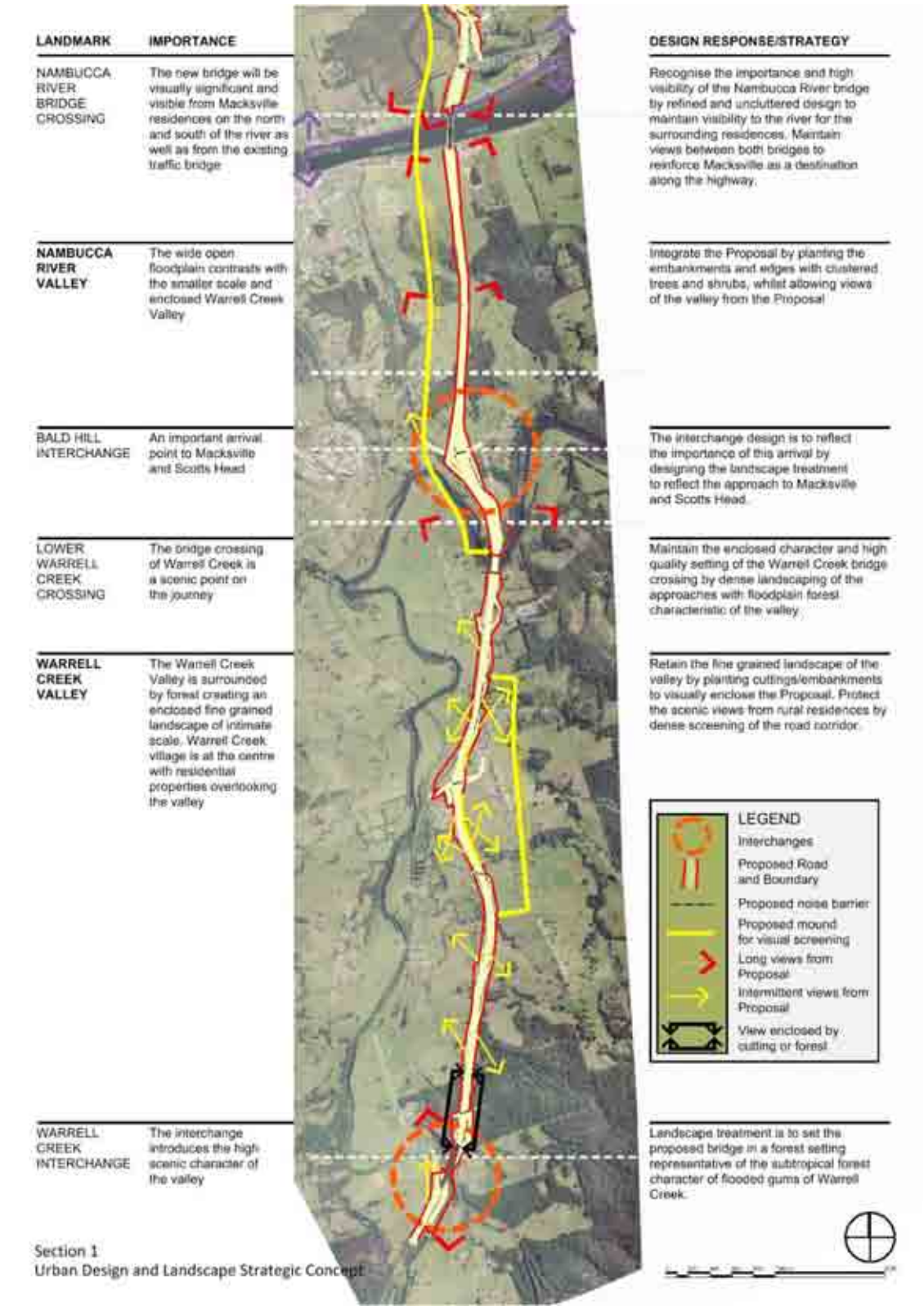
Planting and revegetation has been located to mitigate visual impacts by providing dense screen planting where views to the Proposal from surrounding residents would be available. Where possible, mounding and/or additional profiling of embankments has been included to provide screening for these residents. In particular where the adjacent resident's major view would be towards the Proposal particular attention to mounding and screen planting has been included.

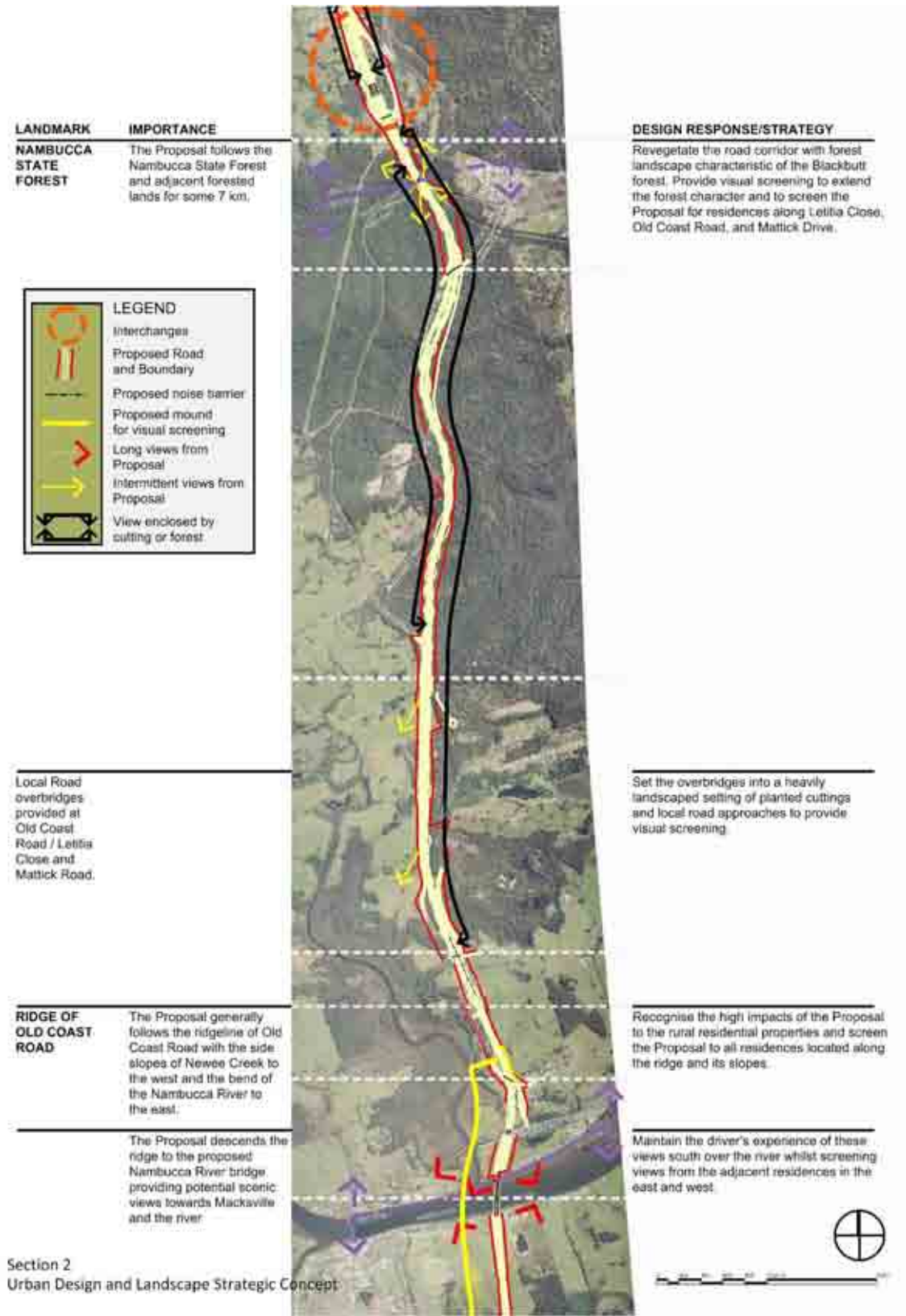
For areas of very high visual impact and where visual and noise barriers are required additional planting outside the road boundary close to residences may be beneficial. Maintenance of views for residents, where the major view is not directly towards the Proposal, is important. This may be practically achieved by supplying tubestock plant species to property owners for their own planting in order to supplement the planting proposed within the road corridor of the Proposal. This approach would occur through mutual agreement between residents and the RTA.

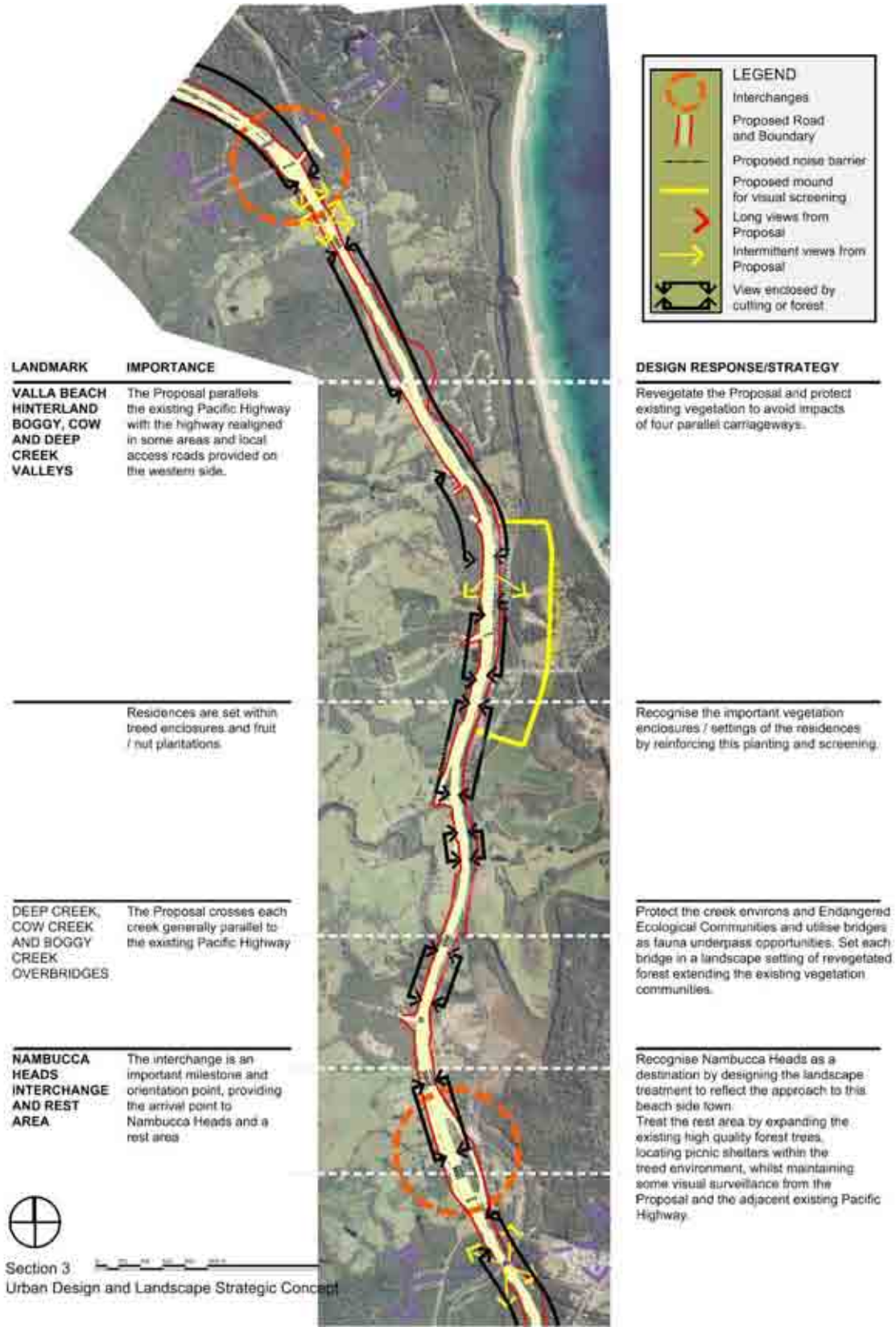
Revegetation of medians within the road verge has been proposed to include dense clustered shrubs and grasses where sight distances and safety allow, to visually reduce the scale of the dual carriageway as well as reduce headlight glare.

The requirements for fauna crossings would be developed in consultation with fauna experts to ensure fauna movements are taken into consideration. In addition to the fauna benefits associated with the planting at fauna crossings, visual/amenity benefits would also be achieved. Where wider medians have been provided for fauna crossings the additional tree planting and revegetation within these medians would reduce the visual impacts of the Proposal by providing additional screening. Important cultural heritage elements have also been incorporated such as the scar tree adjacent to the Proposal corridor and scenic routes as identified in the non Aboriginal heritage section in Chapter 19 – *Other environmental issues*. The landscape treatment associated with these cultural elements would improve the visual amenity and greening of the road corridor.

Figure 13-18 Landscape design for the Proposal







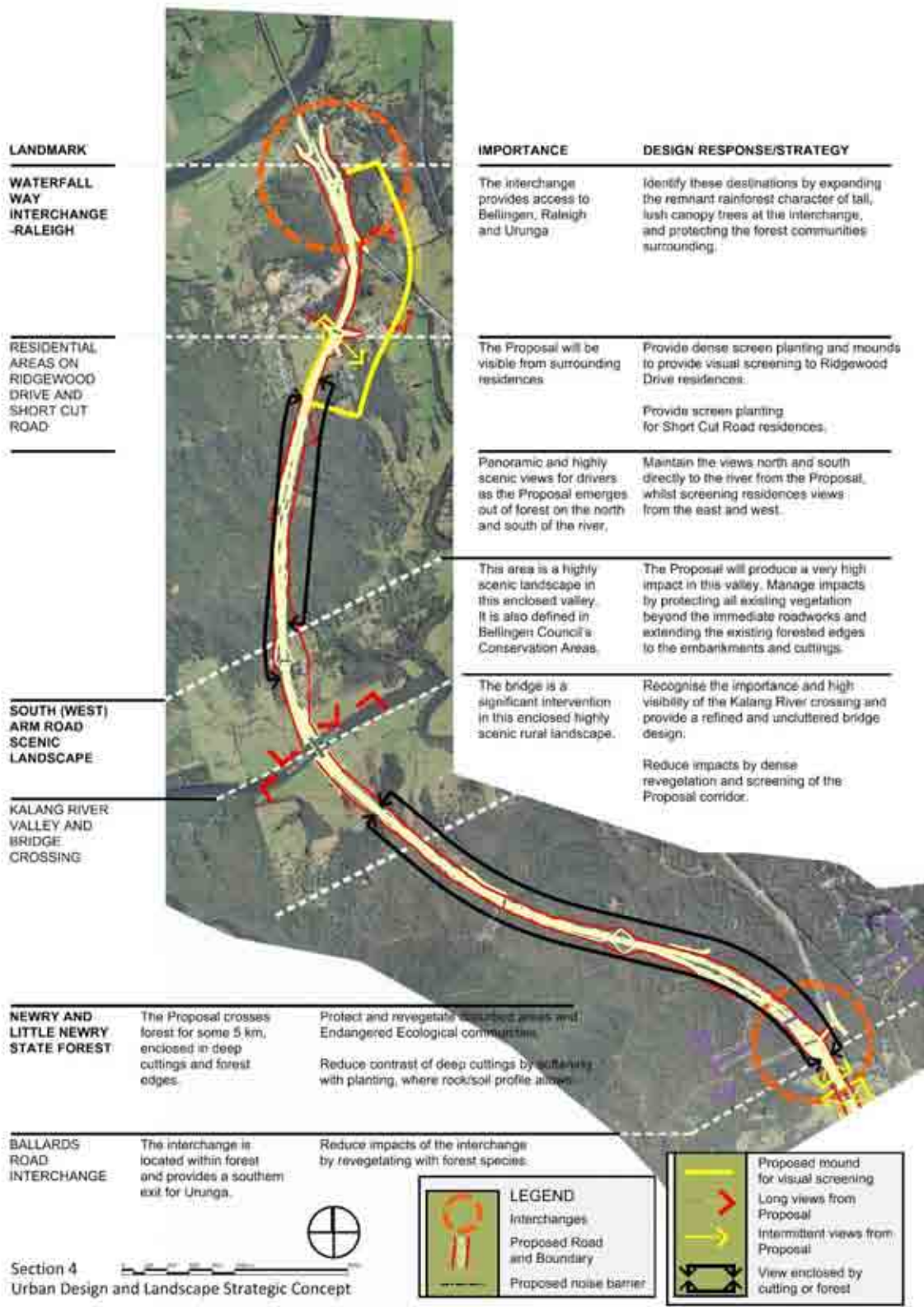
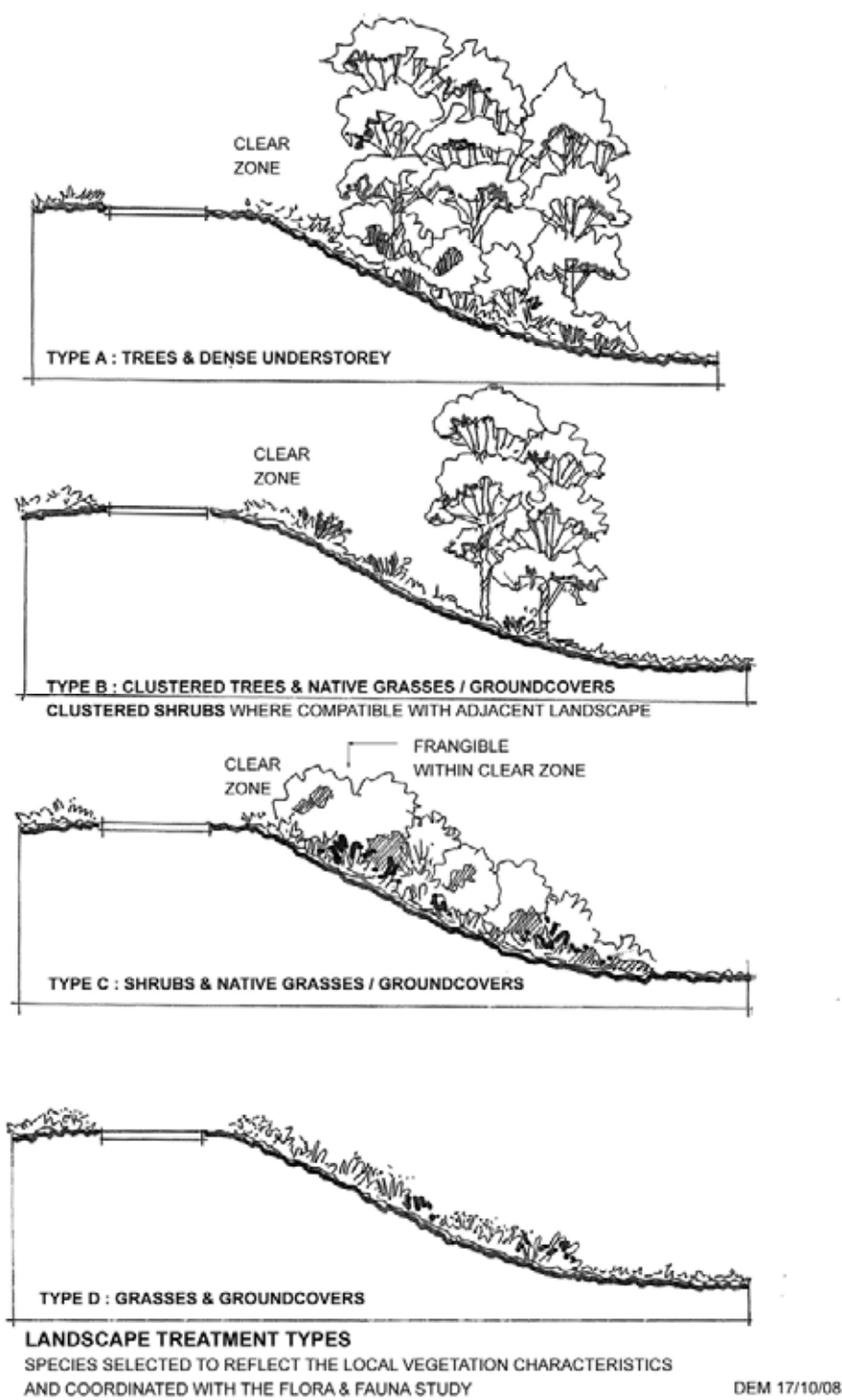


Figure 13-19 Landscape treatment types



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