

Chapter 13 Visual assessment, urban design and landscape

This chapter describes the existing visual environment of the Moorland to Herons Creek area in terms of landscape units. An assessment is made of the visual quality of the area and the impact that the Proposal would have on the visual environment and landscape character of the surrounding area. Landscape and urban design principles are established for the Proposal, which provide the basis for the Landscape and Urban Design Strategy and Concept Plan for the proposal.

13.1 Approach to assessment

The first stage of the study was to undertake an urban design, landscape and visual assessment of the study area. An urban design vision, objectives and principles are presented which form the criteria for assessing the effectiveness of the urban design concept for the Proposal. The relationship of the urban design to the urban design principles (see Section 6.14) is discussed and illustrated. The effectiveness of the urban design is then assessed and a statement of urban design benefits of the Proposal concludes this chapter. Working Paper No. 9 provides details of the urban design, landscape and visual assessment undertaken.

The approach to visual assessment and urban and landscape design of the Proposal involved the following steps:

- analysing the existing context and landscape character
- establishing the urban design vision, objectives and principles which form the criteria for assessing the effectiveness of the urban design
- considering the urban design in relation to the principles and road design
- assessing the visual effect of the Proposal along the route
- providing landscape mitigation and enhancement measures.

13.2 Contextual analysis

13.2.1 Regional

The study area has a highly scenic and attractive natural landscape incorporating water features, regionally significant natural landmarks, forests, National Parks and picturesque rural landscapes. Natural water features in the study area include the Camden Haven and Stewarts Rivers, a number of creeks and smaller waterways, and significant water bodies including Watson Taylors Lake and Queens Lake. The water features form a dominant visual element for both recreational users and passing traffic. The Proposal traverses undulating to moderately hilly landforms including several visually dominant steep ridgelines and mountains. The undulating landforms and vegetative corridors adjacent to the road largely restrict the visual catchment of the Proposal (locations from where the corridor can be seen).

13.2.2 Local

The existing highway passes through highly distinctive and visually interesting environments, which include different landforms, land uses and vegetation types. The current road level varies due to the presence of river crossings, mountains, forests, National Parks and towns. There are four townships on or immediately adjacent to the highway - Johns River, Rossglen, Kew and Herons Creek. Johns River and Kew can be regarded as small service townships for both the highway and local community as they are key nodes in the Proposal area.

13.2.2.1 Topography

Three types of topography occur along the route of the existing highway:

- low undulating to flat
- medium undulating
- ridgeline steeply undulating.

The landform 'low undulating to flat' is primarily located around drainage corridors and associated with water bodies. This landform is generally visible from the highway and is comprised of cleared grassland, wetlands and some scattered woodlands where it abuts more undulating country. In addition, the highway carriageway – which is usually quite elevated – allows for good views over the surrounding areas.

The 'medium undulating' landform is primarily located on the edges of drainage corridors and plateau areas between river valleys. This topography occurs on the approach to Johns River from the south, the area surrounding the crossing of the Camden Haven River and the area north from Kew. This landform primarily comprises scattered woodland and cleared grazing land. The visual experience from the highway generally is reduced as the nature of the topography and vegetation reduces the ability to view beyond the road corridor.

The landform 'ridgeline steeply undulating' is predominantly associated with the three volcanic landforms known as South, Middle and North Brother. South Brother is a dominant visual element on the western side of the highway and in the middle ground when approaching Johns River from the south. North of Johns River, travelling over Stewarts River bridge, the highway follows the eastern base of Middle Brother which is the closest of the three Brother Mountains to the road. The juxtaposition of Middle Brother and Watson Taylors Lake is an area where steep undulating landform meets flat landform. This creates a memorable experience for motorists and puts considerable limitations on the location and construction of the proposed road.

13.2.2.2 Vegetation

There are six vegetation types through which the highway passes (see Chapter 10). Of these, Coastal Blackbutt Forest and cleared/disturbed communities cover a major proportion of the study area. The vegetation types described in Chapter 10 are:

- Coastal Blackbutt Forest (dry open forest)
- Dry Tallowwood Forest (dry open forest)
- Swamp Forest (Melaleuca swamp)
- Sedgeland
- Flooded Gum Open Forest (moist Eucalypt)
- Cleared/Disturbed (cleared).

These vegetation types form strong elements in the overall visual character of the road experience.

13.2.2.3 Land use

There are four main land uses in the study area:

- residential/commercial
- wetlands
- rural
- National Park/State Forest.

Residential/commercial

Johns River is approached from the south through scattered rural residential lots. The township is about four blocks long and is mostly characterised by single storey houses with a small nucleus of commercial activity adjacent to the intersection of the highway with Stewarts River Road. Most of the urban development occurs on the eastern side of the highway, however some new large lot development occurs on the western side. There are three main intersections within the township, giving access to the residential areas. The township's edge along the highway is somewhat fragmented with gaps between commercial activity. The existing highway provides a steady flow of visitors to the township and has influenced the type and scale of the character of the main street. There are wide verges with no formal kerb, gutter or parking.

Rossglen is a small residential settlement located some 600 m west of the highway in a picturesque setting on the south side of the Camden Haven River.

Kew is centred on the intersection of the highway with Ocean Drive and Kendall Road leading to Laurieton to the east and Kendall to the west, respectively. The urban land use extends for about 5 km either side of this intersection. As with Johns River, the township form has been generated from the highway and the cross road with the overriding character based on commercial activities associated with the highway. Kew offers a range of services including petrol, mechanical, information centres, food and rest facilities. The surrounding built form is typified by single lot housing that faces the highway with minimal landscape embellishments.

Hérons Creek, located some 300 m west of the highway, is a small village dominated by the residences of employees of the Boral Timber mill.

Wetlands

This land use is associated with the lower lying areas adjacent to Stewarts River, Watson Taylors Lake and Camden Haven River. Most of these areas have statutory protection under SEPP 14 in relation to alteration and development. The preferred option does not encroach into any of these areas.

Rural

This land use occurs mostly in the lower lying flat areas where rich deeper soils occur. It is predominantly grassland within clumps of remnant vegetation. The original vegetation has been cleared from these areas to make way for agricultural activities. This land use comprises nearly half the total study area and includes single residences and other buildings associated with the rural scale of this land use.

National Park/State Forest

This land use, typically characterised in the study area by ridgeline/steeply undulating topography, is located in areas that have not been used in the past for agricultural or timber getting activities. It arises on both sides of the existing highway around Johns River, and on the western side of the existing highway between Stewarts River and the Camden Haven River. Middle Brother National Park, Middle Brother State Forest and Crowdy Bay National Park (around Watson Taylors Lake).

13.2.3 Landmarks

Key landmarks within the study area include:

- the townships of Johns River, Kew, Kendal and Herons Creek
- the Main Northern Railway line, which closely parallels the existing highway for approximately 12.5 km from south of Johns River to Rossglen
- views to South Brother, Middle Brother and North Brother Mountains
- the Middle Brother National Park and the adjoining Middle Brother State Forest
- Watson Taylors Lake which forms the western part of Crowdy Bay National Park and which extends eastwards to the coast
- Queens Lake, located to the east of the highway between Kew and Herons Creek, which forms part of the Camden Haven River catchment
- extensive areas of wetland protected by the provisions of SEPP 14 wetlands east of the highway and the Main Northern Railway line.

13.2.4 Views

Figure 13-1 shows long and short distance views as well as restricted and partial views as seen from the corridor of the preferred option.

13.2.5 Visual character precincts

The Proposal traverses approximately 22 km of terrain through various landscape types. The study area was divided into six precincts that are reflective of specific landscape and visual characteristics. Each precinct exhibits specific combinations of environmental and cultural influences in conjunction with topographic relief, views and aspect and land use. The precincts are shown in Figure 13-2 and described below.

13.2.5.1 Precinct 1 – Johns River

The Johns River precinct runs from the southern boundary of the study area through to north of the township where undulating forested land gives way to cleared grassland on the southern side of the Stewarts River. The southern approach skirts the eastern base of South Brother (elevation 498 m). It is the first of the three volcano core mountains in this group and it creates a visually dramatic and sudden uplift of landform. The eastern side of the study area comprises small cleared agricultural lots within Coastal Blackbutt Forest covering the undulating landform. The Coastal Blackbutt Forest of Johns River State Forest forms the eastern backdrop of this precinct. The existing highway and Johns River State Forest are separated from the township by the Main Northern Railway line, which has a utilitarian character that contrasts with the surrounding forest.

View catchments within the Johns River precinct are:

- approaching from the south, there are partial views over agricultural land uses
- the middle section has limited views beyond the existing highway corridor with forest running right up to both sides of the highway
- on the northern side of Johns River, views open up to the north over the Stewarts River floodplain and across to Middle Brother Mountain in the distance.

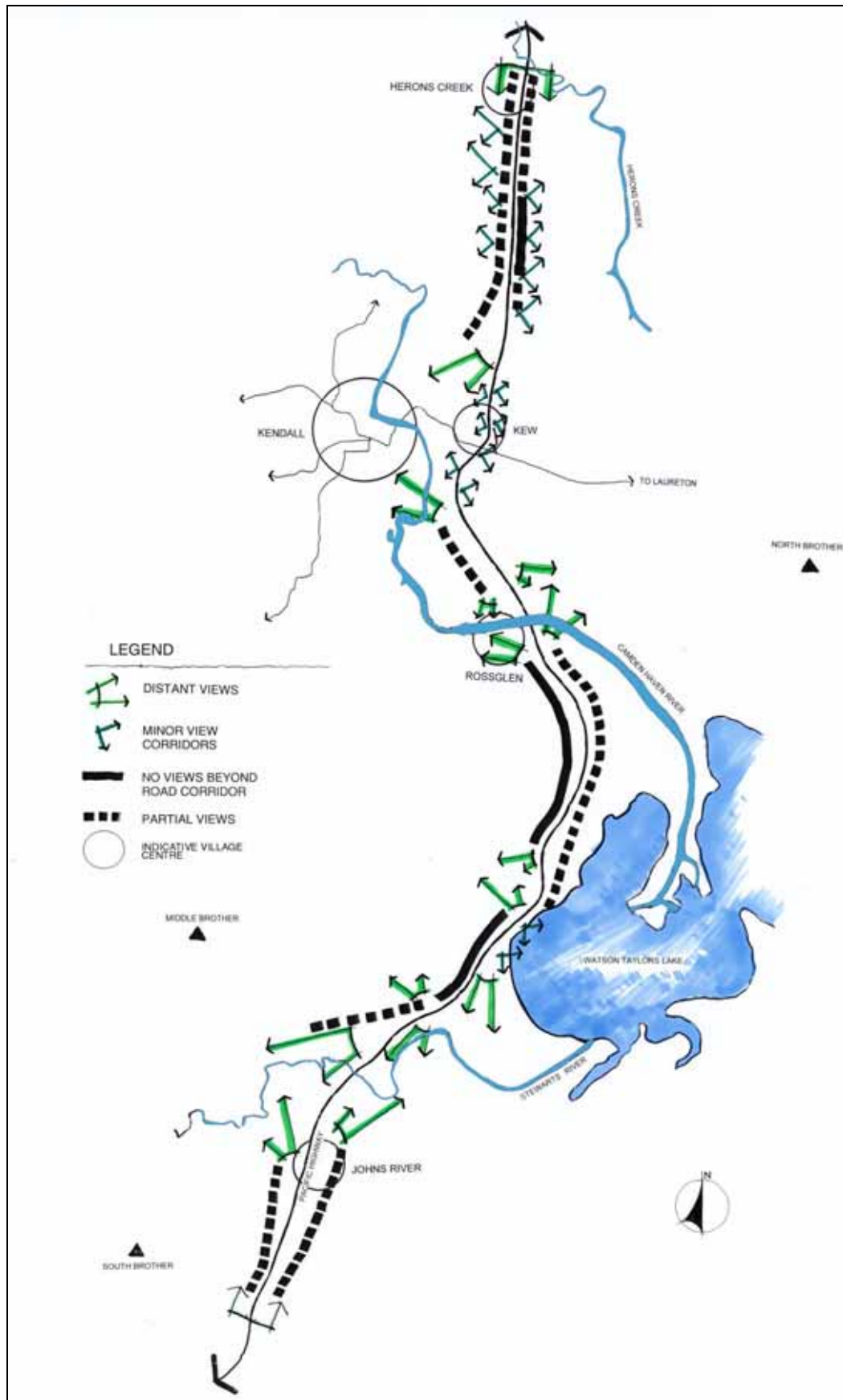


Figure 13-1 View analysis

13.2.5.2 Precinct 2 – Stewarts River

The Stewarts River precinct runs from just north of Johns River to where the highway runs between Watson Taylors Lake and Middle Brother National Park. The highway runs across the Stewarts River floodplain and skirts around the eastern edge of the Middle Brother landform. Middle Brother Mountain (558 m) is a sudden topographic uprising to the immediate west of the highway forming a wall-like effect. This precinct includes the southern end of Watson Taylors Lake.

The precinct is characterised by grasslands, creeks, wetland, and swamp forest. Stewarts River is located in lowlands and is a tree-lined waterway that is deflected by Middle Brother Mountain and largely surrounded by the expansive green of irrigated pasture.

View catchments within the Stewarts River precinct are:

- distant views from and to the highway over a cleared landscape
- Boral Quarry is at the southern base of Middle Brother Mountain and is visible from the southern approach of the highway
- Middle Brother is a dominant element within this catchment.

13.2.5.3 Precinct 3 – Middle Brother

The Middle Brother precinct begins where the highway leaves the Stewarts River valley and runs alongside Middle Brother National Park and Middle Brother State Forest. The highway and the Main Northern Railway line define the eastern boundary of this precinct. The precinct's landforms represent a landmark in the journey north from Taree. The Three Brother Mountains represent the natural gateway from the south into the Hastings LGA.

In this precinct, the highway is strongly contained physically by the Main Northern Railway line and Watson Taylors Lake to the east and Middle Brother National Park and Middle Brother State Forest to the west, and culturally by the views of the Brother Mountains. These considerable constraints represent the dominant visual character of this precinct. The existing highway corridor is a narrow strip of land between two strikingly different landscape features accentuating the visual experience for the motorist.

The view catchment within this precinct, due to the physical constraints, is primarily inwards with short intermittent glimpses outward.

13.2.5.4 Precinct 4 – Watson Taylors Lake and Camden Haven River

This precinct is located entirely to the east of the highway. Watson Taylors Lake and Camden Haven River precinct focuses on the lake, its immediate wetland environment, the Camden Haven River and SEPP 14 wetlands to the north of the river. The highway runs parallel to the Main Northern Railway line that forms the western edge of this precinct from Watson Taylors Lake to north of the crossing of the Camden Haven River.

The precinct is characterised by semi-vegetated farmland, Coastal Blackbutt Forest on steeper slopes, SEPP 14 wetlands and land subject to tidal influences.

The view catchment within this precinct varies from extensive uninterrupted views to heavily filtered views through vegetation along the western side accentuating views across this precinct. Heading north there are views over the upper reaches of Watson Taylors Lake and the associated wetland environments. Views are predominantly to the east and are foreground/middle ground dominated. At the mid section of this precinct, the highway closes in somewhat with only filtered distance and foreground views. The northern section has extensive views over SEPP 14 wetlands to North Brother Mountain, Watson Taylors Lake and Diamond Head.

There is a significant bridge at the Camden Haven River, adding to the overall regional gateway feature. This bridge has a distinctive design consisting of V-shaped pylons complemented by a rounded superstructure. The remains of several piers of the former bridge are visible in the immediate eastern foreground from this bridge. As discussed in Section 6.5.3, these remnant piers are to be removed as part of this Proposal. Their removal will improve the visual amenity (as well as safety) of this section of the Camden Haven River.

13.2.5.5 Precinct 5 – Kew

The highway crosses the Camden Haven River at the southern end of this precinct, proceeds through Kew on the eastern side of the valley, and continues north into the next precinct.

On approach from the south after crossing the Camden Haven River, there is a mix of rural and related residential development. Entering Kew, there is a significant increase in the concentration of housing, commercial development and signage. Kew's village form has been generated from the intersection of the highway and with Ocean Drive and Kendall Road with the overriding character based on commercial activities related to the highway. Urban land use extends to the east along Ocean Drive towards Laurieton with a large lot residential subdivision located to the south between Kew and the Camden Haven High School.

The view catchments within this precinct extend from foreground through to significant distance views across the Camden Haven River to the south and west, Camden Haven Golf Course and Kendall. As the highway leaves the Camden Haven River and approaches Kew from the south, middle distance agricultural views are visible. Some wooded areas provide filtered views on the entrance to Kew. Urban development in Kew partly screens middle ground views through the town heading north. Once out of the Camden Haven River valley, extensive views back across to Kendall are the entire valley are possible. At the ridgeline just north of Kew, the highway becomes enclosed with forest vegetation on both sides.

13.2.5.6 Precinct 6 – Herons Creek

The Herons Creek precinct southern boundary is where the highway leaves the Camden Haven River valley and enters more dissected, undulating country. The northern boundary is the northern extent of the study area at Bobs Creek Road, where the existing dual carriageway starts.

Approaches to Herons Creek village are signified by the 'industrial' type land use of the Boral Timber mill adjacent to the highway and the village behind this complex with no visual connection to Herons Creek. The Herons Creek Public School is located at the northern extent of the precinct.

Views from the highway are controlled by tree lines and land form with a mixture of industrial (timber mill), open agriculture (semi-distance views) and woodland landscapes (restricted views) either side of the highway.

13.3 Visual assessment

The following four subsections set out a summary of the visual assessment that was conducted on each section of the proposed upgrade highway. The results of the assessment provide an indication of the level of urban design mitigation that would be required to meet the desired level of visual amenity within that section.

13.3.1 Johns River

The visual impact of this section of the Proposal has been assessed as moderate based on the combination of the moderate level of visual sensitivity of the vegetation and local viewers and the moderate visual effect of the proposed works including:

- a new interchange at Stewarts River Road
- the installation of noise mitigation measures incorporating both earthen mounds and noise walls
- the downgrading of the existing Pacific Highway within the township.

Figure 13-3 presents the urban design strategy for the Johns River section. It contains both Proposal-funded and non-funded suggestions.

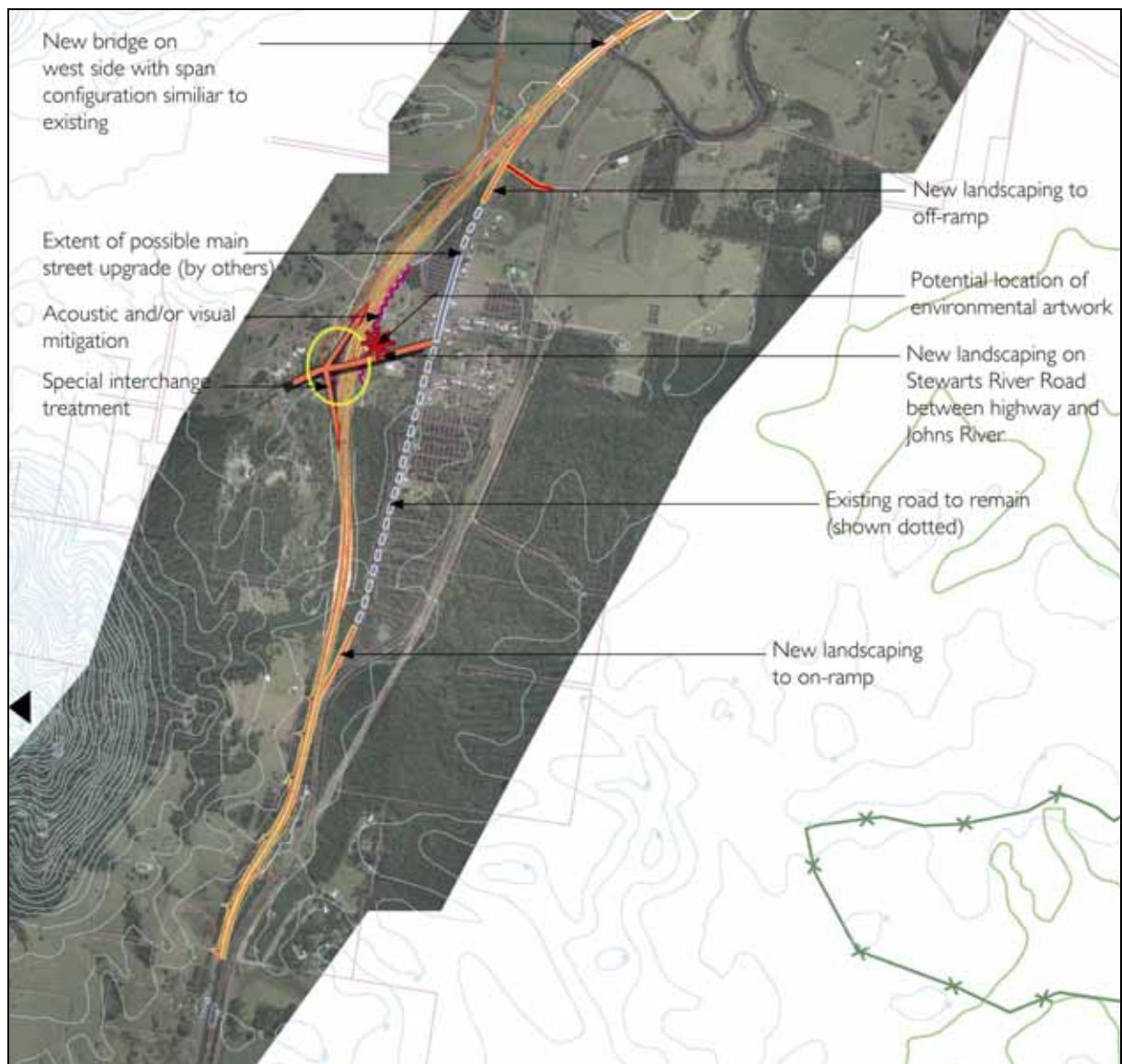


Figure 13-3 Urban design strategy - Johns River section

13.3.2 Lake section

The upgrade of the highway within the Lake section would result in a low visual sensitivity of vegetation impacts and viewer perceptions and moderate visual effect for a composite visual impact of low. The proposed works for this section include:

- the construction of a new carriageway from Stewarts River to Camden Haven River
- a short section of split-level carriageways
- retaining walls
- at-grade T-intersections at Algona Road, Watson Taylor Road, and Ross Glen Road
- replacement and duplication of the bridge at Stony Creek
- a new northbound rest area utilising redundant road reserve
- A duplicated bridge above the Main Northern Railway line
- A second bridge on the western side of the existing one at Camden Haven River
- Removal of the previous bridge piers in the Camden Haven River.

Figure 13-4 presents the urban design strategy for the Lake section.

13.3.3 Kew

The proposed upgrade of the highway within the Kew section would result in a high visual impact with both the visual sensitivity of nearby residents and viewers and visual effect of the road works being of a high rating. Examples of the proposed works contributing to this rating include:

- the Kew bypass and associated works including on- and off-ramps, bridges and roundabouts
- significant cuttings to the east of Kew
- potential visual impacts to nearby residents and users of the golf course to the west of the bypass
- noise walls.

Figure 13-5 provides an urban design strategy for the Kew section. It contains both Proposal-funded and non-funded suggestions.

13.3.4 Herons Creek

The proposed upgrade of the highway within Herons Creek section would result in a low visual impact with both the visual sensitivity to existing vegetation and the local viewer and the visual effect of the proposed works being of a low rating even in consideration of the acoustic mitigation required at Herons Creek Public School. The works included in this section are:

- road duplication
- at-grade T-intersections at Eggbert Egg property, Cluleys Road and Herons Creek Road (north)
- new bridges at Herons Creek floodway and Herons Creek
- replacement of the existing bridge at Herons Creek
- acoustic mitigation at Herons Creek Public School.

Figure 13-6 provides an urban design strategy for the Herons Creek section.

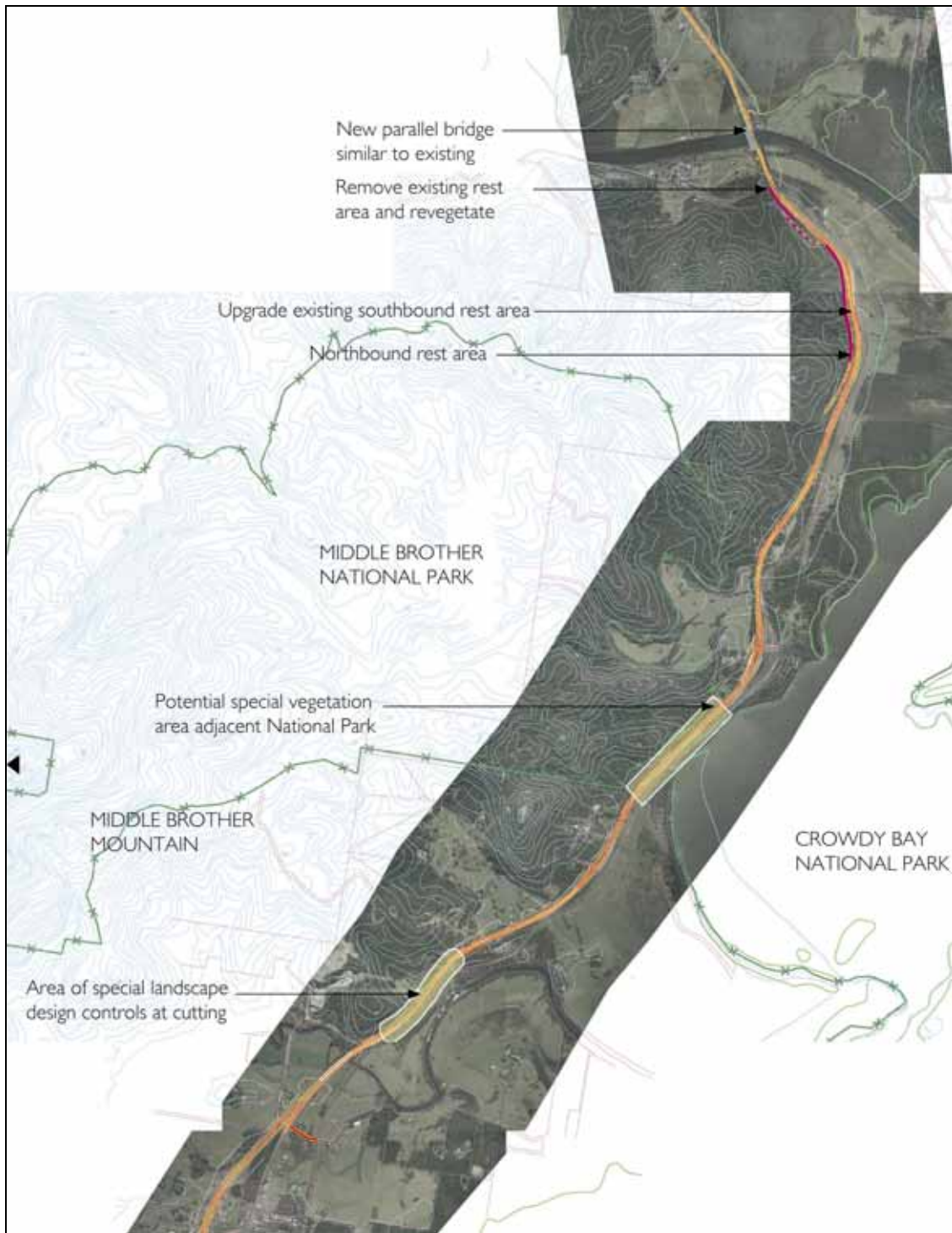


Figure 13-4 Urban design strategy - Lake section

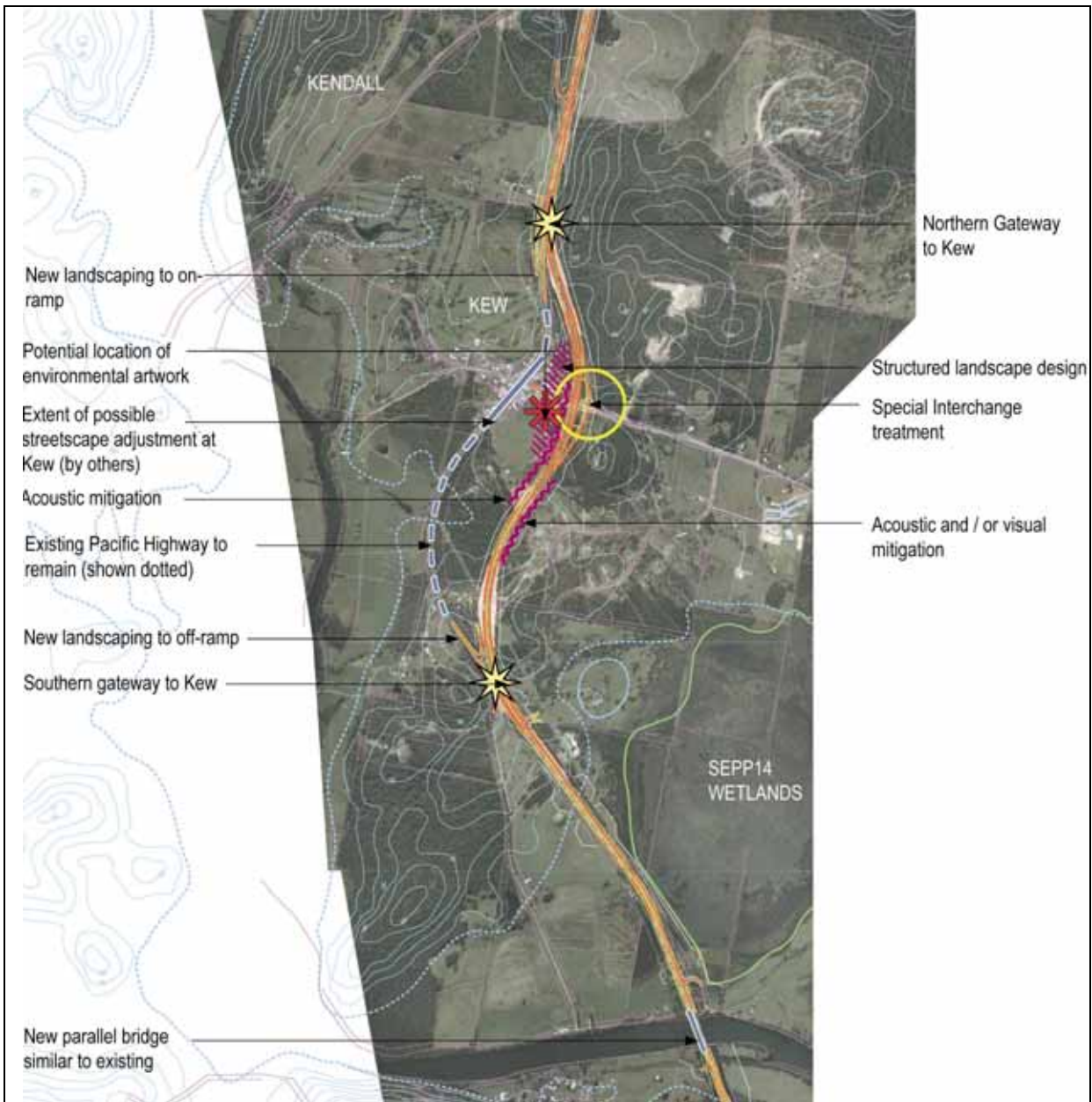


Figure 13-5 Urban design strategy - Kew section

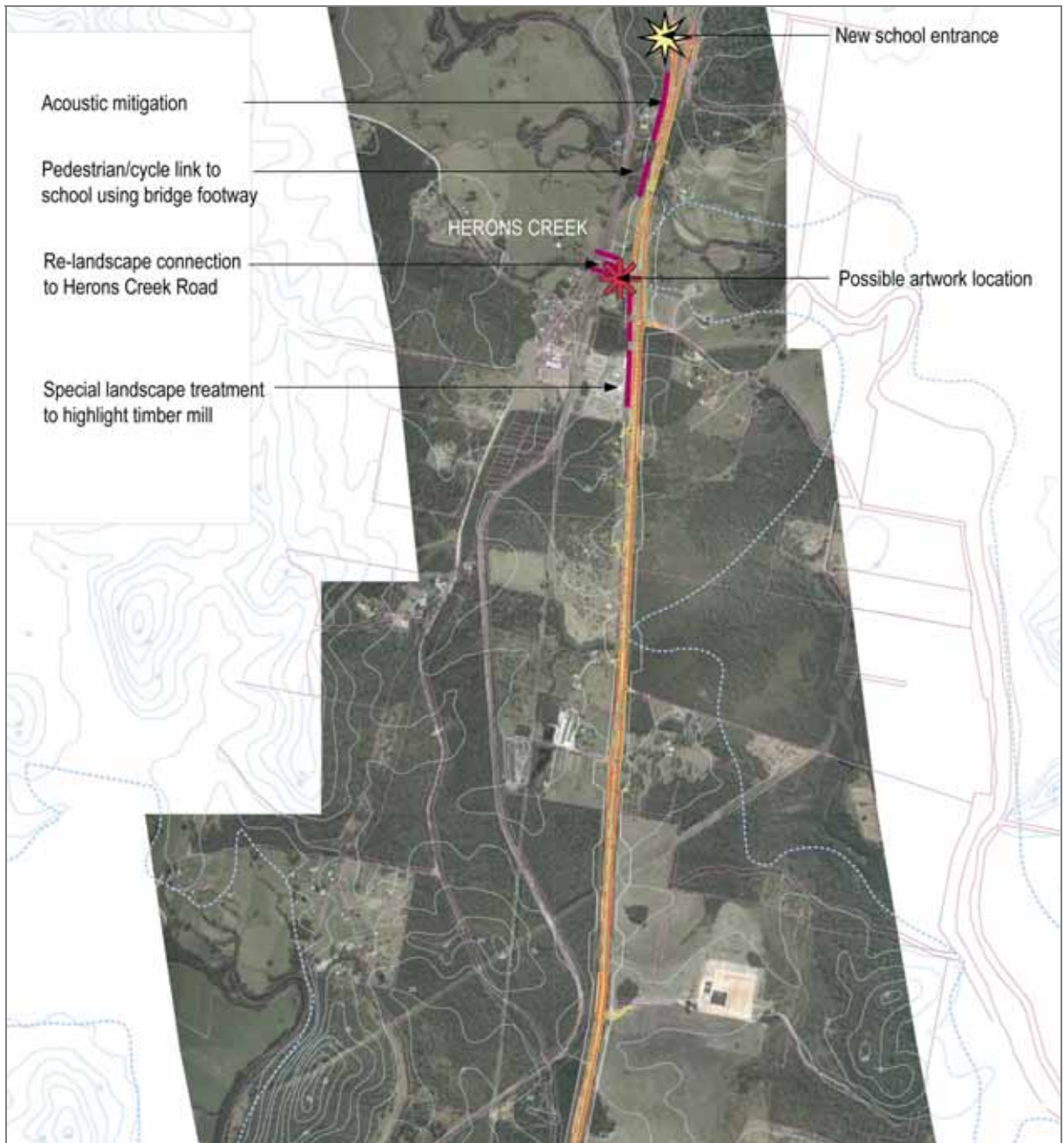


Figure 13-6 Urban design strategy - Herons Creek section

13.4 Urban design vision, objectives and principles

13.4.1 Urban design vision

The *Pacific Highway Urban Design Framework* (RTA 2005) contains the following urban design vision for the entire Pacific Highway upgrade - this vision also applies to this Proposal:

'a sweeping green highway providing panoramic views to the Great Dividing Range and the forests, farmlands, and coastline of the Pacific Ocean. Sensitively designed to fit into the landscape and be unobtrusive and characterised by simple and refined road infrastructure.'

13.4.2 Urban design objectives and principles

This overall vision is complemented by the six objectives presented in Table 13-1 to assist in achieving this vision on particular upgrading projects. Auxiliary to these objectives are a guiding set of urban design principles. These principles form the individual performance criteria for each of the objectives and assist in the indication of when the objectives have been achieved in the urban design strategy and more detailed concept. Principles that apply to the entire length of the Pacific Highway (found in the *Pacific Highway Urban Design Framework*) have been established and are provided in Table 13-1 along with their application to specific types of works for this Proposal.

Table 13-1 Urban design objectives and principles

Objective/ Pacific Highway Urban Design Principle	Specific types of works for the Proposal									
	Carriageway design	Cut and fill requirements	Bridges	Interchanges	At-grade intersections, median openings and local access provisions	Water quality treatment	Lighting, fencing and signposting	Noise mitigation measures	Pedestrian and cyclist facilities	Rest areas
1 Provide a flowing highway alignment that is responsive and integrated with the landscape										
1.1 Where possible, the alignment should respond to the grain of the landscape following the edges of values, skirting around hills and aiming for saddle.	■				■					■
1.2 Aim to integrate highway embankments with adjacent landscape by grading out and varying slopes and varying fence boundaries and planting areas.		■								
1.3 Consider independently grading carriageways on hillsides, to minimise deep cuttings and provide a responsive interesting highway alignment.	■	■								
2 Provide a well-vegetated, natural road reserve										
2.1 Provide a densely vegetated highway - native seed all landscape areas.	■			■	■	■		■		
2.2 Subject to context and the balance of forest and views, use approximately 10,000 tubestock plants per kilometre of highway in the landscape design planted into seeded areas.	■			■	■	■				

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	Carriageway design	Cut and fill requirements	Bridges	Interchanges	At-grade intersections, median openings and local access provisions	Water quality treatment	Lighting, fencing and signposting	Noise mitigation measures	Pedestrian and cyclist facilities	Rest areas
2.3 Integrate the highway landscape into existing vegetation patterns. Augment and defragment habitat. Continue existing bands of planting and where appropriate avoid linear strip planting of trees and shrubs which accentuates rather than integrates the highway.	■				■	■				
2.4 For seeding and tubestock planting, endemic species of local provenance should be used wherever they can perform the requirements of the design	■				■	■				
2.5 Consider the adoption of wide medians, so that when additional lanes are required, the median width remains sufficient for a self reliant, attractive and headlight glare reducing landscape strip.	■				■					
2.6 Use landform and mounds to mitigate noise or, if mounding alone is insufficient, noise wall/ mound combinations. Where possible always allow for at least a 2m width of planting and seeding between the noise wall and highway.								■		
2.7 Where medians are planted, use sedges/ native grass species to edge. (Outside edges to be mown.)	■				■					
2.8 Ensure sufficient space at the base of cuttings to allow planting and seeding to be established and thrive, especially where it is likely that slope stabilisation will be needed (2m minimum). Where possible, allow sufficient room on benches to allow smaller species to grow without impeding access.		■		■						
2.9 Provide well vegetated yet open, park like rest area landscapes (trees in grass).										■
3 Provide an enjoyable interesting highway										
3.1 Create a varied sequence of views and enclosure to match the existing spatial patterns of the landscape. Reinforce planting in wooded sections of highway and keep views available in open sections of highway.	■									
3.2 Provide constant glimpses and panoramic views of Great Dividing range and coastal landscape. Where views are available consider lower species such as ground covers, sedges and grasses to assist in this principle. Where noise walls obscure views of the Oceans and Rivers consider the use of transparent walls.	■									■
3.3 To maximise open views use wire rope barrier types where possible, safe and taking into account engineering issues.	■						■			

Objective/ Pacific Highway Urban Design Principle	Specific types of works for the Proposal									
	Carriageway design	Cut and fill requirements	Bridges	Interchanges	At-grade intersections, median openings and local access provisions	Water quality treatment	Lighting, fencing and signposting	Noise mitigation measures	Pedestrian and cyclist facilities	Rest areas
3.4 On bridges use two-rail barriers instead of solid walls/ parapets or walls with one rail.	■		■							
3.5 Ensure that views to the ocean, rivers and the following key landmarks are maximised: North Brother, Middle Brother and South Brother.	■								■	
3.6 Where possible locate rest areas to maximise views of the surrounding landscape in particular the landmarks of the corridor.										■
3.7 Provide pleasant restful rest area landscapes, incorporating grassed play areas and shade trees for play areas as well as parking bays.										■
3.8 Break up large expanses of parking into bays separated by planting.										■
4 Value the communities and towns along the highway										
4.1 Adverse visual and noise impacts on towns and communities should be avoided, minimised and mitigated (in that order) through the location, form and design of the highway infrastructure.			■	■				■		
4.2 Where possible and not in conflict with 4.1, highway geometry, earthworks and landscape should be designed to allow advance views of Pacific Highway service towns.	■		■	■						
4.3 Where possible and not in conflict with 4.1, consideration should be given to providing glimpsed views to notable features and landmarks in order to retain a link between the town and highway and provide a waymark to the road user.	■			■						
4.4 The accessibility and amenity of public open space near the highway (streets, paths, parks, river frontages etc) should be maintained and improved where feasible and appropriate.										■
4.5 Safe pedestrian and cyclist connections and accessibility should be maintained and improved where feasible and appropriate.										■
4.6 Provide distinctive planting at off ramps leading to towns.				■						
4.7 Consider the reduction in scale of existing Pacific Highway in bypassed towns, through road narrowing and planting.										■

Objective/ Pacific Highway Urban Design Principle	Specific types of works for the Proposal									
	Carriageway design	Cut and fill requirements	Bridges	Interchanges	At-grade intersections, median openings and local access provisions	Water quality treatment	Lighting, fencing and signposting	Noise mitigation measures	Pedestrian and cyclist facilities	Rest areas
5 Provide consistency with variety in highway elements										
Bridges										
5.1 For each upgrade overbridges and bridges over rivers should belong to the same design family and should be considered as part of a suite of unified elements along the whole highway.			■							
5.2 The opportunity to provide occasional distinctive individual bridges should be taken where appropriate for example pedestrian bridges or bridges over deep cuttings.			■	■						
Barriers										
5.3 Use white upstands for wire rope fencing.	■						■			
5.4 If timber noise walls are required consider adoption of Yelgun Chinderah upgrade wall type.								■		
5.5 If Hebel walls are required use dark colour finishes such as charcoal grey or olive green.								■		
Landscape										
5.6 Provide distinctive and locally significant stands of trees at key points on the route such as rest areas, junctions and near towns.					■					■
6 Provide a simplified and unobtrusive highway design										
Bridges										
6.1 Parapets should be continuous, single plane surfaces, clear of adornment with a generous overlap of the abutments.			■							
6.2 Piers for bridges over the highway should be either column without pier caps (headstocks) or wall type (rectangular).			■							
6.3 Where appropriate spill through 'open' abutments should generally be used on bridges over the upgrade. Abutment footings should be screened by planting.			■							
6.4 Where required safety screens should be designed as an integral part of the bridge or traffic barrier. They should extend the full length of the bridge between the points, at either end of the bridge, where the superstructure is closest to the batter slope.			■							
6.5 Bridge barriers should neatly connect with road and safety barriers.			■							

Objective/ Pacific Highway Urban Design Principle	Specific types of works for the Proposal									
	Carriageway design	Cut and fill requirements	Bridges	Interchanges	At-grade intersections, median openings and local access provisions	Water quality treatment	Lighting, fencing and signposting	Noise mitigation measures	Pedestrian and cyclist facilities	Rest areas
Noise barriers										
6.6 Noise walls should be plain simple structures. They should be monochromatic and constructed in one material type, they should not have any patterns or images on their surface.								■		
6.7 Mounds or mound/ wall combinations should be used, where possible, all walls should be screened by planting or seeding.								■		
Cutting stabilisation										
6.8 Shotcrete should be avoided, minimised where necessary and where visible from road or residences designed so that it is unobtrusive. In sensitive areas such as towns and highly scenic locations shotcrete should not be visible.		■								
6.9 Avoid shotcrete finishes underneath and around bridges. Paved or gravel surfaces or formed concrete are preferable.		■								
Earthworks										
6.10 All earthworks cuttings and embankments should have soft, feathered transitions. Tops, bottoms and ends of cuttings should be rounded off.		■								
6.11 Steep formal embankments and cuttings should be avoided as they appear artificial and jarring. Where possible grade out landform to match adjacent slopes but no steeper than 1H:2V, unless stable rock is practically guaranteed.		■		■						
Signage and fences										
6.12 Utilise black coloured mesh on floppy top fencing where fencing is visible from the highway and will not be hidden by vegetation.		■						■		
6.13 Keep all signage below the skyline with a backdrop of landform or vegetation.		■						■		
6.14 Signage should be avoided in highly scenic areas and where possible, should be located so that important views are not blocked. A mini visual impact assessment should be carried out for all large scale signs, advertising signs, variable message signs and camera support structures areas.		■						■		
6.15 With the exception of road name markers, signage should be kept off all overbridges.			■	■				■		
6.16 With the exception of name plates and navigation markers, signage should be kept off all bridges across the major rivers.		■	■	■				■		

13.5 The urban and landscape design

13.5.1 The design of the proposal

Urban design strategies that affect the future physical outcomes of the proposal are important to its overall successful implementation. Consistent with the objectives set out in the *Pacific Highway Urban Design Framework* (RTA 2005), these strategies are intended to positively contribute to the integration of the Proposal into the local environment and communities, to enhance the highway's usability and safety, and to improve the road users' experience of the journey and the landscape through which they travel.

The urban design objectives and principles presented in Section 13.4 provided the guidance for the urban and landscape design strategy for the Proposal illustrated on Figures 13-3 to 13-6 for the four sections of the Proposal. These principles have been applied to the Proposal design described in Section 6.2 with key features of the urban design strategy presented below.

13.5.1.1 Regional integration

Regionally significant natural landmarks visually and physically dominate the area in which the proposal is located. These include the dramatic peaks of the South, Middle and North Brother Mountains. The large water bodies of Watson Taylors Lake and Queens Lake lie adjacent to the Proposal. The rural plains of the area are generally used for agricultural purposes. Within the Proposal area there are villages on or immediately adjacent to the highway – Johns River, Rossglen, Kew, Kendall and Herons Creek.

As well as being a crucial north–south link to the major cities of Brisbane and Sydney, the Pacific Highway through the Hastings LGA in the northern part of the study area has historically been the entrance to the North Coast through Kew and coastal villages such as Laurieton, thus providing a rich social history for thousands of Australians. The narrative histories of road experiences such as family summer holidays, the life of the 'trucking community' and other commercial activities such as the timber and agricultural sectors along the highway are all valid interpretive issues that may be incorporated into the detail design of the upgraded highway either at stopping points or as the journey unfolds.

13.5.1.2 Local integration

As described in Chapter 15, non–indigenous settlement of the area was originally by 'timber getters' in the early nineteenth century attracted by the considerable timber resources of the area. Following land clearing, grazing and crop farming became viable agricultural options. The timber industry is still visibly present in the area, especially north of Kew where plantations are visible and the Boral Timber mill is clearly in view from the highway. Over the past century, transport and the cultural value of the highway has changed immensely, from a bush track to major interstate transport link.

The townships of Johns River and Kew are key nodes in the study area and both can be regarded as small service towns, serving both the local community and highway users. Kew is the larger of the two, offering motel accommodation, service stations, a hotel, an information centre, cafes and other services. At Kew, traffic signals at the intersection of the Pacific Highway and Ocean Drive, provide a controlled junction that allows, at times, the highway user to have a greater appreciation of Kew when they are forced to stop or slow down at the intersection. Johns River has a general store, a tavern, a service station, a mechanic workshop and a Community Hall. Herons Creek, Kendall and Rossglen have been bypassed for many years by the highway. The closest major regional towns and service centres are Taree to the south and Port Macquarie to the north, although neither is situated on the Pacific Highway.

13.5.1.3 Environmental artwork

The opportunity to provide integrated environmentally influenced artwork exists at several locations in the highway experience. Highway intersection treatments at Johns River and Kew townships and the Boral Timber mill at Herons Creek have been identified as potential locations for artwork installations.

The intent of such installations would be to convey a visual interpretation or statement on key local contextual issues including reference to local historical development, natural history, historic land use, and regionally significant natural features.

Any installations should be sensitive to the local setting and consistent with the visual integration requirements of the urban and landscape setting of the highway. Installation locations would be defined by frangible material requirements of the adjacent road edges and a direct visual relationship to view lines of road users.

13.5.1.4 The landscape

The overall landscape strategy would be based on the use of local and endemic native species. Roadside planting would respect the existing ecosystems and generally be of a natural appearance to suit the local adjacent conditions. Plantings may include native grasses, eucalypts, casuarinas, melaleucas, lomandra and possibly *pinus radiata* species near Herons Creek resulting in a landscape palette of a mix of bright green and grey green foliage.

In areas of major construction and landscape and topographic change, planting would gradually become more structured and organised and then revert to a naturalistic planting technique as the road user moves away from the area. Median planting is to be generally of a low height for visibility and consistent with highway design frangibility standards. Due to the combinations of landscapes and landscape types that occur along the highway corridor, a wide range of vegetation types exist allowing a variety of new planting types to be used.

Design principles primarily focus on enhancing existing vegetation and providing new plantings that relate to the surrounding indigenous flora. Where major new cuttings and construction would occur and be highly perceptible, the planting layout may take a more structured and geometric set-out using a similar indigenous planting palette. This is proposed for the areas north and south of the Ocean Drive overpass at Kew where earthworks and geotechnical conditions allow.

13.6 Urban design and landscape concept

Concept plans (Figures 6-4A to 6-4N) illustrate the key urban design and landscape concepts based on the principles presented in Section 13.4 above. These plans provide the basis for design development of urban design and landscape treatments at the detailed design stage, including urban design input for the structures along the Proposal, particularly the bridges over the waterways and signage. The design of specific types of works is discussed in the following subsections.

13.6.1 Carriageway design

Planting along the carriageway verges would be of a lake and open vegetation type, allowing clear views for road safety. Similarly, the median planting would incorporate native and pasture grasses, containing the road corridor and allowing views but minimising headlight glare to the opposite carriageway.

The cross section for Stewarts River Road is an illustration of typical designs at Johns River bypass (see Figure 13-7). This is a section north of the Johns River bypass showing urban design treatments for the northbound entry ramp, the upgraded highway, and the acoustic mitigation.



Figure 13-7 Section north of Stewarts River Road (looking north)

In the area of Stewarts River bridge, supplemental planting would be provided where required at the sides of the carriageways approaching the bridges to reflect the existing conditions in that area, so that on the south side there would be the forest/woodland backdrop and on the north an intimation to the lake and open vegetation ahead in the northbound journey. By the north abutment of the bridge, the median would narrow to 4.5 m and no median planting would be possible until the median widens out more than 1.5 km to the north in the vicinity of the relocated junction with Middle Brother Road.

Local roads adjacent to the highway would maintain a rural country lane character with the use of native grasses and local eucalypt species, and without median or gutters. Naturally-formed swales and overland flow path zones would be created.

There are a number of intersections servicing local roads. Similar design treatments would be applied to each including the planting of endemic species to suit the background conditions, allowing for clear views to oncoming traffic.

13.6.2 Cut and fill requirements

Significant cuttings would occur to the north of Stewarts River between the existing cutting and the railway line. The median would reduce to a width of 4.5 m between the two carriageways for a distance of approximately 2 km. A split level carriageway is proposed in this area with the northbound carriageway remaining at approximately the same level as the existing highway while the southbound carriageway would be lowered to accommodate the road footprint within the existing road reserve. As a result, there would not be any change to the existing major cutting face to the west of the highway.

Consistent with existing cuttings along the highway, the rock face would remain exposed. The use of finishes such as shotcrete to stabilise the cutting is not desirable, however, if used, it should be minimised and pigmented to imitate the natural colours of the rock face. Minimal revegetation at the road level to reduce erosion and run-off would be proposed here.

A 17 m cutting would occur at the Kew bypass as part of the interchange. The design and slope of batters and cuts would have major implications on both the experience of this section for road users and the visual impact of the bypass cutting to the local area. As a consequence where the existing rock geology allows and consistent with existing cuttings along the highway, the rock face should remain exposed. Again, the use of finishes such as shotcrete to stabilise the cutting is not desirable, however, if used should be minimised and pigmented to imitate the natural colours of the rock face.

13.6.3 Structures - bridges

All new bridge structures would have a proposed pavement width of 10.5 m comprising left shoulder width of 2.5 m, two 3.5 m traffic lanes and a 1.0 m median. The urban design response for each bridge is presented below with illustrative cross sections.

13.6.3.1 Stewarts River Road

A new 55 m long two-span bridge would be constructed for the overpass above the Johns River bypass. The overpass and roundabout at Stewarts River Road combines both practical functional elements and 'gateway' aspects that relate to the existing environment in which they are set, as well as to the proximity of the Johns River village. The overpass, when approaching from both north and southbound directions, will add a new feature to the horizon of the existing Middle Brother Mountain. The bridge structure should provide integral design connection, e.g. materials and colours, with the two sides of the road it spans.



Figure 13-8 Stewarts River Road overbridge – general arrangement looking northwards

13.6.3.2 Stewarts River

The existing bridge over Stewarts River would be converted to southbound one-way, two-lane operation complemented by a new eight-span bridge for the northbound carriageway on the western side. The new bridge would adopt a similar span layout to that of the existing bridge, but the superstructure would not necessarily match the shape of the existing bridge.



Figure 13-9 Stewarts River bridge – general arrangement looking westwards

13.6.3.3 Stony Creek

The existing bridge is in poor condition and would be replaced for southbound traffic and a similar new parallel bridge would be constructed for northbound traffic. The new bridges would adopt a similar span layout to that of the existing bridge, but the superstructure would not necessarily match the shape of the existing bridge.

13.6.3.4 Main Northern Railway line at Rossglen

The existing bridge over the Main Northern Railway line would be converted to two-lane operation for the southbound carriageway and a new two-lane bridge would be constructed on the west side for the northbound carriageway. The new bridge would adopt a similar span layout to that of the existing bridge, but the superstructure would not necessarily match the shape of the existing bridge.

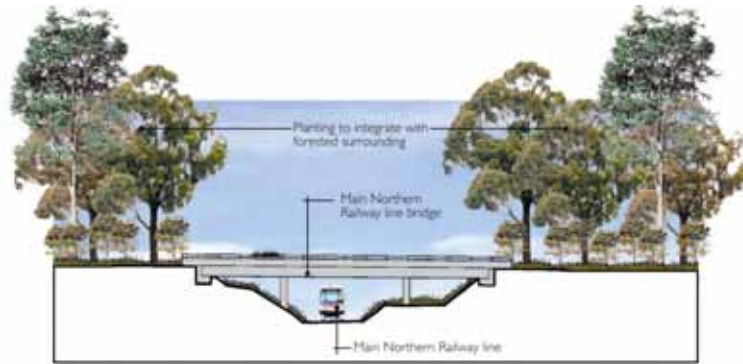


Figure 13-10 Bridge over the Main Northern Railway line – looking westwards

13.6.3.5 Camden Haven River

The existing approximately 20-year-old bridge over the Camden Haven River is of concrete-voided slab construction. This bridge would be converted to a two-lane operation for southbound traffic and a new northbound two-lane bridge would be constructed on the western side for northbound traffic.

The new northbound two-lane bridge would be constructed to the west, parallel and complementary to the key design and construction elements of the existing bridge. The new bridge would be similar to the existing bridge (but not necessarily identical) in form, cross sectional shape and depth. Key considerations are the span arrangement, pier shape, spacing of parapet elements, and finish. The bridge has a low level visual presence to the road user but is visible to local residents in and around Rossglen and to people using the river.



Figure 13-11 Camden Haven River bridge – general arrangement looking westwards

13.6.3.6 Ocean Drive

A new four-span bridge would be constructed for the Ocean Drive overpass above the highway. The Kew bypass overbridge would be one of two new road elements spanning the dual-carriageway (the other being at Stewarts River Road at Johns River) and would be carefully considered in terms of its aesthetic and 'place making' qualities. The engineering and construction detailing of this concrete bridge should be well articulated and refined in keeping with the goals of gateways including simplicity.

This central pier structure would provide opportunities for environmental art to be integrated around or on the interchange bridge structure. The bridge should be constructed of off-form concrete. Specially designed lighting could be used to highlight the structure at night, possibly using coloured light washes and highlight up-lights. The spill-through abutments beneath the bridge would be lined with natural rubble stone finish to contrast with the fine smooth concrete detailing of the bridge and to provide a manageable weed free area beneath the bridge.



Figure 13-12 Ocean Drive overbridge – general arrangement looking northwards

13.6.3.7 Herons Creek floodplain

The existing bridge would be converted to a single direction, two-lane bridge for southbound traffic and widened to meet the 10.5 m minimum width. A new bridge would be constructed on the western side for northbound traffic. While the span configuration for the new bridge would match the existing bridge, the superstructure would not necessarily match the shape of the existing bridge.

13.6.3.8 Herons Creek

The existing bridge is in poor condition and would be replaced with a new single span bridge for the southbound carriageway and a similar new parallel bridge for the northbound carriageway. The new bridges would adopt a parapet arrangement that affords views over the surrounding landscape and would have a similar span layout to that of the existing bridge.

13.6.4 Interchanges

13.6.4.1 Johns River interchange

The overpass and roundabout at Stewarts River Road would combine both practical functional elements and 'gateway' aspects that relate to the existing environment in which they are set, as well as to the proximity of the Johns River village. The overpass, when approached from northbound and southbound directions, would add a new feature to the horizon of both Middle and South Brother Mountains. The bridge structure would provide integral design connection through use of materials and colours with the two sides of the road it spans. The overpass and roundabout would provide an appropriate setting for environmentally based artwork.

13.6.4.2 Kew interchange

The northbound at-grade off-ramp to Kew would occur near the junction of Sunnyvale Road. Kew would not be visible to northbound road users from this location – a marking icon or announcement could be provided in advance of this location to advise of the services available in Kew. Access to Sunnyvale Road would be provided via a new roundabout that also would provide access to Kew and properties to the east of the existing highway and west of the upgraded highway.

The detail design of the gateway area would use signage, native grasses, and shrub and tree planting to create a strong and structured landscape effect to encourage motorists to divert off the highway to visit Kew, Kendall and other localities in the Camden Haven region.

The Kew bypass would be a significant new element in the highway travel experience. The bypass would run east of Kew through a major cutting (ranging up to 13 m high). The carriageways would be split level with the northbound carriageway approximately 2 m lower than the southbound carriageway approximately under the Ocean Drive overbridge.

The planting strategy would move from endemic indigenous naturalistic planting at the southern end of the Kew bypass through to a structured indigenous planting scheme around the overpass (above the top of the cutting) reverting to the same naturalistic style to the north of the Ocean Drive overbridge. The detail design would need to ensure that the interchange, including associated batters, on/off ramps and roundabout, is successfully integrated into the existing landscape. Consideration would be given to the retention of existing major stands of native trees in the road reserve, where frangibility requirements allow.

Southbound on and off-ramps would be constructed to the east of the bypass meeting at a new roundabout on Ocean Drive. The land between the highway and the on-ramp would be planted out in a structured planting pattern using native grasses and large eucalypts where road verge slopes permit. Kew would not be visible to southbound vehicles thus signage or special treatments would be required in advance of the off-ramp to communicate the town's presence. The existing Pacific Highway north of Kew would become a northbound on-ramp for traffic from Kew to merge with the northern end of the bypass.

The land between the highway and the on-ramp would be planted out in a structured planting pattern using native grasses and large eucalypts where road verge slopes permit.

13.6.5 At-grade intersections, median openings and local access provisions

Intersections and median openings would be planted out to meet RTA safety criteria including considerations for site lines and headlight glare.

At Ross Glen Road it is possible to enhance that standard planting to be a slightly more structured arrangement to indicate its connection with the village of Rossglen, which is not immediately visible from the highway, on the west and the airfield on the east.

North of Kew, the intersection at Eggbert Egg Farm, which lies to the west of the highway, would accommodate a widened median for semi-trailers and the median planting would be low height native grasses.

The staggered T-intersection at Herons Creek Road and Cluleys Road would be given design treatments that relate to the Herons Creek village and the Boral Timber mill. Herons Creek Road is the main access to Herons Creek for residents as well as heavy vehicles travelling to the timber mill. Similar to Ross Glen Road, the landscape treatments applied at Herons Creek Road and the highway should be more structured and allow for an indication of the village to the west. These treatments would be implemented up to the railway underpass, which is the threshold into the village.

13.6.6 Water quality treatment

In areas where the highway requires water quality treatment basins, a landscape treatment is proposed which would provide a planting relationship to the visual characteristics of the adjacent area. Basin planting treatments would screen all hard structures, e.g. inlet pipes, and walls, and provide well-vegetated and stabilised embankments. Planting throughout basin embankments would be zoned to respond to the level of water inundation/permanency of water with massed planting of indigenous trees, shrubs and aquatic plant selection based on local planting character types.

Drainage lines would be stabilised with a permanent cover of grasses that would facilitate the movement and entrapment of stormwater runoff. Where these drainage lines and stormwater detention basins are visible from the roadway, the planting of trees to the edges of the basins and drainage lines would be used to blend them into the adjoining landscape.

Landscape treatment to permanent pond areas would embrace the philosophy of minimal maintenance once established. The range of landscape treatments along the route would reflect the diverse local conditions. The substantial and preferred use of locally suited species with low water and maintenance demands would ensure that long term landscape management is both cost effective and visually attractive.

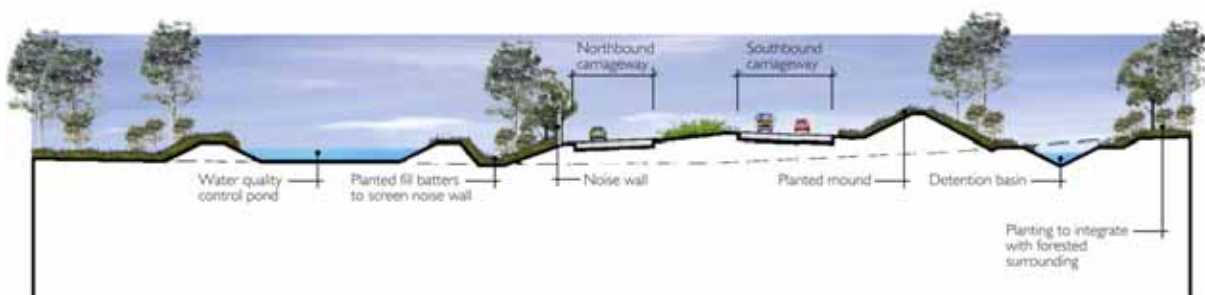


Figure 13-13 Section through Kew towards Ocean Drive looking northwards

13.6.7 Lighting, fencing and signposting

Lighting would be provided in accordance with Part 12 - Roadway Lighting Guide - of the *Guide to Traffic Engineering Practice* (AUSTROADS 1988) and the Australian Standard for Road Lighting (AS 1158). Interchange areas to be lit in accordance with these standards would include:

- merge and diverge areas
- ramps
- roundabouts at Johns River and Kew.

Other than the types of fencing indicated in the principles, no other special fencing would be provided along the highway.

All proposed signage would conform to RTA guidelines. Recommended proposed signage would include:

- improved Johns River signage at the southern and northern approaches to the village
- new signs indicating South and Middle Brother peaks, Crowdy Bay National Park and other regional attractions
- advance signs to alert road users to the facilities available in Johns River such as rest rooms, food and fuel, where appropriate

- new signage at Rossglen, the Middle Brother National Park, and Middle Brother State Forest
- improved Kew and Kendall signage at the southern and northern approaches to the town
- new signs regarding both towns and those further a field such as Laurieton and other regional attractions
- new signs to alert travellers to the facilities available in Kew such as motels, rest rooms, food and fuel
- new directional signage at Herons Creek village and Herons Creek Public School.

13.6.8 Noise attenuation measures

The urban design response for noise mitigation is consistent with the *Pacific Highway Urban Design Framework* (RTA 2005) principles for noise mitigation measures. The noise mitigation would be new elements in the landscape and would need to be integrated into their context. In all three instances of occurrences, the ability to use earthen mounds instead of noise walls was the first consideration. These mounds would be augmented with noise walls only where absolutely necessary.

The noise walls would be simple in design and, subject to detail design, constructed of a single material and neutral in colour appropriate to the particular setting.

13.6.9 Pedestrian and cyclist facilities

Continuous sealed shoulders with a minimum width of 2.5 m (which would also function as breakdown lanes) would be provided for all roadway sections of the proposal. The only locations where the 2.5 m wide left shoulder would not be available would be across the existing bridges at the Stewarts River (289 m long), Rossglen railway (42.3 m) and at the Camden Haven River (163 m long), all of which would be retained for the southbound carriageway. There is no footway on these bridges and the available carriageway width between barriers is 9.2 m.

Cyclists would have an alternative route along the existing Pacific Highway through Johns River and Kew. This route is generally suitable for cyclists although there is not a continuous sealed shoulder. However, the forecast traffic volumes on this route after the opening of the bypasses would be consistent with safe, on-road cycling conditions.

Maintaining pedestrian, cycle and vehicle links between Kew and areas east of the highway such as the high school, residences and towns further removed is important and would be catered for along Ocean Drive. Some tree planting and other visual mitigation measures could precede the major construction phases to reduce both construction impacts and the resultant visual impacts of the highway.

13.6.10 Rest areas

The new rest area at Ross Glen Road could be paved with a mixture of asphalt and aggregate finishes. Facilities would include parking for ten light vehicles; parking for eight to ten B-Doubles; toilets to the new 'Pacific Highway' design; seating and shelter (usually three sets); shade for vehicles (using current trees where possible); and a playground. The rest area would be revegetated in a manner consistent with adjoining vegetation.

13.7 The road users' experience

Two typical experiences are possible with the interpretation of the engineering and urban design of the upgraded Pacific Highway between Moorland and Herons Creek. The first is a new modified experience for those 'passing through' on an inter-regional journey (e.g. Newcastle to Byron Bay). The second is the shorter day-to-day local journey up and down and across the highway.

13.7.1 The inter-regional journey

The journey between Moorland and Herons Creek along the upgraded highway would have a duration of 12 to 15 minutes. The picturesque and natural qualities of the topography and landscape would be maintained using simple and effective urban design and landscape solutions that complement the existing conditions.

Beginning north of Moorland, the upgraded highway would have two lanes in each direction separated by a median, designed for travel at 110 km/h. The highway would divert from the existing road corridor through forested hinterlands and a new cutting to the Johns River bypass, west of the village, through a picturesque environment of open pastures and mature eucalypts (see Figure 13-14 and Figure 13-15). Together with advance signage, the new overpass at Johns River would be visible early enough to alert motorists that a town is near. The design of the overpass and interchange would reflect the simplicity of the rural setting.

The journey would continue north over Stewarts River passing from an open rural environment with views of Middle Brother Mountain to an enclosed road corridor abutted by National Park and State Forest.

The carriageways become closer together, with the traffic travelling in the opposite direction clearly visible. The existing character of this section around the base of Middle Brother Mountain provides a relationship between the mountain, highway, railway corridor and Watson Taylors Lake. A new rest area is provided for northbound travellers. An improved intersection would signify the turn off to Rossglen to the west of the highway.

As the motorists move north across the Camden Haven River bridge, views would open up to rural and grassland areas. An off-ramp along the alignment of the former highway would provide access into Kew. The landscape design and related signage in advance of the southern access point to Kew would allow drivers time to decide to visit the township or continue north on the highway.

Near Sunnyvale Road, the highway would move away from its existing route through new cuttings east of Kew, passing through a low topographical point. From here, the highway would pass between Kew and the Glen Haven residential estate. The bypass adjacent to Kew is the area of the largest scale of intervention and new infrastructure. The landscape treatment closer to Kew becomes more structured with rows of trees and plantings and integrated noise mitigation measures.

Approaching the northern end of the Kew bypass, motorists would pass through an 18 m cutting at its deepest, left in its natural state to emphasise the scale of this feature. The upgraded highway would rejoin the existing route north of Kew with open views through rural environments, roadside woodland and timber plantations.

Advance signage would indicate the turn off to Herons Creek to the west. The highway would then climb evenly up from Herons Creek past Herons Creek Public School to where it joins the existing duplicated highway to Kempsey and beyond.



Figure 13-14 Existing view west of Johns River and Stewarts River valley beyond



Figure 13-15 Photomontage view to west of Johns River showing proposed Pacific Highway bypass and overpass

13.7.2 Local journeys

The highway provides local access to communities on or adjacent to the highway servicing short local trips such as work, shopping, local visits and student commuting. School bus pick-ups and drop-offs would be improved by better lay-by areas and clearer sight lines for road crossing. Additional safety for buses and travellers in general has been incorporated in the design of median openings in selected locations and the installation of left-in/left-out access only configurations. These enhancements would cause some local residents to adjust their normal route, however, the safety implications outweigh any inconvenience.

Local journeys along and across all or parts of the highway would be changed to varying degrees. The Stewarts River Road connection to Johns River would be greatly changed by the construction of an overpass and roundabout. The former highway passing through the centre of the township would now be for local traffic or visitors to Johns River only and provide a better setting for local community signage, artwork and pedestrian access. The relocated section of Bulleys Road on the west side of the new highway would connect into the roundabout at Stewarts River Road to provide local and regional access in all directions.

At Rossglen the existing relationship of the village and the highway would remain generally unchanged, with a small section of Ross Glen Road extended to the south. The existing T-intersection would move to the south and form an intersection with the airfield access to the east. The aesthetics and experience of the enclosed naturally 'tree-lined avenue' is to be maintained in the new section of Ross Glen Road thus maintaining a similar experience.

Major change would occur with access to and from Sunnyvale Road (North) to the highway. A roundabout would be installed on the existing highway allowing northbound travellers from the new highway to access Kew, as well as allowing access to Sunnyvale and Bethesda Roads. Southbound traffic from Kew would access the highway from the roundabout on Ocean Drive.

The highway experience for local users around Herons Creek would remain similar to the existing with improvements made for turning into and off the highway by the construction of a median with openings at Herons Creek Road and Cluleys Road. The road improvements in the short section of Herons Creek Road between the highway and the railway underpass would enhance the civic values of this small town and improve the perceived address and connection to the highway. Access to Herons Creek Public School would be improved by the addition of a formal turnaround on the west side of the highway north of the school that would provide connection directly to the Bobs Creek Road intersection.

13.8 Implications for ESD

13.8.1 Precautionary principle

The proposed bypasses of the townships of Johns River and Kew would have major effects on the visual environment of these sections of the Proposal area. To reduce these visual effects and significant effects in other locations along the route, an Urban Design and Landscape Strategy Plan has been developed. The treatments included in this strategy are discussed in Section 13.4 and include measures to integrate cuttings, structures and noise mitigation measures into the landscape.

13.8.2 Intergenerational equity

The visual impact of the Proposal would be reduced with the implementation of the Urban Design and Landscape Strategy Plan. Although the visual environment especially in the vicinity of the Johns River and Kew bypasses would be permanently changed, the way in which the Proposal is integrated into the landform and the extent and nature of the landscape proposals would ensure that, in the longer term, the road environs would provide a high quality landscape and visual experience for road users. Through the removal of large volumes of through traffic from the 'main streets' of Johns River and Kew, opportunities would be available for urban design improvements which could substantially improve the appearance and amenity of these two townships.

13.8.3 Conservation of biological diversity and maintenance of ecological integrity

The implementation of the Urban Design and Landscape Strategy Plan would entail the planting of local native species within the road reserve throughout the Proposal area which would help to maintain species diversity in line with the requirements of the flora and fauna assessment as discussed in Chapter 10. The clearing of vegetated areas would be minimised wherever possible. Disturbed areas would be replanted or seeded as soon as possible during construction to maintain the ecological integrity of the area.

13.8.4 Improved valuation and pricing of environmental resources

The importance of the visual environment is identified throughout Chapter 13. The possible impacts of the Proposal have been recognised throughout the assessment process. The urban design concepts identified in Figures 6-4A to 6-4N reflect the importance of maintaining the quality of the visual environment.