

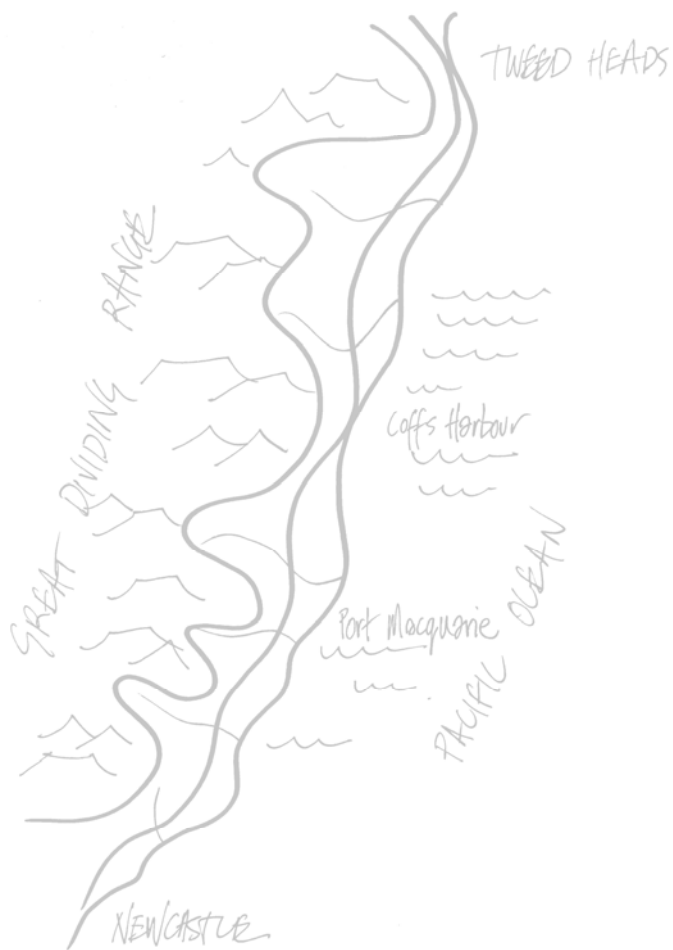


Transport  
Roads & Maritime  
Services

# PACIFIC HIGHWAY URBAN DESIGN FRAMEWORK 2013

URBAN DESIGN VISION, OBJECTIVES AND DESIGN PRINCIPLES FOR THE  
UPGRADE OF THE PACIFIC HIGHWAY FROM HEXHAM TO TWEED HEADS

CENTRE FOR URBAN DESIGN



A highway defined by the Great Dividing Range, the Pacific Ocean and the great rivers that flow between.

Cover: Pacific Highway, Ballina Bypass – a responsive, ‘green’, enjoyable drive with a consistent suite of well designed simple structures and memorable interchanges that provide good access to towns.

## Summary

When complete the Pacific Highway will provide a 664km long highway from Newcastle to the Queensland NSW border on the east coast of Australia. It is situated in a landscape valued for its scenic, ecological, economic and recreational qualities. It should be designed to be respectful of these attributes and provide an enjoyable high quality motoring experience.

Many travellers drive long distances on this highway, particularly in holiday periods. Providing a highway that is interesting and stimulating will make for an enjoyable, memorable experience and will in turn contribute to a safer journey.

Although named the Pacific Highway, the road is characterised more by the mountains and rivers of the Great Dividing Range than by the coast and Pacific Ocean. It is for the most part beautiful and the perfect setting to provide a scenic drive.

The presence of the mountains, the occasional glimpses of the ocean, the great rivers that meander across the coastal plain, the eucalypt forests broken up by meadows and pasture lands, and the small settlements and interspersed farmsteads are constant features along the highway. Variation is in the main provided by vegetation and the agricultural land use: the banana plantations on steep sided hills at Coffs harbour, the cane fields in the flat valley floors in the Northern Rivers area and the increasing frequency of tropical vegetation to the north.

Since the commencement of the Pacific Highway program nearly 50% of the upgrade has been completed and opened to traffic. The rest of the highway has been planned and is being designed. Of the completed projects most have been designed in accordance with the first edition of this document which was published in 2004. Many lessons have been learnt in this time and there are good design qualities and features, which should be continued.

It remains important that all of the Pacific Highway projects and future upgrades together contribute to the urban design quality of the whole Pacific Highway and are not disjointed.

An urban design vision was established in 2004 and is still current:

***‘The upgrade should be 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.’***

Six urban design objectives help achieve this vision and should be factored into the route selection and project development and procurement process.

1. Provide a flowing road alignment that is responsive and integrated with the landscape.
2. Provide a well vegetated, natural road reserve.
3. Provide an enjoyable, interesting highway.
4. Value the communities and towns along the road.
5. Provide consistency-with-variety in road elements.
6. Provide a simplified and unobtrusive road design.

The framework contains urban design principles that will help realise these objectives as well as ensure a minimal maintenance, cost-effective outcome.

This updated framework will help the RMS continue to create a high quality Pacific Highway and should be adopted on all projects whether at planning, design or construction stages. It should be issued to all Pacific Highway staff and project teams, and should be referenced in all planning and design briefs.





Bulahdelah, Myall River bridges

# Contents

Foreword.....	7
1 Introduction .....	8
1.1 The purpose of the framework .....	8
1.2 Relationship to other guidelines .....	8
2 Pacific Highway Program .....	9
2.1 Background .....	9
2.2 Program status .....	9
2.3 Achievements of the Pacific Highway urban design framework 2004 – 2013.....	9
3 Route context .....	20
3.1 A brief history of the Pacific Highway .....	20
3.2 Character of the Pacific Highway coastal landscape .....	21
3.3 Road user experience .....	25
3.4 Landmarks.....	31
4 A vision for the Pacific Highway .....	34
5 Urban design objectives (implementing the vision).....	36
6 Urban design principles (Implementing the objectives).....	38
6.1 Objective 1: Flowing and responsive.....	38
6.2 Objective 2: Well-vegetated and natural.....	40
6.3 Objective 3: Enjoyable journey.....	42
6.4 Objective 4: Community benefit .....	44
6.5 Objective 5: Consistency with variety.....	46
6.6 Objective 6: Simple, refined and unobtrusive.....	48
6.7 Synthesis of urban design principles.....	52
7 How to use the framework .....	54



## Foreword

The upgrading of the Pacific Highway is one of the largest construction projects ever undertaken in Australia.

While its prime purpose is to improve safety, the importance of achieving a high quality design outcome cannot be overlooked for many reasons, including:

- The Pacific Highway is a vast piece of infrastructure that Australia and NSW has funded and built, as such it represents a national achievement and source of pride.
- The Pacific Highway interacts with many villages, towns and cities along the east coast and needs to respect the built, natural and community context of those places.
- The Pacific Highway is a significant drive through the Australian landscape and has great value as a scenic highway and an enjoyable, comfortable experience for road users.

The high quality projects that have been produced over the last 10 years since the 2004 framework was produced have been successful in these terms. The projects have won many awards and industry acclaim. They are admirable in their architecture, durability and landscape setting and have given credit to both the State of NSW and the Commonwealth Government.

They have in the main been valued by the communities along the route and by the road users themselves. Our stakeholders have supported the ongoing quality of the upgrades.

This update reflects these achievements and promotes continued excellence in planning and design on the Pacific Highway. The vision, objectives and design principles largely remain unchanged since 2004 however the outcomes of this design direction are documented so that they can be adopted for the remaining work and save time and money in duplication.

I commend this framework and its adoption on all Pacific Highway projects, large or small.

Bob Higgins, General Manager, Pacific Highway



# 1 Introduction

## 1.1 The purpose of the framework

The purpose of this framework is to provide urban design guidance in the route selection, concept development and procurement of the upgrade of the Pacific Highway.

The scale of the Pacific Highway upgrade is significant. Approximately 664 km of road infrastructure situated between the Great Dividing Range and the Pacific Ocean - a vast area of outstanding natural beauty and ecological value.

A highway in this landscape must respect the character of the place and assist road users in appreciating the landscape and natural qualities of this part of the world. It should also respect the people living within the road corridor and be sensitively designed to avoid detrimental impacts on their communities and towns.

The scale of the undertaking dictates that it must be carried out in a staged manner by a variety of different design teams and contractors. In order to ensure that a good consistent standard of design is applied to the whole highway this document sets down a broad urban design framework.

It is intended to inform urban designers, engineers and project managers working on Pacific Highway projects and should complement not replace the analytical and design processes they adopt.

**‘Urban design involves creating infrastructure that is sensitive to its context, serves the communities well and has a unified architecture.’**  
Beyond the Pavement

## 1.2 Relationship to other guidelines

This framework is derived from and makes reference to the following RMS urban design guidelines which should be used in the design and delivery of Pacific Highway projects:

- Beyond the Pavement: RMS Urban design policy, procedures and design principles
- Landscape Guideline
- Bridge Aesthetics 2012
- Noise Wall Design Guideline
- Shotcrete Design Guidelines





## 2 Pacific Highway Program

### 2.1 Background

In New South Wales, the Pacific Highway or in parts the Pacific Motorway (M1) carries between 2.9 million vehicles per year near Grafton to over 12 million vehicles per year at Tweed Heads and Raymond Terrace, making it one of the most heavily used interstate road corridors.

The almost 700km of highway north of Newcastle serves a region with a population greater than 500,000. This population more than doubles in peak tourist season and is projected to increase to around 800,000 within 20 years.

Much of the undeveloped Pacific Highway is recognised as being inadequate for modern traffic and has a poor record for road crashes and fatalities. The nature and condition of the Highway between Hexham and Queensland varies greatly, from high quality divided carriageways to stretches of narrow two-lane road. There is an urgent need to provide a complete and consistent high standard road to address current and future demands.

Project priorities are based on traffic and road safety needs. In response to the high proportion of head-on crashes resulting in fatal injuries, the main focus of the program is to provide dual carriageway standard highway.

After eight years, the program has saved an hour in travel time and prevented hundreds of crashes.

### 2.2 Program status

At the date of this publication 346 kilometres of the existing 677 kilometre Pacific Highway between Hexham and the Queensland border are now four lanes of divided road. Around 74 kilometres are currently under construction.

The final length of the highway will be 664 kilometres including a high standard connection to the F3 Freeway.

### 2.3 Achievements of the Pacific Highway urban design framework 2004 – 2013

The first edition of the Pacific Highway urban design framework was applied to all the Pacific Highway projects over a ten year period.

It has been used to inform the route selection and guide concept design development in the environmental assessment process.

It was listed as a reference document in the urban design Scope of Works and Technical Criteria and used by tenderers to guide the development of the contract documents.

It has been as a tool for measuring the success of urban design Key Result Areas in the Alliance and some recent Design and Construct projects.

The succinct and clear objectives have been applied to over 300km of upgrade, creating a valued asset for road users and the community as the following images demonstrate.







Banora Point upgrade is a landmark project marking the NSW Queensland border. The well designed viaduct with its views of the Pacific ocean, the deep cutting with feature lighting framing views to the gold coast, Wilson Park recreated on a landbridge and a new gateway to Tweed Heads.



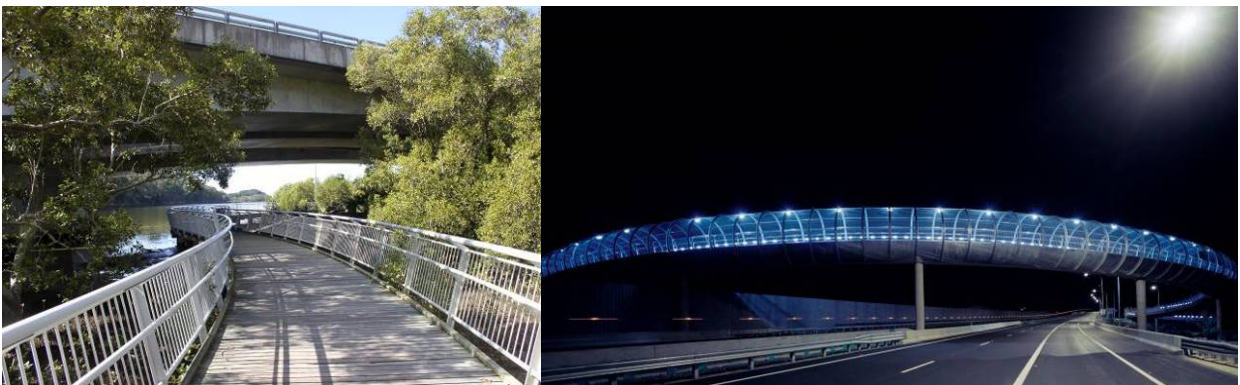






The triple bridges over Brunswick River were a highlight of the Brunswick Heads to Yelgun upgrade. Highly commended in the planning Institutes 2008 awards for its design and fit with the landscape the citation stated the project was *“A tribute to the high standards maintained by Roads and Maritime Services (then RTA) over many years.”*





From top left to right: Tugun Bypass border crossing, Banora Point cutting, cutting at night, Yelgun tunnels, Yelgun to Chinderah fauna overpass, Yelgun to Chinderah overbridge, Brunswick River boardwalk and bridges, Billinudgel pedestrian bridge





From top left to right: Ballina Bypass Teven interchange, Ballina Bypass alignment, Bonville upgrade noise wall, Bonville upgrade alignment and overbridge, bridges over Bonville Creek, clear noise walls over bridges, Pine Creek State Forest alignment.





From top left to right: Kempsey bypass, Kempsey bridge, Cooperook to Herons Creek river crossing, overbridge and alignment. Bulahdelah bypass memorial bridge, Nabiac town and Nabiac bridge.





From top left to right: Bulahdelah interchange, Karuah to Bulahdelah rest area, Karuah to Bulahdelah and Karuah Bypass bridge.









Karuah bridge over the wetland at Horse Island. An elegant structure with wide spans, no headstocks, precast parapets casting a deep shadow over the girder and rock abutments.



### 3 Route context

#### 3.1 A brief history of the Pacific Highway

11 May 1770	Captain Cook sights Port Stephens
15 May 1770	Cook names Cape Byron and Mount Warning
16 May 1770	Cook names Point Danger, the current border of NSW and Queensland
1799	Flinders names Shoal Bay (at the mouth of the Clarence River)
1818	John Oxley names Port Macquarie and the Hastings River.
1823	Oxley discovers mouth of the River Tweed. 'The scenery here exceeded everything I had previously seen in Australia – extending for miles along a deep rich valley clothed with magnificent trees, the beautiful uniformity of which was only interrupted by the turns and windings of the river, which here and there appeared like small lakes, while in the background Mt Warning reared its barren and singularly shaped peak, forming a striking contrast with the richness of the intermediate country' John Uniacke, journalist 1823.
1824	Australian Agricultural Company grants 1 million acres stretching from Hunter River to the Manning River (Taree). A road was constructed running from Raymond Terrace to the north through this property.
1830 – 1880	Red Cedar forests cleared in northern NSW
1850	Grafton established on the Clarence River.
1857	Road extends from Raymond Terrace to Port Macquarie and Kempsey. Then on to Armidale, Grafton and terminates at Casino on the Richmond River.
1866	Road extended north from Kempsey to Fredrickton.
1883	Coffs Harbour area identified for settlement.
1909	At this time it was still considered quicker and more comfortable to travel from Sydney to the border by sea although a road ran from Sydney to the border roughly along the line of the present Pacific Highway with horses and stabling at the main towns along the route. There were few bridges over the major rivers and crossings were generally made by ferries.
By 1914	Road extended north to Ballina.
Early 1920s	Cars began to be introduced; the road was constructed in an earth formation only.
By 1923	Sydney and Grafton connected by rail.
1925	Main Roads Board established.
1932	Combined road and rail bridge over Clarence River at Grafton completed.
By 1952	Bitumen Pacific Highway from Sydney to NSW/ Queensland border.

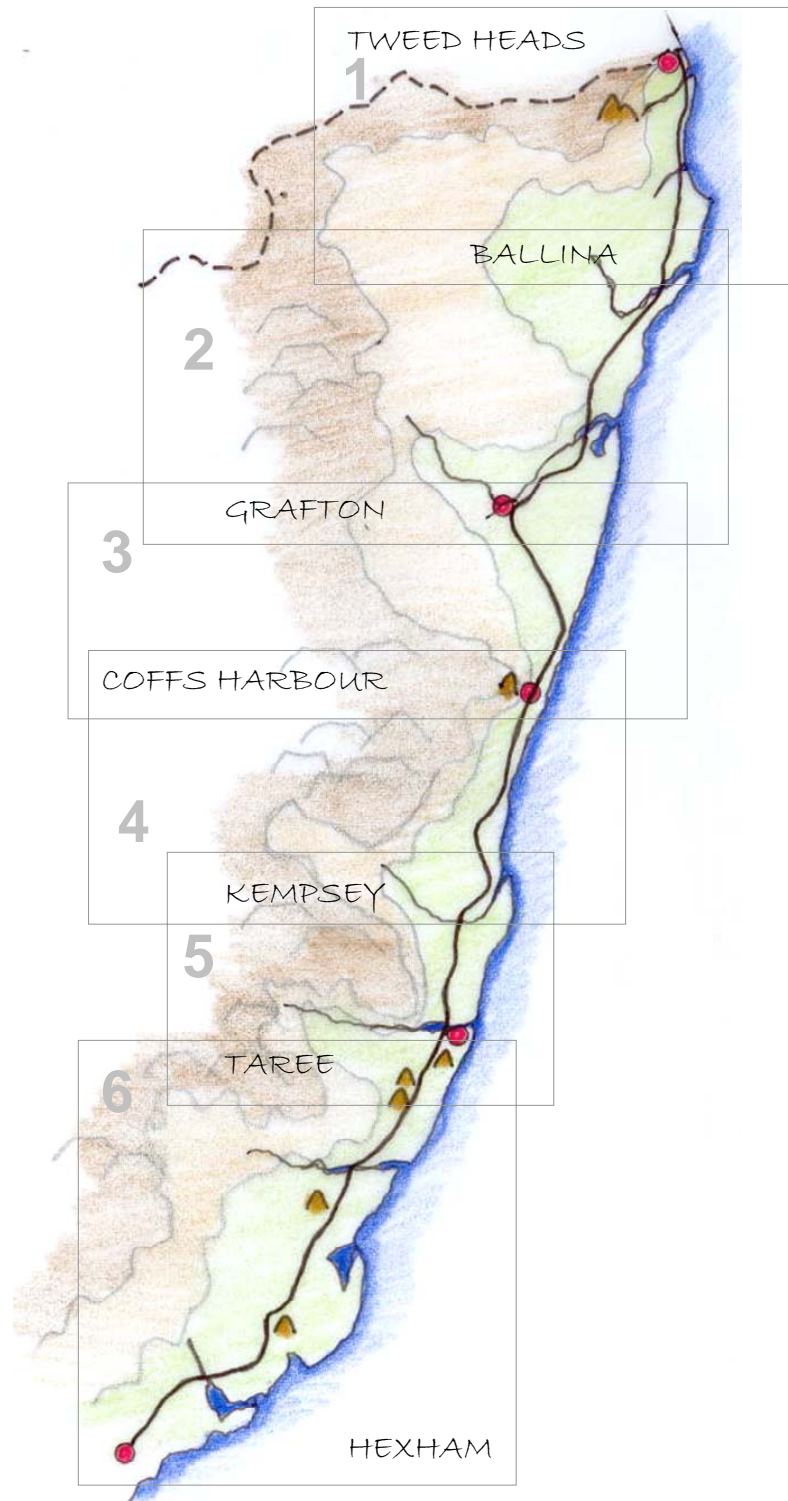
(Extracted from Historical Roads of NSW, The Pacific Highway)



### 3.2 Character of the Pacific Highway coastal landscape

At 664km in length and varying from the ocean to the mountains in width from several kilometres to 30km, this tract of land is vast. It encompasses many different character zones defined by the interaction between built form and land use and topography and native vegetation.

The area can be broadly split into six character regions which in turn can be broken down into many different character zones. These regions are described as follows:



### 1 Tweed Heads to Ballina

This area of the landscape encompasses the towns of Tweed Heads, Murwillumbah, Brunswick heads, Byron Bay and Ballina. The landscape is hilly with a backdrop of the higher mountains to the west. There are flatter areas around the Tweed River and along the coastal edge used for agriculture. There is a strong sub tropical feel to the vegetation and a thriving holiday industry apparent in the built form with the influence of the Gold Coast to the north and Byron Bay to the south. The area contains many character zones relating to the towns agriculture and topography.



Cape Byron hinterland

### 2 Ballina to Grafton

This area occupies a broad flat coastal plain shaped and occupied by the Richmond and Clarence Rivers. It encompasses the towns Ballina Alstonville, Harwood Broadwater Woodburn and Grafton. The land use of the area is in the main agricultural. Character areas are broadly defined by the towns and to the west the proximity to the foothills of the Dividing range.



### 3 Grafton to Coffs Harbour

This area differs from the flat river plains to the north with a number of ridgelines and hills as the Dividing Range lies closer to the coast. Main towns include Woolli Red Rock Corindi Beach and Woolgoolga but by far the largest is Coffs Harbour a small city with a strong holiday industry. The agriculture is in the main plantation based on the hillsides with bananas a major crop near Coffs Harbour.





Coffs Harbour plantation

#### 4 Coffs harbour to Kempsey

Between Coffs harbour and Kempsey the landscape has an undulating pastoral quality broken up by the meandering Macleay, Bellingen and Nambucca and rivers. There are many small towns situated out along this narrow coastal zone including Sawtell, Bonville, Urunga, Nambucca Heads, Macksville, South West Rocks, Frederickton and the larger regional town of Kempsey. Character zones in this area are defined by these towns and the topography that separates them.



Undeveloped highway north of Kempsey

#### 5 Kempsey to Taree

From Kempsey to Taree the coastal landscape broadens including the Maria and Hastings River with a backdrop of the Brother Mountains which dominate the area to the west. Port Macquarie the largest town lies on the coast at the mouth of the Hastings River and the small towns of Hastings Wauchope Kew Cooperook and Harrington fan out around the growing city.



South Brother , Middle Brother and Watson Taylors Lake from North Brother

### 6 Taree to Hexham

The landscape broadens out further between Taree and Hexham encompassing the Great Lakes area and the rivers of Wang Wauk, Myall, Karuah Williams and the Hunter at the south end. The area is undulating and heavily forested with scattered areas of agriculture.

Taree is the main town with Wingham, Old Bar and Nabiac nearby. To the south the twin towns of Forster Tuncurry lie at the mouth of Wallis Lake to the sea with Bulahdelah, Tea Gardens, Raymond Terrace and Karuah outlying towns to the conurbations of Port Stephens and Newcastle. Character zones are largely created by the shape and form of the rivers, lakes and coast.



Bulahdelah from Alum Mountain



### 3.3 Road user experience

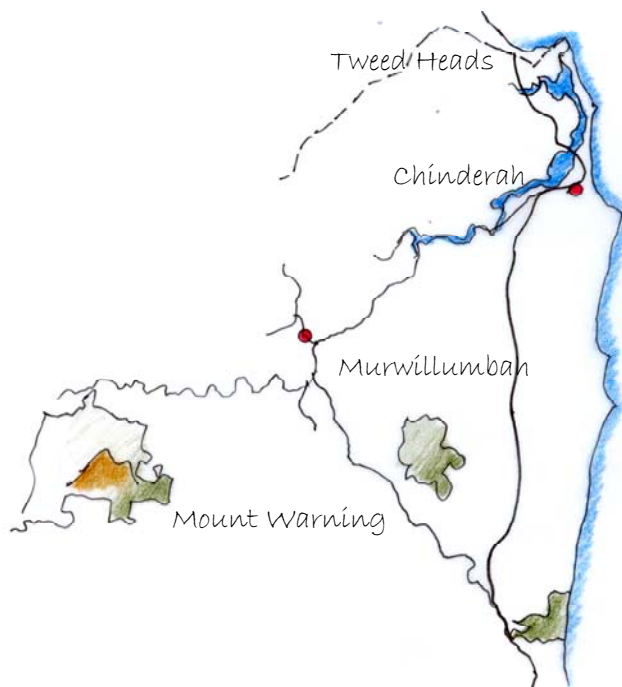
The current Pacific Highway from Hexham to Tweed Heads is a long road; it takes at least a day to travel, two days if a more leisurely pace is adopted. It is therefore a significant part of a business trip or a holiday. Consequently the road user experience of the journey is important.

The Pacific Highway corridor is dominated by the Great Dividing Range to the west, the Pacific Ocean to the east and the rivers of Hunter, Manning, Hastings, Macleay, Clarence, Richmond and Tweed which flow between the two.

While providing access to the Pacific Coast the highway has very few views of the Pacific Ocean and is probably more accurately characterised by the mountains and foot hills of the Great Dividing Range to the west of the highway as well as the broad rivers that cross the floodplains between the mountains and the ocean.

There are, on occasion, precious views towards the Pacific Ocean and glimpses of long sandy beaches especially around Cape Byron. Nevertheless it is the connection to the hills, mountains and rivers that provides a strong identity to the Pacific Highway.

Travelling from north to south the road enters NSW at the Tugun Bypass border marker. It passes through the gateway cutting at Banora Point, over the Tweed River and heads inland alongside the canefields with views of Mount Warning and Mount Burrell. The landscape of this area retains some of the wilderness character described by John Uniacke (section 3.1) although the intervening agricultural development has created a much more pastoral character.



Tugun border crossing, Banora Point cutting and Mount Warning (below)



The tunnel and bridges of the Yelgun to Chinderah upgrade create a memorable journey and sequence of events.



Yelgun to Chinderah tunnel and arched bridge

Crossing the Brunswick River, brief views are available of the river, mangroves and coast. South of Brunswick, Cape Byron comes into view.



Brunswick River and boardwalk built as part of the upgrade

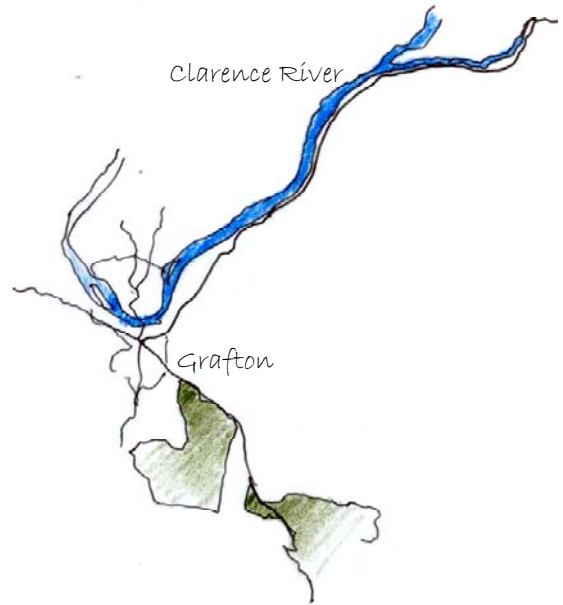




The undulating coastal hills and valleys remain a constant theme around Ballina and Woodburn until the flatter farmed land around the Clarence River north of Grafton. The hills, although still visible, recede into the distance. The crossing of the Clarence River at Harwood is a major milestone on the journey.



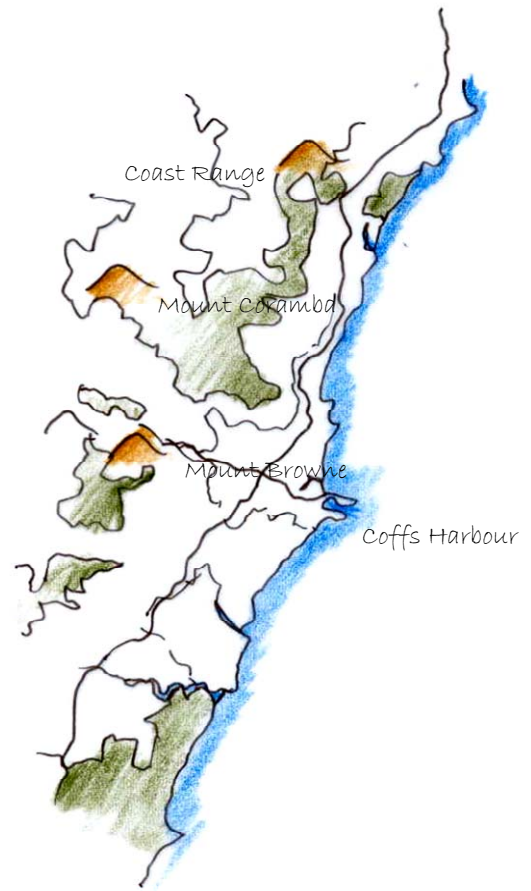
Bridge over the Clarence river at Harwood



Approaching Woolgoolga, the plateau of the Great Dividing Range around Dorrigo again becomes a dominant presence for road users with bold ridges and valleys with lush vegetation and banana plantations extending around Coffs Harbour. The road through the town passes the distinctive arched railway bridge.



Coffs Harbour rail bridge over the Pacific Highway



Bonville Bypass takes the road user on a journey through the pastoral landscapes around Coffs Harbour and through the Pine Creek state forest with its specially designed widened median to retain tree cover. The fauna crossing is also a memorable milestone on the route.



State Forest drive and fauna overpass on Bonville upgrade

South of Coffs Harbour, the mountains, although visible, again recede into the distance giving way to the flatter rural landscape of the area around Kempsey.



Kempsey bridge – the longest in Australia



Near Port Macquarie, the highway crosses the Hastings River and the Wilson River, the mountains again begin to dominate and south of Wauchope three prominent wooded mountains called North Brother, Middle Brother and South Brother loom over the highway and are an important reference for the road user.



The Brother mountains from the upgraded Coopernook to Herons Creek upgrade



Crossing the Manning River near Taree the landscape again flattens with views of the Dividing Range in the distance before the highway passes Mount Talawahl near Nablac and lifts into a wilder undulating bushland region around the Great Lakes.



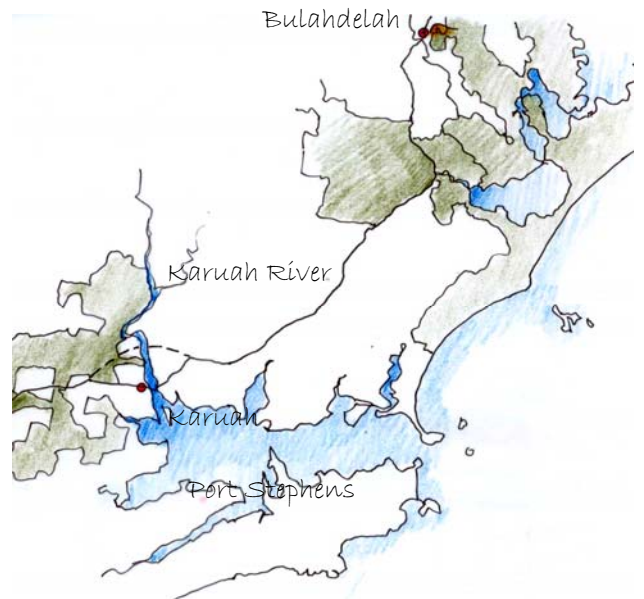
Mount Talawahl framed by the arched bridge at Nablac



The Coolongolook to Bulahdelah upgraded section of highway provides an interesting and varied scenic drive winding through valleys and skirting hillsides. Passing over a saddle, the highway enters a broad basin in which Bulahdelah is situated along the Myall River. A low ridge of hills blocks views to the Great Dividing Range to the west and to the east, Alum Mountain stands over the town.



Memorial bridge at Bulahdelah with Alum Mountain behind



South of Bulahdelah the upgraded highway travels through an undulating region with a balance of forest and open pasture. Views are varied and attractive and provide a pleasant drive. As along much of the highway rest areas with the distinctive toilet buildings and gull wing rest area signage are visible.



Karuah to Bulahdelah Stage 2&3 – a flowing responsive highway alignment



The road passes over Karuah River and Horse Island with views of the old bypassed town in the distance.

The road then passes through a flatter region of woodland and agricultural land before reaching Raymond Terrace at the confluence of the Willams and Hunter Rivers.

A short journey with open views to distant hills to the west takes the Pacific Highway to the Hunter River at Hexham.



Bridge over Karuah River

Although a small aspect of the route in terms of travel time, the towns and villages have a significant impact on the journey: buildings, farms and bridges are visible, and are important milestones as well as places to stop and rest.

However travelling the Pacific Highway is essentially a journey through the landscape. As the upgrades proceed, more than ever the road user interest will rely upon views of the landscape and the interplay between human activity and the natural beauty of the Pacific Coastal environment.

### 3.4 Landmarks

The following are the 18 key natural landmarks of the Pacific Highway Hexham to Tweed Heads set down in the first edition of the framework. Along with the towns and communities along the route, they form important milestones along the journey.

- |                                   |                                 |
|-----------------------------------|---------------------------------|
| 1. Tweed River                    | 10. Hastings River              |
| 2. Mount Warning                  | 11. North Brother               |
| 3. Brunswick River                | 12. Middle Brother              |
| 4. Cape Byron                     | 13. South Brother               |
| 5. Richmond River                 | 14. Manning River               |
| 6. Clarence River                 | 15. Mount Talawahl              |
| 7. Mountains around Coffs Harbour | 16. Bulahdelah or Alum Mountain |
| 8. Kalang River                   | 17. Karuah River                |
| 9. Macleay River                  | 18. Hunter River                |

As well as these natural landmarks there are now a number of major built landmarks on the highway which include:

- The Tugun Bypass border crossing
- The Banora Point cutting and viaduct
- The Yelgun tunnel and Eviron Road arched bridge.
- The serpentine pedestrian bridge over the highway at Billinudgel
- Teven road interchange at Ballina
- The Coffs Harbour rail bridge
- The winding drive through the Bonville State Forest
- The long Kempsey viaduct
- The arched bridge at Nabiac
- The sequence of bridges on Bulahdelah Bypass

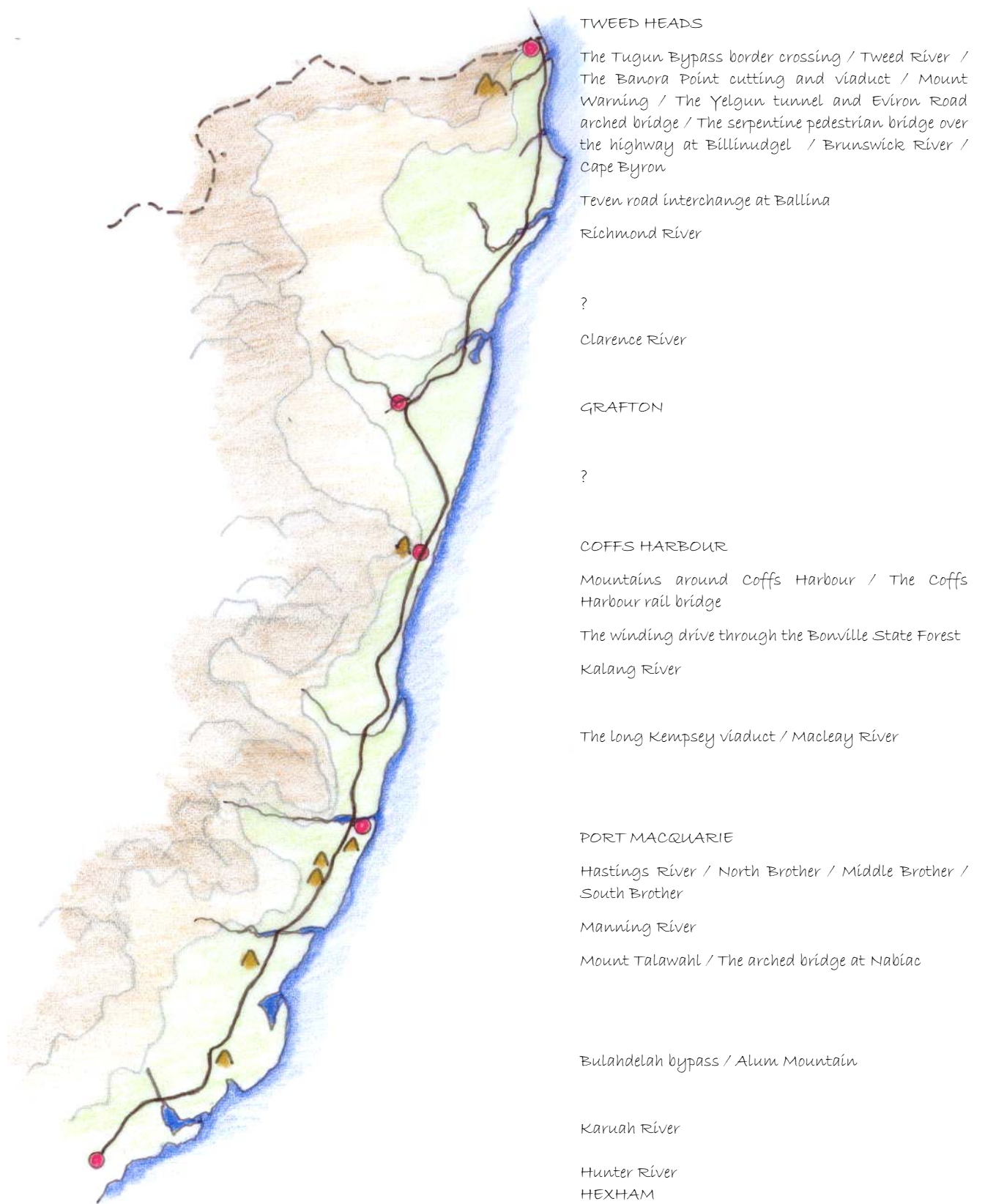
The combination of these landmarks with the design objectives in this framework helps create a memorable and interesting journey experience. As new projects are built new landmarks will be implemented for example the tunnel at the edge of Cape Byron.



Photomontage of tunnel on Tintenbar to Ewinsdale

In reviewing the spacing of these events (next page) It is noticeable that there are some gaps in this sequence of events, these are associated with undeveloped sections of highway and a challenge in the implementation of these sections will be to ensure road user interest through the design of the highway.





## 4 A vision for the Pacific Highway

'The upgrade should be 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.'

Although it is nearly 700km long, there is much that unifies the highway.

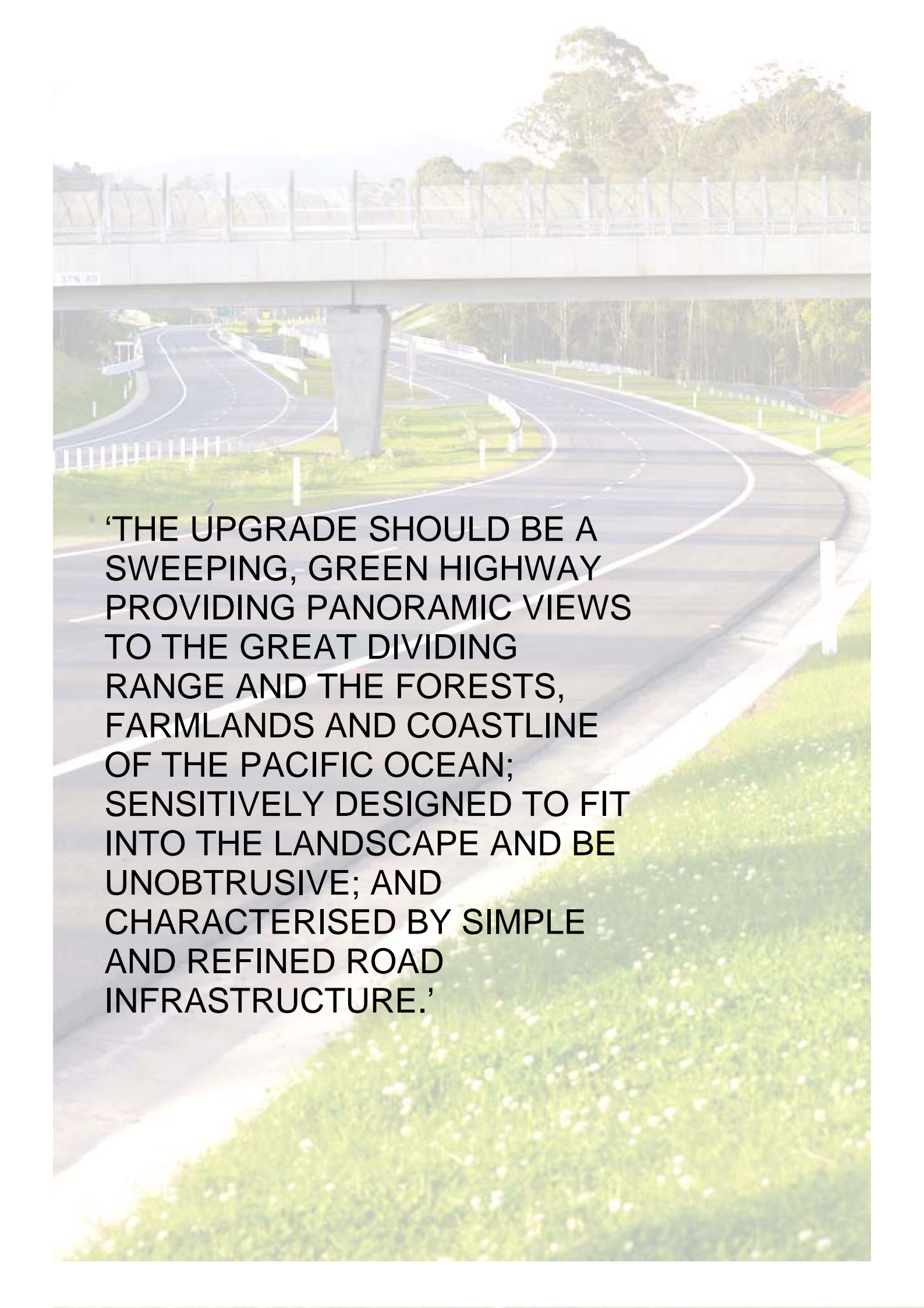
Administratively the whole corridor is dealt with as one entity and named the Pacific Highway. This creates a strong identity in itself.

There are also constants and repeating elements in the landscape experience, namely the coast and the mountains, and the interplay of rolling hills, plains and rivers.

A number of themes re-occur along the highway, for example the river crossings, small towns, and forest.

Consequently there is logic to setting a vision for the whole highway, which is based on the creation of a scenic highway - a highway which will help keep people aware and interested in their surroundings, and create an unfolding panorama of this special area of Australia.



A photograph of a modern highway interchange. A concrete overpass spans across the road. Below it, a multi-lane asphalt road curves through a lush green landscape. The road is bordered by white guardrails and has clear lane markings. In the background, there are trees and a hazy horizon. The text is overlaid on the lower-left portion of the image.

**‘THE UPGRADE SHOULD BE 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.’**

## 5 Urban design objectives (implementing the vision)

The urban design vision can be broken down into the following objectives. These should be considered in the route selection stage of the planning of the Pacific Highway upgrade.

They should also form the basis of the development of the concept design and be used to evaluate the success of the design proposals.

They are to be considered in addition to the economic, safety, engineering and environmental objectives adopted for the Pacific Highway upgrade.

### **Objective 1: Provide a flowing road alignment that is responsive and integrated with the landscape.**

Applying to road alignment decisions as well as the earthworks design, the road should respect the landscape character and should flow and respond to the shape of the landform and patterns of natural and farmed vegetation cover.

### **Objective 2: Provide a well vegetated, natural road reserve.**

A road corridor in the lush forested landscape of the north east coast of NSW should be well-vegetated in the interest of road user enjoyment, residents views, landscape integration and biodiversity protection and recovery.

### **Objective 3: Provide an enjoyable, interesting highway with varied views and vistas of the landscape and pleasant restful places to stop.**

The Pacific Highway is a long road, it takes a considerable time to drive and there is a tendency for drivers to make long duration journeys. Consequently the drive should be an enjoyable and memorable road user experience. This will help shorten the perception of the journey and keep drivers alert.

### **Objective 4: Value the communities and towns along the road.**

It is important to ensure the road upgrade is considerate of the towns and communities along the route.

This can be achieved through sensitive planning of the road alignment to avoid visual and noise impacts. However this is not always possible and in some cases it is of value to have a close relationship between the road and community. In these cases care must be taken not to divide communities and detrimentally affect their fabric. A well-designed road can minimise the severance caused by the road and provide improvements in connectivity and accessibility. It can safeguard the accessibility and amenity of streets, parks, rest areas and river frontages.

It should not be forgotten that the local vernacular of farms, field boundaries, local roads, established businesses and residences is an important cultural aspect of the landscape and the journey.



**Objective 5: Provide consistency-with-variety in road elements.**

Where appropriate, consistent road design and road furniture will help unify the highway and reduce the perception of clutter. This will allow the road user to better appreciate the passing landscape. It will also make the driving experience simpler and more comfortable.

Conversely, a road which is inspired by the character and distinctiveness of the local context will add variety to the journey and help keep drivers interested and aware.

**Objective 6: Provide a simplified and unobtrusive road design.**

The road design should be as simple and refined as possible, unobtrusive and respectful of the scenic qualities of the landscape and the towns along the route.

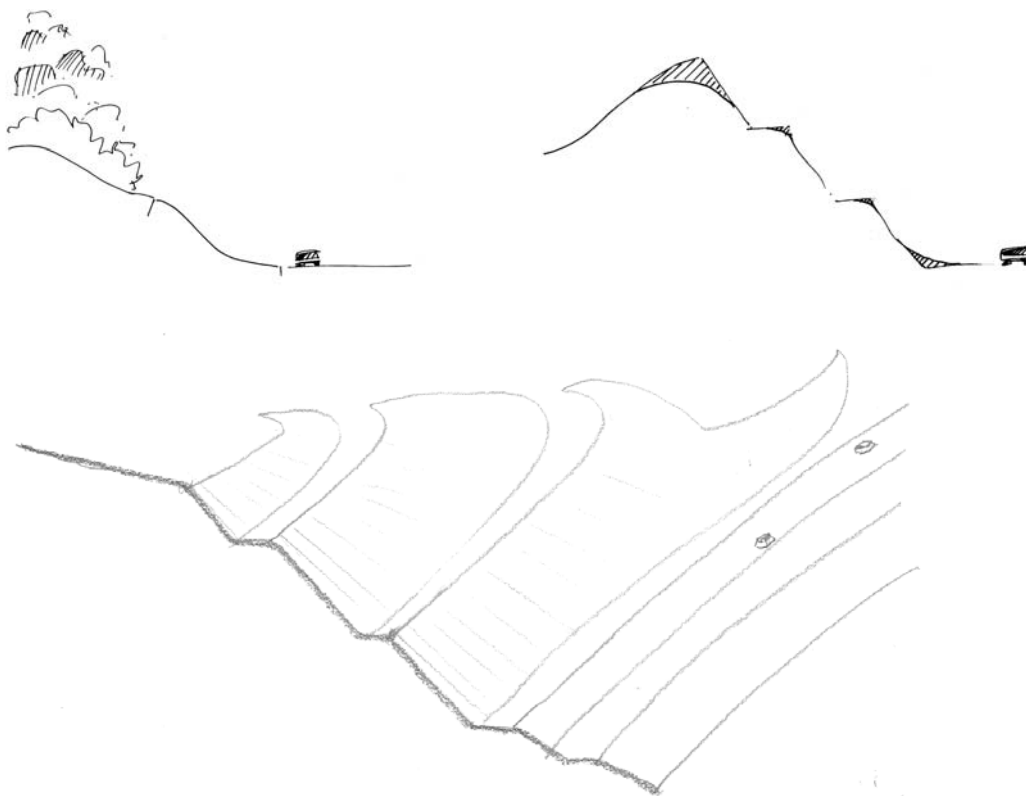
*All these objectives must be addressed by minimal maintenance, cost-effective solutions. The Highway will be 664 km in length; it is part of a state road network of over 17,700 km; and a high maintenance design is inappropriate in this context.*

## 6 Urban design principles (Implementing the objectives)

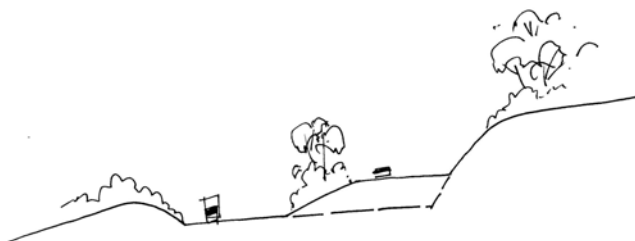
### 6.1 Objective 1: Flowing and responsive

*Provide a flowing road alignment that is responsive and integrated with the landscape.*

- 6.1.1 Where possible, the alignment should respond to the grain of the landscape by: following the edges of valleys and, skirting around hills and aiming for saddles. In this way a more responsive, flowing, integrated and unobtrusive road alignment can be produced.
- 6.1.2 Aim to integrate road embankments with adjacent landscape by grading out tops, bottoms and ends of cuttings. Consider varying slopes gradients, fence boundaries and planting areas to avoid the appearance of a formal edge to the highway.



- 6.1.3 Consider independently grading carriageways on hillsides to minimise deep cuttings and provide a responsive interesting road alignment.







Karuah to Bulahdelah stage 1. A flowing responsive highway with flattened batters, a wide median and an alignment that skirts the hillsides.

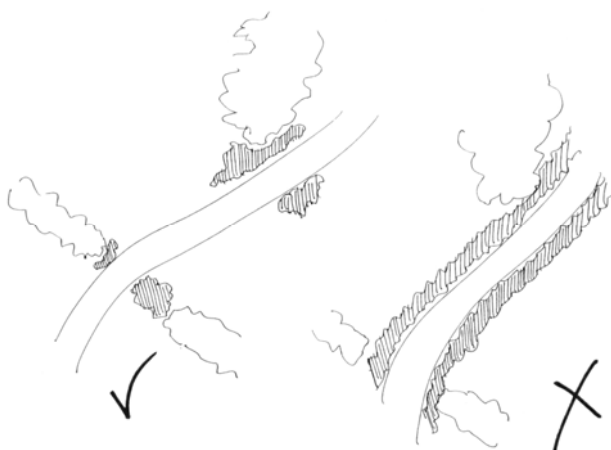


Independently graded carriageway on Karuah Bypass. This approach creates a more interesting fitting alignment.

## 6.2 Objective 2: Well-vegetated and natural

*Provide a well-vegetated, natural road reserve.*

- 6.2.1 Provide a densely vegetated highway - native seed all landscape areas or where the existing soils are suitable, utilise the natural seedbank within the soil.
- 6.2.2 Subject to context and the balance of forest and views, in areas to be planted trees and shrubs should be densely planted into seeded areas.
- 6.2.3 Integrate the road landscape into existing vegetation patterns. Augment and de-fragment habitat. Continue existing bands of planting and where appropriate avoid linear strip planting of trees and shrubs which accentuates rather than integrates the highway.



- 6.2.4 For seeding and tubestock planting, endemic species of local provenance should be used wherever they can perform the requirements of the design.
- 6.2.5 Consider the width of the median, so that when additional lanes are required, the median width remains sufficient for a self reliant, attractive and headlight glare reducing landscape strip.
- 6.2.6 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 road.
- 6.2.7 Where medians are planted, it is preferable to use sedges (eg Lomandra) along the edges of the planted area. (Outside edges to be mown.)
- 6.2.8 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.
- 6.2.9 Provide well vegetated yet open and park like, rest area landscapes (trees in grass).





Kempsey Bypass. Densely spaced median planting helps create a well vegetated corridor.

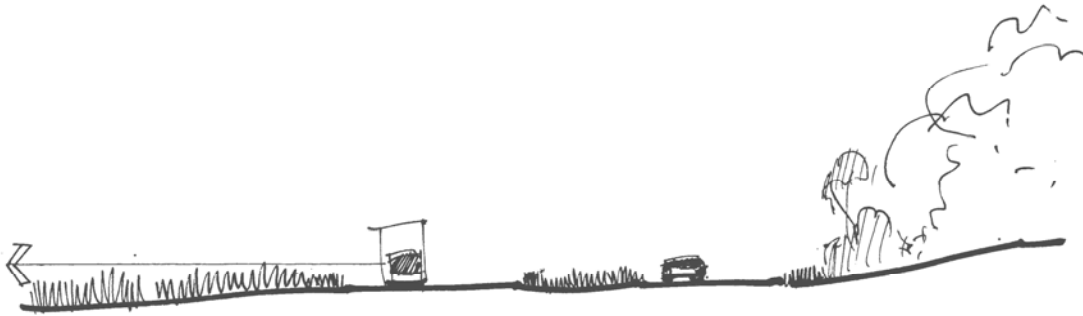


Cost effective revegetation of cutting slopes on the Glenugie upgrade through the spreading of existing forest soils with their natural seed banks.

### 6.3 Objective 3: Enjoyable journey

*Provide an enjoyable interesting highway with varied views and vistas of the landscape and pleasant restful places to stop.*

- 6.3.1 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.



- 6.3.2 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.
- 6.3.3 To maximise open views use wire rope barrier types where possible, safe and taking into account engineering issues.
- 6.3.4 On bridges use 2-rail barriers instead of solid walls/ parapets or walls with one rail.
- 6.3.5 Ensure that views to the ocean, rivers and the key landmarks (see section 2.4) are maximised.
- 6.3.6 Consider the inclusion of interpretative landmark sculptures on sections with few distinctive landmarks
- 6.3.7 Where possible locate rest areas to maximise views of the surrounding landscape in particular the landmarks of the corridor.
- 6.3.8 Provide pleasant restful rest area landscapes, incorporating grassed play areas and shade trees for play areas as well as parking bays.
- 6.3.9 Break up large expanses of parking into bays separated by planting.
- 6.3.10 Rest area layouts and designs should utilise the standard rest area structures (see appendix B and C). Consideration should be given to the placement of these elements so that the structures have sufficient space around them avoiding a cluttered appearance and are accessible and well connected to the paths and parking areas.





Views of Mount Warning maintained by use of low grasses in verge



Open attractive rest area on Karuah to Bulahdelah stage 2&3

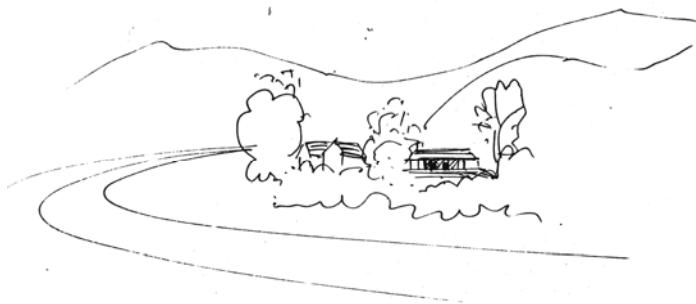


Interpretative landmark sculptures. 'Shadows of the past', Tasmania

## 6.4 Objective 4: Community benefit

*Value the communities and towns along the road.*

- 6.4.1 Adverse visual impacts on towns and communities should be avoided where possible, minimised and mitigated (in that order) through the location, form and design of the road infrastructure.
- 6.4.2 Noise impacts should be minimised through the design of the vertical and horizontal road alignment in the first instance and then if required mitigated in accordance with the Environmental Noise Management Manual.
- 6.4.3 Where possible and not in conflict with 6.4.1, road geometry, earthworks and landscape should be designed to allow advance views of Pacific Highway towns.
- 6.4.4 Where possible and not in conflict with 6.4.1, 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.



- 6.4.5 The accessibility, amenity and character of built form of public open space near the highway (streets, paths, parks, river frontages etc) should be maintained. Where appropriate, potential improvements should be considered.
- 6.4.6 Safe pedestrian and cyclist connections and accessibility should be maintained. Where appropriate potential improvements should be considered.
- 6.4.7 Provide distinctive planting at off ramps leading to towns.
- 6.4.8 Where appropriate provide location marker sculptures before the access points to bypassed towns (see appendix A). Seek community feedback on the selection of images.
- 6.4.9 Assess the potential changes and opportunities of removing traffic from bypassed towns and design the highway to best enable opportunities for improvement and future well being.





Improved access and public space in Nabic. The highway upgrades should enable improvements to bypassed towns through opportunities created by a reduction in traffic.



Glimpsed views of Karuah from the bridge over Karuah River, possible through the use of two rail barriers.

## **6.5 Objective 5: Consistency with variety**

*Provide consistency with variety in road elements.*

### *Bridges*

6.5.1 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.

6.5.2 The opportunity to provide occasional distinctive individual bridges should be taken where appropriate, for example pedestrian bridges or bridges over deep cuttings or wide rivers.

6.5.3 Where appropriate consider the design of the mesh on safety screens as a means of including location specific motifs.

### *Barriers*

6.5.4 Where possible utilise wire rope fencing for all road safety barriers. Use white upstands for clarity and directional guidance.

6.5.5 Noise walls should be concrete panels with a smooth flowing top line.

6.5.6 The opportunity to provide occasional contextual interest should be explored in the texture applied to noise walls and other concrete walls. This will provide road user interest and help in the prevention of graffiti vandalism

### *Landscape*

6.5.7 Provide distinctive and locally significant stands of trees at key points on the route such as rest areas, junctions and near towns.





Pedestrian bridge at Billinudgel provided access to the pie shop and business park and also is a distinctive landmark on the journey. It is important to provide variety and interest along the route where the opportunity arises.



Truss bridge providing access to Alum Mountain and is a point of variety on the route



The opportunity to implement a sprung arch bridge was taken in this rock cutting. It provides an alternative interesting bridge design amongst the more prevalent standard overbridges.

## 6.6 Objective 6: Simple, refined and unobtrusive

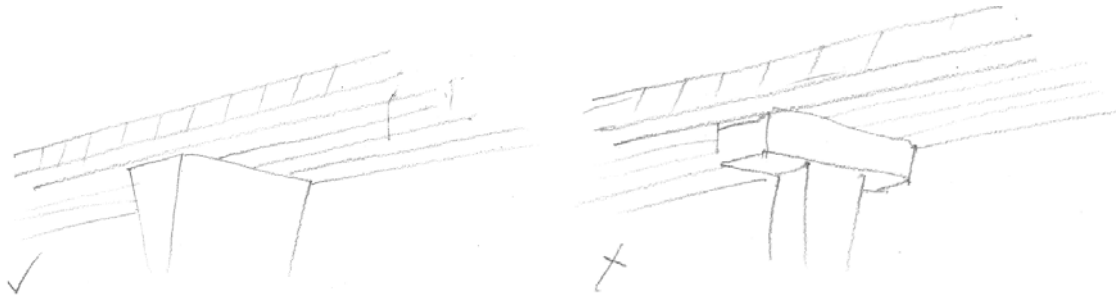
*Provide a simplified and unobtrusive road design.*

### **Bridges**

*(Key points below refer to the RMS document Bridge Aesthetics: Design guidelines to improve the appearance of bridges in NSW for full requirements)*

6.6.1 Parapets should be continuous, single plane surfaces, clear of adornment with a generous overlap of the abutments.

6.6.2 Piers for bridges over the Highway should be either column without pier caps (headstocks) for single girder spans or wall type with a taper, for bridges with multiple girders across spans.



6.6.3 Where appropriate spill through 'open' abutments should generally be used on bridges over the upgrade. Abutment footings should be screened by planting.



6.6.4 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 and end with a sloped termination.

6.6.5 Bridge barriers should neatly connect with road and safety barriers.





The bridges over Bonville upgrade are case studies in achieving simplicity and refinement as well as continuing the consistent design approach to the suite of overbridges along the highway. The main features are spill through abutments, curved safety screens with tapered ends, small abutments, parapets extending into the landscape and wall type tapered piers.

### **Noise barriers and headlight screens**

*(Key points below refer to the RMS document Noise Wall Design Guidelines for full requirements)*

6.6.6 Noise walls should be plain simple structures. They should be painted concrete using a recessive dark grey paint. If desired, patterning should be simple and abstract.

6.6.7 If noise walls on bridges are required they should be clear acrylic walls angled outwards to avoid glare.

6.6.8 Mounds or mound/ wall combinations should be used where possible, where space allows walls should be screened by vegetation.



6.6.9 Headlight screens should be finished with a dark recessive colour. If possible they should allow views of the landscape from one direction by using a specially designed mesh.



Smooth topped, plain concrete noise walls painted in a recessive colour, with vegetation to the rear and front.



Clear acrylic walls on bridges marrying neatly with concrete walls on grade

### Cutting stabilisation

*(Key points below refer to the RMS document Refer to the RMS document Shotcrete Design Guidelines: Guidelines to avoid, minimise and improve the appearance of shotcrete for full requirements)*

6.6.10 Shotcrete should be avoided, minimised where necessary and where visible from road or residences designed so that it is unobtrusive using texture and colour. In sensitive areas such as towns and highly scenic locations shotcrete should not be visible.

6.6.11 Avoid shotcrete finishes underneath and around bridges. Paved or gravel surfaces or formed concrete are preferable.



### *Earthworks*

6.6.12 All earthworks cuttings and embankments should have soft, feathered transitions. Tops, bottoms and ends of cuttings should be rounded off.

6.6.13 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 1 (V) in 2 (H), unless stable rock is practically guaranteed.

### *Signage and fences*

6.6.14 Utilise black coloured mesh on floppy top fencing where fencing is visible from the road and will not be hidden by vegetation.

6.6.15 Utilise white posts on wire rope fencing.

6.6.16 Keep all signage below the skyline with a backdrop of landform or vegetation.

6.6.17 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.

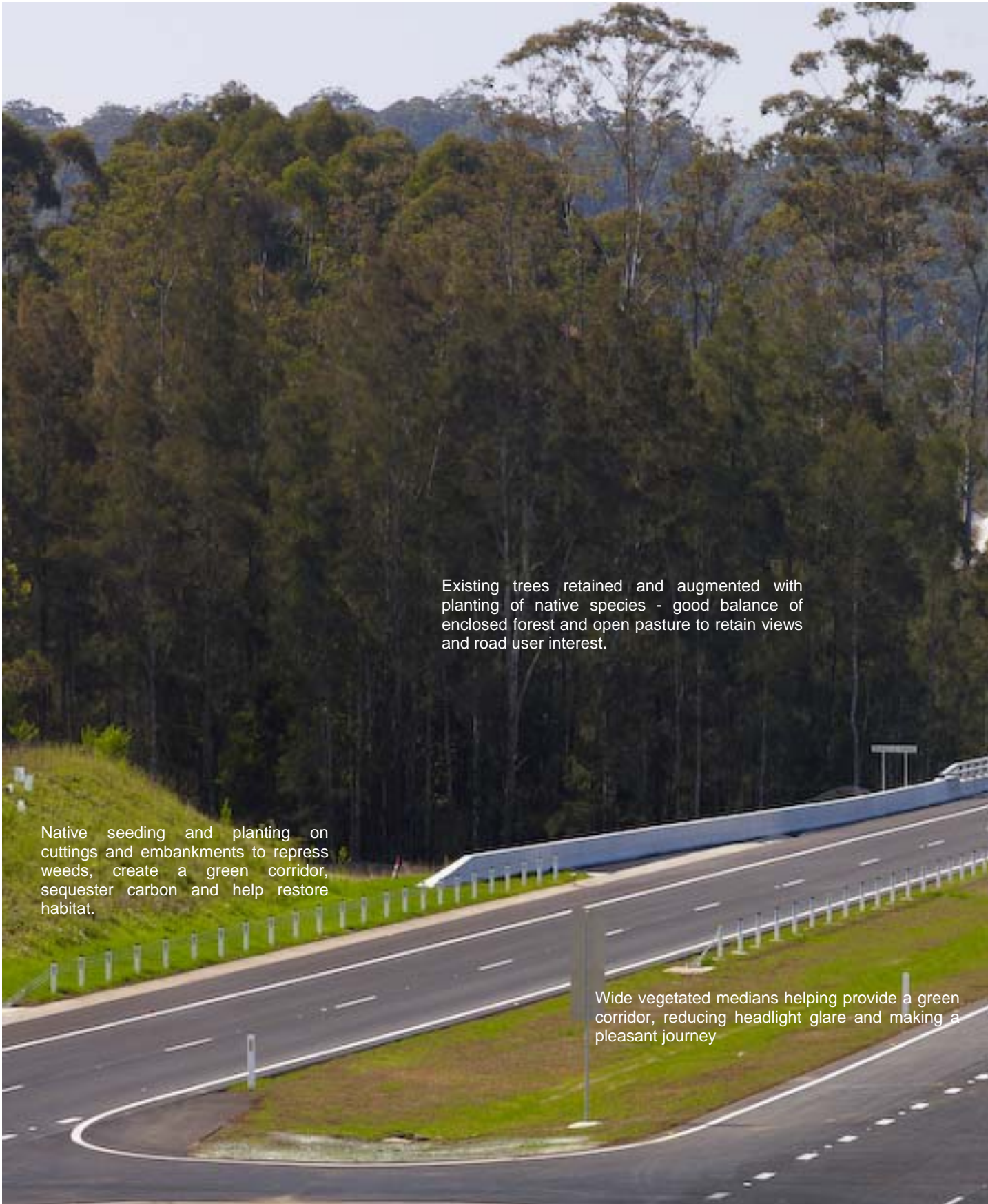
6.6.18 With the exception of road name markers, signage should be kept off all overbridges.

6.6.19 With the exception of name plates and navigation markers, signage should be kept off all bridges across the major rivers.



Black coated fauna fence blends into the background

## 6.7 Synthesis of urban design principles



Existing trees retained and augmented with planting of native species - good balance of enclosed forest and open pasture to retain views and road user interest.

Native seeding and planting on cuttings and embankments to repress weeds, create a green corridor, sequester carbon and help restore habitat.

Wide vegetated medians helping provide a green corridor, reducing headlight glare and making a pleasant journey



Good views to surrounding landscape and towns to provide road user interest.

Noise walls avoided where possible, noise mounds integrated into landscape preferred.

Simple elegant bridges with spill through abutments, tapered piers and integrated barriers designed as a related family of structures.

Cuttings graded to match natural landform feathered at tops, bottoms and ends.

Neat angled connections and terminations on barriers.

## 7 How to use the framework

The Centre for Urban Design should be contacted at the start of any Pacific Highway project. The Pacific Highway Framework applies to all phases of the ProjectPack process as follows:

Phase	Stage	Key Urban Design Actions
Development	Options investigation and option selection	<p>1 Centre for Urban Design to review urban design brief for development phase of work.</p> <p>2 Registered urban design contractor to be engaged to carry out contextual analysis, review <b>Pacific Highway Urban Design Framework</b> and assess route options against the six objectives of the <b>Pacific Highway Urban Design Framework</b>.</p>
	Concept design development	<p>3 Registered urban design contractor to be engaged with engineers to develop concept design as best practice integrated urban design and engineering in line with <b>Pacific Highway Urban Design Framework</b>.</p> <p>4 Registered urban design contractor to be engaged to carry out landscape character and visual impact assessment in parallel with concept development.</p> <p>5 Centre for Urban Design to review concept design and landscape character and visual impact assessment.</p>
Implementation	Scope of Works and Technical Criteria	6 Centre for Urban Design to review urban design brief or Scope of Works and Technical Criteria.
	Detailed design and contract documentation	7 Registered urban design contractor to be engaged with engineers to develop detailed design in line with concept design, <b>Pacific Highway Urban Design Framework</b> and RMS urban design policy and guidelines.
	Construction	<p>8 Centre for Urban Design to review tender submissions.</p> <p>9 Project built in accordance with integrated urban design and engineering design. Centre for Urban Design to be involved in monitoring of implementation and KRA assessment of against the six objectives of the <b>Pacific Highway Urban Design Framework</b>.</p>
Finalisation/operation	Post completion.	10 Centre for Urban Design to be involved in post completion review.
		11 Centre for Urban Design to be involved in monitoring of landscape maintenance.
		12 For all additions to the Pacific Highway such as rest areas, variable message signs, gantries, new bridges and interchanges refer to the Centre for Urban Design for advice on the application of the <b>Pacific Highway Urban Design Framework</b> and other urban design guideline documents.



# Appendix A: Location Markers



## Appendix B: Rest Area Signage





## Appendix C: Rest area toilets and shelters



