

# Great Western Highway Urban Design Framework

Blue Mountains - Lapstone to Katoomba





## **Acknowledgements**

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Cover: View west from Falconbridge. The interweaving relationship between highway and railway is constant along the ridgeline of the Blue Mountains.

## Executive summary

### ***Framework purpose and use***

The purpose of this framework is to set down a consistent design approach for the Great Western Highway that is appropriate for the context of the Blue Mountains. It is meant to guide RTA project development managers, project managers and their teams, as well as consulting urban design and civil engineering companies, in the way that future upgrading of the Great Western Highway is scoped and delivered.

It is meant to inform all design development work and should be captured in and expedite the associated preparation of Reviews of Environmental Factors (REF's) that go on public display, and also inform the subsequent detailed design for construction.

### ***Highway context and use***



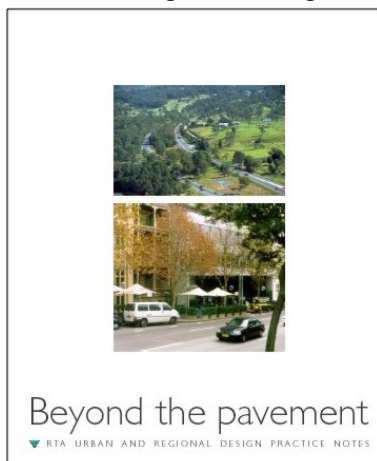
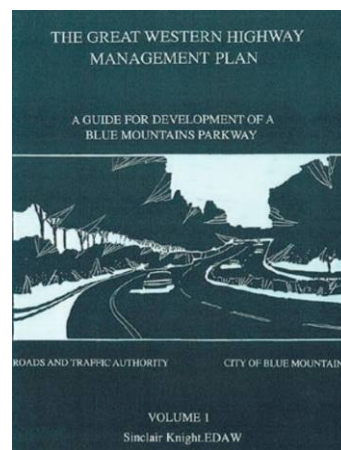
The Great Western Highway follows a ridgeline which runs through the Blue Mountains World Heritage Area. It is one of the key inter-regional highways connecting Sydney with the western plains and is also a busy freight and tourist route

Also, the Highway serves as the principal local traffic spine for many towns along its length. As such, the quality of this public domain, its frontages and access are very important issues within the mountains.

### ***Need for an urban design framework***

Works to upgrade the Highway between Lapstone and Katoomba have been in progress for many years and, under the capital works program, will continue for a few years to come. At some time it will become necessary to retrofit some of the earlier projects to bring them up to today's standards, including better facilities for pedestrians and cyclists.

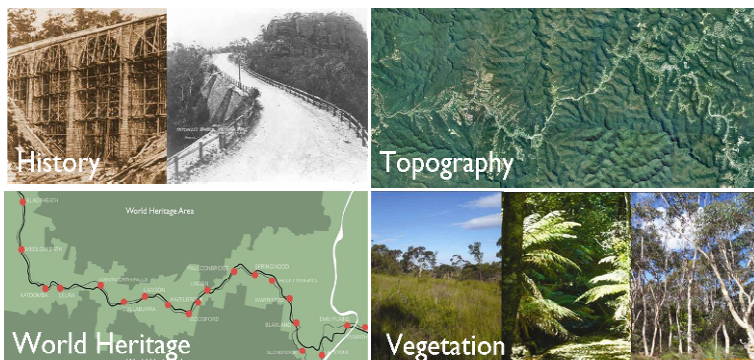
The primary development guideline for Highway upgrade projects to date has been the *Great Western Highway Management Plan (1992) (the Management Plan)* developed by the RTA and the Blue Mountains City Council. It has a focus on highway operation and safety, environmental protection and social issues, rather than addressing urban design in depth.



Since publication of the *Management Plan*, development throughout the Blue Mountains as well as of the Highway corridor itself has undergone substantial change. RTA practice has become more sophisticated in interpreting urban design principles over this time. Substantial highway development has been carried out on a project-by-project, rather than corridor, basis. These factors alone justify the need for this framework.

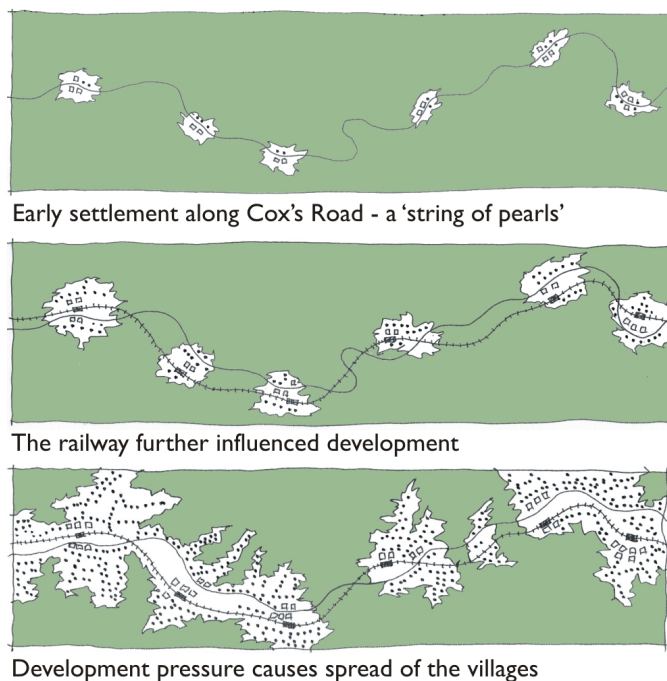
### The framework

This framework starts with an appreciation of the context through which the Highway passes. This includes the history of settlement along the ridge in the Blue Mountains World Heritage Area, the natural topographic features and vegetation, the entire highway and rail corridor along the ridgeline and the character of the various built and natural precincts along the route which need to be protected and, wherever possible, enhanced as highway upgrading proceeds.



An assessment is made of how well the highway upgrades respond to the varied contexts within the Blue Mountains, and of the urban design quality of the Highway itself as a linear facility (Appendix A).

The framework develops the *Great Western Highway Management Plan, 1992* in greater depth and makes some changes to that plan. For example, whereas the plan describes the Highway as a “Parkway”, further study of the nature and history of its development shows in hindsight that it is not a parkway in the traditional sense and should not therefore be planned as one. The Great Western Highway has a different character, defined by its mountain and bushland setting and the alternating and varied sequence of the village landscapes along its length.



Many of the upgrade projects have been extremely well designed and implemented, and some have received design awards. The Highway upgrade through Faulconbridge, completed in 2001, is an excellent outcome in its own right. But this project and others to date have not had the benefit of a corridor framework that connects them together, defines a common design language that is suitable for the mountains environment and creates a consistency along the highway.



The *uniqueness of the villages* is sometimes being diminished due both to highway upgrades and urban development.

Consequently, this framework aims to provide *distinction to the sequence of villages separated by bushland* - through principles to be followed in bushland areas and different principles to be followed in village areas. For example, in bushland areas the way that the Highway has been formed, detailed and vegetated at Woodford bends is seen as a model for similar areas, subject to safety requirements.



Design of the Highway through village areas should *recognise the character and structure of the village core*, access to it and the transition zones between the core and the bushland at each end, and should be quite straightforward. Village centre character should be reinforced with exotic 'signature' planting (definition provided in Section 6.7) to contrast with an ecotone zone (a transition area between two adjacent ecological communities) leading to native bushland areas with endemic native species between towns.



The framework also aims to systematically:

- *protect the natural systems and ecology of the corridor,*
- *protect and enhance the heritage character* of the corridor,
- provide a *travel experience with good views and a strong sense of whereabouts* that gives the Highway distinction in the Blue Mountains and
- provide *a safe and accessible corridor* which reinforces safe driver behaviour and has good connectivity (as opposed to severance) for communities.

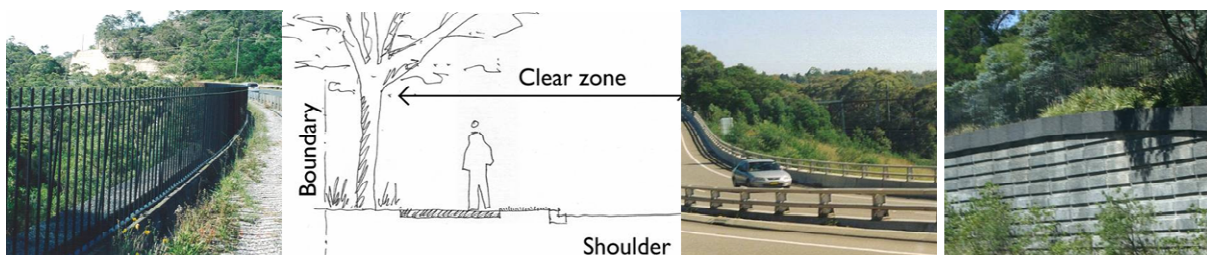


### ***Specific guidelines***

There is *excessive variety in the design of roadside types and plantings* (which is confusing visually and also not very cost-effective), sometimes within the same project, and there is sometimes a use of materials and designs more suitable for Sydney than the Blue Mountains.

The framework therefore provides *guidelines for the design, selection and use of standard roadside components* throughout the route. These include traffic barriers, median treatments, verge treatments, retaining walls, pedestrian fences, plants and trees.

Repetition of these common elements in accordance with the guidelines will help achieve a simple and more unified highway design that has economies of scale and minimises maintenance and associated costs in the long term.



### ***Opportunities***

Opportunities are identified on a precinct-by-precinct basis for improvements which both the RTA and Council should consider subject to funding availability. These are primarily at the level of minor works and planting (also set out in Appendix A), and reinforce the major design principles and guidelines in this framework.

### ***Putting the framework into practice***

The framework includes management principles and processes for its implementation. These include the writing of urban design briefs, selection and use of urban design contractors, continuous design review, and continuity of urban design through the different phases of a project.

### ***Collaboration with Blue Mountains City Council***

As well as providing guidance to the RTA, the framework is seen as the basis for a continued collaboration between the RTA and the Blue Mountains City Council in achieving urban design outcomes that are beneficial to all users of the Highway and the communities of the Blue Mountains.

The RTA's urban design framework is consistent with the Blue Mountains City Council's own 25 Year Vision and associated Urban Design Strategy and Public Domain Manual that are being prepared. Council's vision for the Great Western Highway, as the main transport corridor through the mountains, is one of a *"safe and beautiful space"* that adds to the local amenity and World Heritage identity of the city, which facilitates the ability of people to connect with each other by different modes of movement and that enhances the distinctive Blue Mountains towns and villages.

In the process of developing or upgrading the Great Western Highway, it is important that the policies and guidelines of the RTA and Blue Mountains City Council regarding urban and landscape design are considered to ensure consistency throughout the corridor.





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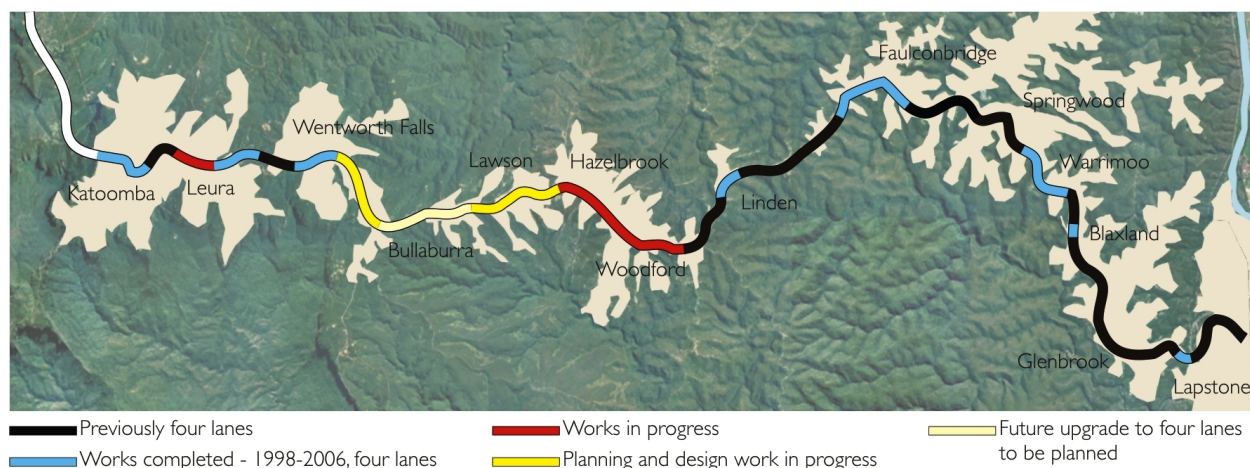
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## I.0 Introduction

### I.1 Background

The RTA is currently upgrading the Great Western Highway to achieve 4 lanes between Lapstone and Katoomba. The overall aim of the upgrade program is to improve the capacity and safety of the corridor primarily for traffic, but also for cyclists and pedestrians. An important goal for the RTA is to achieve the upgrade in a way that is responsive to the unique context of the Blue Mountains, in particular its historic and cultural identity, environmental and visual qualities and the functioning of its towns.

At the time of writing a substantial proportion of the development program has been completed. Several sections of the Highway are currently in the early concept design phase and several more are in the detailed design phase and due for construction over the next few years. Concept design of other sections will commence soon. Retrofitting of some previously completed projects may occur when funding becomes available to further improve traffic, accommodate bicycle networks and meet urban design objectives. The status of the upgrade program as of September 2006 is shown on the summary diagram below, with greater detail provided in Appendix B.



*Status of upgrade program (September 2006) – Lapstone to Katoomba*

The upgrade projects completed and under construction to date have been informed by the 1992 document “*The Great Western Highway Management Plan: A guide for Future Action*”, developed by the RTA and the Blue Mountains City Council. Whilst the Management Plan is still regarded as the primary development guideline, it does not reflect the RTA’s current urban design guidelines or practice.

The development and delivery of projects between Lapstone and Katoomba over a number of years has not occurred sequentially, often with different project objectives and variable urban design outcomes. Design and construction to date has proceeded on a number of separate projects, without consistent consideration of the urban design character of other sectors or indeed of the route as a whole.

## 1.2 The purpose of the framework

The RTA seeks to achieve greater consistency of vision and outcomes for future Great Western Highway works. The purpose of this Urban Design Framework is to guide the continued upgrade of the Highway, specifically the stretch from Lapstone through to Katoomba which will be completed to a 4-lane highway standard.

It is intended that this framework will form part of the brief to designers from all disciplines, to urban design specialists and to project development managers and project managers for each remaining upgrade, maintenance and retrofit work, and that it will be periodically reviewed.

The framework supplements the RTA's other policies and guidelines used in relation to upgrade and improvement works and the operational aspects of the highway.

## 1.3 Study process

This framework has been prepared under the guidance and direction of an RTA Steering Committee comprising Raeburn Chapman (Senior Urban Design Advisor), Michael Sheridan (Urban Designer), Phil Mahoney (Senior Project Development Manager), John Chang (Manager, Landscape Design Policy & Standards), and Dennis Woodbridge (Project Services Manager).

Initial work on the framework was carried out by Jackson Teece and involved a consultation program with workshops. The workshop representatives were drawn primarily from the Blue Mountains City Council and the RTA. Consultation was also made with the Environment Protection Authority (EPA), National Parks and Wildlife Service, and RailCorp.

This initial work was further built upon by John Pilton Walker, and completed by the RTA's Urban Design Section. There has been input throughout from RTA project development managers, project managers and teams responsible for the Great Western Highway upgrade.

The study methodology has entailed extensive site visits and photographic recording, stakeholder and technical consultations, an analysis of the Highway and its upgrades in the context of the Blue Mountains and review of the 1992 Great Western Highway Management Plan. Urban design analysis has been carried out at a number of scales – the Sydney metropolitan area, the corridor through the Blue Mountains, and the different zones and precincts that make up distinctive places. This methodology has formed the basis for the formulation of an urban design vision, objectives, principles and guidelines for the development and delivery of the remaining projects in the upgrade program and any future improvements of already upgraded works.

## 1.4 Structure of the document

2.0 Application of the framework: How and when to use

3.0 Great Western Highway context: Identified characteristics

4.0 Urban design challenge: The uniqueness of the Mountains

5.0 Urban design vision, objectives and principles

6.0 Standard roadside components, and details

Appendix A: Precinct assessment and opportunities

## 2.0 Application of the framework

The framework should be followed for all Great Western Highway projects through the development and implementation phases. It should also be applied to on-going traffic management and maintenance.

### 2.1 Urban design management approach

The following principles should be adopted in managing the implementation of the framework:

- The *RTA Steering Committee*, comprising urban design, engineering design and construction, landscape representation and asset management, should oversee the implementation of the framework through (as a minimum) the review of all concept and detail design work.
- The *RTA's Urban Design Section* should be consulted throughout the project with particular regard to project scope, consultant briefs, suitability of urban design contractors, project inception and design reviews and implementation monitoring.
- There should be a level of *continuity between the different project phases*. This will be helped by the Steering Committee but the overlap approach between a project's development manager and project manager has proved particularly valuable and should be continued. It is preferable for the urban design consultant to be retained throughout the project phases, subject to acceptable performance.
- The *Register of Urban Design Consultants* on the RTA internet site should be used. However, experience on the Great Western Highway has shown that there are certain considerations: Firstly, it is desirable for urban design contractors to be commissioned directly, as part of the concept design team and an equal member, rather than separately appointed by a principal ('lead') consultant. Secondly, it is vital that the consultant budgets for significant senior level involvement, the reasons being that projects are complex, the corridor is constrained and the outcomes are under considerable scrutiny. There is little room for inexperience.

### 2.2 Process

The framework forms the basis and a starting point for the development of **all** projects.

Project teams should interpret the framework for their specific project and site conditions. Thereafter, a more detailed analysis and formulation of project specific design principles should be carried out for the concept design. A project should be sensitive to the context of each area through this process, whilst ensuring that there is an overall consistency along the route, so that everything is part of the same highway.

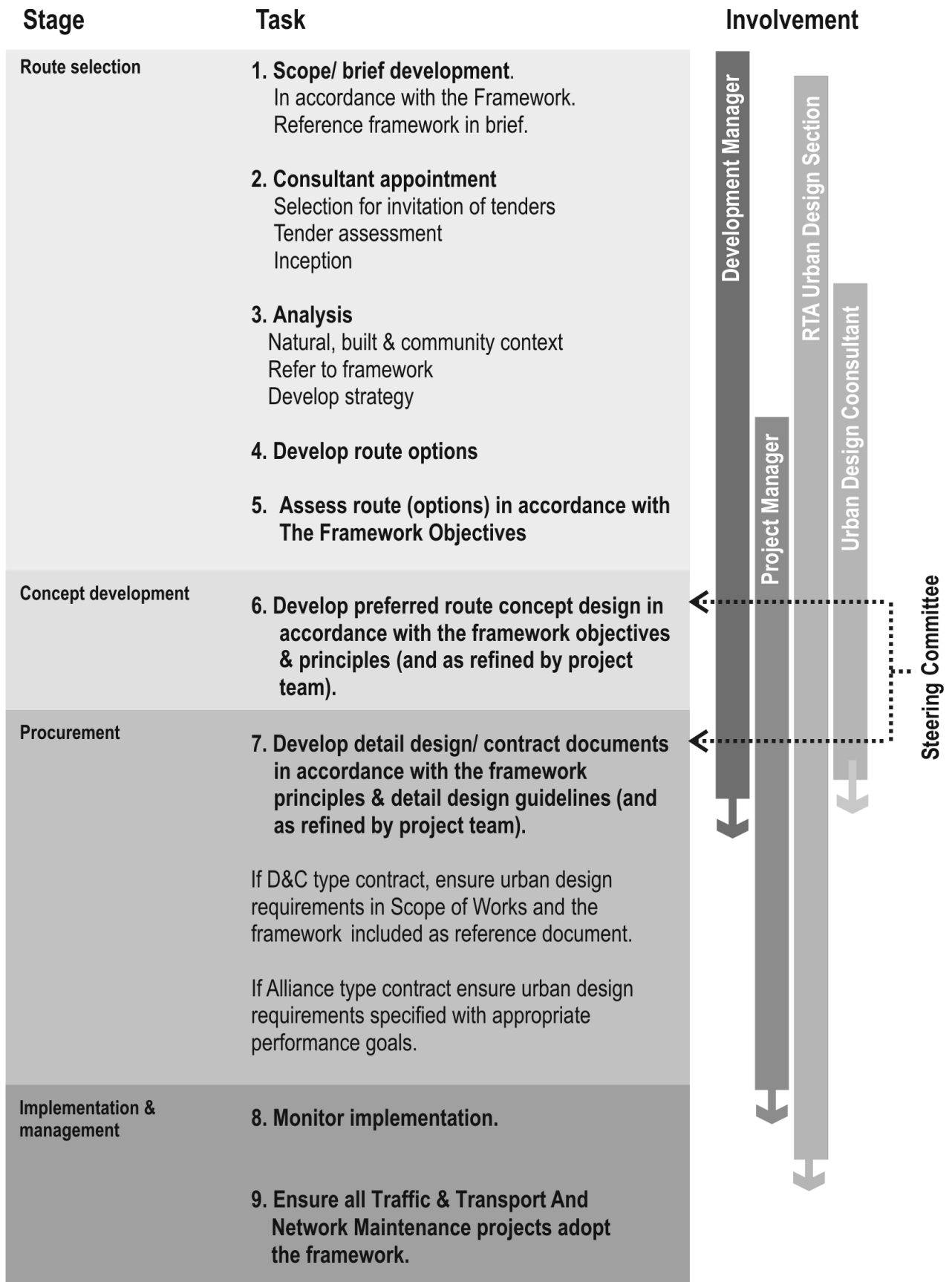
The concept design itself should be tested to ensure that it is practical, contributes to the overall corridor outcomes and, that it has a continuous and consistent fit with the designs of adjacent projects.

Reference should also be made to the following RTA urban design guidelines:

- Beyond the Pavement RTA Urban and Regional Design Practice Notes
- Bridge Aesthetics: Design guidelines to improve the appearance of bridges in NSW
- Shotcrete Design Guidelines
- Noise Wall Design Guidelines (currently in draft)
- Landscape Guidelines (currently in draft)

Reference should also be made to Blue Mountains City Council policies and guidelines regarding urban and landscape design.

The framework should be developed and applied in accordance with the following process:

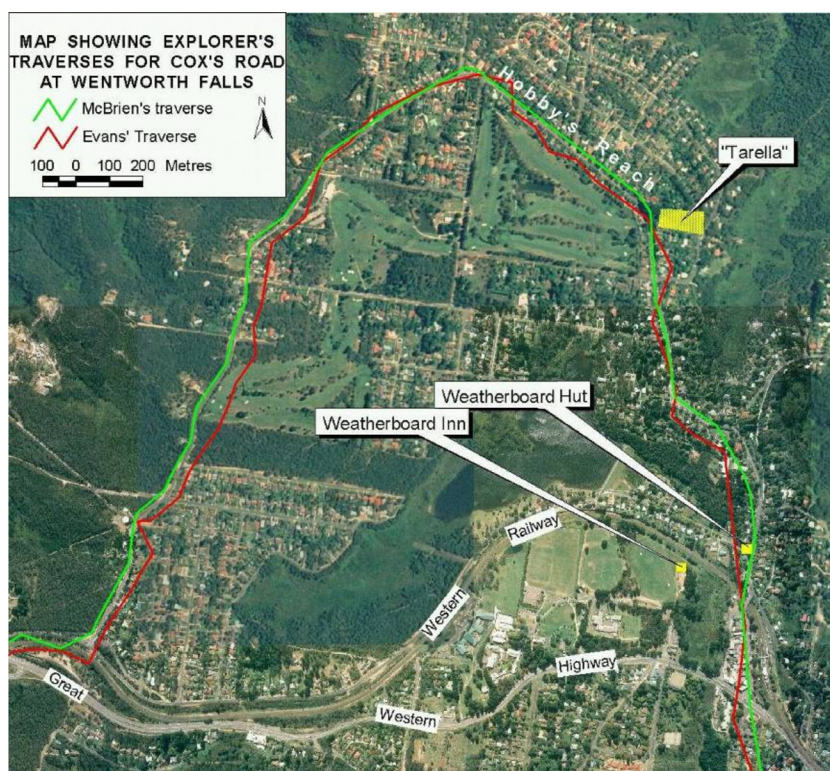


## 3.0 Great Western Highway context

### 3.1 A brief history

[Information extracted from the Urban Design Framework Report: Leura to Katoomba 2002, by Spackman & Mossop]

- The Blue Mountains area was originally occupied by Aboriginal tribes but within 20 years of the first European crossing of the mountains, the expansion of the colony into and across the mountains resulted in a decline in the Aboriginal population of the area. Given that European activity has largely been restricted to the transport corridor along the main east-west ridge most Aboriginal sites have been located along this corridor. However this is likely to present an incomplete picture of Aboriginal occupation.
- The rugged terrain prevented a crossing of the mountains until in 1813 Blaxland, Wentworth and Lawson discovered the crossing which, to this day, forms the main route between Sydney and the western plains.
- In 1814 magistrate William Cox was given the task of overseeing the construction of a 'cart road' from Emu Plains to the 'Champagne Country' in the west. This convict-built road, 4m wide by 160km long, was completed in January 1815. Remnants of the road can still be seen today.



*Previous traverses through Wentworth Falls thought to be close to the Cox's Road*

- Improvements were made to Cox's Road by the Surveyor General Thomas Mitchell in the 1820's and 1830's so that by the late 1830's the rough track had been transformed into the Great Western Road, again built by convicts.

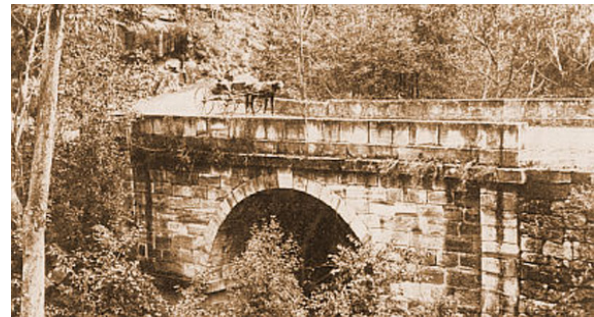


*Remnants of Cox's Road are still visible.*

- Searches for alternative routes across the mountains have only resulted in one other crossing, Bell's Line of Road which became popular with cattle drovers wishing to avoid the toll on the Great Western Highway.

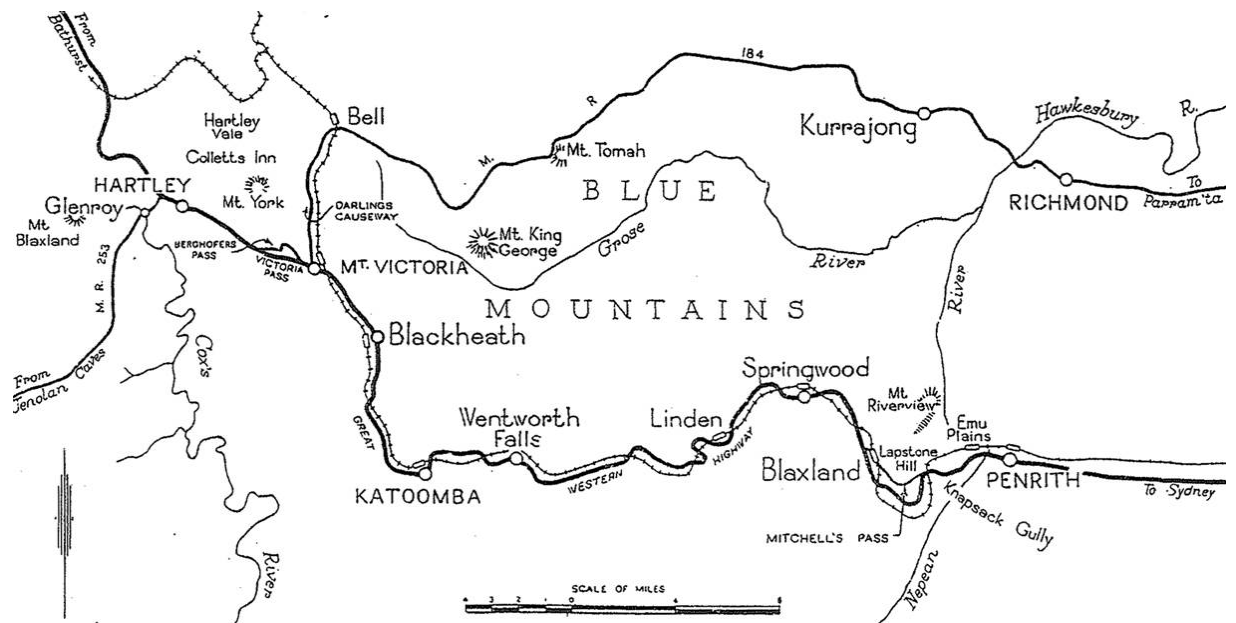


*Mitchells Bridge*



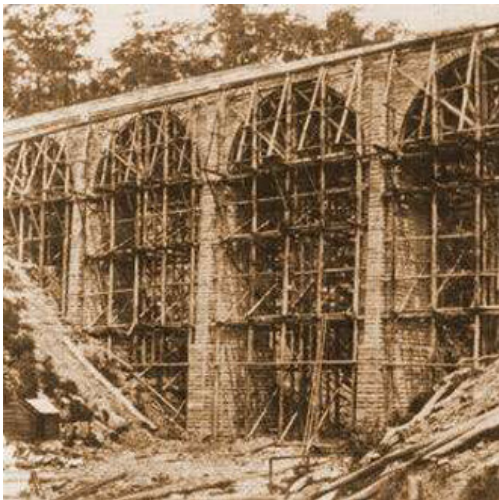
*Lennox Bridge*

- The Great Western Highway is not only functionally important as the primary westward route from Sydney but is of major historical significance representing a defining achievement in the history of the colony and tracing its expansion and development.
- Given the topographical constraints it is obvious that the Main Western railway would also follow a similar route to the Highway. Construction commenced in 1863 with a line from Penrith to what is now Wentworth Falls and by 1876 the line from Sydney to Bathurst was complete. Due to the strict grade requirements for the rail line the route crossed and recrossed the Great Western Highway, creating the entwined ('DNA') relationship which remains to this day a fundamental and defining aspect of both journeys through the mountains.



*The intertwined relationship of the railway and highway which share the main ridgeline.*

- It was the railway which was mainly responsible for economic and urban development in the mountains and by the 1920's the Blue Mountains had become a major tourist destination. However the Great Depression ended this and, whilst tourism is still important, it has not returned to its 'golden age'.



*Knapsack Viaduct*



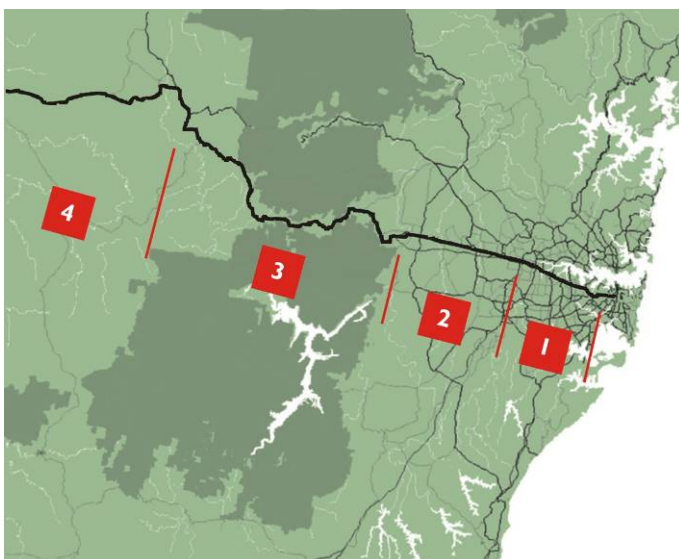
*Katoomba Railway Station*

- Major development of the townships in the upper mountains occurred in the 1890's. In the lower mountains major growth occurred from the 1930's as a 'suburban' expansion of Sydney. Hence the different development patterns of upper and lower mountains villages.
- The Blue Mountains City Council was established in 1947 following amalgamation of three local councils.



### 3.2 Regional context

The Great Western Highway stretches between Broadway near the Sydney CBD and Bathurst. There are four distinct character sections along its length.

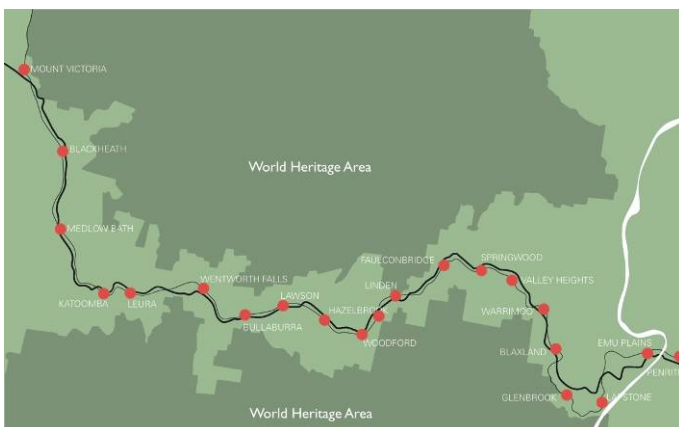


1. An urban zone (essentially Parramatta Road which has an industrial and commercial landscape).
2. Suburban (parallel to the M4 – larger scale with longer, generally attractive views).
3. The Blue Mountains (predominantly a bushland character punctuated by villages and towns, but with few views 'out').
4. The western plains (rural and largely open).

This report addresses only the part of Zone 3 through the mountains (between Lapstone and Katoomba).

### 3.3 Blue Mountains World Heritage Area

The majority of the Blue Mountains is a World Heritage site. Such a wilderness close to a world city is unique. The outstanding landforms and scenery are major tourist attractions.



*It should be noted that the Great Western Highway and the Blue Mountain's villages are not located within the World Heritage area itself, but along the developed ridgeline which splits the heritage area. The World Heritage Area is viewed from, and accessed off, the Highway.*

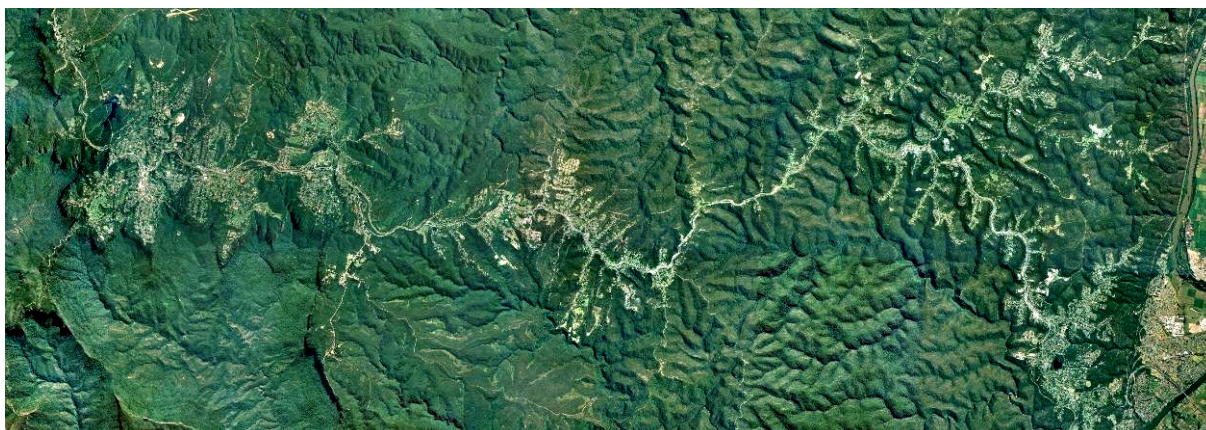
### 3.4 Blue Mountains corridor characteristics

***Starting up the mountains.*** The mountains section of the Great Western Highway has a very distinct beginning. Starting just west of the Nepean River at the rail overbridge (which acts as an entrance to the mountains), there is a dramatic and sudden change in landscape character from the Cumberland Plain.



*It is also worth noting that this rail bridge is the first signal of the inter-relationship between the Great Western Highway and the Main Western rail line, which partly defines the character of the Highway.*

***Ridge top location.*** The route of the Great Western Highway, that of the railway and the pattern of urban development are largely determined by topography. The elevation of the villages ranges from around 160m (Glenbrook), to 1010m (Katoomba).



*Access and development through the Mountains is located on a ridgeline.*

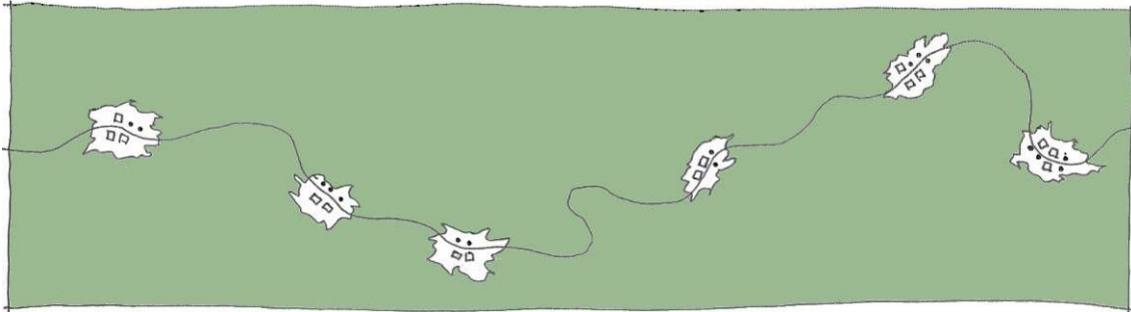
***Vegetation.*** The route of the Great Western Highway passes through a highly diverse landscape in which there are more than 40 different vegetation communities. However it should be noted that only a few of these communities actually occur along the Highway corridor.



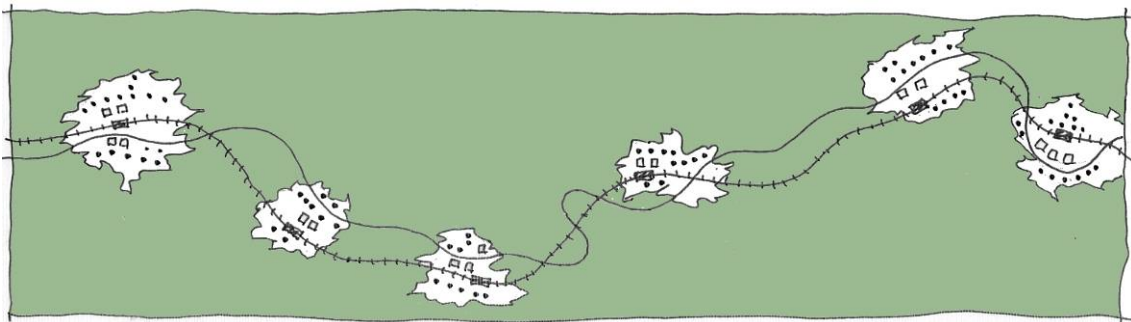
*Some of the broader vegetation types of the Blue Mountains.*

**Settlement pattern.** The basic built structure of the corridor is a pattern of villages threaded along the highway and railway corridor, with the natural bushland between the villages and exotic (introduced) plantings within them. This formation is likened to a 'string of pearls'.

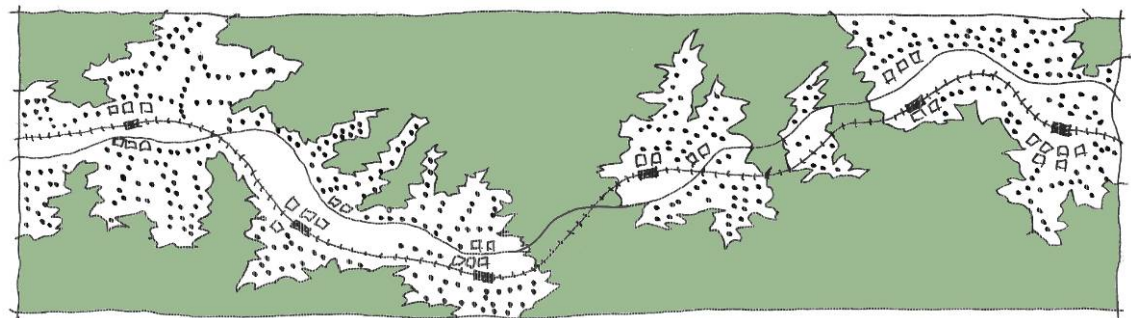
Over time however this settlement pattern and the distinction between town and bush has become blurred as development advanced.



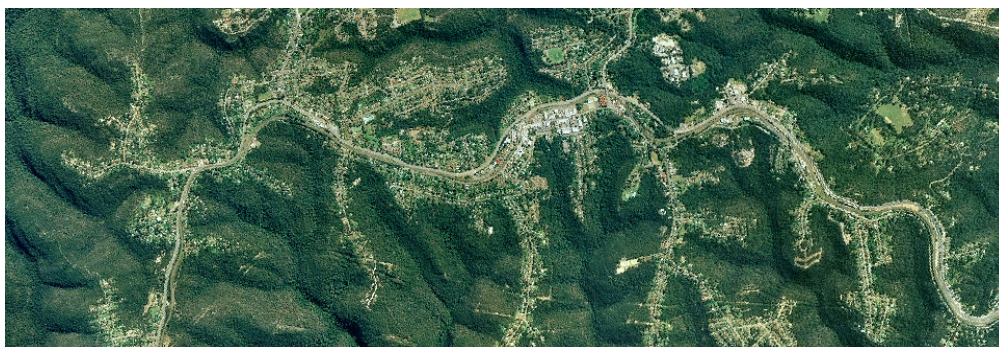
*A - Early town settlements sprung from Inns located along Cox's Road - the 'string of pearls'.*



*B - Introduction of the railway spawned greater development of the 'pearls'.*



*C - Development pressure has eroded much of the definition of the villages and the bush in between – the 'pearls' are becoming less distinctive, with more of a sprawl along the Highway and a consequent similarity of travel experience.*



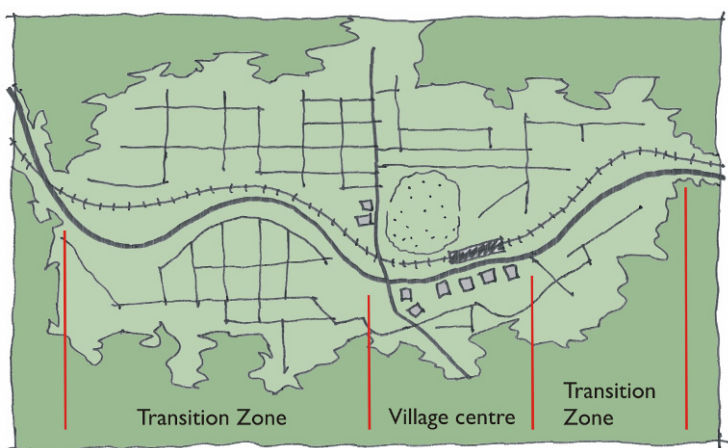
*Aerial image showing part of the lower mountains - little distinction now remains between villages.*

**Highway and railway – a lifeline.** The Highway and railway continue to have a very special relationship through the Blue Mountains. The constraints of topography are greater for the railway and it can be seen deviating from the Highway to find acceptable grades.



*This intertwined relationship, together with the role of the Highway and railway as the lifeline through the mountains, is reminiscent of the double helix of DNA.*

**Village structure.** The typical early structure of villages through the mountains can still be discerned today. Their integrity of form and scale should be protected as far as possible in upgrading the corridor.



*Commonly centred at or near the railway station, where the Highway and railway are in close proximity, the focus of the village usually includes retail and commercial activities, and often civic functions, playing fields or other public open spaces.*



*The Highway through the village centre is usually quite formal, often highlighted by exotic street trees that provide a distinctive sense of place and are an iconic part of the mountains. Hazelbrook, on the left and Blackheath (while not within the study area) on the right exemplify these qualities.*

The village centres remain the historic ‘pearls’ but are increasingly becoming less of a definable feature along the route, gradually eroded by development pressures, bypassed or, simply, the restructuring of a town diminishes them.

Residential development typically spreads either side of these village centres, along the highway/railway corridor and outwards on the accessible areas of the ridge. Typically, a transition zone is formed between the bushland separating the villages and the village centres.

**Not a Parkway.** The 1992 *Plan of Management* describes the Great Western Highway as a 'Parkway'. Americans Fredrick Law Olmstead and Calvert Vaux are credited with introducing the term 'Park-way' in the late 1860's, being tree-lined boulevards intended primarily for pleasure traffic travelling to and from suburban parks, and often serving as linear parks that brought the benefits of nature to the urban public.

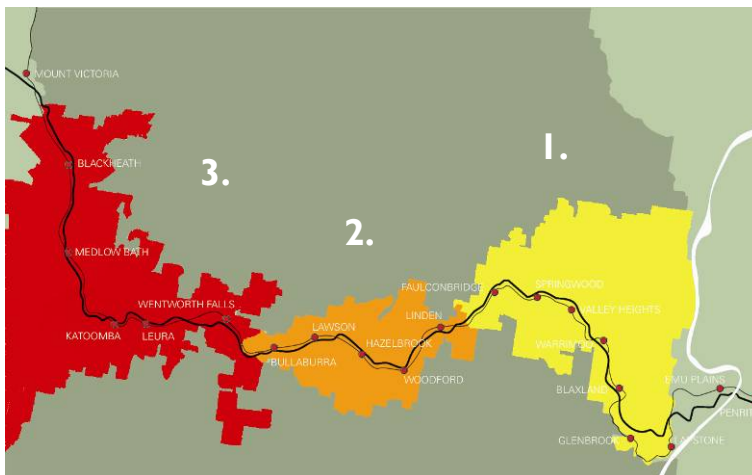
Significantly, the nature and history of the development of the Great Western Highway, discussed above, confirm that it is not a parkway.



*Example of an American parkway – not the character of the Great Western Highway.*

*The character of the Great Western Highway rather, is defined by its essential natural bushland setting and the alternating sequence of the village landscapes through which it passes. These cultural highlights along the journey can be likened to a 'string-of-pearls'.*

**Three distinct zones.** Within the mountains there are three relatively distinct zones:



**1. Lower Mountains** area from Glenbrook to Faulconbridge.

**2. Middle Mountains** area from Linden to Bullaburra.

**3. Upper Mountains** area from Wentworth Falls to Mount Victoria.



*The Lower Mountains is characterised by almost continuous and comparatively recent housing areas not unlike other parts of suburban Sydney.*



*The Middle Mountains is characterised by older housing, roadside village buildings and more bushland views*



*The Upper Mountains is the main 'tourist area' of the mountains with 19<sup>th</sup> century rectangular road grid patterns that dramatically defy the topography.*

**Views.** Long views from (and to) the highway are generally restricted by vegetation and landform. Thus whilst the highway is a conduit to the tourist destinations it does not, in itself, provide an exceptional tourist experience even though it passes through some attractive landscapes.



*In some very limited areas there are extensive views into the National Park, although not to the most dramatic scenery.*

## 4.0 The uniqueness of the Blue Mountains: an urban design challenge

Beyond question, the Blue Mountains are a natural feature of immense value. The juxtaposition of urban settlement along the main ridge line through this landscape is highly unique when considered for the lifestyle on offer and its proximity to Sydney. An appreciation of this uniqueness is gained through traversing, viewing and interacting with the many varied parts of the developed and natural areas, and how they all come together as a whole.

But several distinct urban design issues are apparent which affect many aspects of the Blue Mountains' special qualities, the Highway itself and the experience for the traveller. The issues highlighted below are challenges which must be faced, particularly by the RTA, but also by all authorities and stakeholders responsible for the management of the developed areas, the transport and access through the mountains, and the natural regions.

In meeting these challenges, it is necessary that ongoing highway upgrades continue to be developed in close consultation with the Blue Mountains City Council, RailCorp and other key authorities.

### 4.1 Overall urban development

As an overall theme, it can be seen that many aspects of the uniqueness of the Blue Mountains are becoming eroded.

- The original form of villages separated by bushland is becoming less distinctive as development expands.
- A sense of the villages being located within the Blue Mountains is becoming lost and less 'Mountains-like', instead assuming characteristics more typical of suburban precincts.
- Many historic and cultural qualities are disappearing as the increasing scale and spread of urban development threatens the concept and character of the village.

### 4.2 The highway corridor

The key urban design issues within the Great Western Highway corridor are:

- The village structure is often not clear along the Highway.
- The uniqueness of individual villages – the sense of a place that characterises them - is often diminished as the Highway is upgraded.
- The formation of the Highway through bushland areas is inconsistent and, typically, does not reflect a road-through-the-bush principle.
- Inconsistency is common throughout the highway corridor as a whole:
  - The highway is sometimes simple and low-key, but at other times is too flashy and imposing of its own character rather than allowing the local village character to flourish (even if it's a sleepy, low-key character).
  - Highway elements, details and their application are often inconsistent.
- Inappropriateness – development of the highway (including its form, design of structures, selection and detailing of materials and finishes), is often inappropriate within this mountains context.

It may be concluded that many Highway upgrade projects in themselves have been extremely well executed within a particular precinct of the corridor, but without the benefit of a corridor framework that connects them with the next project and without a common design language that is suitable for the Mountains.

## 5.0 Urban design vision, objectives, principles

### 5.1 Vision

The RTA's vision for the Great Western Highway is based on the premise that the heritage values, rugged landscape and uniqueness of the ridge-top development nested in the Blue Mountains World Heritage area should be the driving force behind the future management of access and development.

*Within the context of the rugged terrain and bushland setting of the Blue Mountains and the unique natural and cultural landscapes and precincts through which it passes, the Great Western Highway should:*

- *Be a safe and integrated piece of engineering design.*
- *Reinforce the journey sequence of bushland and village.*
- *Evoke a sense of its history and heritage.*
- *Provide views and a clear sense of orientation for users.*

### 5.2 Urban design objectives and principles

The key objectives to meet this vision and the associated principles by which that can be realised in practice are set out in this section of the framework.

They should be:

- considered throughout each phase of a project, starting from the early route options assessment stage.
- form the basis of the development of the concept design, carried through to detailed design and construction.
- used to evaluate the success of design proposals.
- systematically applied, not only to all future highway upgrade, but also to retrofit and maintenance works.

In summary, the objectives are as follows.

*Objective 1: Provide distinction to the sequence of villages separated by bushland*

*Objective 2: Protect the natural systems and ecology of the corridor*

*Objective 3: Protect and enhance the heritage and cultural character and qualities of the corridor*

*Objective 4: Provide a travel experience with good views and strong sense of whereabouts*

*Objective 5: Provide a safe and accessible corridor which reinforces safe driver behaviour and that has good connectivity for communities*

*Objective 6: Achieve a simple and unified design of the highway and its elements, which minimises maintenance and associated costs in the long term.*

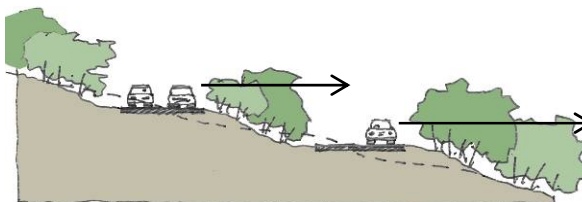


*Objective 1*

*Provide distinction to the sequence of villages separated by bushland*

Formation of highway through BUSH areas.

- Carriageways should be independently graded and separated, where site conditions permit, to: better fit the highway with the topography; minimise cut and fill; minimise the scale and visual impact of the highway; and maximise bush and mountain views for the traveller.



- Major rock cuttings above, and facing, the highway, where feasible, should be designed in a similar way as those on the Woodford Bends (which appear natural and unobtrusive rather than 'engineered'). Cuttings should allow for a landscape zone at the base of the cutting, as in the Woodford Bends case.



- Major retaining structures below the highway, facing bushland, should be designed to suit the bushland interface. The type at Woodford Bends provide a good model and should be used wherever feasible (i.e. heavily ribbed, exposed dark aggregate concrete).



- Minor retaining structures above, and facing, the highway should preferably consist of random stone or should reflect existing types in the vicinity.



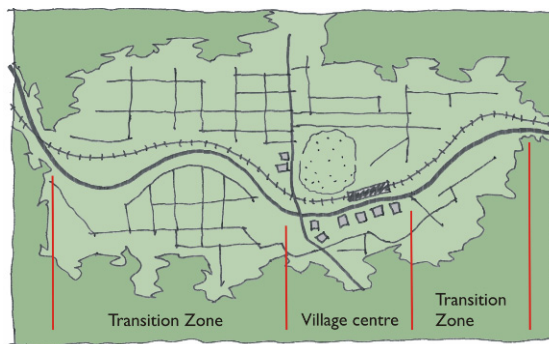
- Endemic vegetation only should be used in verges, medians and adjacent areas.

- Medians should be planted with appropriate frangible endemic shrubs, ensuring appropriate sight lines. Where barriers are appropriate, the use of non-frangible vegetation may be considered, ensuring safety criteria are met (the medians through Woodford Bends are simple, bold and appropriate for the bush and mountain setting).



**Formation of highway through VILLAGE areas.**

- The essential structure of each village should be identified and reinforced as part of the highway formation and treatment. Typically, there is a village centre, or focal point, with a Transition Zone on either side leading to the edge of the village, where the bushland starts.



- The highway should be designed and comprehended as a straightforward four-lane road with simply designed medians, appropriate for its context.

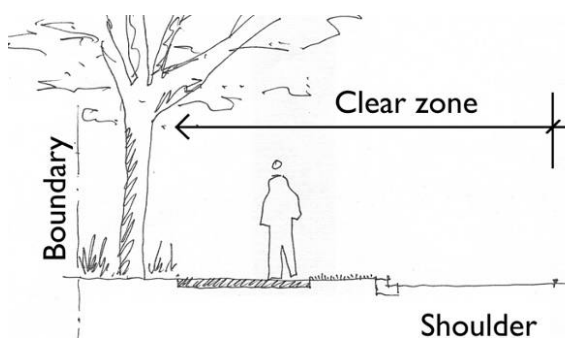


- Design of the highway through each village should enhance its uniqueness and character, but at the same time have a consistency with the rest of the highway through the Blue Mountains.



- Verges should be sufficiently generous to allow:

- The required clear zone from the travel lane with respect to the design speed.
- Sufficient space behind the kerb for an off-highway shared pedestrian and cycle path (where appropriate), street trees and/or other landscape, services, street lighting, signs, etc.



- The landscape treatment of the transition zone should contain a mix of exotic (refer definition provided in Section 6.7) and endemic species, forming an 'eco-tone' between the bush and village centre.



Formation of highway through VILLAGE areas (continued).

- Design of the corridor through the village centre should enhance the uniqueness of the particular village. Landscape within the village centre should be strongly exotic (refer definition provided in Section 6.7) with each village encouraged to have its own 'signature' planting, limited to one or two species.



- The relationship between the highway and village trading or commercial activities should be as follows.

- Where trading directly fronts the highway, as at Blaxland, commercial frontages and related streetscape should be protected, with on-street parking provided (at least in the off-peak periods) to support an economically active frontage and preserve the symbiotic relationship between village and highway.



Alternatively, where appropriate, service roads can be introduced as a means to control vehicular access, improve pedestrian safety, create a frontage that is set back from traffic and possibly accommodate trees. Traffic safety needs to be specially addressed in sections with service roads. eg. Warrimoo.



- In several villages, shopping centres are set off the highway (as at Wentworth Falls and Hazelbrook) together with parking and planting. There should be good traffic, bicycle, pedestrian and visual connection with such village centres.

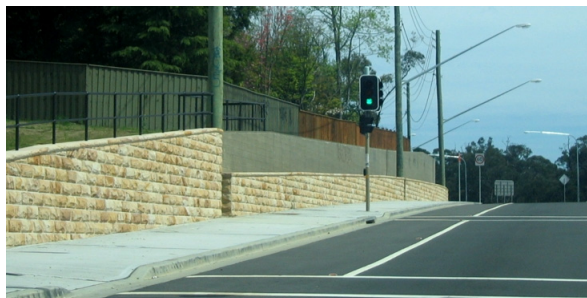


- The design of intersections should be in accordance with RTA standards and consider:

- Their role as definable entry points to a village, its shopping centre or residential districts.
- Their immediate context, including definition of the space by buildings and/or plantings giving it a strong sense of place.
- Pedestrian safety and amenity.



- Design of retaining structures should be based on a 'place appropriate' response to their form and materials. Preferably, as is common throughout the Blue Mountains, minor retaining walls should be simple, randomly coursed, natural stone structures. Retaining walls should be terraced where possible to reduce their visible size and scale, and to better integrate with the adjacent environment.



### *Objective 2*

#### *Protect the natural systems and ecology of the corridor*

- Natural and ecological systems and values in the corridor should be identified and, wherever possible, retained and enhanced in Highway planning, design and upgrade.
- Fauna links should be provided across the Highway where appropriate.
- The management of stormwater (capture, manage and discharge) must be considered throughout the planning, design and upgrade of the Highway.
- Detention basins and water quality ponds, and service access to them, should be located discretely, easy to maintain, designed to be natural in character, appropriate for individual contexts, in keeping with the Blue Mountains environment, and designed in accordance with good water sensitive urban design practice. The water quality control pond at Woodford Bends should be used as a benchmark.



### *Objective 3*

#### *Protect and enhance the heritage and cultural character and qualities of the corridor*

- The impact of road engineering on indigenous and non-indigenous heritage, historic and culturally significant contexts and settings, items and artefacts should be avoided or minimised.
- Design of the highway should incorporate the cultural landscape and heritage/historic buildings and their curtilages which should be visually linked to the highway where possible.
- The heritage of the highway should, where practicable, be interpreted for road users and the local community (including the feats of the early pioneers and explorers in constructing a great route to the west).
- Any heritage interpretation, preparation of conservation plans of management for the Great Western Highway, and similar activities should occur in consultation with the RTA Heritage Committee, Blue Mountains City Council and other relevant bodies and parties.
- Design of the highway corridor should consider policies and guidelines prepared by Blue Mountains City Council regarding urban and landscape design, public art and sustainability.

#### Objective 4

*Provide a travel experience with good views and strong sense of whereabouts*

- Open up and exploit views from the highway, especially into the National Park and bushland areas wherever possible, without compromising road user safety through: grading of the highway; 'open' design of parapets and median barriers; by clearing obstructing vegetation and/or avoiding planting that will become an obstruction.



- Views to, and the settings of, the many historic buildings and groups of buildings (railway, hotel, institutional and residential etc.) should be retained and enhanced throughout the Blue Mountains, where appropriate and feasible.



- Views of the railway infrastructure should be retained and enhanced



- Bridges and other structures, over and above their functional requirements, should be designed and used as a visual marker or aid to travel orientation.



- Key intersections should be well defined to provide a sense of entry to and connection with villages (a good example is shown here in Blackheath, which is outside the study area).



### *Objective 5*

*Provide a safe and accessible corridor which reinforces safe driver behaviour and that has good connectivity for communities*

- All corridor urban design outcomes must be designed in accordance with RTA safety requirements and policies.
- Design of the corridor should create a 'self-explaining' road throughout all speed zones wherever possible: transition zones should suggest a reduction of travel speed, and village centres should reinforce the 60km/h limit.
- Clear zone and sightline requirements must be complied with for the relevant design speed.
- Continuous and safe access for pedestrians and cyclists should be provided along and across the highway, where appropriate, and preferably 'at grade', ensuring safety criteria are met, and with consideration of Blue Mountains City Council requirements and policies, to satisfy desire lines, improve social cohesion, and support public transport; pedestrian bridge landings should be well integrated into adjacent settings and appropriately designed to feel safe.
- Future eastbound and westbound truck stops should be located and laid out in consideration of road user safety, with good sight lines from and to the highway, but visually unobtrusive within the corridor.

### *Objective 6*

*Achieve a simple and unified design of the highway and its elements, which minimises maintenance and associated costs in the long term.*

Structures (such as bridges, overpasses and retaining walls) should:

- Be designed in their full 3-dimensional context, considering horizontal and vertical alignments, and their relationship to all adjoining elements, materials and treatments.
- Be bold and simple using concrete as the dominant material.
- Be contemporary in design and with respect to heritage and landscape considerations.
- Have a common design approach, however be adapted to the particular context.

Repetitive elements:

- Should be in accordance with Section 6.0 *Standard roadside components and details*.
- A more consistent design of bus shelters for the Blue Mountains should be encouraged, so that they are immediately identifiable, safe and accessible and part of the design language of the highway.

Landscape

- Should be in accordance with Section 6.0 *Standard roadside components and details*.

Overhead services

- Where feasible and practical, they should be consolidated and placed underground to improve the appearance of villages.

Signage and way-finding: (in accordance with current specifications and standards)

- Signage should be consistent and located to enhance sense of direction, way-finding and/or tourism where appropriate.
- Fixed and variable signage should not obstruct or conflict with landmarks or views and should not create clutter with other elements.
- Advertising is not appropriate within the Highway corridor, given its unique contextual, historic, cultural and environmental qualities. It should also be discouraged in visually sensitive locations.


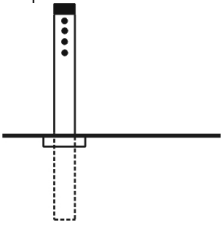
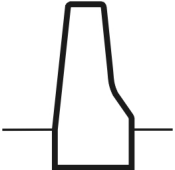
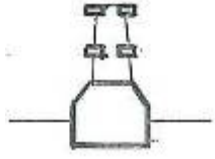
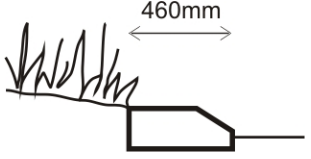
## 6.0 Standard roadside components and details

This section covers the design, selection and use of the various standard roadside components and details to meet the urban design objectives of the framework.

The final selection and design of these components, details and criteria for their use however, must be in accordance with the RTA *Road Design Guide* and any other RTA policies and standards regarding safety and maintenance to ensure their proper and safe use.

Corridor planning and design should consider the whole-of-life costs associated with all components and roadside elements including, but not limited to, their cost, maintenance, replacement, reuse and recycling.

### 6.1 Safety barriers and kerbs

Type	Urban Design Criteria for Preferred Use	Notes
W Beam (G4) 	<ul style="list-style-type: none"> <li>• General purpose guard rail</li> <li>• When a non rigid guard rail can be used</li> <li>• Preferred use in bushland/non-urban situations, where required at roadside or on medians.</li> <li>• Restrict use in urban areas</li> </ul>	<ul style="list-style-type: none"> <li>• Use appropriate barrier terminal treatments</li> <li>• Reconstituted rubber crash cushions are preferred where appropriate.</li> </ul>
Wire rope barrier. 	<ul style="list-style-type: none"> <li>• Preferred use in bushland/non-urban situations, where required at roadside or on medians.</li> <li>• Preferably use in conjunction with vegetation.</li> <li>• Ensure maintenance of barrier and adjacent areas is considered in the design and placement of the barrier.</li> </ul>	<ul style="list-style-type: none"> <li>• Less interference with sightlines.</li> <li>• Colour of vertical supports must be considered in the context of the Mountains. White is visually very prominent in the corridor. Consistency is also important.</li> </ul>
Type-F – single sided 	<ul style="list-style-type: none"> <li>• Non-urban situations.</li> <li>• In medians - double sided.</li> <li>• Along highway edges - single sided</li> <li>• Bushland zones with no views.</li> <li>• To provide protection from non-frangible trees, poles etc.</li> <li>• Avoid use on both sides of carriageway in a parallel situation since this produces a 'slot car' character.</li> </ul>	<ul style="list-style-type: none"> <li>• Maximum preferred height to be 820 (standard).</li> <li>• If greater height required for cycle safety, add rail to top to achieve visual transparency.</li> <li>• Has minor acoustic protection qualities.</li> </ul>
Modified Type-F with Twin Rails 	<ul style="list-style-type: none"> <li>• In medians - double sided.</li> <li>• Along highway edges - single sided</li> <li>• Use in bushland zones with narrow medians, or along highway edges, where visual transparency is required.</li> <li>• Not favoured over long lengths.</li> </ul>	<ul style="list-style-type: none"> <li>• Very appropriate in the Blue Mountains context permitting maximum visual connection with landscape setting.</li> </ul>
Modified SF median kerb 	<ul style="list-style-type: none"> <li>• For use in raised medians with planting (usually in village situations).</li> <li>• Integrates standard SF kerb with wide maintenance edging strip.</li> </ul>	<ul style="list-style-type: none"> <li>• As used along Windsor Road.</li> <li>• Avoids weed growth in joints between typical separate edging strips and median kerbs.</li> </ul>

## 6.2 Median treatments

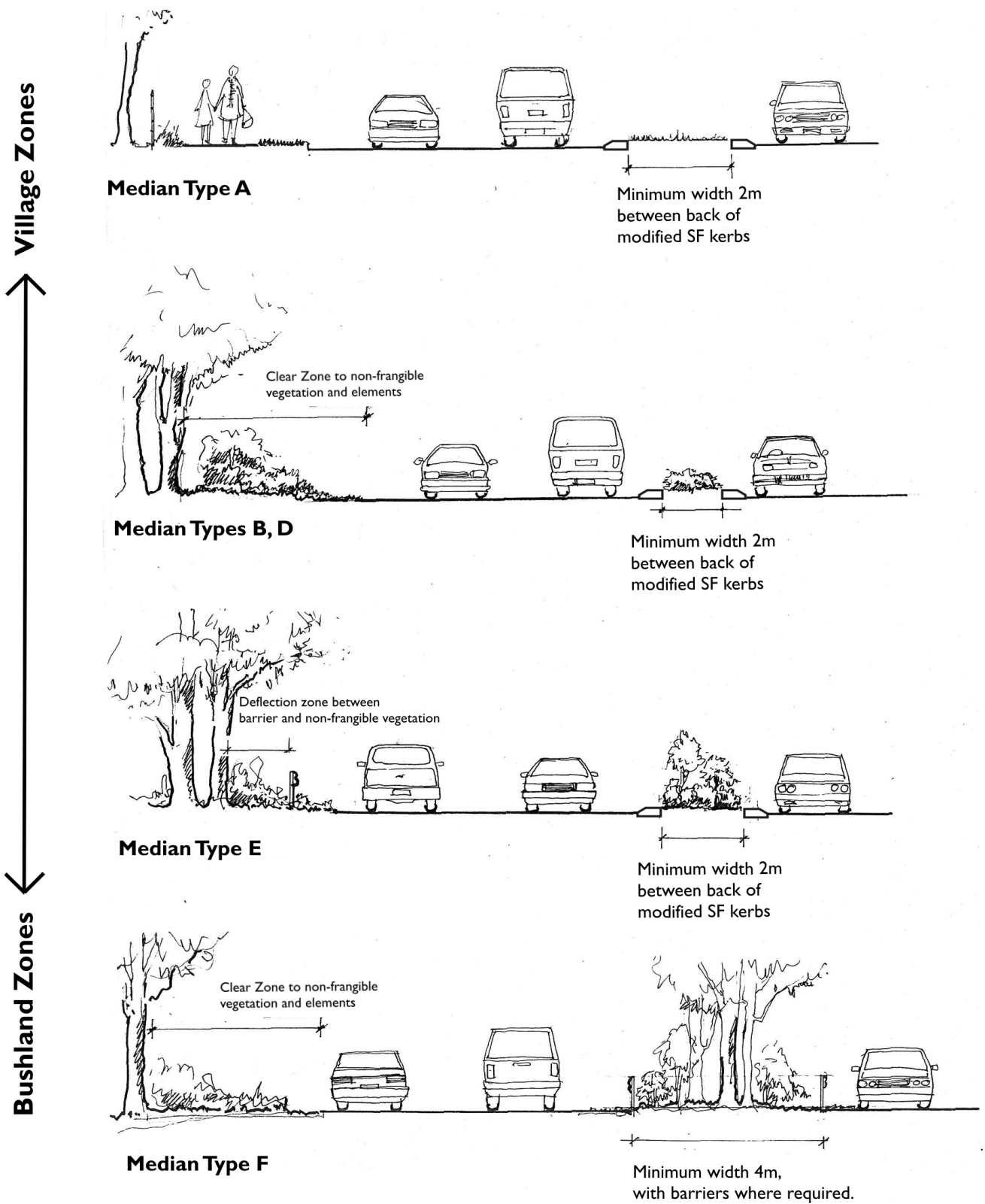
- Where a safety barrier is required within median areas, these situations to be individually designed and appropriate for their particular context. Where appropriate and safe it is preferable to incorporate landscape treatment within these median areas.
- Design of the corridor must consider the operational maintenance implications of the various median treatments.

Type (ref diagrams on opposite page )		Urban Design Criteria for Use
<b>Within Villages</b>		
<b>A</b>	Grass	<ul style="list-style-type: none"> <li>• Village situations (suburban zones)</li> <li>• Adjacent to open landscape such as playing fields</li> <li>• Matching grassed nature strip road edge to footpath</li> <li>• Good for maintaining clear sight lines</li> <li>• Minimum planting width 2m, between back of kerbs.</li> <li>• Preferred median kerb – use modified SF type.</li> </ul>
<b>B</b>	Ground cover - exotic (non-native), or appropriate native vegetation.	<ul style="list-style-type: none"> <li>• Town areas</li> <li>• Used to discourage pedestrian crossing</li> <li>• Provides vegetated separation between opposing traffic lanes</li> <li>• Low planting to ensure clear sight lines</li> <li>• To be compatible with planted verge treatment</li> <li>• Minimum maintenance plants in narrow medians</li> <li>• Minimum planting width 2m, between back of kerbs.</li> <li>• Preferred median kerb – use modified SF type.</li> </ul>
<b>C</b>	Concrete infill	<ul style="list-style-type: none"> <li>• Where no safety barrier is required</li> <li>• Where median is too narrow for maintenance of vegetation.</li> <li>• Maximum width 2m (between face of kerbs).</li> <li>• Preferred median kerb – standard SF type.</li> </ul>
<b>Transition Zones (closer to bushland)</b>		
<b>D</b>	Ground cover native vegetation (low)	<ul style="list-style-type: none"> <li>• Where vegetated separation between traffic lanes is desired</li> <li>• To be compatible with verge treatment and adjacent native vegetation</li> <li>• Low planting to ensure clear sight lines</li> <li>• Minimum maintenance plants in narrow medians.</li> <li>• Minimum planting width 2m, between back of kerbs.</li> <li>• Preferred median kerb – use modified SF type.</li> </ul>
<b>E</b>	Frangible native vegetation (high)	<ul style="list-style-type: none"> <li>• Provides greater vegetated separation between opposing traffic lanes</li> <li>• Useful to shield motorists from oncoming head lights</li> <li>• Ensure at least minimum sight lines are achieved.</li> <li>• No (or controlled) cross pedestrian traffic.</li> <li>• To be compatible with adjacent bush.</li> <li>• Minimum planting width 2m, between back of kerbs.</li> <li>• Preferred median kerb – use modified SF type.</li> </ul>
<b>Bushland Zones</b>		
<b>F</b>	Wide median with non frangible trees	<ul style="list-style-type: none"> <li>• Use in bushland zones where possible to provide a continuous and more vegetated native corridor, enhance the natural bush landscape, separate the carriageways and minimise the visible width of road pavement.</li> <li>• Safety barriers may be needed for non-frangible planting if located within the required clear zone.</li> <li>• Minimum width 4m (typical).</li> <li>• Provide maintenance strip behind kerb where required.</li> <li>• Ensure sight lines are achieved.</li> </ul>



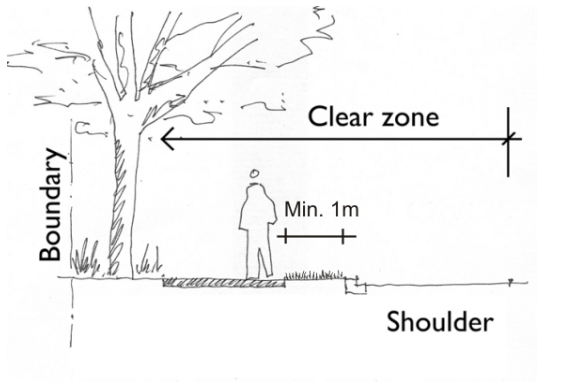
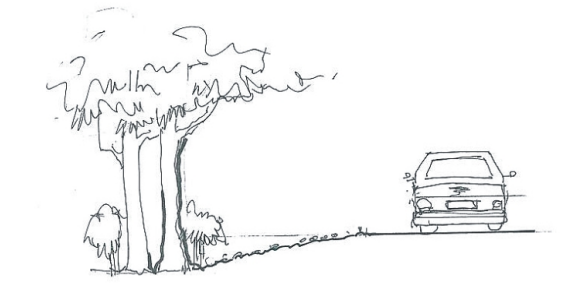

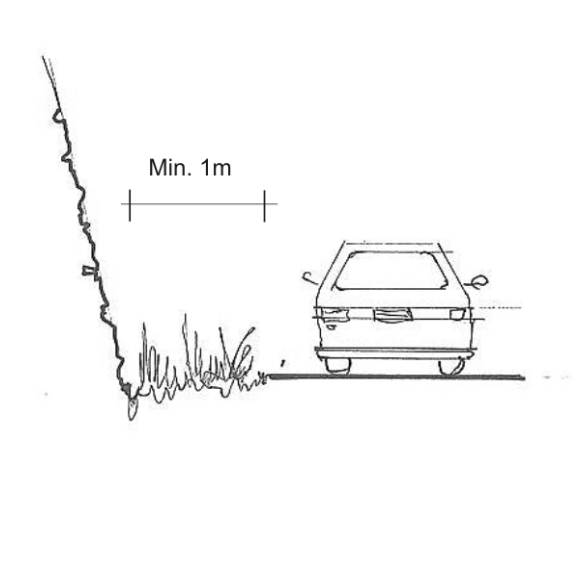
## 6.2 Median treatments (continued)

(Refers to details on previous table)









### 6.3 Verge treatments

- Verge areas must be appropriate for their context and require low maintenance.





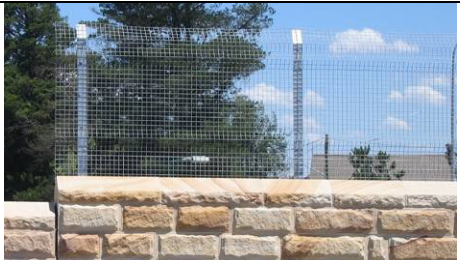
Type	Urban Design Criteria for Use	Illustration
Town zones	<ul style="list-style-type: none"> <li>• Urban and bushland transition zones</li> <li>• Where pedestrian (and cycle) pathways, utilities, lights, signs trees, etc.</li> <li>• Desirable verge width must be planned for early as part of whole corridor.</li> </ul>	
Bushland zones – where non-frangible planting is <u>outside</u> clear zone	<ul style="list-style-type: none"> <li>• Bushland areas</li> <li>• When significant non frangible trees exist and clear zone requirements are <u>met</u>.</li> <li>• Use low growing and/or frangible planting, or stabilised gravel.</li> </ul>	
Bushland / town transition zones – where significant existing non-frangible planting is <u>within</u> clear zone	<ul style="list-style-type: none"> <li>• Bushland / town transition zones.</li> <li>• When significant existing non-frangible plants exist and clear zone requirements are <u>not</u> met.</li> <li>• Consideration for use of G4 barrier.</li> </ul>	
Cuttings	<ul style="list-style-type: none"> <li>• If cutting within clear zone, ensure characteristics of the rock face meet all safety requirements.</li> <li>• Generally - cuttings in sandstone are characteristic of the highway and must not be compromised with complicated planting.</li> <li>• Provide a landscape zone at the base of cuttings, with appropriate drainage, ensuring all safety criteria are met, including appropriate sight lines. (Maintenance benefits – runoff and sediment collection area.)</li> </ul>	

## 6.4 Cuttings and Retaining walls

- Planting at base of cuttings and retaining walls is desirable in all situations to: soften their appearance; integrate the walls within a landscape setting; promote climbing plants; and discourage graffiti.
- Access for ongoing maintenance walls and landscape areas to be considered in the design.

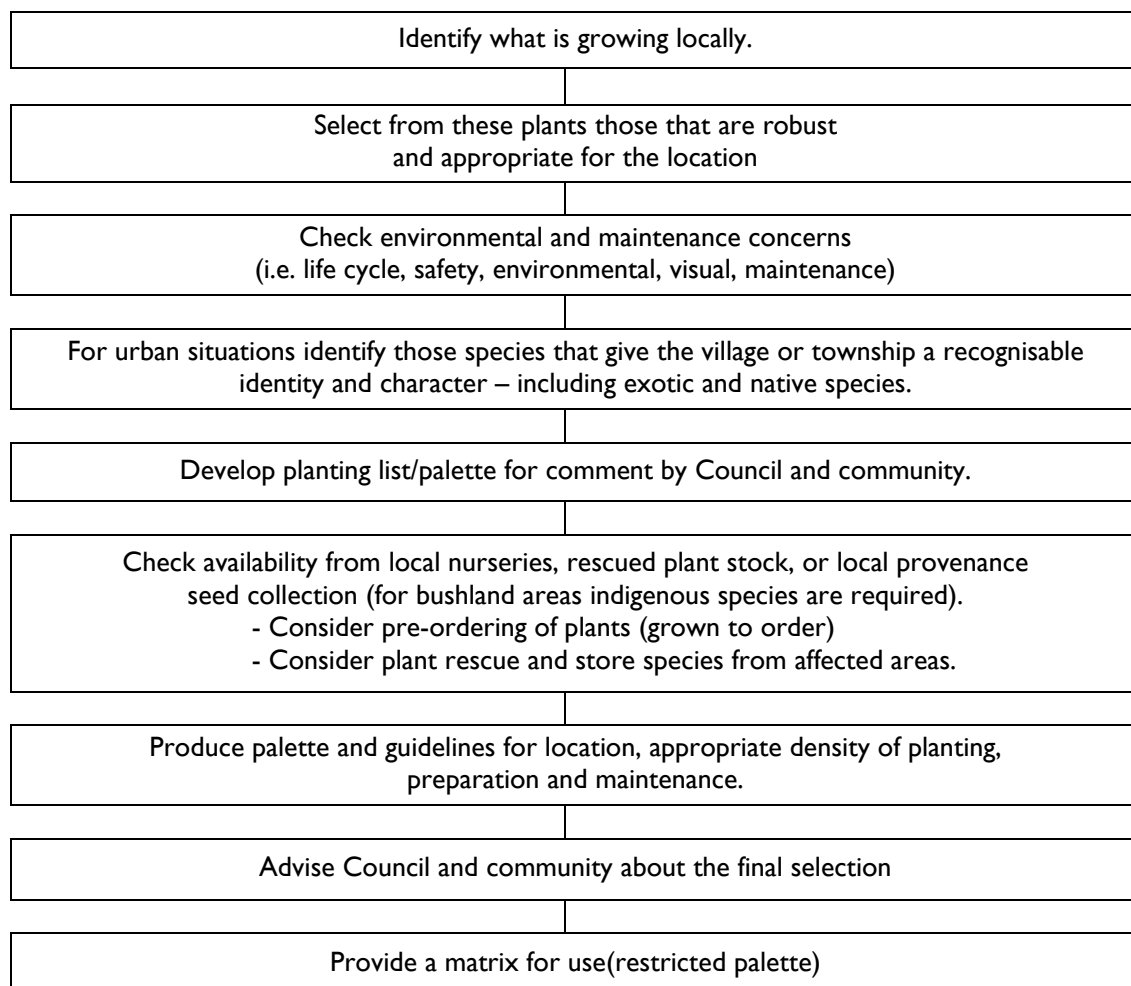
Type	Urban Design Criteria for Use	Notes	Illustration
Natural cuttings (Hawkesbury Sandstone, east of Lawson)	<ul style="list-style-type: none"> <li>Generally medium to high strength.</li> <li>0.25H:1V cut batters generally appropriate.</li> <li>Unexcavated sandstone in medians ('mohawks') are possible.</li> <li>Ensure all safety requirements are met regarding the excavated face.</li> </ul>	<ul style="list-style-type: none"> <li>Spray concrete (shotcrete) is to be avoided wherever possible.</li> <li>Where absolutely necessary, refer to RTA Shotcrete Design Guidelines</li> </ul>	
Natural cuttings (Banks Wall Sandstone, within and west of Lawson)	<ul style="list-style-type: none"> <li>Generally low to extremely low strength, highly erodable.</li> <li>2H:1V cut batters stabilised with vegetation where possible.</li> <li>Low height cuttings (&lt;3.5m) 1.5V:1V generally possible with provision for eroded sediment.</li> <li>Medians 'mohawks' not possible.</li> <li>Ensure all safety requirements are met regarding the excavated face.</li> </ul>	<ul style="list-style-type: none"> <li>In general, minimise cut and fill and disturbed areas in this geology.</li> <li>Retaining by soil nailing and facing may be required.</li> <li>Spray concrete (shotcrete) is to be avoided wherever possible.</li> </ul>	
Reinforced soil retaining wall	<ul style="list-style-type: none"> <li>Bushland settings, <u>below</u> the highway.</li> </ul>	<ul style="list-style-type: none"> <li>Dark colour to reduce visual impact</li> <li>Use type and developed for Woodford Bends – horizontal ribs, dark exposed aggregate.</li> </ul>	
Gabions	<ul style="list-style-type: none"> <li>Bushland settings - <u>above</u> the highway.</li> <li>Particular use where retaining the railway embankment</li> </ul>	<ul style="list-style-type: none"> <li>Gabions are complementary to the railway line construction. Their use elsewhere is inappropriate</li> </ul>	
Natural stone	<ul style="list-style-type: none"> <li>For low to medium retaining walls in bushland or semi urban areas</li> <li>Carefully design the 3D form of walls - horizontal alignment, section and elevation.</li> <li>Use of raked walls provides a more open corridor.</li> <li>Coursing – consider random coursing, ashlar, stretcher, etc.</li> </ul>	<ul style="list-style-type: none"> <li>This material is in keeping with the sandstone natural cuttings found along the highway</li> </ul>	
Concrete block walls.	<ul style="list-style-type: none"> <li>Urban areas</li> <li>Carefully design the 3D form of walls - horizontal alignment, section and elevation.</li> <li>Use of raked walls provides a more open corridor.</li> </ul>	<ul style="list-style-type: none"> <li>Allow planting area between wall and pedestrian or cycle path to discourage graffiti.</li> <li>Use low maintenance and low graffiti potential materials.</li> </ul>	

## 6.5 Pedestrian fences

Type	Description	Urban Design Criteria for Use	Illustration
Railing	<ul style="list-style-type: none"> <li>Vertical steel rods, extended ends</li> <li>Black finish</li> <li>1.4m high (typical)</li> <li><u>Not</u> the lighter weight 'pool' fence</li> </ul>	<ul style="list-style-type: none"> <li>Non urban area (typical) - as protection to steep embankments, at top of retaining walls, etc.</li> <li>Must be outside clear zone, or separated by safety barriers from moving vehicles, may shatter on impact – not impact resistant.</li> </ul>	
Handrail	<ul style="list-style-type: none"> <li>Vertical steel rods with top rail</li> <li>Black finish preferred.</li> </ul>	<ul style="list-style-type: none"> <li>Pedestrian paths or bridges</li> <li>Designed to meet pedestrian impact loads, and vandal resistant.</li> </ul>	
Mesh fence	<ul style="list-style-type: none"> <li>Cyclone type mesh fence.</li> <li>Black, or dark grey.</li> <li>Height varies depending on security needs and to prevent easy access.</li> </ul>	<ul style="list-style-type: none"> <li>Typical use – railway boundaries, around water quality control ponds.</li> <li>Must be outside clear zone, or separated by safety barriers from moving vehicles, may shatter on impact – not impact resistant. Alternatively, a modified design type is available meeting crash test criteria.</li> </ul>	
Pedestrian barrier	<ul style="list-style-type: none"> <li>RTA crash test approved type.</li> <li>Note: this is not a safety barrier</li> <li>Black finish</li> </ul>	<ul style="list-style-type: none"> <li>Use in urban zones</li> <li>Type for use within the clear zone.</li> <li>Edge of pedestrian paths</li> <li>Pedestrian barriers in medians and verges</li> <li>Careful design required on steep gradients, to avoid excessive and irregular stepping of top edges.</li> </ul>	
Suburban fencing	<ul style="list-style-type: none"> <li>To replicate private fence being relocated or to suit urban context</li> </ul>	<ul style="list-style-type: none"> <li>Urban areas and/or historic context</li> <li>Where no traffic safety function is required.</li> </ul>	
Pedestrian safety screens -	<ul style="list-style-type: none"> <li>Preferred type – adapt type used at Medlow Bath over railway tunnel entry.</li> <li>Tapering vertical steel 'T' sections with self-supporting welded mesh. No top edge sections.</li> </ul>	<ul style="list-style-type: none"> <li>Pedestrian bridges over highway or railway.</li> <li>Ensure design meets RTA safety screen standards.</li> </ul>	

## 6.6 Corridor plant selection process

- Corridor landscape should be:
  - Robust, non-invasive, of species that are not fire promoting, low maintenance, accessible and easy to maintain.
  - Preferably grown from seeds collected from local area to maintain ecological integrity.
  - Densely planted to reflect the bushland environment, minimise maintenance and weed infestation.
  - Designed to minimise effects on pavements and paths, and not interfere with traffic.
- Species selection must exclude environmental weeds, and consider the Blue Mountain City Council's plant species and weed schedules.
- The term 'exotic' is used in this framework to mean a species which provides distinction and contrast within a village context (to complement its unique cultural and historical setting), and which may originate from a different country or region. This may also include an appropriate species from a different region within Australia (that is, a native, non-endemic species).



### Example – Location: bushland median

<i>Species</i>	<i>Container size</i>	<i>Plant height</i>	<i>Plant spacing</i>
<i>Myoporum parvifolium</i>	150mm	<200 mm	2 plants per m <sup>2</sup>
<i>Grevillea 'Royal Mantle'</i>	150mm	200 mm – 500 mm	2 plants per m <sup>2</sup>
<i>Banksia spinulosa</i>	200mm	1.2m	4 plants per m <sup>2</sup>

## 6.7 Corridor tree species

- The select list of street trees below are suitable for use within the townships. The process for finalising species selection is documented in the previous section 6.6 *Corridor plant selection process*.
- Sterile forms of non-local or cultivar species should always be selected.

### Flowering trees

	Common Name
Prunus serrulata 'Kanzan'	Japanese flowering cherry
Prunus serrulata 'Mt Fuji'	Japanese flowering cherry
Prunus x blireana	Evergreen plum
Prunus campanulate	Taiwan cherry
Pyrus calleryana	Chinese wild pear
Pyrus ussuriensis	Manchurian pear

### Autumn foliage

	Common Name
Liriodendron tulipifera	Tulip tree
Quercus robur fastigiata	English oak
Populus yunnanensis	Yunnan poplar
Nyssa sylvatica	Tupelo
Zelkova serrata	Keyaki

### Conifers

	Common Name
Cedrus atlantica glauca	Blue cedar
Cupressus sempervirens stricta	Italian cypress
Wollemia nobilis	Wollemia pine

## 6.8 Species for median planting

- Sterile forms of non-local or cultivar species should always be selected.

<i>Species</i>	<i>Container Size</i>	<i>Plant Height</i>	<i>Spacings</i>
<b>Native Species</b>			
Dianella caerulea	Viro-tube	0.7m	9 plants per m <sup>2</sup>
Dianella tasmanica 'TR20'	Viro-tube	0.4m	9 plants per m <sup>2</sup>
Lomandra "nylla"	Viro-tube	0.5m	9 plants per m <sup>2</sup>
Lomandra 'tanika'	Viro-tube	0.3m	9 plants per m <sup>2</sup>
Lomandra longifolia 'Katrinus'	Viro-tube	1.0m	9 plants per m <sup>2</sup>
Grevillea 'gaudi chaudi'	150mm	0.3m	2 plant per m <sup>2</sup>
Grevillea 'royal mantle'	150mm	0.3m	2 plant per m <sup>2</sup>
Myoporum parvifolium	150mm	0.2m	2 plants per m <sup>2</sup>
Banksia spinulosa	200mm	1.2m	4 plants per m <sup>2</sup>
Callistemon 'little john'	200mm	1m	4 plants per m <sup>2</sup>
Callistemon "captain cook"	200mm	1.5m	1 plant per m <sup>2</sup>
<b>Exotic Species</b>			
Gazania tomentosa	Forestry tube	0.2m	6 plants per m <sup>2</sup>
Trachelospermum jasminoides	200mm	0.4m	2 plants per m <sup>2</sup>
Trachelospermum jasminoides 'tricolour'	200mm	0.3m	6 plants per m <sup>2</sup>
Nandina domestica 'moon bay'	200mm	0.5m	6 plants per m <sup>2</sup>
Coprosma kirkii 'goldstream'	200mm	0.5m	2 plants per m <sup>2</sup>
Ophiopogon japonicus	Viro-tube & 'Flora-Edge'	0.2m	20 plants per m <sup>2</sup> 1 linear strip along verge
Juniperus conferta	200mm	0.3m	4 plants per m <sup>2</sup>
Juniperus horizontalis 'douglassii'	200mm	0.3m	4 plants per m <sup>2</sup>
Juniperus horizontalis 'glauca'	200mm	0.3m	4 plants per m <sup>2</sup>
Buxus sempervirens	150mm	0.4m	6 plants per m <sup>2</sup>
Buxus japonica	150mm	1.2m	6 plants per m <sup>2</sup>
Rosmarinus officinalis 'prostrate'	150mm	0.3m	4 plants per m <sup>2</sup>
Nerium oleander 'dwarf'	200mm	0.6m	4 plants per m <sup>2</sup>

## References

Blue Mountains City Council (2005) *Local Environment Plan: Schedule 1*

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Blue Mountains City Council (2005) *Blue Mountains – Our Future: How we did it.*

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Roads and Traffic Authority NSW and Blue Mountains City Council (1992) *Great Western Highway Management Plan*

Roads and Traffic Authority NSW (1999), *Beyond the Pavement: RTA Urban and Regional Design Practice Notes.*

Roads and Traffic Authority NSW (2004), *Bridge Aesthetics: Design guidelines to improve the appearance of bridges in NSW*

Roads and Traffic Authority NSW (2005), *Shotcrete Design Guidelines*

Roads and Traffic Authority NSW (*currently in draft*), *Noise Wall Design Guidelines*

Roads and Traffic Authority NSW (*currently in draft*), *Landscape Guidelines*



## Appendix A: Corridor analysis and opportunities

Within each of the three major zones of the Blue Mountains that have been identified –lower, middle and upper mountains - there are a number of precincts that have a distinctive sense of place and which collectively define the character of the Highway corridor. (The 1992 *Management Plan* breaks the corridor down into numerous landscape types, but this has proven too complex and does not assist in formulating a future vision for the highway).

Precincts form a useful basis to analyse how well the design of the highway is responding to the different environments through which it passes, and how well the RTA is performing with its upgrade works in urban design terms. By comparing the highway design across the different precincts, it is possible to identify any serious inconsistencies that diminish the corridor experience. Equally, it is possible to identify where the design of the highway is appropriate, and why.

In summary, by defining the extent and individual character of the precincts it is possible to specify an appropriate urban design response for the highway which will allow the character (the 'genus loci') to be retained and enhanced, within an overall vision for the corridor. This is, therefore, a key piece of analysis.

The analysis of precincts systematically covers sections of the corridor as yet not upgraded, as well as the completed sections of the corridor, according to the following criteria.

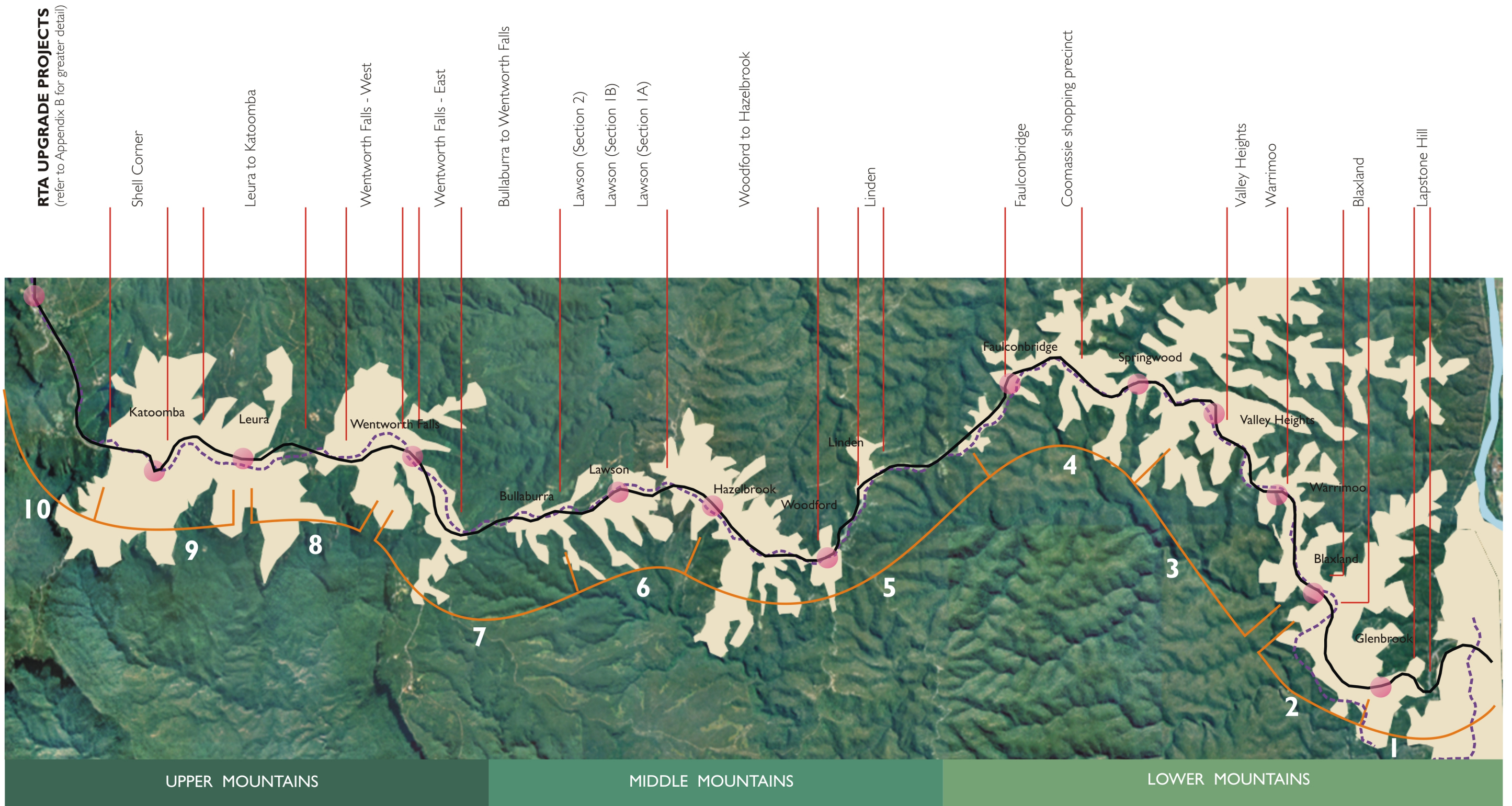
- Topography and landscape
- Road formation
- Urban structure and form
- Landmarks
- Views
- Connectivity and access
- Road infrastructure and roadside elements
- Corridor landscape

These criteria are addressed to greater or lesser degree, depending on the nature of the individual precincts and highway issues involved.






The vision, objectives and broad principles in the framework will respond essentially to the different topographic conditions, vegetation, views, character of villages, historic built fabric, the parallel railway and road through the Blue Mountains, the interface with adjacent development and the local street, cycling and pedestrian networks (where information at this level of analysis allows) and the design quality of the highway itself as it passes through the different precincts.

RTA priority is given to upgrading of the Highway to meet its stated urban design objectives. Over and above this, the opportunities identified within each precinct should however, be considered by both the RTA in any future upgrade or retrofitting works, and the Blue Mountains City Council as ongoing managers of the highway corridor, to further enhance the Great Western Highway corridor and contribute to the driving experience through this unique region. Implementation of any of the opportunities identified should be made with consideration to Blue Mountains City Council policies and guidelines regarding urban and landscape design.

**RTA UPGRADE PROJECTS**  
(refer to Appendix B for greater detail)



Legend:

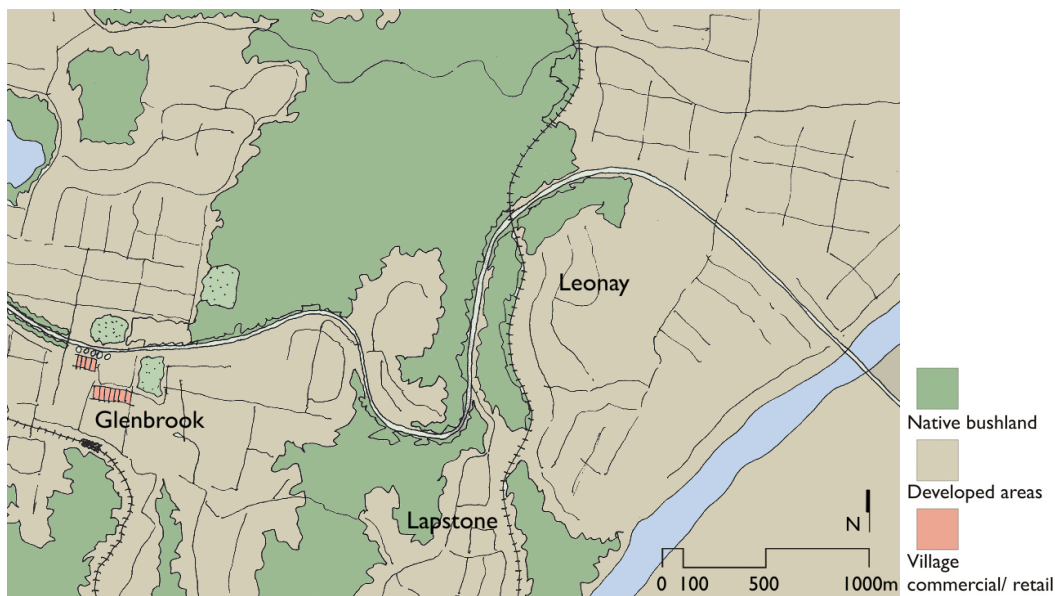
-  Village Centres
-  Highway
-  Railway
-  Developed Areas
-  Precincts



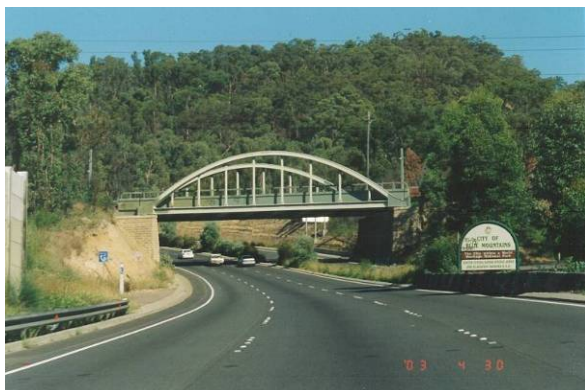
**Study Precincts and RTA Projects**

## The Lower Mountains

### *Precinct 1: Leonay (Knapsack Gully Bridge) – Glenbrook*



After crossing the Nepean River, the start of the Blue Mountains (and the end of the Cumberland Plain) is sharply different to all of the landscapes encountered along the drive from Sydney.

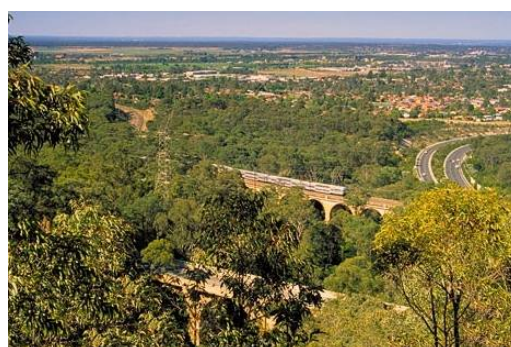


This precinct heralds the entry or 'gateway' to the mountains. It includes the transition from the western edge of the Cumberland Plain, the change from the motorway formation, the new well detailed arch railway bridge and the journey up to the top of the ridge at Glenbrook. All set within mature eucalypt forest, the precinct is characterised by the sweeping end of the M4 Motorway, and the distinct gradient change and tight curves of the highway as it traverses up and around the steep ridge, until it levels out at the top of the Knapsack Ridge.

Off to the side, and further up the gully, is the beautiful old sandstone Knapsack Viaduct set within the bushland.

This precinct is primarily about getting into the mountains, with a few isolated local access points. There are no pedestrian footpaths, and cycle access is via the road shoulders only.

Roadside and median barriers are dominant elements though the Lapstone Hill incline. Several upgrade programs and safety improvements over the years have resulted in a variety of barrier types and details used: various height and detail concrete barriers (some appear painted white), wire rope, galvanised G4 guardrail, and painted striped medians. The barrier height on the south side detracts from the dramatic bushland view. There was at the time no corridor urban design framework to guide this. One objective of this framework is to ensure consistency and coordination between barrier types used, to avoid the current situation on the Lapstone Hill incline and to ensure transparency.



*Several panoramic views over the Cumberland Plain appear on descent*

*View from Lapstone over the old Knapsack Gully Bridge, new railway bridge and Emu Plains.*

The suburban areas of Glenbrook are generally hidden behind tracts of bushland in this precinct. Ridge-side houses are glimpsed through the woodland towards the top of the Lapstone incline, reappearing again closer to Glenbrook. This transition precinct is within the mountains eucalypt woodland, with exotic highlights closer to the Glenbrook centre.



*At Glenbrook, the village centre is marked by an open parkland landscape, playing fields and the Blue Mountains Visitors Centre, creating a strong impression.*

A short formal row of deciduous trees between a parallel service road and the highway is a highlight, and could be enhanced to further define the Glenbrook village. The shopping precinct starts against the highway fronting a service road, however is generally located well away from the highway.



***Precinct opportunities***

- Future barrier replacement or upgrades should utilise the modified Type-F with twin rail type, where feasible.
- The narrow planted median on the descent is in a poor state and needs replanting.
- Further well scaled and bold landscape initiatives would greatly enhance the Glenbrook village centre.
- The painted median at the top of the Lapstone Hill should be replaced with a kerbed and turfed median, integrating the existing wire rope barrier as required.

## Precinct 2: Glenbrook – Blaxland



*The vehicle overbridge at Fletcher St (western Glenbrook) marks the boundary between Glenbrook and Blaxland. Few other distinctive built features occur along this length, however the scale and density of trees is impressive.*

Glenbrook to Blaxland is a gentle climb, flattening out on the approach to the Blaxland town centre. The western end of Glenbrook is nestled in a well formed, minor cutting with exposed geology, edged by a strip of 'suburban' bushland. These cuttings and vegetation visually separate the extensive suburban development beyond, while also providing good noise separation. Carriageways are generally divided by turfed medians (it would be preferable these were retrofitted with endemic shrub species and grasses, ensuring required sightlines are not compromised), or simply infilled with concrete where narrower.



*The dominant residential form apparent through Blaxland, can be called 'Mountain's suburbia' – that is, it is similar to many post war Sydney suburbs but still distinctly different due to its setting.*

A network of parallel service streets operates well and minimises local vehicular access points. Cyclists must use these streets or the highway shoulders. Pedestrian footpaths are limited to areas immediately fronted by residential development.

Throughout the residential area (Blaxland), there are very few roadside trees, the result being that the corridor is too open for the mountain's context. Beyond the corridor however, tree cover is relatively heavy (with exotic species an obvious part of the mix), providing a good backdrop.

A wide variety of road barrier types exist along the corridor in this precinct – from standard G4 guardrail (most common and appropriate), to a 'log' type (which is not an acceptable barrier type along the highway). The framework seeks to gain concurrence on barrier types used in the future, taking into account safety and urban design principles.

The relationship between the highway and the railway is not yet obvious (as it is further up the mountains).

There are few views of any significance, the corridor generally being contained by either earth cuttings or adjoining development.

***Precinct opportunities***

- Street tree planting along the highway roadside throughout Blaxland, where feasible and in accordance with safety design criteria, to reinforce the mountains context.
- The existing turf medians west of Hare St should be replanted with endemic shrub species and grasses to reinforce this "between-town-bushland" zone, ensuring that required sightlines are not compromised.
- The retail/commercial zone at east Blaxland needs a more distinctive and well scaled tree planting scheme.

***Precinct 2 (part): Blaxland***



Blaxland on its own forms a precinct due to its distinct urban design treatment. The Blaxland shopping strip is adjacent to the south side of the Highway and there is enough space between it and the railway station to have allowed the formation of a four lane divided road and a fairly generous supply of kerb side parking. A layout that appears to work well.

In terms of highway infrastructure and elements, Blaxland village is particular noteworthy for its raised and planted median (generally in poor condition), unique street lights and palm tree planting. Despite being distinctive, and the choice of the community, these elements are inappropriate for mountains context: the medians essentially divorce half of the highway from the 'village' (working counter to the speed zone), the lights are overly elaborate and inconsistent within the corridor context, and the phoenix palm trees are completely out of historic and geographic context, being more suited to low lying areas closer to the foreshore.

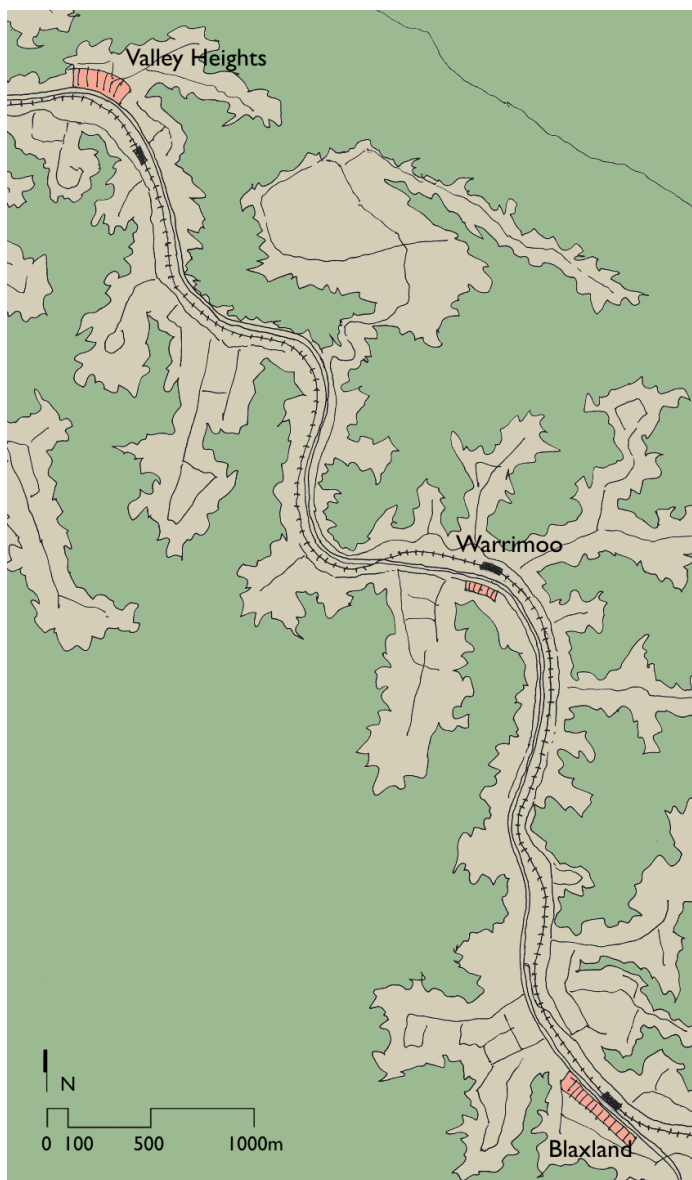


*A pedestrian bridge connects the shops to the station, the stairs of which create an unpleasant space around it and an unfortunate disjunction to the continuity of the retail frontage.*

***Precinct opportunities***

- The median landscape treatment through the shopping precinct is in a very poor state and should be replanted as soon as possible, complemented by a good maintenance program.

### Precinct 3: Blaxland – Valley Heights



West of the village centre, Blaxland is more typically suburban with direct frontages, 'mannered' footpaths and (appropriately) turfed medians (refer to previous precinct) – it however lacks a distinctive 'mountains' landscape. The railway and its relationship to the highway start to become obvious from Blaxland heading west.



*The western end of Blaxland – a simple highway configuration.*

- Native bushland
- Developed areas
- Village commercial/ retail

This character changes abruptly at the start of Warrimoo, where the highway corridor takes on a distinctly mixed suburban/ bushland character - 'Bushland suburbia' - with native shrub species in the median and along the highway verges. It differs from the Glenbrook precinct in that it is less legible as a landscape and the sense of space is much more open.



*The highway has a four -lane configuration, generally with a wide median and varying width of shoulders. Narrow pedestrian pathways (not shared paths) are found in the village centres and where residences front the highway. A network of generally well screened and accessed parallel service roads is located throughout this precinct.*

Between these villages, the Highway follows a narrow section of ridgeline often providing a good connection between the highway and the Blue Mountains topography and landscape. Between Warrimoo and Valley Heights the upgraded Highway passes through bushland and has opened up an extensive view to the north.



Toward the eastern side of Valley Heights, the roadside and medians contain some very successful, dense and well scaled native vegetation. Residential development on the eastern side of Valley Heights is even less apparent and generally along one side only, again with a network of parallel streets.

Within Valley Heights however, a zone of commercial frontage presents a rather bleak and distinctly non-mountains character (refer photo to right), which could be vastly improved with an extensive street tree planting program (ensuring all safety requirements are met).



Overhead services are quite constant and in some places, visually dominate the corridor.



A pedestrian bridge at the railway station marks the eastern entry into Valley Heights. Otherwise, there is little to identify the focus or centre of the village.

Full height concrete barriers are found in several locations in the medians and roadside, sometimes used for noise mitigation as in Warrimoo. West of Warrimoo however, dependent upon their appropriateness, the more visually transparent modified Type-F barrier with twin rails could have been more appropriate to suit this exposed context. Lengths of G4 guardrail are successfully used in bushland areas in the median and on the roadside. A few instances of median wire rope barrier almost go unnoticed in planted medians.

### *Precinct opportunities*

- Village appropriate native/exotic ecotone tree planting is needed throughout Blaxland to emphasise a 'mountains' character.
- Street tree planting program through Valley Heights to reinforce the mountains context and offer some relief to the stark commercial frontage.
- Cycle facilities should be retrofitted throughout this precinct (as shared paths in most instances) where appropriate and safe.



### ***Precinct 3 (part): Warrimoo***

The Warrimoo village centre is located adjacent to the highway, with its own distinctly different character. It lies along a parallel service road, separated by a fenced and planted median, on the inside of an 80km/h curved section of the highway. Overall, this centre is very open, lacking well-scaled corridor vegetation. The hard paving of the highway and service road dominate.

The village would benefit from a softer, distinctive landscape treatment, focussed along the service road.



*A pedestrian bridge is a defining element in this precinct, connecting the shops with the railway station.*



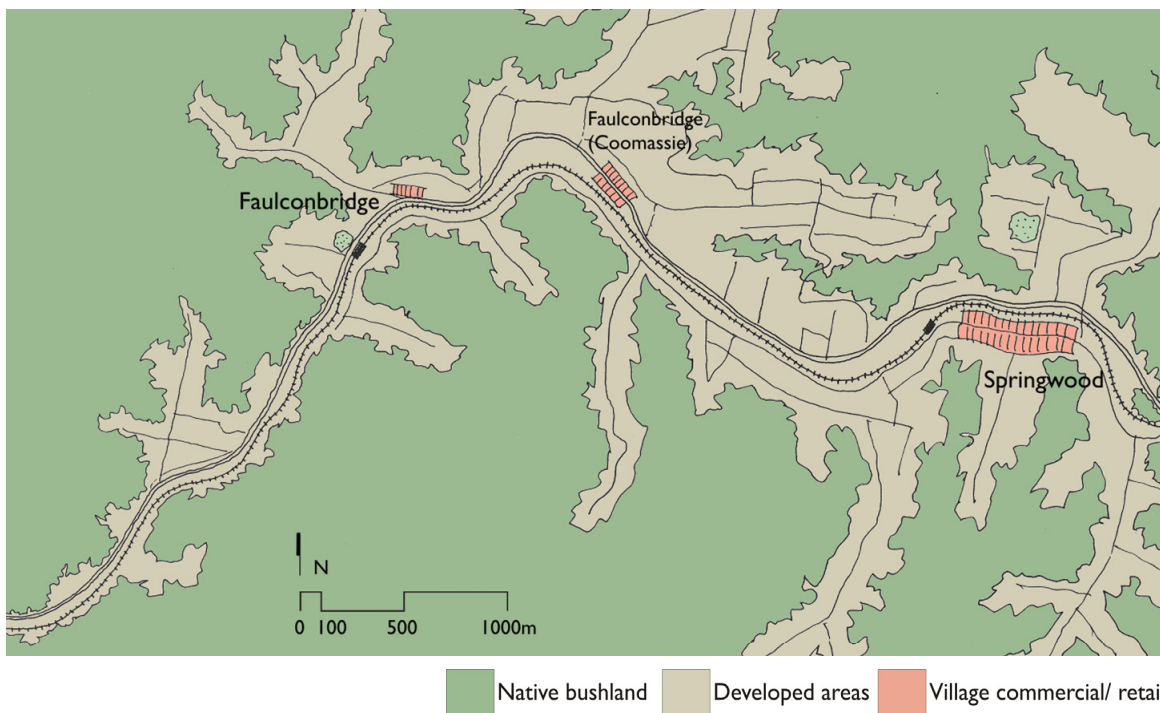
*The ramps and associated landing areas however, present an awkward resolution, due to less than adequate space made available for the ramp and partly due to a clutter of other street side elements in their immediate vicinity.*

### ***Precinct opportunities***

- A village appropriate and distinctive landscape solution is needed through the Warrimoo village. This may include planting large, well scaled exotic trees within the service road corridor, ensuring all safety criteria are achieved, including clear zones and sight lines. Consideration may be given to appropriate barrier protection if required.



**Precinct 4: Springwood – Falconbridge (west)**



The Highway is a 4 lane divided road from Springwood to Linden, and for much of the section there is a parallel local road.



The Springwood Shopping Centre is remote from the highway, however occasional tall conifers and older buildings subtly signal the village and establish its character on the highway. At some stage, this now well established highway bypass would benefit from an upgraded landscape treatment and the addition of continuous shoulders.

Between Springwood and Falconbridge the highway is adjoined by generally well treed suburban development. Local accessibility is assisted by the use of parallel service roads, overpasses and traffic lights. However in some parts there is insufficient space for a cycle path and compromises have been made. Except on the recent work between Falconbridge and Linden, there is no cycle lane on the highway.

Throughout this precinct, the railway is often visible from the highway, including at Falconbridge where the station and rail line have been very successfully exaggerated.

The Highway divides the Coomassie shopping centre, and the overall narrowness of the corridor allowed little opportunity for streetscape improvements. It is very open and overall, lacking in character. Access and parking has been provided to the rear of the shops.





The Highway upgrade at Falconbridge, completed in 2001 is, overall, an excellent outcome. The careful planning and design through this village centre is now maturing, highlighting its successful integration, well designed access and structures. It is well landscaped with a mixture of European and indigenous species.

The median has been planted with Juniper, which has established well, minimising maintenance requirements. The attractive railway station, which has been exposed to the highway, is a major visual event.

Throughout Falconbridge, five different types of pedestrian fences have been used which somewhat detracts from the overall visual quality of the locality.

The new footbridge (photo right) provides a high quality connection between the parking area on the north side to the station, and has been more recently extended to the south side of Falconbridge. Several details of the bridge railings and stairs however are overly complicated, and reflect a 'high-tech' character rather than more appropriately, 'mountain ruggedness'.



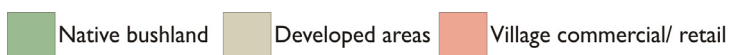
An isolated small industrial area on the northern side of the road between Falconbridge and Linden detracts from the otherwise good visual quality of this section of corridor, being too open – each property has cleared too much of the original vegetation.

### *Precinct opportunities*

- Relatively modest landscaping would greatly improve the industrial area between Falconbridge and Linden and provide a better setting for the Falconbridge entry sign.
- The Springwood bypass would benefit from a distinct and appropriate mountains/village landscape scheme, and road shoulders retrofitted for breakdowns and cycle access.
- There is no apparent continuity of a pedestrian/cycle route through this area. However there appear to be opportunities to use parallel roads with appropriate connections where safe.
- Replacement of pedestrian fences in the future, when the need arises, should follow a limited and coordinated palette. Selection and design should ensure all safety criteria are met, especially within clear zones.

## The Middle Mountains

### *Precinct 5: Linden –Hazelbrook (east)*



The design of the highway changes radically from the west end of Falconbridge, from a somewhat suburban feel to one which is much more 'mountain'. From Linden to Woodford the Highway is generally through attractive bushland on the ridge, with National Park views to the north and south. It is at times in cuttings. The highway is adjacent to the railway, crossing it after Linden and again before Lawson.

The earlier Linden and Woodford bends projects are two of the highest quality highway built outcomes in the Blue Mountains: the highway's sweeping alignment and the elegant cuttings provide much interest and have retained the connection with the mountains landscape, while extensive native bush landscape separates the carriageways and lines the bases of the cuttings.

These projects include two different and very successful median treatments, as described below. These examples demonstrate good urban design outcomes within their respective contexts and should be used elsewhere in the Blue Mountains where feasible and where safety requirements are met.



In the first, closer to Linden, the narrow median contains the modified Type-F barrier with double rails, which are excellent for this context with their greater transparency. Used also on the outside of the highway, they have minimum interference on the extensive views outwards to the National Park (best experienced on the descent).

The second, through the cuttings at Woodford, the medians are wide and are heavily planted with native species, visually separating the carriageways and establishing a greater connection between the bushland and the highway. G4 guardrail is installed due to safety requirements.



The Linden village is hidden from the highway behind the cut ridges, with only a few identifiable features and intersections to orientate the driver. The overall character is of a small and secluded settlement nestled in the bush.



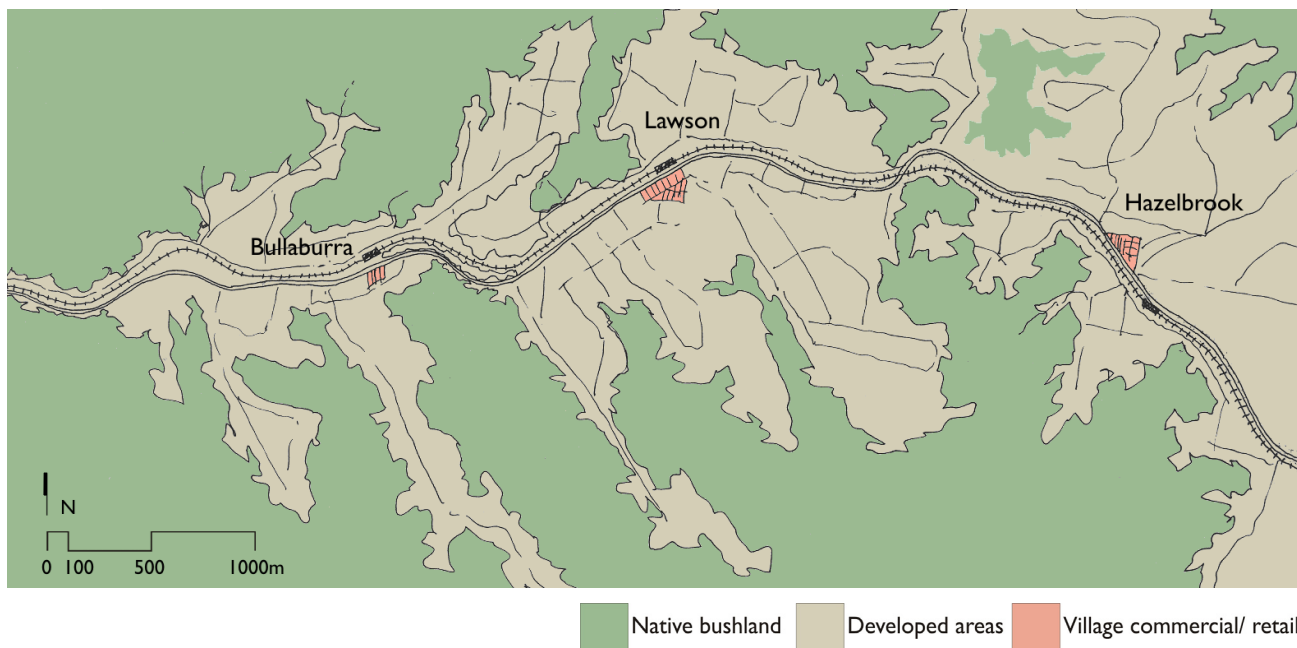
Woodford is a small village with heritage cottages, close to the road, set in a landscape of native and exotic trees. Between Woodford and Hazelbrook residential development fronting the highway has a more 'mountains' character than lower in the mountains, with exotic species being more apparent. This character should however be strengthened in the current upgrade project.

All within the highway corridor, this project demonstrates a successful design of the verge areas which comfortably accommodate a shared pedestrian/bicycle path, utilities, light and power poles, in addition to appropriately scaled and safely located landscape.

#### *Precinct opportunities*

- At Woodford, the current upgrade project should provide clear landscape distinction between the bush and town zones.
- The Woodford to Hazelbrook upgrade project should clearly identify and emphasise the unique qualities that make up these villages, and what distinguishes them within the Blue Mountains.
- The detailing of engineering structures, fences and barriers in the proposed upgrade works should be as simple and unpretentious as possible.
- It is desirable that additional endemic planting be established between villages.
- A well connected pedestrian/cycleway should be considered throughout the towns in this precinct, where appropriate, safely separated from the highway and with safe connections across.

**Precinct 6: Hazelbrook (east) – Bullaburra (east)**



Most of this precinct will undergo substantial change through highway upgrades in the coming years. This will include the Woodford to Hazelbrook and Lawson projects that are being developed in several sections. Changes through Bullaburra will be planned as part of a future highway upgrade. The significant challenge for these future projects is to capture the essential qualities of these villages, each with their own uniqueness, and ensure a truly integrated outcome.

This precinct is primarily residential in character, with more of a mountains-suburban character than elsewhere, with regular direct highway access. The original separation of these villages by tracts of bushland has significantly diminished over time, with only short breaks of bushland remaining. The highway’s ridge top alignment is at a fairly constant gradient.

The railway and highway closely interact through the precinct. It is regularly visible and constrains highway upgrades at several points.



At Hazelbrook the main retail/commercial centre (a relatively new development) is located away from the railway and off the highway, with only a minor presence for passing motorists. Enhancing the highway address of this village centre is a key challenge to the future upgrade project.

The current access to the station will be rearranged via a new rail underpass in that project.



*In contrast, Lawson is a small scale village with many charming small heritage buildings set in a mature and diverse landscape of exotic and native trees.*

The proposed upgrade of the highway will include relocation and reconstruction of the highway retail strip along a new parallel service road. A key objective to the concept design contained in the Lawson Section Two Review of Environmental Factors is to reinforce and highlight the centre, which is consistent Lawson Village Centre master plan being prepared by Blue Mountains City Council.



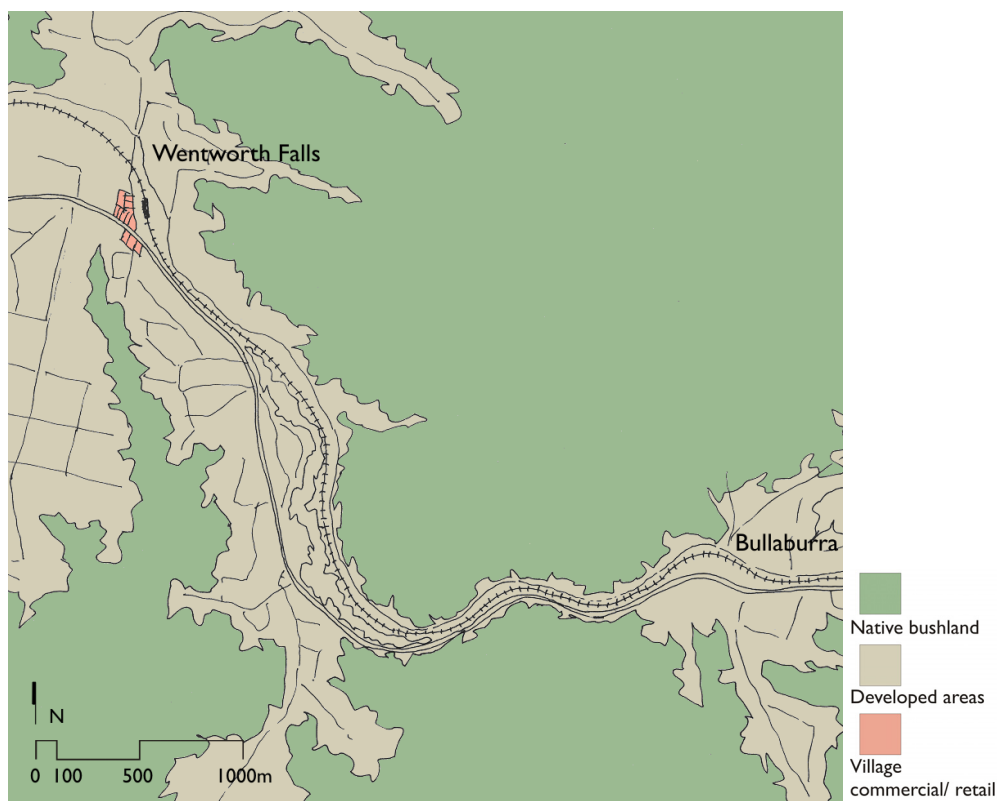
*Artists Impression Option 1A Highway Upgrade; looking west towards Blue Mountains Hotel and Lawson Station*

Bushland separating Hazelbrook, Lawson from Bullaburra has diminished over time as these villages have developed. There will however be opportunities to reinforce these bushland separating zones as well as enhance the distinction between these towns and their unique characteristics in the future upgrade projects.

#### ***Precinct opportunities***

- As this precinct will undergo much change in coming years, the essential qualities of these villages, transition and bushland zones must be clearly identified and enhanced wherever possible, to ensure a truly integrated outcome.
- Signifying and enhancing the Hazelbrook village centre's highway address will be a key challenge in the Woodford/Hazelbrook upgrade project.
- Provide greater distinction between bushland and town zones where possible.
- Provide distinguishing tree planting in each of the town centres.
- The detailing of engineering structures, fences and barriers in the proposed upgrade works should be as simple and unpretentious as possible.
- A continuous pedestrian/cycleway should be considered through this section in the future in locations which are appropriate and safe.

### ***Precinct 7: Bullaburra (east) – Wentworth Falls (east)***



This precinct is also subject to much future upgrade. Design of Wentworth Falls East is in progress, and Bullaburra (west) will be considered in the future.



*Bullaburra is one of the smaller and quieter townships formed along the ridgeline. There is a strong, essentially native, landscape quality to the corridor throughout the village.*

*A former convenience store is a small but important marker on the highway. The village centre is apparent here at the store, and marked also by the appearance of the railway station.*

The highway and railway (travelling parallel) are set within an extensive zone of natural bushland separating these villages. The highway is predominantly 2-3 lanes undivided. Several lengths are separated by concrete median on tighter curves and on Boddington Hill.





Bullaburra and Wentworth Falls are separated by an extended zone of bushland fronting the highway. The transition from the Middle to the Upper Mountains lies between these two villages, marked by Boddington Hill.

Boddington Hill is one of the steepest sections through the Blue Mountains, providing expansive views across the National Park on descent. These vista's are one of the most important along the corridor, giving the driver a distinct awareness of the elevation and emphasising the character of the Blue Mountains.



The eastern end of Wentworth Falls is residential within a distinctly mountains setting. The generally older stock of suburban houses (well separated) is surrounded by tall cool-climate deciduous trees and conifers with large mature gardens. This is the landscape character experienced from the highway. At present, many of these properties directly front and access the highway, and regular intersections (several signalised) provide good access either side of the highway to the developed ridge top areas.

The proposed highway upgrade concept through the eastern end of Wentworth Falls has identified and acknowledged the key characteristics of the existing corridor in the concept design. The result should not be a significant change to the character of this stretch.

#### *Precinct opportunities*

- Priority should be given to strengthening the bushland edges of the road where possible, clearly defining the differences between bush and settlement, ensuring all safety criteria are met.

## The Upper Mountains

### ***Precinct 7 (part): Wentworth Falls***

The centre of Wentworth Falls is a precinct in its own right, differing from the primarily residential frontage through the east and west of Wentworth Falls. In many ways this village centre is the entry point to the tourist section of the Blue Mountains.

The station, railway and main shopping area are not on the highway but are “announced” by a strong group of corner shops at the intersection of Station Street. These heritage buildings, the town village, the grounds of the Blue Mountains School and the sweeping ‘dip’ of the Highway give Wentworth Falls a memorable image.



*View into Wentworth Falls village from the highway.*

The Station St intersection is the main point of vehicle access into the village centre, and pedestrian crossing point of the highway. Currently there are no facilities for cyclists.

Other major characteristics are the dominant ‘European’ trees and the wide highway with largish properties lining both sides of the road. Note that there are currently no parallel service roads.



### ***Precinct opportunities***

- Consideration should be given in the future to enhancing the existing character of the highway through central Wentworth Falls, including iconic, well scaled street trees, designed to ensure all safety requirements are met..
- Improvements to pedestrian and cyclist facilities should also be considered in the future, where appropriate and safe.

**Precinct 8: Wentworth Falls (west) – Leura (east)**



This precinct traverses a wider and flatter section of ridgeline with residential development spreading to the north and south of the highway. Frequent intersections and crossings permit good accessibility throughout Wentworth Falls. The new shared pathway extends west of Falls Road only, ending at the western end of town.

The western end of Wentworth Falls has recently been upgraded to four lanes, closely following its previous alignment and with only minor property acquisition required.

The narrowness of the corridor has required a tight formation of the highway. The northern side footpath now however appears cramped and is dominated by the shared pedestrian/cycle footpath, light poles and signs.



The result is more akin to a 'hard' urban highway, with the more relaxed mountains suburbia characteristics evident elsewhere through the corridor unfortunately missing within this precinct.

Several of the new elements constructed as part of the recent upgrade works are noteworthy as well designed and considered within their context, as seen in the images below.



*New consistent height retaining walls in front of the Blue Mountains Grammar School*



*New split level sandstone retaining walls at Mitchell St.*



The cemetery is a notable feature along the highway with the low sandstone block boundary wall successfully recreated (and setback) as part of the recent upgrade.

Different highway lighting standards have been used on either side of the corridor, in this upgrade. This inconsistency within the project is quite noticeable and does not blend with the adjoining sections of the highway.

The bushland section between Wentworth Falls and Leura clearly separates these two towns. The demarcation between the 'bush' and the village landscapes at both Wentworth Falls west and Leura east however, could be reinforced through future landscape works, including emphasising the ecotone transitional areas, and planting greater numbers of exotic trees within the village limits.



The Paul Sorensen Bridge and the intersection of Scott Ave form a distinct area within the bush separating Wentworth Falls and Leura. Although not a visual highlight, this 'node' is however a landmark within the precinct, providing the community with a sense of whereabouts, which could be further emphasised, including through specific landscape works.

Emerging from the bushland at the eastern end of Leura, the arrival is currently marked by views of the railway line and the pedestrian overbridge at Leura Primary School. The current upgrade project in Leura, which has been recognised as being of a high urban design standard, will work to enhance this area improving the sense of entry into Leura.



### *Precinct opportunities*

- Further reinforcing the difference between the landscape of villages and the bushland areas should be considered in future landscape works within and alongside the highway reserve, especially via exotic and native-exotic ecotone tree planting.
- Enhancement of the Paul Sorensen Bridge/Scott Ave precinct should be considered in the future.

### ***Precinct 8 (part): Leura***

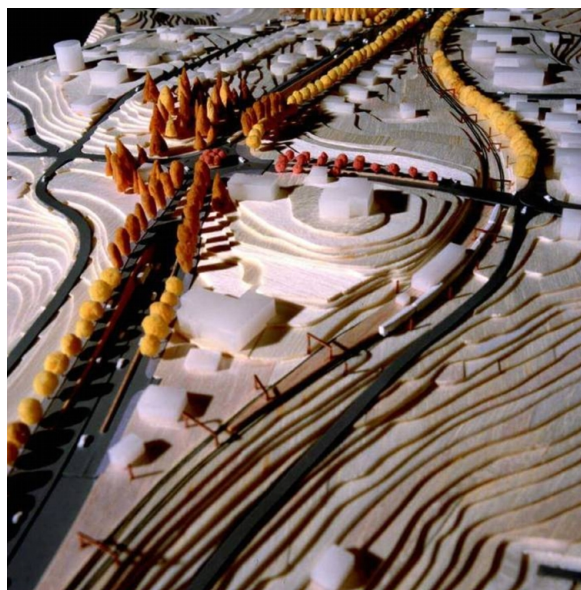
The centre of Leura, as it intersects with the Great Western Highway, is identified as a precinct in its own right. A recently completed upgrade of this section reinforces this distinguished point on the highway, and retained the significant features of the precinct; the top of the ridge line and the intersection with Leura Mall which runs along the north-south ridgeline.



The Leura village centre is located away from the highway on Leura Mall which, in itself, is highly distinguished by its unique village qualities, highlighted by the decorative exotic tree species.

The project design is the result of a very successful integrated team approach, being recognised and commended by the NSW Australian Institute of Landscape Architects in 2002.

This is a major project along the highway and will dramatically change this precinct; increasing the scale of the intersection and associated road works (to become a grade separated interchange), affecting properties on all sides of the interchange and improving the connectivity between north and south Leura.



The new underpass (in effect a short tunnel) will become a major place marking element within the upper mountains. It is noted however, that its form, materials and detailed finishes are very urban in character, and lack a mountains-context quality.

Property adjustments, including new retaining walls and fences, have been sensitively handled, well designed and integrated.

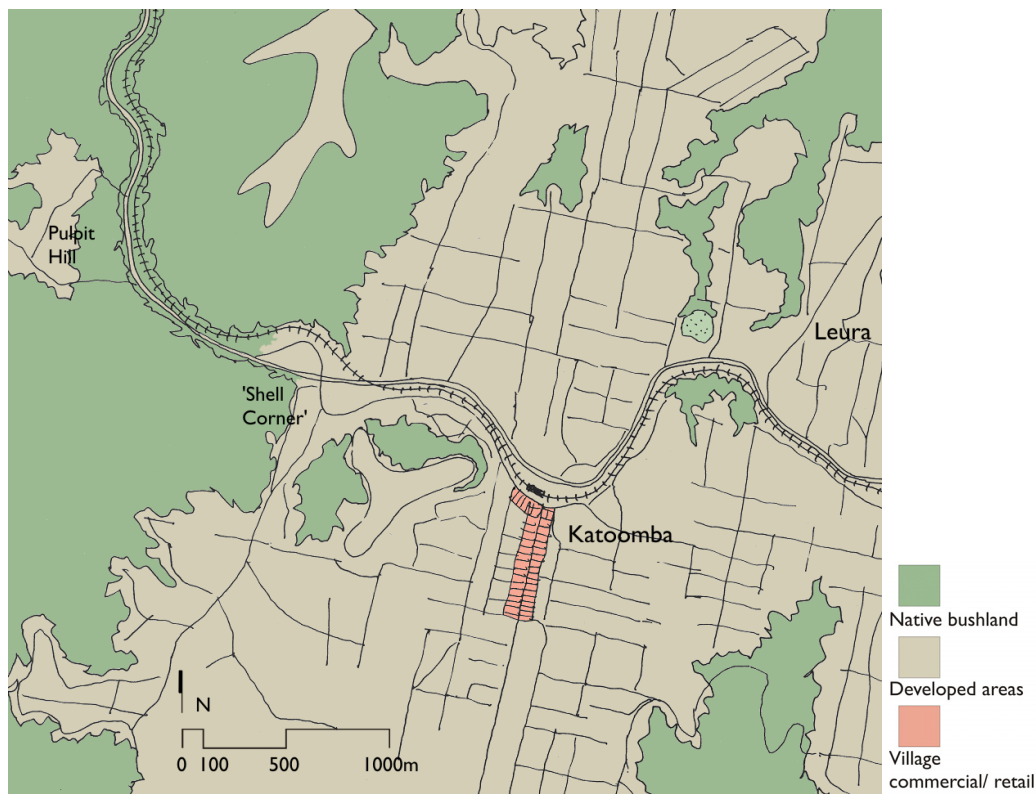
A significant local benefit of the highway upgrade will be to Leura Mall itself, which will be strengthened as the primary connection between north and south Leura, as well as being improved to unify with the qualities of the historically significant southern retail area.

Once complete, the upgrade will bring greater emphasis to this part of the highway, reflecting its pivotal tourism focus in the Blue Mountains.

### ***Precinct opportunities***

The upgrade to the highway corridor through this precinct will mark a considerable enhancement to this peak Blue Mountains village and major tourist destination.

**Precinct 9: Leura (west) – Shell Corner**



The highway as it approaches east Katoomba reinforces the tourist 19th century mountains image. The view from the road however, is generally unattractive: the highway frontages of several businesses are quite poor and the state of the highway corridor has a general appearance of being unkempt. Phase 2 of the Katoomba to Leura project will introduce changes over this length, improving the qualities of the corridor to a standard currently under construction at east Leura.

The highway and railway are located on the narrow winding E-W ridge dividing the Jamison and the Grose River catchments. The railway travels parallel to the highway and is almost constantly visible between Leura and Katoomba.



Although not readily apparent from the highway, across Leura and Katoomba there is a unique urban environment dramatised by a road grid laid over the pronounced terrain. The major cross streets are at the entrances to Leura Mall and Katoomba.



At Katoomba the highway physically and visually bypasses the town centre, which is more urban in character than all of the other settlements. The vegetation along the bypass is quite mature, being a successful mix of exotics and natives. In places however, it is rather dilapidated and would be greatly enhanced through revegetation works.

The highway commands interesting contrasting urban and bushland views from the road towards the south. Views into Katoomba's urban setting include heritage items such as the Carrington Hotel and its chimney.



The recent Shell Corner project is overall an excellent outcome. Particular local area benefits include the conversion of the 'Shell Corner' length of highway to local road status, improvements to the western end of Bathurst Road, and substantial areas of vegetation regeneration incorporating local provenance stock, which involved direct community input.



This complex project is the result of a well integrated design and construction process, and includes several new and prominent elements such as a new bridge, retaining walls, cuttings, safety screens and barriers. While each element and structure has been well designed and executed, aspects of their design and final composition are however, over complicated and not well suited to the Blue Mountains context.



*There is an uncomfortable union between the complex retaining wall brick inlay patterns, the irregular form of the cutting walls and the new elegantly curved bridge soffit.*



*New fences and safety screens introduce new and aggressively different design treatments that have little to do with their context*

### ***Precinct opportunities***

Phase 2 of the Katoomba to Leura should enhance the generally low quality of the corridor from west Leura to Katoomba.

### ***Precinct 10: Shell Corner – Medlow Bath***

This precinct is at the western edge of the area covered by the framework.

Of particular note here is that west of the Shell Corner upgrade project the highway reverts to a more historic and memorable image of the mountains. That is, the corridor closely resembles the ‘pearls on a string’ village/bush formation as it passes through Medlow Bath, Blackheath and Mount Victoria.

Emerging from the bushland that separates Katoomba and Medlow Bath, the highway is immersed in the culturally and historically significant context of the Hydro Majestic precinct, with the prominent avenue of pine trees a highlight along the highway.



This pattern of well defined bushland surrounding the village is further repeated at Blackheath, then and Mount Victoria. It is important that future highway and village development work west of Katoomba proceed cautiously and purposefully if these quintessential mountains qualities are to be preserved.



*The recently completed highway crossing upgrade of the railway resulted in many greatly improved residential precincts adjacent to the highway.*