

Roadside Vegetation



Plan of Management
May 2007



KIAMA MUNICIPAL COUNCIL
your council, your community

ACKNOWLEDGMENTS

Special thanks to Denise Black for identifying all roadside vegetation and plant communities in the database, preparing the Rural Roadside Vegetation Assessment and preparing the roadside vegetation plant species lists in Appendix 2.

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EXECUTIVE SUMMARY

Native vegetation is important because of its conservation value, its ecological value and its contribution to the landscape character of the Municipality.

This Roadside Vegetation Management Plan has been prepared to provide better overall protection of this native vegetation bearing in mind the various activities that occur in road reserves that affect this vegetation.

As part of the process a vegetation survey was undertaken on all the rural roads in the Municipality to assess the quality of the vegetation. The assessment used criteria developed by the NSW Roadside Environment Committee to determine the conservation value of the vegetation i.e. high, medium, low value. The criteria included the degree of weed invasion, the condition of the native vegetation, the extent of the area, species present and possible faunal habitat.

The survey assessed 206 kilometres of rural roads throughout the Municipality, and found that:

- 28 km (14%) of roadsides are of **HIGH** Conservation Value
- 16 km (8%) of roadsides are of **MEDIUM** Conservation Value
- 162 km (78%) of roadsides are of **LOW** Conservation Value

The roadside environment is affected by a range of practices such as road construction, road maintenance, weed control, public utilities etc. Management actions have been developed to deal with each of the activities. These actions vary according to the conservation value of the vegetation. Basically, they are designed to protect the vegetation in High Conservation Value areas, protect and enhance the vegetation in Medium Conservation Value areas and allow other activities associated with road reserves in the Low value areas. All the recommendations take into account the safety of road users and the need for road maintenance.

The information collected in the survey has been used to develop a database of the roadside vegetation. The database will provide valuable information on the distribution and occurrence of native species and has also been used to produce field maps to assist Council staff to carry out the recommendations in the plan.

It is important that this remnant vegetation on rural roadsides be conserved and where possible expanded. The implementation of this Roadside Vegetation Management Plan will assist in achieving that aim.

Introduction

1.1 The Aims of this Management Plan

This management plan provides the guidelines for the better management of remnant native vegetation along rural roadsides in the Municipality. This will encourage the conservation and regeneration of native vegetation in road reserves and hence improvements in biodiversity.

This will be achieved by providing the framework for identifying areas of conservation value and the mechanisms and procedures to ensure the protection of those areas. It will assist in raising the awareness of the importance of roadside vegetation amongst Council staff and adjoining land owners.

1.2 Preservation of native vegetation in road reserves - why is it important?

Road reserves sometimes preserve significant remnants of the original vegetation that covered the Municipality which was removed during the logging era and the early establishment of dairy farming. Native grasses, while mostly destroyed in pastureland, remain in various locations in road reserves. In places substantial cross-sections of the plant species in a natural vegetation community have survived. Generally this occurs in steeper topography where site constraints have restricted clearing.

1.2.1 Conservation Values

Roadsides represent a significant area and make up approximately *equal to the area of all the National Parks in NSW* (NSW Roadside Environment Committee [REC] 1995). They are utilised regularly by the community for a variety of reasons and hold a range of ecological, economic and social values.

The total area covered by rural roadsides in the Kiama Municipality is approximately 200ha. This is a significant area of land and is equivalent to approximately 60% of the all land included in public reserves. Approximately 22% of the rural roadsides are covered by native vegetation

The native vegetation on our roadsides and road reserves is a valuable community asset and is important to conserve for a variety of reasons, including:

- It provides habitat (food and shelter) for local fauna.
- It acts as a link between larger patches of native vegetation (Biodiversity Corridor).
- It can provide shelter from wind and inclement weather.
- It helps to minimise the impact of weed infestations.
- It provides local providence seed sources for revegetation works.
- It is very nice to look at and drive along.

Most importantly, roadside vegetation makes a significant contribution to the conservation of our native plants and animals. Many roadsides provide the only example of once wider spread vegetation communities that are now restricted due to competitive land uses. The Roadside Conservation Advisory Committee reported that 25% of all plants species listed under the Flora and Fauna Guarantee Act (plants that are threatened) occur on roadsides.

The vegetation on roadsides is protected by Council's Tree Preservation Order. This means that the vegetation cannot be damaged or removed without appropriate approval or permit from Council.

1.2.2 Ecological Values

Roadsides often contain remnant vegetation cover. These remnants help to maintain biological diversity and provide important habitat for native plants and animals. They may also act as wildlife corridors and provide an important source of local seed.

In cleared landscapes, species that have become rare or in danger of becoming extinct are often found in remnant vegetation surviving in road reserves. If that vegetation is damaged or removed those species can become locally extinct.

1.2.3 Visual Amenity and Landscape Character

Roadside vegetation is an important part of the landscape of the Kiama Municipality. Maintenance practices can have a big impact on the condition of the vegetation and hence the overall character of the Municipality.

1.3 Overview of Kiama Municipality

Kiama Municipality lies within the South Coast region of New South Wales between Shellharbour City Council and Shoalhaven City Council (Figure 1). The municipality covers an area of around 256 km² and includes the townships of Jamberoo, Kiama, and Gerringong and the villages of Minnamurra and Gerroa.

Kiama Municipal Council manages regional and local roads throughout the municipality. Approximately 206 kilometres of these roads are found within the rural areas outside of the urban townships of Kiama, Gerringong and Jamberoo.

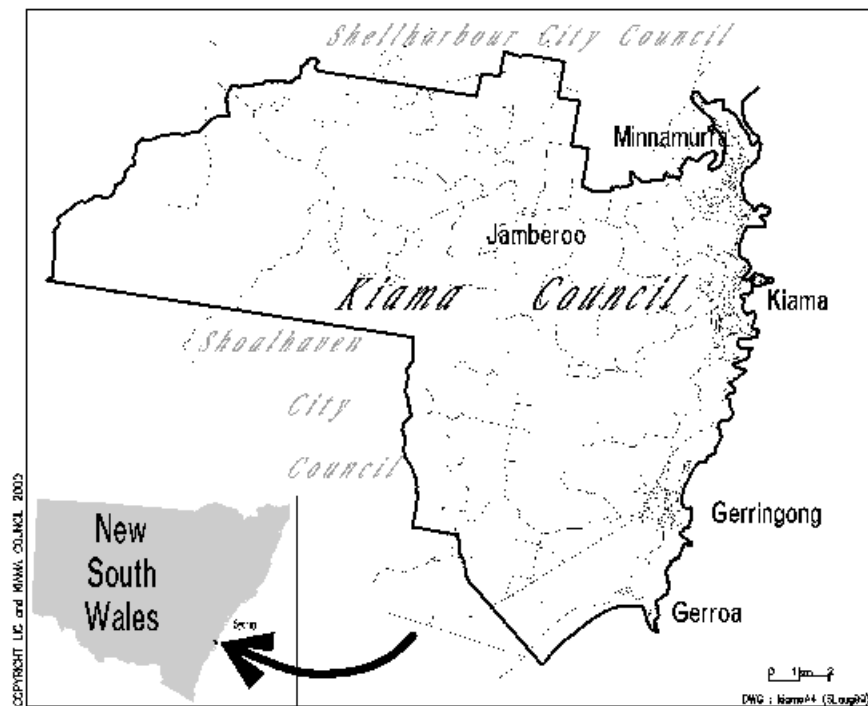


Figure 1. Location of Kiama Municipal Council Area

The landscape of Kiama ranges from coast line with sandy beaches, rocky cliffs and headlands, through coastal plains with large areas of pasture land, river flats and swamps, to ridges and valleys leading up to the escarpment with eucalyptus forests and subtropical rainforest to the sandstone plateaux with mallee forests. Some examples of the vegetation types found in the Kiama area are listed in Table 1. There are many small remnant communities scattered throughout the Municipality.

Table 1. Some Broad Vegetation Types within Kiama Municipality

Broad Vegetation Type	Location Example
Illawarra Subtropical Rainforest	Williams Rd Saddleback
Eucalyptus fastigata/quadrangulata Forest	Nuninuna Drive (kmc-ra-132)
Eucalyptus sieberi/piperita Forest	Pheasants Ground Rd (kmc-ra-99)
Warm Temperate Rainforest	Misty Lane (kmc-ra-85)
Tall Moist Eucalypt Forest	Knights Hill Road
Riparian Communities*	Crooked River Rd Gerroa

Most of the original native vegetation on the coastline and coastal plains has been cleared or modified. None of the original Red Cedar forests exist. Clearing of forest in the Kiama hinterland and the Jamberoo Valley for dairy farming took place in the mid 1800's. Native grasses were progressively replaced by introduced species of Oates, Sweet Vernal grass, Paspalum and Kikuyu among others. Eucalypt Forests and Subtropical Rainforest were cleared to the isolated remnants seen today. (Table 1)

The major threat to the existing remnant native vegetation within the region is invasive weeds emanating from already established sources, the most serious being Lantana, Madeira vine, Privet and Coral Trees.

2.0 Methods

2.1 Roadside Assessment Process

To manage the remnant native vegetation on the roadsides all local rural roads were assessed by a basic “windscreen survey”, a drive by observing and recording the changes and collecting data. On occasion the road section were walked to better identify the plant species present. This assessment was to gather information to allocate one of three categories to sections of rural roads that will lead to better management strategies.

All rural roadsides within the Municipality were assessed except for Crown roads and private roads. The Prince’s Highway, while a significant road in rural areas south of Kiama was not assessed, as Council does not control the maintenance of this road. Rural roads between townships were assessed up to the zoning change. Residential streets were not assessed, for example Jamberoo Road was assessed from the outskirts of Kiama to the outskirts of Jamberoo.

Management categories were determined using a roadside vegetation assessment sheet, based on criteria developed by the NSW Roadside Environment Committee (NSW REC 1995). The assessment form (Appendix 1) was used to identify the location of road sections and the vegetation found there. Management practices were observed and general comments made. A management category was derived from the scored numerical section of the assessment form.

Table 2 is a summary of the Roadside Assessment form.

Table 2. A summary of the Roadside Vegetation Assessment Sheet

Section	Characteristics Assessed / Recorded
1. Header <ul style="list-style-type: none"> Information required to locate roadsides 	<ul style="list-style-type: none"> Road starting point to section end Road section Direction of travel or other useful information
2. Scored Section <ul style="list-style-type: none"> Criteria assessed to determine conservation category 	<ul style="list-style-type: none"> Width of road reserve Condition of indigenous vegetation Extent of introduced plants Degree of regeneration Potential wildlife habitat
3. Unscored Section <ul style="list-style-type: none"> Additional information useful for road management 	<ul style="list-style-type: none"> Indigenous trees, shrubs and groundcovers Presence of rare or endangered species Presence of wildlife corridor Road activities (including stockpiles, erosion, road works) Further comments and recommendations Reference to GIS vegetation communities mapping

The assessment process used was designed to ensure that efficient management areas were identified along roadsides and that information could be collected consistently over vast lengths of road from varying roadside communities (NSW REC 1995). Roadside sections recorded are at least 200 metres long. The major vegetation type was recorded. Short or intermittent patches that may be a variation on the major type were not recorded unless it was of special significance.

As time passes the vegetation will either naturally, or forcefully change, so the information in the database will have to be periodically updated.

2.2 Implementation of Recommendations

Council staff will be consulted, educated and encouraged to become more aware of the existing native roadside vegetation and the practical methods needed to protect and increase the remnants that remain.

Community groups or adjoining land owners will be assisted in undertaking conservation and regeneration works in accordance with this plan.

A GIS overlay showing the locations of the HCV, MCV and LCV areas will be available for Council staff or for the assistance of community groups or adjoining land owners. Information on species will also be available from the database.

2.3 Typical Roadside Categories

High Conservation Value Roadside

- Near natural condition
- Species diversity or in communities
- Regeneration
- Few or no weeds present
- High habitat value



Figure 2a. High Conservation Value Roadside
Jamberoo Mountain Road

Medium Conservation Value Roadside

- Degraded areas with native species
- Sometimes native tree cover
- Weeds often scattered throughout
- Some habitat value
- Usually mown beyond dish drain
- Sometimes a sward of native grasses



Figure 2b. Medium Conservation Value Roadside
Old Saddleback Mountain Road

Low Conservation Value Roadside

- Usually pasture grasses
- Sometimes all weeds
- Few or no natives present
- Usually no native regeneration
- Habitat value low but variable
- Usually mown. To dish drain or to fence line



Figure 2c. Low Conservation Value Roadside
Lower Section of Jamberoo Mountain Road

3.0 Results

3.1 Roadside vegetation data collection

The rural roadsides managed by Kiama Municipal Council totals approximately 206 kilometres, comprising of 48 named roads. All 48 roads were assessed and the vegetation recorded (on a database).

The survey found that:

- **28 km (14%)** of roadsides are of **HIGH** Conservation Value (HCV)
- **16 km (8%)** of roadsides are of **MEDIUM** Conservation Value (MCV)
- **162 km (78%)** of roadsides are of **LOW** Conservation Value (LCV) (Figure 3)

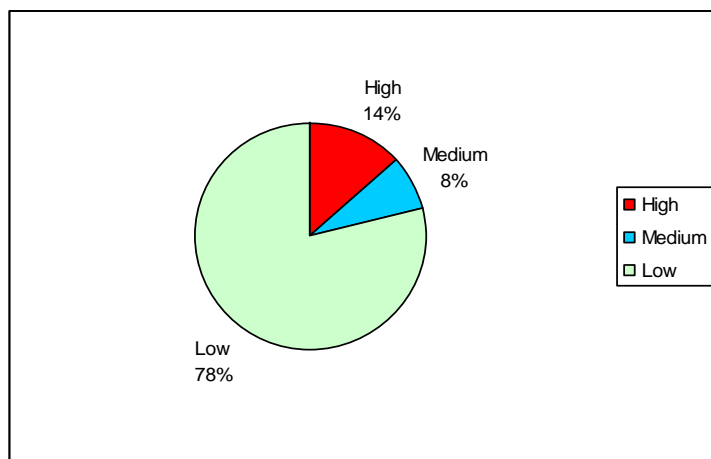


Figure 2. Percentage of high, medium and low value areas

Residential roadsides were not assessed. These roadsides have little or no remnant vegetation and are generally mown introduced pasture grasses of no conservation value.

Most roadsides between the townships on the coastal plain are degraded and of Low Conservation Value with random remnants of medium and high value. These remnants are usually short and occur because of some topographic feature prevented it being cleared or allowed the area to regenerate. A high number of individual remnant of Medium and High Value portions of roadside were identified (64 sections of High Conservation Value and 47 sections of Medium Conservation Value) mainly

associated with the more elevated areas that adjoined remnant bushland outside the road reserve. Some sections, especially Jamberoo Mountain Road, are almost continuous High Conservation Value over many kilometres. Many occur in small, isolated patches some not 200m long or more often, frequently interspersed with or adjacent to weed areas. There is a need to protect and extend sections that are identified as High or Medium Conservation Value with a view to possibly reconnecting these isolated sections into a cohesive whole.

3.2 Roadside vegetation database

During the roadside vegetation survey the information was collected on an electronic database and sections identified and an overlay created on Council's GIS mapping.

This overlay can be produced to provide an overall map of the Municipality or to provide detailed maps for individual areas.

The database and GIS mapping will allow easy reference to roads and individual sections to identify the value of the road; the identification of species in a particular road segment, easy updating of information after management actions, or re-assessment of observed changes to the vegetation.

Threatened species and communities were also identified on the database and mapping. The GIS mapping shows the specific location of each database entry record. An example of the detailed maps produced is shown in Appendix 3.

3.3 Plant species local and introduced

Not all native plants found along roadsides within the Kiama Municipality were recorded but a significant number of key indicative species were noted (see Appendix 2).

Species from many broad vegetation types were identified in remnant areas, although observations of species within riparian community vegetation types were limited as the roads cross rather than follow waterways. Coastal plant communities were generally not recorded, as the roads in coastal areas are mostly urban residential roads.

Several rare or threatened species were identified, some in many locations, particularly *Zieria granulata*. As it was not practical to identify every plant species present, this does not represent a complete list of every species present. However, it will be possible to update the database when information is available. The ecologically endangered community Illawarra Subtropical Rainforest was identified in many areas. Since this is the predominant plant community in higher altitudes this is not surprising. Generally the HCV areas were the furthest from the residential community centres, in the higher escarpment areas. MCV areas were mostly in the transition between HCV and LCV. 78% of roadsides were reduced to mown grass verges adjacent to pasture land with very few native species remaining except along the barbed wire boundary fence line. A total of 7 species, however, were identified as being uncommon (Appendix 2).

Introduced plant species were identified in a more general way, for example *pasture grass* rather than the specific species. These pasture grasses were found to dominate on the coastal plains where dairy farming was most intensive. Significant or widespread weeds were noted on the data sheets.

3.4 Special management areas

Some areas of roadsides require special management. Any threatened plant species must be managed in accordance with the Department of Conservation Recovery Plans, e.g., *Zieria granulata* Recovery Plan, *Daphnandra* sp. Recovery Plan and the Plan of Management for the conservation and regeneration of *Zieria granulata* on Saddleback Mountain Road. Other threatened species such as *Grevillea rivularis*, for which there are no recovery plans at present, will rely on education of maintenance staff, marking the areas it is known to exist and monitoring of species numbers.

4.0 Recommendations

4.1 Managing roadsides according to their conservation value

High Conservation Value

These roadsides are generally in a near-natural, undisturbed state. They require little maintenance (weed management) if left undisturbed and are often the cheapest and easiest roadsides to manage in the long-term (NSW REC 1995). Limiting disturbances, such as impacts from machinery, should be a priority so that ecological values of these areas are protected and future management problems such as weed invasion are minimised.

The aim of management in these locations is to maintain their high conservation status.

Medium Conservation Value

These roadsides have some elements of native vegetation remaining; they are generally partially modified areas. These areas may contain native vegetation in good condition but of limited extent not connected to larger areas. They may be narrow because of the overall width of the road reserve or include patches of weeds. Because they have the basic structure of native species these areas would respond best to regeneration works and therefore should be targeted for any rehabilitation work.

Revegetating and restoring these roadsides with native vegetation has long-term cost benefits as native vegetation requires little maintenance, suppresses weeds and is generally cheaper to maintain (NSW REC 1995). As native vegetation is generally cheaper to maintain than exotic grasses or weeds, rehabilitation works in these areas will eventually reduce maintenance costs as well as providing environmental benefits.

The aim of management in these locations is to prevent further degradation in the short term and to enhance their conservation in the long term.

Low Conservation Value

These roadsides generally have little remaining native vegetation and are highly modified and degraded and hold minimal nature conservation value. In many cases exotic grasses such as Kikuyu dominate and subsequently they often have high maintenance costs associated with them.

4.2 Management Issues

The following activities affect roadside vegetation:

- Road construction and maintenance
- Vegetation removal
- Weed control
- Pest control
- Grazing
- Fire control and hazard reduction
- Public utilities
- Revegetation
- Education and awareness

The recommendations for management of high, medium and low conservation roadsides within the Municipality are given in Table 3. All the recommendations take into account the safety of road users and the need for road maintenance.

Table 3. Summary of recommendations for management of high, medium and low conservation roadsides within Kiama Municipality

	HCV Roadsides	MCV Roadsides	LCV Roadsides
Primary Purpose	Vegetation conservation	Vegetation enhancement, low impact activities	Other activities
Activity	HCV Roadsides	MCV Roadsides	LCV Roadsides
Grazing	Not recommended - <u>cattle to be kept out of these areas.</u>	<ul style="list-style-type: none"> Generally <u>cattle to be kept out of these areas unless there is a specific need that is permissible when</u> compatible with management aims (e.g. weed control, hazard reduction) 	<ul style="list-style-type: none"> Permissible
Weed Control	<ul style="list-style-type: none"> Identify high priority areas for control works e.g. those sites supporting threatened species, sites with small gaps in habitat corridors Minimal impact methods including spot hand spraying, selective herbicide use, hand removal Slash shoulder and table drain as far as the back of the table drain <u>or</u> to a maximum 3 metres above the invert of the drain on a cut embankment <u>Minimise the spread of weeds into HCV areas by machinery. Organise work schedules or arrange cleaning of equipment to minimise this</u> Revegetate with indigenous species following weed removal and following disturbances such as road construction and maintenance Provide assistance and advice for landholders wishing to control weeds on adjoining roadsides 	<ul style="list-style-type: none"> Identify Medium priority areas especially those sites linking HCV and MCV areas Minimal impact methods including spot hand spraying, selective herbicide use, hand removal, Slash shoulder and table drain as far as the back of the table drain <u>or</u> to a maximum 3 metres above the invert of the drain on a cut embankment <u>Minimise the spread of weeds into MCV areas by machinery. Organise work schedules or arrange cleaning of equipment to minimise this</u> Revegetate with indigenous species following weed removal and following disturbances such as road construction and maintenance Provide assistance and advice for land holders wishing to control weeds on adjoining roadsides 	<ul style="list-style-type: none"> Low priority areas except for noxious weed control Slashing as required

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Activity	HCV Roadsides	MCV Roadsides	LCV Roadsides
Revegetation	<ul style="list-style-type: none"> • Identify high priority areas e.g. those sites supporting threatened species , sites linking HCV areas and depleted broad vegetation types • Mandatory following road works • Use assisted bush regeneration techniques: control weeds, direct understorey seeding or planting in degraded patches • Ensure plantings contain a mix of locally native trees, shrubs, and ground covers • Enhance significant roadside areas by encouraging adjoining land holders to protect regeneration and undertake revegetation works • Support the establishment of a bushland regeneration group to undertake revegetation works 	<ul style="list-style-type: none"> • Identify Medium priority areas especially those sites linking HCV and MCV areas • Mandatory following road works • Use assisted bush regeneration techniques: control weeds, direct understorey seeding or planting in degraded patches • Ensure plantings contain a mix of locally native trees, shrubs, and ground covers • Enhance significant roadside areas by encouraging adjoining land holders to protect regeneration and undertake revegetation works • Support the establishment of a bushland regeneration group to undertake revegetation works 	<ul style="list-style-type: none"> • High priority when linking HCV areas • Low priority in other cases

Fire hazard Reduction	No cultivated firebreaks <ul style="list-style-type: none"> • Reduce and control fuel build up along roadside table drains through regular mowing/slashing 	No cultivated firebreaks <ul style="list-style-type: none"> • Reduce and control fuel build up along roadside table drains through regular mowing/slashing 	No special requirements
Road Maintenance	<ul style="list-style-type: none"> • Undertake road construction and maintenance procedures in accordance with guidelines outlined in '<i>Roadside handbook: environmental guidelines for road construction and maintenance workers</i>' (NSW REC 1996) • Provide suitable marking on the road pavement to indicate the presence of Threatened Species • Consult with the Manager Parks and Environment prior to undertaking work within 3m of any threatened species • Revegetate disturbed areas following major roadworks with indigenous species • Plan stockpile sites, turning circles and machinery parking sites in already cleared outside these areas or in degraded (LCV) areas • Restrict slashing and mowing to the shoulders and the table drain. Mow as far as the back of the table drain or to a maximum 3 metres above the invert of the drain on a cut embankment. (See Plan 2149 - Appendix 4) 	<ul style="list-style-type: none"> • Undertake road construction and maintenance procedures in accordance with guidelines outlined in '<i>Roadside handbook: environmental guidelines for road construction and maintenance workers</i>' (NSW REC 1996) • Provide suitable marking on the road pavement to indicate the presence of Threatened Species • Consult with the Manager Parks and Environment prior to undertaking work within 3m of any threatened species • Revegetate disturbed areas following major roadworks with indigenous species • Plan stockpile sites, turning circles and machinery parking sites in already cleared outside these areas in or degraded (LCV) areas • Restrict slashing and mowing to the shoulders and the table drain. Mow as far as the back of the table drain or to a maximum 3 metres above the invert of the drain on a cut embankment. (See Plan 2149 - Appendix 4) 	<ul style="list-style-type: none"> • No special requirements

	<ul style="list-style-type: none"> • Where there are specific requirements to maintain existing sight distances, slash or mow to the edge of the existing trees • Where there are specific requirements to establish improved sight lines consult with Manager Parks & Environment prior to undertaking any work • Restrict clearing of mitre drains and the inlets and outlets of culverts to the formation of the drain. Extend clearing of the outlets only as far as necessary to allow runoff to drain from the culvert • <u>Minimise the spread of weeds into HCV areas by machinery. Organise work schedules or arrange cleaning of equipment to minimise this</u> • When it is necessary to remove trees or native vegetation mulch all vegetation, as far as practical, and spread the mulch back onto the site 	<ul style="list-style-type: none"> • Where there are specific requirements to maintain existing sight distances, slash or mow to the edge of the existing trees • Where there are specific requirements to establish improved sight lines consult with Manager Parks & Environment prior to undertaking any work • Restrict clearing of mitre drains and the inlets and outlets of culverts to the formation of the drain. Extend clearing of the outlets only as far as necessary to allow runoff to drain from the culvert • <u>Minimise the spread of weeds into MCV areas by machinery. Organise work schedules or arrange cleaning of equipment to minimise this</u> • When it is necessary to remove trees or native vegetation mulch all vegetation, as far as practical, and spread the mulch back onto the site 	
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Ancillary works [stockpile dumps, machinery parking]	<ul style="list-style-type: none"> • Not recommended 	<ul style="list-style-type: none"> • Plan stockpile sites, turning circles and machinery parking sites in already cleared outside these areas in or degraded (LCV) areas 	<ul style="list-style-type: none"> • Permissible
Public Utilities [Water, Gas, Power lines]	<ul style="list-style-type: none"> • Not recommended • If unavoidable utilise any already disturbed areas when working in HCV areas • Aim to locate utilities on roadside edges (eg along fence lines) to avoid vegetation fragmentation • Consider locating utilities on adjacent cleared land • Ensure machinery/equipment is thoroughly cleaned especially after working in weedy areas • Revegetate disturbed areas with grasses and small shrubs after construction 	<ul style="list-style-type: none"> • Permissible • Utilise any already disturbed areas when working these areas • Aim to locate utilities on roadside edges (eg along fence lines) to avoid vegetation fragmentation • Revegetate disturbed areas with grasses and small shrubs after construction 	<ul style="list-style-type: none"> • Permissible
Education and Awareness	<ul style="list-style-type: none"> • High priority. Involve adjoining land holders, Landcare and other community groups with roadside vegetation maintenance, enhancement and awareness raising activities • Provide regular, appropriate training opportunities for road maintenance/management staff • <u>Landowners to be encouraged to keep cattle out of these areas</u> 	<ul style="list-style-type: none"> • Medium priority. Involve adjoining land holders, Landcare and other community groups with roadside vegetation maintenance, enhancement and awareness raising activities • Provide regular, appropriate training opportunities for road maintenance/management staff • <u>Landowners to be encouraged to keep cattle out of these areas</u> 	

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Roadside Assessment Sheet

A. Road Name/Number	Date	Start Odometer Reading
Road Type: Sealed	Unsealed	End Odometer Reading
Assessor	Map Reference	Length of Section
Start Point		Direction of Travel
End Point		Section Number

B. Width of road reserves
Tick one line for each side.

	Score	L	R
Unfenced	0		
1-5 metres	1		
6-21 metres	2		
21+ metres	3		

C. Condition of indigenous vegetation

	Score	L	R
Degraded	1		
Modified	2		
Near natural	3		

D. Introduced species
Include trees, shrubs, herbs, grasses.

	Score	L	R
Dominant	0		
Scattered throughout	1		
Isolated clumps	2		
Few or none	4		

E. Regeneration
Are there young native trees present?

	Score	L	R
None	0		
Moderate	1		
Extensive	2		

F. Potential fauna habitat
Tick when features are common.

	Score	L	R
Trees	2		
Trees with hollows	2		
Shrubs	2		
Native herbs and grasses	2		
Fallen logs/litter	2		
Rocks/crevices	2		
Wet/marshy/creek	2		

Max. value 5 each side

G. Roadside category

Box	L	R
B		
C		
D		
E		
F		

Total Score _____
Assigned Category _____

High (A1-4) Medium (B10-13) Low (C1-9)

H. Rare species and significant sites
Indicate species or community name and site location including right or left reserve, odometer reading, reference or grid points.

I. Wildlife corridor
Does this section connect areas of natural bushland greater than 10 Ha?
Yes _____ No _____

J. Introduced species
Botanical name or common name.

Trees/shrubs Mills sedge

Herbs/grasses from GTS

Noxious plants over lay

K. Indigenous species
List most common species.

Trees _____

Shrubs _____

Herbs and grasses _____

L. Road management activities
For location include right or left reserve, odometer reading, reference or grid points.

- Road works affecting reserve
Location _____
- Erosion/drainage problems
Location _____
- Stockpiles or soil dump
Location _____
- Other - specify
Location _____

M. Comments

APPENDIX 2

Excerpts from *Roadside Vegetation Assessment 2006* prepared by Denise Black

Roadside Vegetation Scheduled Threatened Species and Communities Identified:

Zieria granulata. This species was recorded and mapped at several different locations. [\(see Appendix\)](#) The most prolific occurrence is on Mt Brandon Rd, Jamberoo, where in one section (KMCRA 136), it forms a 'shrubland'.

Illawarra subtropical rainforest. This vegetation community is scheduled as endangered under the TSC Act. There are major occurrences along the following roads:

Williams Rd, Foxground Rd, Hoddles Rd, Wallaby Hill Rd, Minnamurra Falls Rd, Jamberoo Mt Rd, Williams Rd, Fountaindale Rd, Wilson's Rd, Saddleback Mt Rd.

Illawarra lowlands grassy woodlands, understory component, opposite Jamberoo Recreation Park (KMC-RA 69). Represented by remnant *Eucalyptus tereticornis* on Rutledge Rd (KMC-Ra 45,46) and Jamberoo Rd (KMC-RA36).

Grevillea rivularis on Cloonty Rd, Carrington Falls (KMC-RA 95).

Regionally Uncommon Species Recorded:

*Alocasia macrorhizos*⁴

*Austromyrtus acmenoides*⁴

*Geijera salicifolia*⁴

*Maytenus silvestris*⁵

*Eucryphia moorei*⁴

*Cinnamomum oliveri*⁴

*Sambucus australasicus*⁴

Road Sections identified in which the original suite of native trees, shrubs and groundcovers were largely intact:

	<u>Road Section</u>	<u>Section (KMC RA) database reference</u>
i.	Cloonty Rd	95
ii.	Crooked River Creek Rd	158
iii.	Fountaindale Rd	123,126
iv.	Free Selector's Rd	111,113
v.	Hoddles Rd	24
vi.	Jamberoo Mt Rd	74,75,76
vii.	Knight's Hill Rd	90,92
viii.	Minnamurra Falls Rd	62

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⁴ 'Rainforests of the Illawarra District' by K. Mills and J. Jakeman 1995

⁵ Anders Bofelt (Pers. Comm.2002)

APPENDIX 2

ix.	Misty Lane	86,87
x.	Nuninuna Drive	132
xi.	Pheasant's Ground Rd	99,102
xii.	Saddleback Mt Rd	152
xiii.	Upper Foxground Rd	22
xiv.	Wallaby Hill Rd	41,42
xv.	Williams Rd	105
xvi.	Wilson's Rd	147

Remnant areas of native grass:

Austrodanthonia bipartita-current practices are destroying small remnants in rocky areas of some road verges eg Jerrara Rd (KMC-RA3), Saddleback Mt Rd (KMC-RA152), Jamberoo Rd (KMC-RA32), Wallaby Hill Rd (KMC-RA39).

Poa labillardieri-several occurrences were noted (refer to Roadside Vegetation database).

- i. *Imperata cylindrica* Swathes of this grass can be found on several roads in the municipality, for example, Jamberoo Rd (KMC-RA 68-70), Sims Rd (KMC-RA 153), North Curramore Rd (KMC-RA 50).
- ii. *Cymbopogon refractus*-destroyed except in locations not reached by roadside mowing and spraying, ie elevated rocky sections eg Sims Rd (KMC-RA 153), Tomlins Rd (KMC-RA 119), opposite Grass Ski Park (KMC-RA 69).
- iii. *Entolasia stricta*, *E. marginata* occur with other grasses in some locations eg Cloonty Rd (KMC-RA 98), Jamberoo Mt Rd (KMC-RA 75).
- iv. *Poa cheeii*-road verge at Carrington (KMC-RA 95,102);
- v. *Microlaena stipoides*This would probably formerly have been widespread. Its distribution is now reduced to refugia (such as road verges) in Kiama municipal area. Large patches were located in only a few places. Eg: Minnamurra Falls Rd (KMC-RA 59).
- vi. *Themeda australis* (Kangaroo grass) occasionally found in drier locations eg (KMC-RA 165).
- vii. *Hemarthria uncinata* An unusual occurrence on Toolijooah Rd, in drainage ditch against fence, adjacent to Sharpe's Lane. (KMC-RA 110).

Additional 'Species of Interest' not frequently seen in Kiama municipal area

These fall into 2 types:

i. <u>Straggly shrubs:</u>	<u>KMC-RA</u>
<i>Indigofera australis</i> (Austral Indigo)	126
<i>Goodia lotifolia</i> (a Pea bush)	142, 144, 145
<i>Trochocarpa laurina</i> (Tree heath)	126
<i>Telopea speciosissima</i> (Waratah)	95

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ii. Groundcovers:

<i>Pollia crispata</i>	74, 105, 123
<i>Peperomia leptostachya</i>	123
<i>Zornia dictyocarpa</i>	69

Kiama Roadside Vegetation Plant Species List:

A list of plant species recorded during the survey

*Denotes non native species

1. <i>Acacia binervata</i>	Two-Veined Hickory Wattle	widespread
2. <i>Acacia longifolia</i> var. <i>sophorae</i>	Coast Wattle	
3. <i>Acacia maideni</i>	Maiden's Wattle	
4. <i>Acacia mearnsii</i>	Black Wattle	
5. <i>Acacia melanoxylon</i>	Blackwood	
6. <i>Acmena smithii</i>	Lilly Pilly	
7. <i>Acronychia oblongifolia</i>	Lemon Berry	
8. <i>Adiantum aethiopicum</i>	Maidenhair Fern	
9. <i>Adiantum formosum</i>	Giant Maidenhair	
10. <i>Adiantum hispidulum</i>	Rough Maidenhair	
11. <i>Ageratina riparia</i> *	Mistweed	
12. <i>Alchornea ilicifolia</i>	Native Holly	
13. <i>Alectryon subcinereus</i>	Native Quince	
14. <i>Allocasuarina littoralis</i>	Black She-Oak	Fountaindale on sandstone
15. <i>Alocasia macrorrhizos</i>	Cunjevoi Lily	
16. <i>Alphitonia excelsa</i>	Red Ash	Dry subtropical
17. <i>Angophora floribunda</i>	Rough-Barked Angophora	
18. <i>Anredera cordifolia</i> *	Madeira Vine	
19. <i>Aphanopetalum resinum</i>	Gum Vine	
20. <i>Araujia hortorum</i> *	Moth Vine	
21. <i>Arthropteris tenella</i>	Ground Fern	
22. <i>Asplenium australasicum</i>	Bird's Nest Fern	
23. <i>Austrocynoglossum latifolium</i>	Forest Hound's Tongue	
24. <i>Austrodanthonia bipartite</i>	Wallaby Grass	
25. <i>Austrodanthonia pilosa</i>	Danthonia Grass	
26. <i>Backhousia myrtifolia</i>	Grey Myrtle	
27. <i>Baloghia inophylla</i>	Brush Bloodwood	
28. <i>Banksia integrifolia</i>	Coast Banksia	
29. <i>Banksia serrata</i>	Old Man Banksia	
30. <i>Bidens pilosa</i> *	Cobbler's Pegs	
31. <i>Bidens tripartita</i>	Burr Marigold	Jerrara/Elambra
32. <i>Blechnum cartilagineum</i>	Gristle Fern	
33. <i>Blechnum indicum</i>	Soft Water Fern	
34. <i>Brachychiton acerifolius</i>	Illawarra Flame Tree	

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35. <i>Bracteanthus bracteata</i>	Yellow Paper Daisy
36. <i>Bursaria spinosa</i>	
37. <i>Callistemon salignus</i>	Pink Tips
38. <i>Calochlaena dubia</i>	Common Ground Fern
39. <i>Canthium coprosmoides</i>	Coast Canthium
40. <i>Carex appressa</i>	
41. <i>Cassine australis</i>	Red-Fruited Olive-Plum
42. <i>Casuarina cunninghamiana</i>	River Oak
43. <i>Casuarina glauca</i>	Swamp Oak
44. <i>Cayratia clematidea</i>	Native Grape
45. <i>Ceratopetalum apetalum</i>	Coachwood
46. <i>Chrysanthemoides monilifera</i> *	Bitou Bush
47. <i>Cinnamomum camphora</i> *	Camphor Laurel
48. <i>Cinnamomum oliveri</i>	Camphorwood
49. <i>Cissus antarctica</i>	Native Grape Vine
50. <i>Cissus hypoglauca</i>	Water Vine
51. <i>Citriobatus pauciflorus</i>	Native Orange-Thorn
52. <i>Clematis glycinoides</i>	Headache Vine
53. <i>Clerodendrum tomentosum</i>	Native Clerodendrum
54. <i>Commelina cyanea</i>	
55. <i>Commersonia fraseri</i>	Brown Kurrajong
56. <i>Coprosma quadrifida</i>	Prickly Coprosma
57. <i>Correa lawrenciana</i> ssp. <i>macrocalyx</i>	
58. <i>Crinum pedunculatum</i>	Native Crinum Lily
59. <i>Croton verreauxii</i>	Green Carscarilla
60. <i>Cryptocarya glaucescens</i>	Native Laurel
61. <i>Cryptocarya microneura</i>	Murrogun
62. <i>Cyathea australis</i>	Rough Tree Fern
63. <i>Cymbopogon refractus</i>	Barbed Wire Grass
64. <i>Austrodanthonia bipartita</i>	Wallaby Grass
65. <i>Delairea odorata</i> *	Cape Ivy
66. <i>Dendrocnide excelsa</i>	Giant Stinging Tree
67. <i>Dianella caerulea</i>	
68. <i>Dichelachne crinita</i>	Long hair plume grass
69. <i>Dicksonia antarctica</i>	Soft Tree Fern
70. <i>Diospyros australis</i>	Black Plum
71. <i>Doodia aspera</i>	Rasp Fern
72. <i>Doryphora sassafras</i>	Sassafras
73. <i>Duboisia myoporoides</i>	Corkwood
74. <i>Ehretia acuminata</i>	Koda
75. <i>Elaeocarpus kirtoni</i>	Pigeonberry Ash
76. <i>Elatostema reticulatum</i>	Waterfall Spinach
77. <i>Entolasia marginata</i>	

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78. <i>Entolasia stricta</i>	Native Grass
79. <i>Eragrostis leptostachya</i>	Paddock Lovegrass
80. <i>Eragrostis tenuifolia</i>	Elastic Grass
81. <i>Erythrina x sykesii</i> *	Coral Tree
82. <i>Eucalyptus amplifolia</i>	Cabbage Gum
83. <i>Eucalyptus botryoides</i>	Bangalay
84. <i>Eucalyptus dendromorpha</i>	Budawangs Mallee
85. <i>Eucalyptus eugenioides</i>	Thin-Leaved Stringybark
86. <i>Eucalyptus fastigata</i>	Brown Barrel
87. <i>Eucalyptus obliqua</i>	Messmate Stringybark
88. <i>Eucalyptus paniculata</i>	Grey Ironbark
89. <i>Eucalyptus piperita ssp. urceolaris</i>	Urn-Fruited Peppermint
90. <i>Eucalyptus pilularis</i>	Blackbutt
91. <i>Eucalyptus quadrangulata</i>	Coast White Box
92. <i>Eucalyptus robusta</i>	Swamp Mahogany
93. <i>Eucalyptus saligna x botryoides</i>	Hybrid Blue Gum/Bangalay
94. <i>Eucalyptus smithii</i>	Gully Peppermint
95. <i>Eucalyptus sieberi</i>	Silvertop Ash
96. <i>Eucalyptus tereticornis</i>	Forest Red Gum
97. <i>Euroschinus falcata</i>	Blush Cudgerie
98. <i>Exocarpos cupressiformis</i>	
99. <i>Ficus coronata</i>	Sandpaper Fig
100. <i>Ficus macrophylla</i>	Moreton Bay Fig
101. <i>Ficus obliqua</i>	Small-Leaved Fig
102. <i>Ficus rubiginosa</i>	Port Jackson Fig
103. <i>Ficus superba var. henneana</i>	Deciduous Fig edible fruit
104. <i>Gahnia sieberana</i>	
105. <i>Geijera salicifolia</i>	Brush Wilga
106. <i>Glochidion ferdinandi</i>	Cheese Tree
107. <i>Goodenia ovata</i>	Hop Goodenia
108. <i>Guioa semiglauca</i>	
109. <i>Hakea dactyloides</i>	
110. <i>Hakea salicifolia</i>	Willow Hakea
111. <i>Hardenbergia violacea</i>	
112. <i>Hibbertia scandens</i>	Golden Guinea Flower
113. <i>Hibiscus heterophyllus</i>	Native Hibiscus
114. <i>Hymenanthera dentata</i>	Tree Violet
115. <i>Imperata cylindrica</i> *	Bladey Grass
116. <i>Indigofera australis</i>	
117. <i>Ipomoea indica</i> *	Blue Morning Glory
118. <i>Juncus kraussi</i>	
119. <i>Juncus usitatus</i>	
120. <i>Kennedia rubicunda</i>	Running Postman
121. <i>Lagunaria patersoni</i> *	Norfolk Island Hibiscus
122. <i>Lantana camara</i> *	Lantana

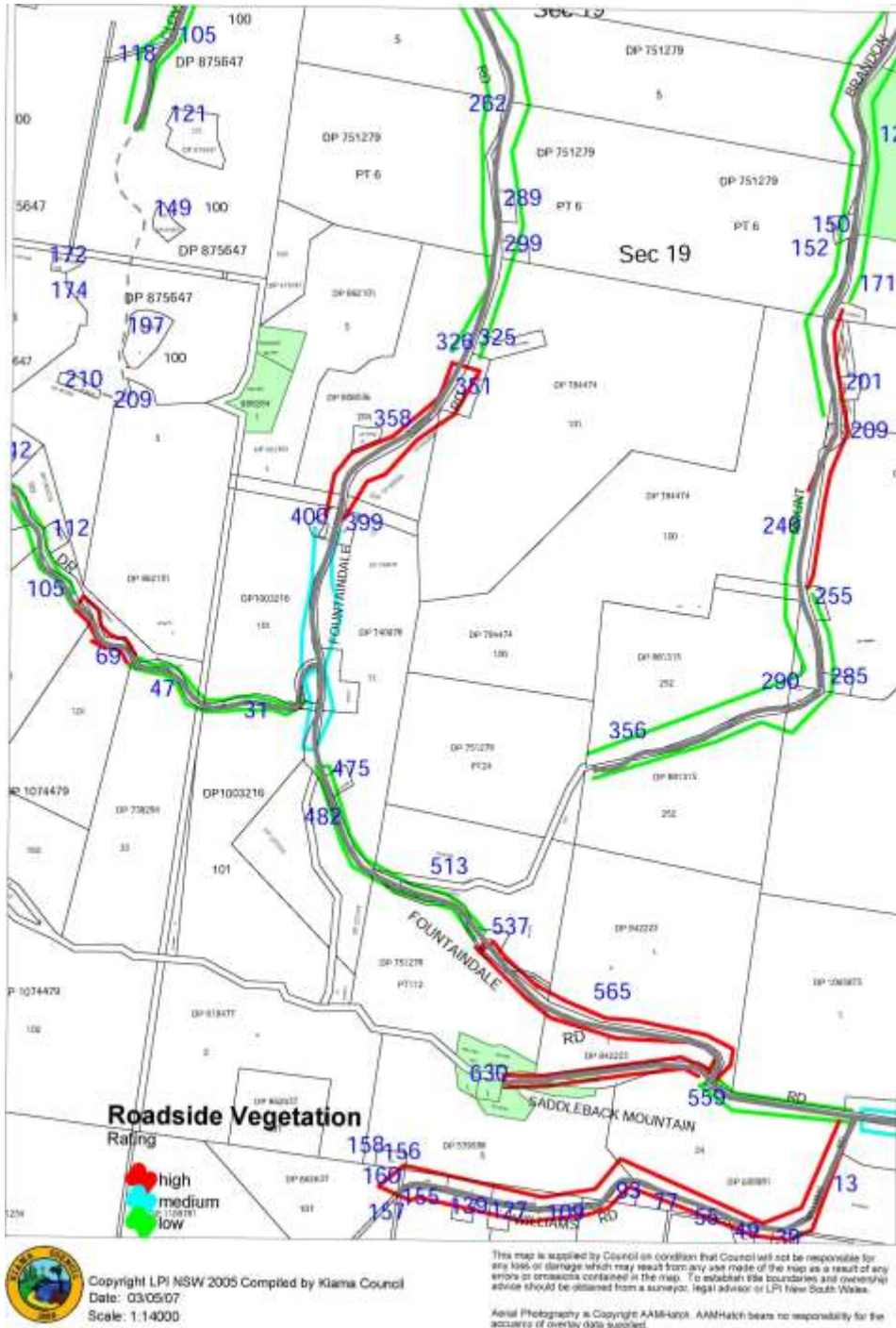
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123. <i>Leptospermum laevigatum</i>	Coast Tea Tree
124. <i>Leptospermum morrisoni</i>	Common Tea Tree
125. <i>Leucopogon juniperinus</i>	
126. <i>Ligustrum lucidum</i> *	Large-leaved Privet
127. <i>Ligustrum sinense</i> *	Small Leaf Privet
128. <i>Livistona australis</i>	Cabbage Palm
129. <i>Lomandra longifolia</i>	Mat Rush
130. <i>Lonicera japonica</i> *	Honeysuckle
131. <i>Maclura cochinchinensis</i>	Cockspur Thorn
132. <i>Melaleuca armillaris</i>	Bracelet Honey Myrtle
133. <i>Melaleuca stypheloides</i>	Prickly Melaleuca
134. <i>Melia azederach</i>	White Cedar
135. <i>Melicope micrococca</i>	White Euodia
136. <i>Microlaena stipoides</i>	Weeping Grass
137. <i>Myoporum acuminatum</i>	Boobialla
138. <i>Myrsiphyllum asparagoides</i> *	Bridal Veil Creeper
139. <i>Notolaea venosa</i>	Native Olive
234. <i>Ochna serrulata</i> *	Ochna
140. <i>Olea africana</i> *	African Olive
141. <i>Omalanthus populifolius</i>	Native Bleeding Heart
142. <i>Oplismenus aemulus</i>	Native Grass
143. <i>Oplismenus imbecilis</i>	
144. <i>Opuntia stricta</i> *	Prickly Pear
145. <i>Ozothamnus argophyllus</i>	White Paper Daisy
146. <i>Pandorea pandorana</i>	Wonga Vine
147. <i>Parsonsia straminea</i>	Twining Silkpod
148. <i>Paspalum dilatatum</i> *	
149. <i>Pellaea falcata</i>	Sickle Fern
150. <i>Pennantia cunninghamii</i>	Brown Beech
151. <i>Pennisetum clandestinum</i> *	Kikuyu Grass
152. <i>Peperomia leptostachya</i>	
153. <i>Phragmites australis</i>	Common Reed
154. <i>Phymatosorus scandens</i>	Fragrant Fern
155. <i>Pimelea ligustrina</i>	
156. <i>Pinus radiata</i> *	Radiata Pine
157. <i>Piper novae-hollandiae</i>	Giant Pepper Vine
158. <i>Pittosporum revolutum</i>	Hairy Pittosporum
159. <i>Pittosporum undulatum</i>	Native Daphne
160. <i>Planchonella australis</i>	<i>Black Apple</i>
161. <i>Poa labillardieri</i>	
162. <i>Poa sieberana</i>	
163. <i>Podocarpus elatus</i>	Plum Pine
164. <i>Pollia crispata</i>	Pollia
165. <i>Polyscias elegans</i>	Celery-Wood
166. <i>Polyscias murrayi</i>	Pencil Cedar

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167. <i>Prostanthera lasianthos</i>	White Flowered Mintbush
168. <i>Protasparagus aethiopicus</i> *	Asparagus 'Fern'
169. <i>Pteridium esculentum</i>	Bracken Fern
170. <i>Rapanea variabilis</i>	Muttonwood
171. <i>Rhodamnia rubescens</i>	Brown Malletwood
172. <i>Ricinus communis</i> *	Castor Oil Plant
173. <i>Rubus rosifolius</i>	Native Raspberry
174. <i>Rubus ulmifolius</i> *	Blackberry
175. <i>Rumex saggitatus</i> *	Turkey Rhubarb
176. <i>Salix babylonica</i> *	Willow
177. <i>Scolopia braunii</i>	Flintwood
178. <i>Senecio madagascarensis</i> *	Fireweed
179. <i>Senna x floribunda</i>	Cassia
180. <i>Sida rhombifolia</i> *	Paddy's Lucerne
181. <i>Siegesbeckia orientalis</i> *	
182. <i>Smilax australis</i>	Lawyer Vine
183. <i>Smilax glycyphylla</i>	Sarsparilla
184. <i>Solanum mauritianum</i> *	Wild Tobacco
185. <i>Spinifex sericeus</i>	Coastal Spinifex
186. <i>Sporobolus indicus</i>	Parramatta Grass
187. <i>Sporobolus virginicus</i>	Marine Couch
188. <i>Stenocarpus salignus</i>	Scrub Beefwood
189. <i>Stenotaphrum secundum</i>	Buffalo Grass
190. <i>Stephania japonica</i>	Snake Vine
191. <i>Streblus brunonianus</i>	Whalebone
192. <i>Syncarpia glomerulifera</i>	Turpentine Tree
193. <i>Synoum glandulosum</i>	Bastard Rosewood
194. <i>Syzygium australe</i>	Brush Cherry
195. <i>Tagetes minuta</i> *	Stinking Roger
196. <i>Tasmannia insipida</i>	Brush Pepper Bush
197. <i>Tecoma capensis</i> *	Cape Honeysuckle
198. <i>Themeda australis</i>	Kangaroo Grass
199. <i>Toona ciliata</i>	Red Cedar
200. <i>Tradescantia albiflora</i> *	Wandering Dew
201. <i>Trema aspera</i>	Poison Peach Bush
202. <i>Urtica incisa</i>	Native Stinging Nettle
203. <i>Verbena bonariensis</i> *	Purple Top
204. <i>Verbena rigida</i> *	Veined Verbena
205. <i>Viola hederacea</i>	
206. <i>Xanthium occidentale</i> *	Noogoora Burr
207. <i>Zieria arborescens</i>	Stinkwood
208. <i>Zieria granulata</i>	Kiama Zieria
209. <i>Zieria smithii</i>	Sandfly Zieria

APPENDIX 3



APPENDIX 4

