




## Vegetation Management Plan

141 Riverview Road Avalon Beach, NSW 2107

Report prepared by Narla Environmental for Uday Bonu

May 2021

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<b>Report:</b>	Vegetation Management Plan – 141 Riverview Road Avalon Beach, NSW 2107
<b>Prepared for:</b>	Uday Bonu
<b>Prepared by:</b>	Narla Environmental Pty Ltd
<b>Project no:</b>	Udbo1
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# Introduction

## 1. Project Background

This Vegetation Management Plan (VMP) has been developed on behalf of Uday Bonu (the proponent) and recommends the management of vegetation at 141 Riverview Road Avalon Beach, NSW 2107 (Lot 2/ DP 833902), hereafter referred to as the 'Subject Property' (Figure 1). All works associated with the proposed development within the Subject Property are hereafter referred to as the Subject Land.

The Subject Land involves the following:

- A new dwelling;
- A vehicular crossing; and
- Stockpiling locations

The Subject Property has an area of approximately 740m<sup>2</sup> and is located on the western side of Riverview Road, Avalon Beach. The Subject Property contains primarily native trees with some exotic species throughout the canopy. The proposed development will impact approximately 368m<sup>2</sup> Spotted Gum - Grey Ironbark open forest in the Pittwater and Wagstaffe area, Sydney Basin Bioregion (PCT 1214). PCT 1214 conforms to the Biodiversity Conservation Act 2016 (BC Act) listed Endangered Ecological Community (EEC), Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion. As such, this VMP has been produced to guide the rehabilitation and revegetation of the BC Act listed EEC, Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion.

### 1.2 Site Assessment

A site assessment was undertaken by experienced Narla Ecologists, Chris Moore and Angus McClelland, on Tuesday the 27<sup>th</sup> of April 2020. During the site assessment, the following activities were undertaken:

- Mapping the extent of native and exotic vegetation including areas that exist only as ground cover;
- Mapping all occurrences of any threatened plants across the site;
- Mapping all priority and environmental weed infestations on the site and identifying areas of weed infestation from adjoining properties; and
- Identifying any management issues that requires addressing in the VMP (e.g. weed management).






Figure 1. Components of Subject Property including proposed development.



**Management Zones**

 Subject Property

**Management Zones**

-  Management Zone 1 – Development Footprint
-  Management Zone 2 – Native Species Revegetation Area
-  Management Zone 3 – Temporary Stockpile Locations

0 2.5 5 7.5 10 m



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Date: 13/05/2021  
 Coordinate System: GDA94 MGA Zone 56  
 Data Source: FYFEE Design (2021)  
 Image Source: Nearmap Australia Pty Ltd [January 2021]



Figure 2. Management zones within the Subject Property.

# Management Zones

## 2 Management Zone 1 – Development Footprint

Approximate Area = 333m<sup>2</sup>



### Description

This management zone encompasses the proposed new dwelling and vehicular crossing over an area of 333m<sup>2</sup>. Vegetation in this area consisted of moderate quality PCT 1214. This included a consistent canopy layer comprised of *Corymbia maculata* (Spotted Gum), *Allocasuarina torulosa* (Black Sheoak) *Brachychiton acerifolius* (Illawarra Flame Tree), *Pittosporum undulatum* (Sweet Pittosporum), *Jacaranda mimosifolia* (Blue Jacaranda) and *Eucalyptus paniculata* (Grey Ironbark). The mid-storey was generally absent with some instances of *Macrozamia communis* (burrawang) and diversity of landscape exotic species including *Phyllostachys spp* (Bamboo), *Ligustrum lucidum* (Broad-leaf Privet), *Canna indica* (Indian shot) and *Agapanthus spp.* (Lily of the Nile). The understorey was a mix of native and exotic species. Native species included *Oplismenus aemulus* (Basket Grass), *Oxalis perennans* (Grassland Wood-sorrel), *Glycine tabacina* (variable glycine), *Centella asiatica* (Indian pennywort), *Commelina cyanea* (Scurvy weed) and *Entolasia marginata* (Bordered panic grass). Exotic Species were present including *Ehrharta erecta* (Panic Veldtgrass), *Sporobolus africanus* (Parramatta Grass), *Sida rhombifolia* (Paddy's Lucerne), *Chlorophytum comosum* (Spider Plant), *Solanum nigrum* (Black Nightshade), *Bidens Pilosa* (Farmers Friend) and *Conyza bonariensis* (Flaxleaf Fleabane). Priority weed *Asparagus aethiopicus* (Ground Asparagus) was also present.

### Objectives of Zone

- Appropriate disposal of exotic vegetation; and
- Minimise impacts to native fauna.

### Management Requirements

#### **Disposal of Exotic Vegetation**

- All exotic vegetation must be treated separately to native vegetation during vegetation clearing. Exotic vegetation must not be used in mulching's and must be disposed of at a license waste disposal facility.

#### **Vegetation Clearing**

- Prior to vegetation removal, a suitably qualified Project Ecologist should conduct a pre-clearing survey:
  - Conducting any required targeted searches for threatened flora prior to vegetation clearing;
  - Delineating Priority Weed species; and
  - Delineating habitat-bearing trees, shrubs and other potential habitat features to be retained/removed;
- All vegetation should be removed under the direct supervision of the Project Ecologist to ensure any suitable fauna can be rescued and relocated or transferred to a care agency.

## Management Zone 2 – Native Species Revegetation Area

Approximate Area = 191m<sup>2</sup>



### Description

This management zone encompasses land to be retained during construction covering an area of approximately 191m<sup>2</sup>. Vegetation in this area consisted of moderate quality PCT 1214. This included a canopy layer comprised of *Corymbia maculata* (Spotted Gum), *Allocasuarina torulosa* (Black Sheoak) *Brachychiton acerifolius* (Illawarra Flame Tree), *Pittosporum undulatum* (Sweet Pittosporum), *Jacaranda mimosifolia* (Blue Jacaranda) and *Araucaria cunninghamii* (Hoop Pine). The mid-storey was scarce of native species and displayed a high diversity of landscape exotic species including *Phyllostachys spp* (Bamboo), *Ligustrum lucidum* (Broad-leaf Privet), *Canna indica* (Indian Shot), *Camelia spp.*, *Agapanthus spp.* (Lily of the Nile) and *Plumbago auriculata*. The understorey was a mix of native and exotic species. Native species included *Oplismenus aemulus* (Basket Grass) and *Commelina cyanea* (Scurvy Weed) Exotic Species were present including *Ehrharta erecta* (Panic Veldtgrass), *Sporobolus africanus* (Parramatta Grass), *Sida rhombifolia* (Paddy's Lucerne), *Solanum nigrum* (Blackberry Nightshade), *Bidens Pilosa* (Farmers Friend) *Chlorophytum comosum* (Spider Plant) and *Conyza bonariensis* (Flaxleaf Fleabane). Priority weed *Asparagus aethiopicus* (Ground Asparagus) was also present.

### Objectives of Zone

- Remove all Priority Weeds;
- Reduce all other exotic species vegetation cover; and
- Native species revegetation.

### Management Requirements

#### Exotic Species Control

- Removal and control of the Priority Weeds *Asparagus aethiopicus* (Ground Asparagus);
- Reduce all other exotic species to a maximum of 5% cover; and
- Prevent further encroachment of weeds from adjoining areas.

#### Infill Planting

Infill planting will occur post development and will consist of:

- o
  - Tree planting:
    - o A minimum of three (3) locally native tree species (*Corymbia maculata*) shall be planted within Management Zone 2 or Management Zone 3 in accordance with the following (Northern beaches Council 2021):
      - Tree planting at a minimum 75 litre container size shall be located within a 9m<sup>2</sup> deep soil area wholly within the site and be located a minimum of 3 metres from existing and proposed buildings and other trees;
      - Tree planting shall be located to minimise significant impacts on neighbours in terms of blocking winter sunlight or where the proposed tree location may impact upon significant views; and
      - Tree planting shall be maintained until establishment including fertilising and watering, and thereafter for their safe useful life expectancy, and replaced should the trees fail due to lack of maintenance.
  - o Native shrub and groundcover planting:
    - o Native shrub species should be present at a rate of 1 per 10m<sup>2</sup> and native groundcover species at a rate of 10 per 10m<sup>2</sup>. Where site values fall below this benchmark, infill planting should be conducted; and
    - o Native shrub and groundcover species should be representative of Spotted Gum - Grey Ironbark open forest in the Pittwater and Wagstaffe area, Sydney Basin Bioregion (PCT 1214), representative species of this PCT are presented in **Appendix A**.

## Management Zone 3 – Temporary Stockpile Locations

Approximate Area = 35m<sup>2</sup>



### Description

This management zone encompasses land to be temporarily impacted by construction activities for use as a stockpiling area and a washroom facility covering an area of approximately 35m<sup>2</sup>. Vegetation in this area consisted of moderate quality PCT 1214. This included a canopy layer comprised of *Corymbia maculata* (Spotted Gum), *Brachychiton acerifolius* (Illawarra Flame Tree), *Pittosporum undulatum* (Sweet Pittosporum) and *Jacaranda mimosifolia* (Blue Jacaranda). The mid-storey had few native species and high diversity of landscape exotic species including *Ligustrum lucidum* (Broad-leaf Privet), *Canna indica* (Indian Shot), *Agapanthus spp.* (Lily of the Nile), *Schefflera actinophylla* (Umbrella Tree) and *Plumbago auriculata* (Blue Plumbago). The understorey was a mix of native and exotic species. Native species included *Oplismenus aemulus* (Basket Grass) and *Entolasia marginata* (Bordered panic grass). Exotic Species were present including *Sida rhombifolia* (Paddy's Lucerne), *Chlorophytum comosum* (Spider Plant) and *Solanum nigrum* (Blackberry Nightshade). Priority weed *Asparagus aethiopicus* (Ground Asparagus) was also present.

### Objectives of Zone

- Appropriate disposal of exotic vegetation;
- Native species revegetation; and
- Minimise impacts to native fauna.

### Management Requirements

#### **Disposal of Exotic Vegetation**

- All exotic vegetation must be treated separately to native vegetation during vegetation clearing. Exotic vegetation must not be used in mulching's and must be disposed of at a license waste disposal facility.

#### **Vegetation Clearing**

- One (1) week prior to vegetation removal, a suitably qualified Project Ecologist should conduct a pre-clearing survey:
  - Conducting any required targeted searches for threatened flora prior to vegetation clearing;
  - Delineating Priority Weed species; and
  - Delineating habitat-bearing trees, shrubs and other potential habitat features to be retained/removed;

All vegetation should be removed under the direct supervision of the Project Ecologist to ensure any suitable fauna can be rescued and relocated or transferred to a care agency.

#### **Infill Planting**

- Infill planting will occur post development and will consist of:
  - Tree planting:
    - A minimum of three (3) locally native tree species (*Corymbia maculata*) shall be planted within Management Zone 2 or Management Zone 3 in accordance with the following (Northern Beaches Council 2021):
      - Tree planting at a minimum 75 litre container size shall be located within a 9m<sup>2</sup> deep soil area wholly within the site and be located a minimum of 3 metres from existing and proposed buildings and other trees;
      - Tree planting shall be located to minimise significant impacts on neighbours in terms of blocking winter sunlight or where the proposed tree location may impact upon significant views; and
      - Tree planting shall be maintained until establishment including fertilising and watering, and thereafter for their safe useful life expectancy, and replaced should the trees fail due to lack of maintenance.
  - Native Shrub and Groundcover planting:
    - Native shrub species should be present at a rate of 1 per 10m<sup>2</sup> and native groundcover species at a rate of 10 per 10m<sup>2</sup>. Where site values fall below this benchmark infill planting should be conducted; and
  - Native shrub and groundcover species should be representative of Spotted Gum - Grey Ironbark open forest in the Pittwater and Wagstaffe area, Sydney Basin Bioregion (PCT 1214), representative species of this PCT are presented in **Appendix A**.

# Ongoing Management Actions

## 3. Performance Criteria

Task	Objective	Key Performance Indicator (KPI)	How will this KPI be assessed?	Designated time to meet KPI	If KPI cannot be met by designated time
3.1	1. Remove all Priority Weeds.	The Priority Weed <i>Asparagus aethiopicus</i> (Ground Asparagus) is to be removed from all management zones by the end of the first year and disposed of at a licensed waste treatment facility.	This is confirmed by the Project Ecologist through a site assessment that comprises randomised monitoring plots within the management zones.	Within 12 months of weeding works commencement.	Double the amount of site visits for the next 6 months or until KPI is met.
		2. Control exotic species.			
3.	Infill planting	A minimum of three (3) locally native tree species ( <i>Corymbia maculata</i> ) are to be planted within Management Zone 2 or Management Zone 3 in accordance with the Landscape Referral Response (Northern Beaches Council 2021).	Northern Beaches Council will access this objective.	Before occupancy certificate is required.	Occupancy certificate will not be issued by Northern beaches Council.
		Infill planting species representative of PCT 1214 <b>Appendix A</b> in Management Zone 2 and 3: <ul style="list-style-type: none"> <li>Shrub species present at a rate of 1 per 10m<sup>2</sup>.</li> <li>Native Groundcover species at a rate of 10 per 10m<sup>2</sup>.</li> </ul>	This is confirmed by the Project Ecologist through a site assessment that comprises randomised monitoring plots within the management zones.	Within a year of the completion of construction activities within the Subject Property.	Infill planting to meet KPI.
4.	Minimise impacts to native fauna	A Project Ecologist should undertake a pre-clearing assessment within Management Zones 1 and 3: <ul style="list-style-type: none"> <li>Conducting any required targeted searches for threatened flora prior to vegetation clearing;</li> <li>Delineating Priority Weed species; and</li> <li>Delineating habitat-bearing trees, shrubs and other potential habitat features to be retained/removed.</li> </ul>	This is confirmed by the Project Ecologist through a pre-clearing survey report summarising the results of the survey.	At least 1 week prior to vegetation clearing works.	Cease vegetation clearing works until pre-clearing survey is complete.
		All vegetation to be removed within Management Zones 1 and 3 should be completed under the direct supervision of the Project Ecologist to ensure any suitable fauna can be rescued and relocated or transferred to a care agency.	This is confirmed by the Project Ecologist through a post-clearing survey report summarising the results of the clearing supervision.	During vegetation clearing works.	N/A
5.	Review of the VMP document.	This VMP document is reviewed by a qualified Ecologist with experience in preparing VMP's.	An Ecologist will review this VMP by the date that is exactly 5 years after commencement of VMP implementation. An ecologist must undertake a site survey and produce a report that compares all of the data from the previous 5 years before reviewing the VMP.  The review will allow the VMP to be updated to best reflect the condition and requirements of the Subject Property.	5 years after commencement of VMP implementation.	N/A



Proposed Work Schedule / Timing

Task	Process for Completion	Time Required (estimate)	Responsibility	Scheduling						
				Year 1	Year 2	Year 3	Year 4	Year 5	Ongoing	
Appointment of Relevant Contractors.	Appointment of a Qualified Project Ecologist.	Prior to construction.	Proponent							
Installation of Sediment Fencing and Controls.	Installation of sediment control surrounding the proposed construction area must be completed prior to any excavation or modification of vegetation for construction.	Once, prior to any excavation or vegetation clearing works.	Contractor							
Implement Hygiene Protocol.	Implementation of Hygiene Protocol as per the report, 'Arrive Clean, Leave Clean' (Commonwealth of Australia 2015).	During all construction and vegetation works.	Contractor Project Ecologist Proponent							
Pre-clearing Assessment.	A Project Ecologist should undertake a pre-clearing assessment within Management Zones 1 and 3	1-day site visit, prior to vegetation clearing works.	Proponent Project Ecologist							
Clearing Supervision.	All vegetation to be removed within Management Zones 1 and 3 should be supervised by the Project Ecologist.	During all vegetation clearing works.	Contractor Project Ecologist Proponent							
Bush Regeneration	Appointment of suitably qualified person.	Prior to construction	Proponent							
	Planting of three (3) locally native tree species ( <i>Corymbia maculata</i> ) planted within Management Zone 2 or Management Zone 3 in accordance with the Landscape Referral Response (Northern Beaches Council 2021).	Before occupancy certificate is required	Contractor Proponent							
	Active removal of Priority Weeds from management zone 2 and 3 to complete eradication.	For the life of the VMP	Contractor Project Ecologist Proponent							
	Active removal of exotic vegetation from management zones 2 and 3, ensuring <5% weed cover.	For the life of the VMP	Contractor Project Ecologist Proponent							
	Infill planting of native shrub and groundcover species to benchmark (1 shrub per 10m <sup>2</sup> and 10 groundcovers per 10m <sup>2</sup> ) in zones 2 and 3. Species representative of PCT 1214 (Appendix A)	For the life of the VMP	Contractor Project Ecologist Proponent							
Long-term maintenance.	Any repair or maintenance of signage or fences (incl. sediment fence) or replacement plantings.	As advised Project Ecologist.	Contractors	As required						
Formal Monitoring and Reporting.	Assess progress of vegetation management actions through sampling of two (2) 5 x 5m vegetation plots within management zones 2 and 3 and a general assessment of the Subject Property.	Annually: 1 Project Ecologist for 1-day site visit, 20hrs report writing.	Project Ecologist							

## Additional Management Actions and Details Applicable to the Management Zones

### 3.3.1 Assign a Project Ecologist

- 3.3 Prior to commencement of any vegetation clearing, weed removal, or construction works on the Subject Property, a Project Ecologist must be assigned to oversee relevant works. The Project Ecologist must as a minimum:
- Hold a relevant tertiary degree in Science, Biology, Ecology, Environmental Science, Environmental Management, or Natural Resource Management;
  - Be fully licensed under the Biodiversity Conservation Act 2016 (or equivalent); and
  - Be fully licensed with a NSW Animal Research Authority (or equivalent) permitting the handling, relocation, and humane euthanasia of all terrestrial fauna.

### 3.3.2 Pre-clearing Survey

- A pre-clearing survey should be completed before clearing begins in Management Zones 1 and 3. The survey is to be undertaken by an appropriately qualified Project Ecologist. The survey should involve the search for threatened species and any suitable habitat including hollow-bearing trees, with all threatened flora species and habitat features demarcated. Priority Weeds are also to be demarcated. The results from the pre-clearing survey are to be collated into a short Pre-clearing Survey Report and are to be provided to the proponent within ten (10) days of undertaking the survey.

### 3.3.3 Clearing Supervision

- Clearing supervision should be carried out by a qualified Project Ecologist within Management Zones 1 and 3. The Project Ecologist should be present during the clearing of all vegetation in order to manage any fauna that may be present in situ. If any fauna is encountered, the fauna will be checked for any injuries, and if deemed suitable, will be relocated into adjacent lands or nearby Council reserves. If the fauna is injured or unsuited for release, it will be taken to an appropriately licenced wildlife carer or vet.

### 3.3.4 Exotic Species Management

- Exotic species management is to be undertaken throughout the management zones, targeting infestations and ensuring no weed encroachment into surrounding area of native vegetation;
  - Management visits should be as quoted by a suitably qualified person; and
  - All exotics removed should be bagged, removed from site, and disposed of at a registered waste facility.
- a. Performance Criteria**
- Specified exotic densities (<5%) for the management zones are achieved and maintained;
  - Specified site visit frequency fulfilled;
  - No Priority Weeds present within the management zones; and
  - Exotic species maintained to low levels (not spreading or impacting native plant species growth or regeneration).
- b. Weeding Techniques**
- Cut and Paint: Woody weeds such as Privet are to be treated using the cut and paint method, which involves the cutting of the stem as close to the ground as possible and applying herbicide to the freshly exposed stem;
  - Scrape and Paint: Weeds with a deep tap root will need to be treated utilising the cut and paint method which involves taking a knife and scrapping up the stem from the base to as high as possible and then applying herbicide to the exposed section of the stem;
  - Hand Removal: Small weeds such as *Asparagus aethiopicus* (ground asparagus) will be required to be dug out with a trowel or shovel. Trying not to remove too much soil, you should dig to expose and remove the crown; and

- Herbicide Usage: Only herbicides suitable for use in environmentally sensitive areas, such as Roundup Biactive, should be used.

### 3.3.5 Erosion Control

- In pre-emptive action, adequate erosion and sediment measures will be in place during construction activities in case of minor sediment run off and/or disruption to soil profiles;
- Preceding construction works, the 'Blue Book' (Landcom 2004) should be consulted to ensure any additional necessary erosion controls are adequately installed; and
- Appropriate sediment traps should be installed around the construction area prior to any excavation works being undertaken.

### 3.3.6 Monitoring Specifications

#### a. Establishment of Monitoring Quadrats

- Two (2) 5m x 5m randomised monitoring quadrats are to be assessed within management zones 2 and 3 to record all native and exotic species, and abundance cover of each species as a percentage of the plot;
- Photographs are to be taken as a reference to highlight the regeneration and maintenance of the management zone and should be included in annual monitoring reports; and
- The Ecologist should monitor the percentage of native ground cover across the Subject Property and track its regeneration against key performance criteria.

#### b. Monitoring Details

- Vegetation monitoring is to be completed on an annual basis (during Spring) by a suitably qualified Ecologist;
- General site-specific photographs are to be collected within the management zones;
- Vegetation condition within the monitoring plot is to be monitored against performance criteria;
- Floristic data to be collected within each plot should include:
  - Exotic cover within each vegetation layer (ground, mid-strata, canopy);
  - Full species list including native and weed species; and,
  - One photograph collected of the groundcovers within a 1m x 1m quadrat.

### 3.3.7 Reporting and Review

- Vegetation monitoring reports are to be produced annually (late Winter – Spring) by a qualified Ecologist and should include:
  - A summary of annual exotic species management works;
  - A site assessment based on performance targets;
  - Presentation of photographic evidence to illustrate progress of exotics management and native regeneration;
  - Any management issues/recommendations required to meet performance targets;
  - Updated work specifications as required to meet performance targets; and
  - Management/maintenance requirements or recommendations to inform any subsequent management of the site (beyond the 1<sup>st</sup> year maintenance period).
- This VMP should be reviewed by a qualified Ecologist at least every five years from the date of its adoption.

### 3.3.8 References

- Abacus Tree Services (2021) Arborist Report: 141Riverview Road, Avalon beach NSW
- Landcom (2004) Managing Urban Stormwater: Soils and Construction
- Fyffe Design (2021) Proposed New Dwelling 141 Riverview Road, Avalon Beach- Proposed Site Plan
- Narla Environmental (2021) Streamlined Biodiversity Development Assessment Report 141 Riverview Road, Avalon Beach NSW 2107
- Northern Beaches Council (2021) Landscape Referral Response DA2021/0317 Lot 2 DP 833902, 141 Riverview Road Avalon Beach NSW 2107
- NSW Department of Primary Industries (DPI) (2019) Priority Weeds for the Greater Sydney, NSW Weeds Wise <https://weeds.dpi.nsw.gov.au/WeedBiosecurities?AreaId=77>
- NSW Office of Environment and Heritage (OEH)(2016) The Native Vegetation of the Sydney Metropolitan Area. Volume 2: Vegetation Community Profiles. Version 3.0. NSW Office of Environment and Heritage, Sydney.
- NSW Rural Fire Service (2019) Planning for Bush Fire Protection

### 3.3.9 Appendices

Appendix A Shrub and groundlayer proposed revegetation species list representative of PCT 1214- Spotted Gum - Grey Ironbark open forest in the Pittwater and Wagstaffe area, Sydney Basin Bioregion (OEH 2016).

Category	Scientific Name
Shrub	<i>Podolobium ilicifolium</i>
	<i>Macrozamia communis</i>
	<i>Notelaea longifolia</i>
	<i>Synoum glandulosum</i> subsp. <i>glandulosum</i>
Groundlayer	<i>Billardiera scandens</i>
	<i>Dianella caerulea</i>
	<i>Entolasia stricta</i>
	<i>Lomandra longifolia</i>
	<i>Xanthorrhoea macronema</i>
	<i>Microlaena stipoides</i> var. <i>stipoides</i>
	<i>Schelhammera undulata</i>
	<i>Themeda australis</i>
	<i>Eustrephus latifolius</i>
	<i>Pandorea pandorana</i>
	<i>Cassytha pubescens</i>
	<i>Cissus hypoglauca</i>
	<i>Geitonoplesium cymosum</i>
	<i>Lomandra filiformis</i>



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