

# **Vegetation Management Plan**

Guide to preparing a Vegetation Management Plan within the Campbelltown Local Government Area





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# **1.0 Introduction**

Campbelltown is fortunate to be home to a diverse array of flora and fauna. These ecological values are part of what makes Campbelltown special and why many people choose to live here. For these reasons, Council places significant emphasis on the protection and restoration of native vegetation impacted by development.

The restoration and rehabilitation of native vegetation within parts of the Local Government Area (LGA) where it has been lost, removed or impacted on, is a critical aspect of effectively conserving Campbelltown's ecosystems and their functions and achieving our community vision of:

"A connected community with opportunities to grow in a safe and sustainable environment."

This guide has been developed to facilitate the revegetation of cleared areas and protect existing native vegetation. Specifically, it aims to guide developers, consultants, community groups and private landholders in the preparation of Vegetation Management Plans (VMP).

### Did you know?

Any restoration works conducted on the Cumberland Plain must be carried out in accordance with the Recovering Bushland on the Cumberland Plain – Best Practice Guidelines for the Management and Restoration of Bushland and the Cumberland Plain Recovery Plan.

www.environment.nsw.gov.au/resources/nature/RecoveringCumberlandPlain.pdf
 www.environment.nsw.gov.au/resources/threatenedspecies/20100501CumberlandPlain.pdf

# 1.1 What is a VMP?

A VMP is intended to assist land managers and/or owners in managing the impacts of development (planned, previous or existing), in order to protect existing bushland and habitat from disturbance and/or remediate impacts from development activities.

A VMP outlines the objectives, techniques and actions specific to the management of vegetation on site. A VMP is to be provided to Council either on request (such as a direction following illegal clearing) or accompanying a Development Application, if native vegetation clearing is proposed, the development is likely to impact on vegetation and/or vegetation restoration is required.

The preparation of a VMP does not necessarily mean that the clearing of native vegetation will be approved. The VMP will be reviewed by Council staff and amendments may be required to works programs, development designs and/or management actions.

### A VMP may be required:

- as part of a Development Application as a condition of development consent (usually following a Flora and Fauna Assessment)
- following unauthorised activities, such as land clearing, including hazard reduction without a relevant approval
- where poor management of a development site may have led to clearing and/or damage of proposed retained vegetation
- in addition to a landscape plan and/or weed management plan
- in order to comply with the Noxious Weeds Act 1993.

A VMP aims to ensure that development and ongoing site management:

- achieves the relevant objectives prescribed within Council's respective Environmental Planning Instruments (eg Campbelltown Local Environment Plan 2015)
- is consistent with relevant environmental legislation and policies (eg *Threatened Species Conservation Act 1995*, *Noxious Weed Act 1993*, Recovering Bushland on the Cumberland Plain, best practice guidelines)
- is conducted in accordance with the land manager's obligation under relevant frameworks (Local Government Act 1993, Rural Fires Act 1997 and Environmental Planning and Assessment Act 1979)
- mitigates impacts of urban development on remnant bushland areas.

The VMP must be prepared to the satisfaction of Council. A VMP must provide quantifiable goals and strategies that help to conserve certain site values such as ecological processes operating on-site, where these processes are likely to be affected by the development or associated activities.

Implementation of the VMP may be incorporated by Council into conditions of consent (where relevant) and in some cases, may be subject to a restriction on the land or positive covenant under the *Conveyancing Act 1919*.

- 1. A VMP is not required for works approved under a Bushfire Hazard Reduction Certificate, or a Hazard Reduction Notice under s66 of the *Rural Fires Act 1997*.
- 2. A VMP is linked to a site, not the owner of the property, therefore it applies to the site for the timeframe specified in the plan. Should the respective property(s) change ownership, the new owner will become responsible for implementing any outstanding actions.
- 3. When developing a VMP, all property owners affected by management actions must agree to the terms of the VMP.



# 2.0 Preparing the VMP

# 2.1 Who can prepare a VMP?

The VMP must be prepared by a suitably qualified environmental consultant or bush regenerator with theoretical and practical experience in bushland restoration and management, including weed control, preferably with experience in the Campbelltown LGA and on the Cumberland Plain. The consultant will need to demonstrate the following minimum qualifications and experience:

- a tertiary degree in Natural Sciences and/or a Certificate IV in Conservation and Land Management
- a minimum of 500 hours practical bushland regeneration.

If the minimum qualification requirement cannot be met, approval may be granted by Council on a case by case basis, depending on the size and significance of the vegetation.

# 2.2 Who can implement a VMP?

Depending on the complexity of the tasks specified under the VMP, a bush regenerator will generally be required to carry out the works. The person(s) implementing the VMP will need to demonstrate the following minimum qualifications and experience:

- a Certificate III in Conservation and Land Management and/or Certificate III in Natural Area Restoration
- a minimum of 500 hours practical bushland regeneration under an experienced supervisor.

Supervisors will need to demonstrate the following minimum qualifications and experience:

- a Certificate IV in Conservation and Land Management and/or Certificate IV in Natural Area Restoration
- a minimum of 700 hours practical bushland regeneration.

A Chemcert AQF III or greater is required for persons undertaking chemical application.

In some cases, the implementation of a VMP may run over several years where the last few years may only require general maintenance and monitoring. The landholder or other persons responsible for maintenance of the site may be suitable to undertake those works themselves. Persons responsible for each action will need to be identified in the plan and should this responsibility change, Council will need to be notified.



Figure 1. Site overview (example only - not indicative of any proposed development)

### Did you know?

Riparian corridor widths must comply with specifications under the NSW Office of Water's Guidelines for Riparian Corridors on Waterfront Land 2012. This should be highlighted in the site description

# 3.0 What are the contents of a VMP?

There are many factors that need to be considered when developing a VMP. The following provides an overview of the components required for an effective VMP. A checklist to help you make sure the VMP is of a standard required by Council can be found in Appendix 1.

# 3.1 Site assessment

- Provide a written description of the site, addressing features and attributes such as: 1.
- land use zoning
- contamination drainage
- waterways riparian corridors
  - existing infrastructure
    - any environmental constraints
- topography substrate

•

- •
- any significant or sensitive environmental features of the subject site, including threatened species sightings and hollow-bearing trees.
- 2. Describe the type, extent and current condition of existing vegetation on the subject site. In most cases, a Flora and Fauna Assessment will need to be undertaken prior to the development of a VMP. This may have already occurred through a Development Application process.

Determine vegetation communities present or prior to impact, including a statement describing the current form, diversity, complexity, health and resilience of the vegetation subject to the VMP. Include photographs from photo reference points (refer to point 5 below), showing baseline condition of vegetation.

- Provide a brief description of the proposed development and or impact being ameliorated. З.
- Specify the width of any Asset Protection Zone (APZ) required under Planning for Bushfire Protection, including the 4. Inner Protection Area and Outer Protection Area.
- 5. Provide a map of the proposed development site to support the above assessment (see Figure 1 for example), showing the following where applicable :
- Legend, scale bar and north arrow
- Topography

Development footprint and/or impact being ameliorated ٠

- Waterways •
- Environmental constraints •
- Environmental features
- Asset protection zones; existing or proposed ٠
  - Areas of clearing proposed under the 10/50 code of practice
- Location of photo reference points, for monitoring and evaluation purposes.
- Vegetation communities on site

If vegetation has already been cleared refer to nearby patches of native vegetation to predict the vegetation that previously occurred on site. Consult the NSW Wildlife ATLAS and the Vegetation Information System (VIS) Flora Survey database, available online.

The VIS provides integrated information about NSW vegetation communities, floristic and structural typologies. This information can be viewed and accessed through the OEH website.

Ground truthing should also be undertaken where possible, this will occur through the Flora and Fauna Assessment process.

# 3.2 Legislative and policy requirements

Outline the requirements for the VMP under the relevant Local Environmental Plan, Development Control Plan and state and federal legislation. For example, identify the applicable LEP clauses and requirements for vegetation management (eg conditions of consent or directives of the compliance notice) relating to the site.

Actions specified in the plan must be consistent with relevant legislation and government policy.

Within the Campbelltown LGA, relevant legislation and policies include:

- Environment Protection and Biodiversity Conservation Act 1999
- Environmental Planning and Assessment Act 1979
- Threatened Species Conservation Act 1995
- Protection of the Environment Operations Act 1999
- Local Government Act 1993
- Water Management Act 2000
- Rural Fires Act 1997
- Noxious Weeds Act 1993
- National Parks and Wildlife Act 1974
- State Environmental Planning Policy 19 Urban bushland
- State Environmental Planning Policy 44 Koala habitat
- State Environmental Planning Policy 55 Remediation of land
- Planning for Bushfire Protection 2006
- Bushfire Environmental Assessment Code 2006
- 10/50 Vegetation Clearing Code of Practice
- Campbelltown Local Environmental Plan 2015
- Campbelltown Sustainable City Development Control Plan 2015
- Recovering Bushland on the Cumberland Plain: Best Practice Guidelines for the Management and Restoration of Bushland
- Cumberland Plain Recovery Plan
- Campbelltown Noxious Weed Management Strategy.



# 3.3 Aims and objectives of the VMP

- 1. Identify the aim of the VMP. This is also known as the target condition and generally related to requirements for vegetation management such as those prescribed in conditions of consent, court orders or compliance notices (eg. 'Restoration of Cumberland Plain Woodland community on site' or 'restoration of bushland within urban context').
- 2. Outline the management issues and the objectives designed to address these management issues.

Management issues may include:

- loss of native vegetation
- endangered ecological communities
- threatened species habitat
- weed infestation
- watercourse and/or wetlands including riparian zones
- development impact including increased access
- stormwater, on site effluent disposal
- soil type, erosion and sediment control
- fragmentation and retention of vegetation corridors
- asset protection zone (APZ)
- contaminated land.
- 3. The main objectives for a VMP generally relate to the need to protect sensitive site features and to mitigate the impacts of development. Objectives for a VMP may include but are not limited to, the following:
- establishment of environmentally sensitive APZ's by the selective removal of vegetation in a manner that is acceptable to the consent authority (consistent with the relevant LEP objectives and the principles of Planning for Bushfire Protection 2006)
- conservation or selection of appropriate landscape species and on-site tree management
- limiting impacts to threatened, endangered, vulnerable or a locally significant flora and fauna species or ecological communities by their conservation, provision of adequate native vegetation buffers and ameliorative measures
- retaining and restoring vegetation and trees within identified protected areas
- management of vegetation to achieve optimum and effective nutrient uptake and removal function of an on-site effluent disposal system
- selecting and maintaining vegetation that stabilises soils or that absorbs run-off from accumulation points on the site, or that contributes to the optimum and effective functioning of Water Sensitive Urban Design (WSUD) stormwater management devices
- conserving and enhancing native vegetation to provide high quality habitat and wildlife corridors for native fauna
- restoration of degraded areas resulting from unauthorised clearing, stormwater erosion, sediment deposition or other degrading factors
- removal of noxious and environmental weeds in a manner that is environmentally sustainable.

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Vegetation Management Plan - Management Zones	Property Address: XXXX Author: XXXX
Moderate Resilient Bushland	Date: XXXX
with Weeds) To Be Revegetated	Hollow-Bearing Tree
Natural Regeneration Area To Be Fenced	Photo Reference Points
Property Boundary	Threatened Species Record - Spiked Rice Flower
- Development Footprint	(Fillielea Spicala)
Asset Protection Zone (APZ)	0 250 meters
Waterway (Wetland/Dam)	Scale: 1:6,781

Figure 2. Map of site showing proposed management zones (not indicative of any proposed development)



# 3.4 Identify management zones

Commonly, there will be areas across the site that have unique management issues distinguishing them from other parts of the site (eg weed infestation). It is therefore recommended that the site be broken up into different management zones. There is no limit to how many zones a site may have, but the zones should reflect either site/environmental features, management approaches or aspects of the development.

Examples of different types of management zones are:

- construction zone
- inner and outer APZs
- on-site effluent and stormwater disposal areas
- landscaped areas including streetscape/front setback
- bushland and/or areas requiring conservation and/or restoration
- threatened species, environmentally sensitive or significant vegetation communities and their buffers
- groundwater recharge zones and/or overland flow paths
- riparian or wildlife corridors
- weed infestations.

A description of management zones should be supported by a map showing the location and extent of the zones. See Figure 2 for example.

# 3.5 Developing an action plan

An action plan incorporating specific actions to achieve the objectives needs to be developed (see Appendix 2 for an example of an action plan format). Describe with detail each task necessary for the implementation of the plan – describe the location of each action, techniques used to carry out the action, who will be responsible and the time required to complete the task.

It is important that, where possible, areas of existing native vegetation and key habitat features are protected during construction and throughout the life of the development. This includes managing indirect impacts. Management actions should address a range of site-specific issues, as outlined below.

### 3.5.1 Site preparation

Site preparation is crucial to ensuring the success of any regeneration. Be sure to take into consideration the previous land use, impacts on the soil, slope and salinity potential. Actions to prepare the site for ongoing effective management and enhancement may include:

- soil testing and remediation, if the area is on contaminated land or to identify suitability of the substrate for planting
- application of herbicide
- details of other surface preparation such as levelling
- soil remediation techniques and/or surface preparation and/or stabilisation of disturbed areas (scarifying, ripping, mulching, erosion matting, sterile cover crops, binding sprays, etc).

### 3.5.2 Site management

Site management actions include:

- provision of temporary or permanent fencing of features to be protected, including specifications of fence type and location
- decommissioning, soil stabilisation and vegetative rehabilitation areas affected by temporary erosion and sedimentation controls
- protection of existing native vegetation and key habitat features at all stages of construction and during the life of the development, (including indirect impacts) such as the installation of tree guards to protect plants from fauna predation
- educational signage may also be warranted in sites where large areas are fenced off and/or public access is impacted, to promote awareness of the significance of the area and the management actions.

### 3.5.3 Weed management

Weed management actions include:

- herbicide treatment and mechanical removal are the most effective methods for management of dense weed cover and should be conducted at least two to three months prior to planting
- manual or hand removal for small scale projects can be the most efficient and environmentally sensitive option. It is also preferred for works within ecologically sensitive areas
- scalping the soil as a means of weed control or site preparation is generally not supported within the Cumberland Plain, except in highly degraded/modified areas as it can result in removal of the seed bank from the soil profile
- habitat value of weeds on the site; removal may need to be staged if weeds are providing habitat for wildlife
- methods of weed control (proposed techniques and priorities) in accordance with current guidelines and standards. Include removal strategies, timing, constraints, herbicides to be used, and waste disposal and where relevant, the recommended qualifications of those to undertake the work.

### 3.5.4 Stormwater, wastewater and hydrological function

### Actions include:

- erosion and sediment controls, type, location and maintenance, where relevant
- undertaking revegetation of WSUD stormwater quantity and quality treatments or on-site effluent disposal areas, including selection of nutrient tolerant native species and plant establishment densities for optimum performance
   restoration of appropriately sized riparian zones, detailing stabilisation measures and locally Indigenous species
- to be provided, with planting densities included.

### 3.5.5 APZ management

Specific and detailed vegetation and soil management strategies need to be outlined, including:

- extent of modification (slashing, pruning, thinning, tree removal, resulting canopy separation, retained shrub cluster dimensions) of existing vegetation proposed, being the minimum required to comply with Planning for Bushfire Protection 2006
- specifications required to protect natural bushland values by retaining elements of all stratum, representing all age classes and maintaining species diversity
- nature of habitat features to be retained or provided (forage trees, habitat hollows and ground or shrub layer shelter), and how they will be identified and protected during site works
- where appropriate, species targeted for priority removal and retention
- fuel reduction frequency, access management and method including machinery and equipment to be employed, and limits to their use in relation to any slope or other constraints
- vegetative waste management, reuse and/or disposal etc, including tree stumps and logs.

### Did you know?

Tubestock planting is the recommended best practice for areas within the Campbelltown LGA where less than 5ha have been cleared. Seedlings should be propagated from locally collected seeds where possible or purchased from reliable nurseries who stock endemic plants.

Seed collection must be undertaken in accordance with the Florabank guidelines.

A licence to collect seed from endangered species and communities is required from the Office of Environment and Heritage (OEH). Alternatively, you can contact a nearby nursery or consultant that may provide the service relevant to the area you need to rehabilitate.

Direct seeding is generally not supported due to the disturbance to the soil, unless over an area greater than 5ha or on severely degraded sites and only for specific species. Often direct seeding can result in the establishment of strong seed stock, however survival rates are usually lower and establishment can take longer.

### 3.5.6 Regeneration/revegetation

Actions include:

- details of the planting program, rehabilitation methods and staging. Techniques such as plating of tubestock, hydro-seeding, brush matting or assisted natural regeneration may be considered
- vegetation species composition, planting layout and densities. The required mix of plant species relates to the actual community to be emulated and the size of the area/s to be rehabilitated, but mature vegetation communities are generally well structured, comprising trees, shrubs and groundcovers species
- as a preference, use locally-sourced Indigenous plant material, comprised of nutrient and/or disturbance tolerant species to provide a buffer around ecologically sensitive areas or features
- seed/plant sources should be identified
- vegetation salvage and transplant from donor (development) to recipient (area requiring restoration) areas, including indicative species and timing of activity
- avoid exotic vegetation. Only species endemic to the local area and vegetation community (where appropriate) should be used. In highly urbanised/landscaped settings, the use of exotic species for temporary soil stabilisa-

tion

is permitted provided they are sterile, non-invasive and easily eradicated when permanent vegetation is established

- restoration and/or enhancement of fauna habitat and/or corridor connectivity, by reinstatement of absent stratum elements (canopy, mid-storey or groundcover)
- restoration of a vegetation community through selective planting, including proposed species schedule and planting density for areas requiring reinstatement of local provenance plant species
- debris of dead shrubs and trees should be left in place to provide animal habitat and to help prevent soil erosion and suppress weeds
- protection of plants through provision of tree guards to prevent predation by fauna
- any other ameliorative measures to limit impacts on threatened, endangered, vulnerable or a locally significant flora or fauna species or ecological communities
- measures for controlling long term access and encroachments (bollards, fences, etc) into regenerating areas should also be identified.

Further information and recommendations on effective regeneration techniques and planting/seeding densities is

### 3.5.7 Habitat supplementation

Where the development has or has the potential to impact on significant fauna habitat features, actions to supplement fauna habitat should be included, for example:

- provision of nest/roost boxes (include the number, target species, design and location of installation)
- placement of fallen timber or removed tree hollows on the ground
- creation of watering points
- creation of artificial refuge sites .
- provision of food sources such as planting of food trees.

### 3.5.8 Maintenance

Specify the maintenance periods required to ensure viability of the project and who will be undertaking the maintenance. Where lands are being dedicated to Council, a minimum maintenance period of five years is required or until such time as a minimum 80 per cent survival rate of each species planted and a maximum five per cent weed cover is established (unless otherwise negotiated). Timing for the maintenance period commences once final primary works specified under the VMP have been completed (eg weeding and planting) irrespective of staging of works.

A maintenance plan should be included that details works to be carried out following primary works, including:

- replacing losses of vegetation, where density requirements are not achieved
- secondary weed control.

# Works on the Cumberland Plain

Actions should be proposed in accordance with Best Practice Guidelines for the Management and Restoration of Bushland and the Cumberland Plain Recovery Plan, including:

- identify potential wildlife sanctuary areas on your site
- consider the habitat potential of weeds, unwanted trees and shrubs, and rubbish such as old pipes, car bodies, etc before removal and work towards their slow replacement by more natural components
- avoid removing weeds in areas providing important habitat for existing wildlife until nearby substitute habitat is provided and established
- retain and where possible reintroduce logs, bark and natural debris
- for intensive weeding over large areas, adopt a mosaic pattern of weed removal
- remove areas of dense weed infestation only outside peak fauna breeding times (usually spring and early summer) or when they are not providing a major food source
- protect mature trees through the removal of weed vines smothering the canopy, and weed competition from around their bases
- selectively retain mature weed trees in the absence of mature native trees until mature-sized native canopy trees are established
- remove weed trees gradually and consider poisoning in autumn to mimic the natural cycles of some exotic trees
- leave dead trees (including exotics) in place, where feasible, as they will provide habitat in the form of hollows and perches
- consider introducing artificial nesting boxes, for native arborea animal habitat
- consider the potential impacts of herbicide on amphibians
- try to repeat the density and species mix in revegetation sites that occur naturally in local remnants (remember to mimic aspect), ensuring a diversity of habitats is retained
- try to link habitat areas with a vegetated corridor and where possible, regenerate/revegetate waterways to maintain bank stability, and provide important corridors and aquatic habitat.





# 4.0 Monitoring, evaluation and reporting

# 4.1 Determining performance criteria

Identify how the achievement of the objectives will be measured. Performance criteria should be identified for each objective and must be specific and measurable. They are expressed as either qualitative or quantitative statements that define how the success of the VMP in achieving the stated objectives will be determined.

Performance criteria may include, but not be limited to:

- the specific number, location and condition of rare plant species that are to remain following the completion of site works, where sites contain rare plant species
- the percentage area of groundcovers or shrubs to remain following implementation of an APZ
- the percentage survival rate for plantings in a riparian zone 12 months after establishment
- the species diversity and density of a bushland regeneration zone following 12 months of management
- the percentage weed coverage 12 months following primary weed control.

In this section of the VMP, you must specify the methods and responsibility for evaluating the achievement of the performance criteria.

# 4.2 Monitoring and reporting

Monitoring and reporting should be undertaken on a 6 to 12 month basis for the life of the project, including the maintenance period. Council will monitor the satisfactory completion of specified targets in the VMP through critical stage inspections and/or at other times, including prior to the issue of an Occupation or Subdivision Certificate. The parties responsible for implementing the VMP must contact Council to organise inspections associated with critical stages/milestones.

Annual reports should also include photographs from nominated photo reference points selected to demonstrate the progress of the works. Where any actions have been amended, not undertaken or timeframes have not been met, this should be discussed in the report with a justifiable explanation. Where the VMP requires significant adjustment and/or works can no longer be undertaken, Council should be notified immediately and a management response negotiated.

## 4.3 Links to other plans, documents or conditions

Where the VMP is linked to any other plans, documents or conditions that relate to the development, this must be highlighted (eg erosion and sediment control plan, landscape plan, weed management plan).

# 4.4 Timeframes and budget

For each task/action to be completed, a timeframe in the action table showing the sequence and duration of works necessary for the implementation of the VMP, is required. For large scale projects, a works schedule in the form of a Gantt chart is appropriate to reflect the staging of the works. It should detail the duration, sequence of sub-projects/activities/tasks/milestones necessary for the implementation of the VMP, including frequency of visits and number of hours required for each action.

A budget for implementing the whole VMP should be prepared and included. The budget should reflect all sub-projects and the schedule of works for the duration of the VMP including the cost of materials, labour, watering, maintenance (including plant replacement), monitoring and reporting.

Council is willing to accept a bond for the landscape or revegetation works in certain circumstances, such as provision of a subdivision certificate prior to the completion of works. Contact Council for more details about bond requirements.

<sup>&</sup>lt;sup>2</sup> Photo points may not be required for small-scale VMPs

<sup>&</sup>lt;sup>3</sup> This includes external events such as bushfires, drought and flood.

# 5.0 Further information and advice

For further information and advice on VMPs when they are required, how to prepare one, implementation and monitoring contact Council's Environment Unit on 4645 4601 or email environment@campbelltown.nsw.gov.au

# 6.0 Useful links and contacts

AABR (Australian Association of Bush Regenerators) www.aabr.org.au/index.php Atlas of NSW wildlife www.wildlifeatlas.nationalparks.nsw.gov.au/wildlifeatlas/watlas.jsp Australian Network for Plant Conservation www.anbg.gov.au/anpc/web.html Australian Pesticides and Veterinary Medicine Authority (APVMA) www.apvma.gov.au Australian Plant Name Index www.anbg.gov.au/cpbr/databases/apni.html Australian Weeds Committee www.weeds.org.au DECC threatened species assessment guides www.environment.nsw.gov.au/threatenedspecies/tsaguide.htm Ecological Consultants Association www.ecansw.org.au Florabank www.florabank.org.au Greening Australia www.greeningaustralia.org.au Greening Australia resources www.greeningaustralia.org.au/resources/resources Local Land Services www.lls.nsw.gov.au NSW DECC threatened species www.environment.nsw.gov.au/threatenedspecies/index.htm NSW Rural Fire Service www.rfs.nsw.gov.au Noxious weeds information kit www.bmcc.nsw.gov.au/councilservices/noxiousweeds Office of Environment and Heritage www.environment.nsw.gov.au Office of Water www.water.nsw.gov.au Planning for bushfire protection www.rfs.nsw.gov.au/ data/assets/pdf file/0008/4400/Complete-Planning-for-Bush-Fire-Protection-2006.pdf PlantNET plantnet.rbgsyd.nsw.gov.au

The introduced flora of Australia and its weed status www.weedscrc.org.au/ documents/intro\_flora\_australia.pdf

# 7.0 References

Blue Mountains City Council, 2009. Vegetation Management Plan Guide.

Department of Environment and Conservation (NSW), (2005). Recovering Bushland on the Cumberland Plain: Best practice guidelines for the management and restoration of bushland.

Department of Environment and Conservation (NSW).

Lake Macquarie City Council, 2012. Vegetation Management Plan Guideline.

Lismore City Council, 2010. Guidelines for the Preparation of Vegetation Management Plans.

NSW Office of Water, 2012. Controlled Activities on Waterfront Land, Guidelines for Riparian Corridors on Waterfront Land. Department of Primary Industries.

Shire of Mundaring, 2015. Landscape & Revegetation Guidelines.

The Hills Shire Council, 2015. Vegetation Management Plan Guideline.

Wood R et al, 2014. UWS Vegetation Management Plan Campbelltown, Riparian Zones 1 to 6, prepared for Urban Growth NSW. Green Australia.



# **Appendix 1. Checklist for VMP preparation**

Information recommended to be included	Addressed
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### 1. Site assessment

Please refer to the relevant flora and fauna assessment (where undertaken) for details on existing native flora and fauna and weeds present, and any restrictions this may have on actions under the plan.

1.1 General details	<ul> <li>scheduled date for implementation to commence</li> <li>proposed date for plan completion</li> <li>details of persons preparing plan, including qualifications</li> <li>details of persons implementing plan, including qualifications</li> </ul>	
1.2 Site description	<ul> <li>site location (street name, suburb)</li> <li>site description (total area, perimeter, length, width)</li> <li>land use zoning</li> <li>waterways</li> <li>riparian corridors</li> <li>topography- slope, aspect, erosion and safety risks</li> <li>substrate, geology, soil structure</li> <li>contamination</li> <li>drainage</li> <li>any environmental constraints</li> <li>any significant or sensitive environmental features of the subject site, including threatened species sightings and hollow-bearing trees</li> </ul>	
1.3 Existing infrastructure	<ul> <li>buildings</li> <li>fencing</li> <li>lawn</li> <li>paths</li> <li>taps</li> <li>access gates</li> <li>health and safety</li> <li>identify public risks</li> <li>actions to mitigate public risk</li> </ul>	
1.4 Site access	<ul> <li>licence, lease or land use agreement (all property owners must agree to all aspects of the plan)</li> <li>site access for vehicles</li> <li>restrictions/consideration to any existing plans of management, other reports or conditions affecting the site</li> </ul>	
1.5 Flora and fauna	<ul> <li>details of flora and fauna assessment (if undertaken), including date and name of consultant</li> <li>existing native vegetation types, diversity, health and resilience</li> <li>presence or evidence of endangered species and/or ecological communities</li> <li>weed species present</li> <li>access for fauna</li> <li>pest species</li> <li>presence of biodiversity corridors on site</li> </ul>	
1.6 APZ	<ul> <li>widths required under Planning for Bushfire Protection</li> <li>any clearing proposed under 10/50 code of practice</li> </ul>	

1.7 Site map	<ul> <li>legend, scale bar and north arrow</li> <li>site boundaries</li> <li>land use</li> <li>topography</li> <li>waterways</li> <li>existing vegetation and natural features, their type and condition</li> <li>environmental constraints</li> <li>development footprint and/or impact being ameliorated</li> <li>location, type and extent of weed infestation</li> <li>'dial before you dig' information, if relevant</li> <li>APZs- existing or proposed</li> <li>areas of clearing proposed under the 10/50 code of practice</li> <li>location of photo reference points, for monitoring and evaluation purposes</li> </ul>	
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### 2. Guiding principles and legislative requirements

2.1 Legislation and policy	•	a list of requirements under government legislation and policy	
2.2 Aims and objectives	•	overall aim of the VMP list of management issues on site objectives to address each of the management issues	
2.2 Licences	•	licences that are required to undertake the actions in the VMP a (eg. Section 132C scientific licence)	

### 3. Action Plan

3.1 Management zones	<ul> <li>identify management zones such as riparian corridor, weed infestation</li> <li>map of management zones</li> </ul>	
3.2 Site preparation	<ul> <li>soil testing and remediation, if the area is on contaminated land or to identify suitability of substrate for planting</li> <li>application of herbicide</li> <li>details of other surface preparation such as levelling</li> <li>soil remediation techniques and/or surface preparation and/or stabilisation of disturbed areas</li> </ul>	
3.3 Site management	<ul> <li>fencing specifications and locations</li> <li>staging of works and decommissioning of areas</li> <li>erosion and sedimentation controls location and description</li> <li>protection of existing vegetation and key habitat features</li> <li>educational and deterrent signage</li> </ul>	
3.4 Weed treatment	<ul> <li>identify areas of weed infestation to be treated and managed</li> <li>outline methodology and frequency, staging of works</li> <li>specify follow-up treatments</li> </ul>	
3.5 Stormwater, waste- water and hydrological function	<ul> <li>On-site effluent disposal infrastructure and wastewater disposal areas</li> <li>stormwater management devices such as water tanks, detention basins, water sensitive urban design</li> <li>irrigation systems</li> </ul>	

3.6 Bushfire management	•	extent and location of APZ details of any proposed clearing under 10/50 code of practice	
3.7 Planting program	• • • •	species, density, number and areas for revegetation type of revegetation to be undertaken (eg tube stock planting, direct seeding) source of plants/seeds methodology and staging of works plant protection devices (such as tree guards and weed mats)	

### 4. Site maintenance

A minimum of five years maintenance for sites is required or until such time as a minimum 95 per cent survival rate of each species planted and a maximum five per cent weed cover is established.

4.1 Maintenance schedule	<ul> <li>details of weed follow up treatments</li> <li>sediment and erosion control</li> <li>watering</li> <li>replacement of plant losses</li> <li>disease and insect control</li> <li>replenishment of mulch (where present)</li> </ul>	
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### 5. Monitoring, evaluation and reporting

5.1 Monitoring and evaluation	<ul> <li>identify how the success of the plan will be measured</li> <li>comparison with baseline data established in the planning phase</li> <li>specify the methods, frequency and responsibility for assessing progress against performance criteria</li> </ul>	
5.2 Reporting	<ul> <li>include a reporting schedule, a minimum of annually</li> <li>records for reporting purposes are identified</li> <li>'before and after' photographs and/or maps or vegetation quadrat descriptions.</li> </ul>	
5.3 Timeframe	• prepare a works schedule (Gantt chart), reflecting timing and staging of works for all the tasks in the project	
5.4 Budget	• costing for the implementation of all components and stages of the work including materials, labour, watering, maintenance (including plant replacement), monitoring and reporting	

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Management Issue	Objective	Actions	Management zone	Timing	Responsibility	Performance Criteria
		<ol> <li>Identify planting locations and planting schedule</li> </ol>	M2, regeneration zone	October 2016	Contractor	Planting schedule representative of veg community Approved by Council
		<ol> <li>Propogate</li> <li>tubestock using locally sourced seed</li> <li>representative of veg community</li> </ol>		November 2016 – February 2017	Nursery	Sufficient numbers of tubestock propagated
Loss of native	To revegetate area to expand the existing	<ol> <li>Prepare planting locations</li> </ol>	M2, regeneration zone	March – April 2017	Contractor	Herbicide treatment, ripping and mulching completed
Vegeration	remnant vegetation	<ol> <li>Plant provenance tubestock, using plant protection measures</li> </ol>	M2, regeneration zone	May – July 2017	Contractor	Canopy – 250 stems per ha Shrub – 1050 stems per ha Ground – 5 plants/ stems per sqm
		<ol> <li>Undertake maintenance of plantings and replace losses</li> </ol>	M2, regeneration zone	September 2017 – September 2022	Contractor	Replace plant losses annually 95% plants established
		<ol> <li>Monitor, review and report to Council</li> </ol>		ylul	Contractor	Reports provided annually

# Appendix 2. Action plan format example

# Appendix 3. Information on effective regeneration techniques

### Planting

Only species endemic to the local area and vegetation community (where present) should be used. All-layer planting is usually the most resilient and assists in the control of weeds. Planting native grass and shrubs in dense clumps also helps maintain weed control during the establishment period.

Planting densities should achieve quick vegetative cover and root mass to maximise bed and bank stability along watercourses. Costs associated with high density planting will be recovered through reduced maintenance costs (weeding, replacement planting, etc).

The following densities are recommended as a general guide when replanting is used as the sole revegetation technique, but may need to be adjusted to suit local conditions or the vegetation community.

Category	Height	Density
Ground covers (grasses, sedges, rushes and forbes)	< 0.5	four plants per 1m <sup>2</sup>
Climbers	n/a	one plant per 16m <sup>2</sup>
Shrubs	< 4m	one plant per 4m <sup>2</sup>
Trees	> 4m	one plant per 16m <sup>2</sup>

Seedlings should be sourced in either hiko tubes (40mm round x 90mm deep) or forestry tubes (50mm squared x 125mm deep). Native plants are best planted in the cooler months of autumn, winter or early spring. There is usually a higher rainfall in these months which will reduce the need for watering and reduce the risk of plant death. If you are planning to order your plants through a nursery, you will need to order them in advance to allow time to collect and propagate seed. If you are collecting and propagating plants yourself, ensure adequate time for plants to establish. Some suggested times to undertake the main activities required for planting are provided below:

Activity	Suggested time of year
Order plants (if applicable)	October – November
Collect and propagate local seeds <sup>4</sup>	Seasonally Dependent (usually November – February for most species)
Site preparation	November – March
Apply direct seed	Мау
Planting	March – October
Watering	Weekly up to 6 weeks after planting or after warm/dry conditions
Follow up weed control	October – March
Monitoring	Biannually
Replacement planting	After year 1

### Assisted natural regeneration

Assisted natural regeneration is based on the ecological principles of community succession and is most practical if there are patches of natural vegetation within the cleared area. It involves the natural regrowth of vegetation using the existing seed bank in the soil. It guarantees that vegetation will be a representation of what was previously growing at the site. Where achievable, natural regeneration is preferred to replanting.

Regeneration, however, is only appropriate for some areas where topsoil is intact and a sufficient native seedbank is present. It is not appropriate for areas that have been subject to long term disturbance. When relying on this technique, regeneration surveys must be conducted to assess species richness and diversity. If either is lacking, then natural regeneration must be supplemented with planting or direct seeding.

Accumulating debris of dead shrubs and trees are to be left in place to provide animal habitat, help prevent soil erosion and suppress weeds. The aim of this is to restore the ecosystem and not just as a bushland garden.

### **Direct seeding**

This involves the sowing of seeds, either by hand or machine, directly to a revegetation area. Seeds are best collected from the site or a site with similar vegetation nearby. This is known as 'local provenance' seed stock. By using local provenance seeds, you can be sure that the stock in which the seed was collected is well adapted to that particular environment, its soils, climate, salinity and other processes.

When undertaken correctly on larger sites, direct seeding can allow for a higher plant density, which provides shelter for seedlings and reduces the potential for weed invasion. However it is generally not supported in Campbelltown due to the disturbance to the soil, longer establishment times and lower success rates.

Applicable sowing rates are dependent on the vegetation community and structure you are trying to achieve. There can be differences in the germination rate between species, so the following rates are recommended:

Species type	Recommended per hectare
Eucalypt species	50-100 grams per species
Acacia and large seeded species	50-100 grams per species
Other species (eg shrubs and grasses)	25-50 grams per species

Seeds can be either purchased from commercial providers or collected by hand. If you are planning to collect your own seeds, contact the NSW National Parks and Wildlife to obtain the relevant licence for seed collection. All efforts should be made to obtain local seeds from as close to the site as possible. All collections must be undertaken in accordance with the Australian Florabank Guidelines.



Campbelltown City Council PO Box 57 CAMPBELLTOWN NSW 2560 Visit campbelltown.nsw.gov.au Phone 4645 4000