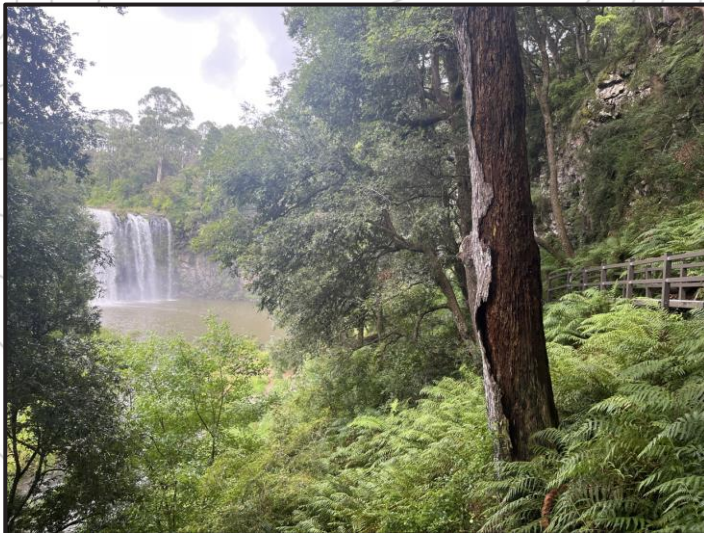


Dangar Falls Reserve - Vegetation Management Plan

Bellingen Shire Council



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Template 2.8.1

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Abbreviations

| Abbreviation | Description |
|--------------|---|
| AABR | Australian Association of Bush Regenerators |
| BAM | Biodiversity Assessment Method |
| BSC | Bellingen Shire Council |
| DA | Development Application |
| DPE | NSW Department of Planning and Environment |
| DPI | NSW Department of Primary Industries |
| EEC | Endangered Ecological Community |
| ELA | Eco Logical Australia |
| GBD | General Biosecurity Duty |
| NCSWMP | North Coast Regional Strategic Weed Management Plan |
| NRAR | NSW Natural Resources Access Regulator |
| LGA | Local Government Area |
| VMP | Vegetation Management Plan |
| WM | Water Management Act (2000) |
| WoNS | Weed of National Significance |

1. Introduction

This Vegetation Management Plan (VMP) has been prepared by Eco Logical Australia Pty Ltd (ELA) on behalf of Bellingen Shire Council (BSC) and relates to Dangar Falls Reserve located in the Dorrigo area of NSW (Figure 1) which is managed by BSC.

This VMP covers Dangar Fall Reserve only – 208 Coramba Rd, Dorrigo, Lot 7004 DP1052130

Recommendations with this VMP are subject to funding and resources being available. To ensure that this VMP is representative of changing needs, it should be reviewed and revised to satisfy legislative, administrative, environmental and community requirements every five years.

1.1. Background

Dangar Falls is a Public Recreation Reserve (No. 19416) gazetted under the *Crown Lands Act 2016*. The land is a Crown Reserve, with BSC as corporate manager of the Reserve Trust, responsible for the management of this reserve. Crown Reserves are managed in accordance with the principles of Crown land management (Crown Land Management Act 2016):

- that environmental protection principles be observed in relation to the management and administration of Crown land;
- that the natural resources of Crown land (including water, soil, flora, fauna and scenic quality) be conserved wherever possible;
- that public use and enjoyment of appropriate Crown land should be encouraged;
- that, where appropriate, multiple use of Crown land should be encouraged;
- that, where appropriate, Crown land should be used and managed in such a way that both the land and its resources are sustained in perpetuity; and
- that Crown land be occupied, used, sold, leased, licensed, or otherwise dealt with in the best interests of the State consistent with the above principles.

This VMP aims to provide direction for the ongoing land management issues as described within the Draft Bush Regeneration Plan for Dangar Falls Reserve (provided by BSC) for the next five years. The following additional reports have also been reviewed in the preparation of this plan:

- Bellingen Shire Council High Environmental Values Vegetation Mapping and Field Validation Report (ELA 2022)
- Dangar Falls Reserve Plan of Management Part A (GeoLink 2015)
- Dangar Falls Reserve Plan of Management Part B (GeoLink 2015)
- REF Dangar Falls Reserve Upgrade (GeoLink 2019)

Dangar Falls Reserve is zoned as E3- Environmental Management under the *Bellingen Local Environmental Plan* (BLEP 2010). Objectives of this zoning are:

- To protect, manage and restore areas with special ecological, scientific, cultural or aesthetic values.
- To provide for a limited range of development that does not have an adverse effect on those values.

In addition, this VMP has been prepared to meet the NSW Department of Planning and Environment requirements under the *Water Management Act 2000* (WM Act). The VMP has been prepared based on current best practice and is consistent with the DPE guidelines (DPE 2022), including provision of indicative costs for management actions.

The Guidelines for Riparian Corridors on Waterfront Land issued by the DPE are provided in **Appendix A**.

The DPE recommends a Vegetated Riparian Zone (VRZ) width based on watercourse order as classified under the Strahler system of ordering watercourses (Strahler 1957) and using current 1:25 000 topographic maps. The width of the VRZ should be measured from the top of the highest bank on both sides of the watercourse. The sections of the Bielsdown River running through the reserve area are defined as a 6th order Strahler stream, which require a 40 m VRZ on each side of the watercourse (80 m total), plus the channel width itself.

Although it is not a requirement for Local Government Authorities such as BSC to meet the requirements under the WM Act BSC will still be required to apply for a controlled activity approval.

Excerpt from Draft Bush Regeneration Plan for Dangar Falls Reserve (provided by BSC).

“Dangar Falls Reserve is a significant regional tourism site. Visitors come to the Reserve to view the falls, swim in the river and experience the calm lushness of the Antarctic Beech forest. The reserve is managed mostly for tourism and recreation, however it is the natural assets of the reserve that visitors come to see. Unfortunately, the large number of visitors also increases the likelihood of weed incursion. The Reserve is also surrounded by agricultural land, which is another attraction for visitors, it appears as an oasis of natural bushland with a cauldron of water, amongst rolling green hills. As such, there are many edges in the park between the park-like tourist picnic area, the viewing platform, carpark, and walking tracks and the native vegetation. These disturbed edges are where weed incursion is greatest, however over time, weedy species have also infiltrated the major vegetation communities, either carried by animals, pedestrians or water. In particular, the riparian zone is thick with Small-leaved Privet on both sides of the Bielsdown River. It is important to manage the natural assets of the reserve to maintain its attractiveness and significance to visitors, as well as maintain the integrity of the vegetation communities within it”.

1.2. Objectives of the Vegetation Management Plan

The overall objectives of the VMP are to establish native species cover and density along the riparian corridor by revegetation works and to assist in the natural regeneration by weed control works within the VMP area. The VMP area will be managed in perpetuity. This VMP covers the initial five-year period, or until the objectives and performance criteria outlined in this VMP are met. The objectives for the VMP are summarised in Table 1.

Table 1: VMP objectives

| Objectives | Approach |
|---|---|
| To control weeds in the four Plant Community Types (PCTs) and along the riparian zone at Dangar Falls Reserve. In particular target woody weeds, Small-leaved Privet, Blackberry, Japanese Honeysuckle and English Ivy. | In accordance with this VMP and current Dangar Falls Draft Bush Regeneration Plan under the Crown Land Reserve project commitments. Use a mixture of natural regeneration and assisted regeneration techniques. Protect existing native vegetation. Control weeds and prevent new outbreaks – particularly priority weeds. |
| To collect seed & propagate local native species. | Collect native seed from within remnant native vegetation in Dangar Falls Reserve. Use locally indigenous species from local seed and / or plant material sourced from local nurseries. |
| To restore native vegetation communities by replenishment planting where required. | Assist in the natural regeneration of species across the VMP area through suitable plantings. Increase native flora species diversity to provide native fauna habitat. |
| Engage and educate local community and Landcare volunteers. | Installation of signage at key locations along the VMP boundary. Promote community involvement in weed control and enhancement activities. Engage and educate local Landcare volunteers. |

This VMP is inclusive of current Crown Land project commitments.

1.3. Preparation and implementation of this plan

This VMP has been prepared by Senior Ecologist Phoebe Smith and Graduate Ecologist Samantha Patch and overseen by Experienced Restoration Ecologist Gordon Patrick.

Gordon Patrick has over 26 years of experience as a consultant botanist / ecologist, bushland manager and an environmental teacher. As part of his current position within ELA and his General Manager role at a Landcare organisation he has implemented and managed numerous environmental restoration and bushland regeneration projects (both on a commercial and voluntary basis) of various sizes and complexities for many clients. In addition to project management, he undertook the overall coordination of the organisation, including various volunteer and education programs, a locally indigenous plant nursery, budgeting and managing over 20 staff and many more volunteers. Gordon has a Bachelor of Environmental Science (Env Mgnt).

Samantha Patch has two years of experience working in environmental management and assessment within the Coffs Harbour Region. Samantha has a Bachelor of Environmental Science/Marine Science and Management.

Phoebe Smith has over 7 years experience in environmental restoration, and environmental management and assessment including 3 years restoration work and 4 years of biodiversity assessment and monitoring primarily in NSW North Coast and Hunter Valley. Phoebe Smith has a Bachelor of Environmental Science & Management and a Master in Environmental Management & Sustainability.

Suitably qualified and experienced bush regeneration contractor/s is required to implement this VMP. They should be a member of the Australian Association of Bush Regenerators (AABR) or should possess

the required qualifications and experience for membership. In addition to this, team leaders should have, as a minimum, a *Certificate III in Conservation & Land Management* or equivalent. The contractor will need to carry out best practice bush regeneration techniques as described by Buchanan (2000).

1.3.1. Duration

The VMP covers a minimum period of 5 years, or until the objectives and performance criteria outlined in this VMP are met. Monitoring of performance criteria throughout this period can be assessed by the Council appointed ecologist to determine if Key Performance Indicators (KPI's) are met early, or if the VMP requires an extension beyond this timeframe.

1.4. Key terms

For the purpose of this VMP the following terminology has been adopted:

- Dangar Fall Reserve – Council Reserve under BSC management (Figure 1)
- VMP area: The proportion of the Reserve to be conserved and managed by this VMP, comprising remnant vegetation and areas for revegetation and weed control works (Figure 3).

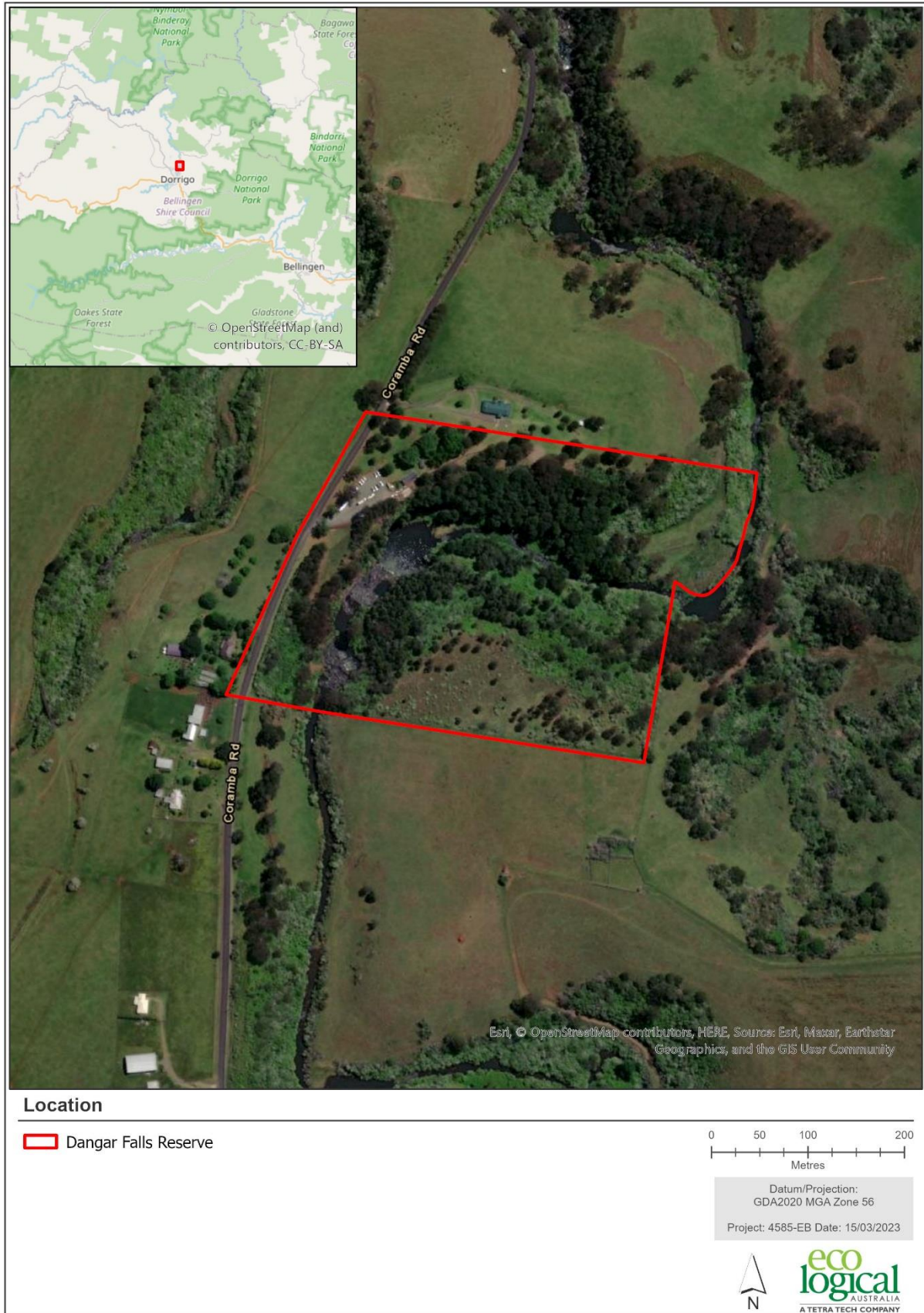


Figure 1: Location

2. Description of the environment

2.1. Location, Topography and hydrology

Dangar Falls Reserve is situated northwest of the Dorrigo township occurring within the Bellingen Shire Council (Figure 1). The reserve occurs on basalt-derived landscape of the Dorrigo Plateau with an elevation around 730 m asl. The site sits within two Mitchell Landscapes of Nymboida Meta-Sediments and Dorrigo Basalts. The topography of the site consists of contrasting landforms, including gentle to moderate gradient sloping to the east along the boundary of the site and steep escarpment of Dangar Falls and the Bielsdown River. The Bielsdown River dissects the site, entering at the southern boundary and leaving the eastern boundary, eventually flowing into the Nymboida River.

2.2. Cultural Significance

The site is potentially significant to Aboriginal people (Dorrigo LALC) and therefore should be assumed to be significant in the first instance, with appropriate consultation occurring. Knowledge holders are to be given the opportunity to review this plan and identify any culturally sensitive sites that may be affected by this plan – this could include both tangible (artefacts, middens, scarred trees, burials, sacred sites) and intangible heritage (stories, song line, creation story, spiritual belief, historical significance, appropriate cultural burning, bush tucker) prior to the plan being adopted.

2.3. Vegetation communities

Four Keith Class Types occur within the site including; Cool Temperate Rainforest; Northern Tableland Wet Sclerophyll Forests; Coastal Dune Dry Sclerophyll Forests; and Northern Montane Heathlands. Notably significant vegetation communities have been mapped within this area including Cool Temperate rainforest – a remnant of the Gondwanan vegetation that previously formed the main vegetation community along creek banks and sheltered slopes on the Dorrigo Plateau prior to clearing. Additionally, a unique occurrence of Port Jackson Pine community is considered to have high conservation value as it typically occurs in sclerophyll forests along the coastline (Geo Link 2015). Dangar Falls Plan of Management (GeoLink 2015) outlines the important value, of significant flora species such as Antarctic Beech and Port Jackson Pine. Protection of these species should be a key focus in the management of this site with particular attention on weed management and sensitive track construction.

Four remnant vegetation communities or Plant Community Types (PCT) have been mapped as part of the Bellingen Shire Council High Environmental Values Vegetation Mapping and Field Validation (ELA 2022) (Figure 2). A flora species list provided for these communities in Appendix B. The four PCTs within the reserve are:

- PCT 3052: Northern Escarpment Antarctic Beech Rainforest (Photo 1)
- PCT 3146: Dorrigo Red Gum Grassy Forest (Photo 2)
- PCT 3207: Northern Escarpment Layered Blackbutt Fern Forest (Photo 3)
- PCT 3823: Cascades Cypress-Tea-tree Riparian Forest (Photo 4)

2.3.1. PCT 3052: Northern Escarpment Antarctic Beech Rainforest

This PCT has likely been retained due to its location on steep slopes of Dangar Falls. Mainly occurs on the northern side of Bielsdown River, on the steep slopes with a southerly aspect. A smaller patch also occurs on the southern side within the river gorge.

The upper canopy is dominated by *Nothofagus moorei* (Antarctic Beech), *Doryphora sassafras* and *Cryptocarya meissneriana* (Thick-leaved Laurel) (infrequent). The midstorey is dominated by *Acacia melanoxylon* (Blackwood), *Lomatia fraseri* (Silky Lomatia), *Dicksonia antarctica* (Soft-tree-fern) with *Denhamia moorei* (Mountain Denhamia). Epiphyte fern species include *Asplenium australasicum* (Birds Nest Fern) and *Microsorium scandens* (Fragrant Fern). Vine species *Smilax australis* (Lawyer Vine) occurs. Groundcover within this community is sparse and consist of *Blechnum* spp., *Entolasia marginata* (Bordered Panic), *Commelina cyanea* and *Lomandra* spp. (ELA 2022).

Exotic weeds are present including *Ligustrum sinense* (Small-leaved Privet), *Tradescantia fluminensis* (Trad) and *Solanum mauritianum* (Tobacco Bush).

The vegetation is not consistent with any endangered ecological community (EEC) listed under the *Biodiversity Conservation Act 2016* (BC Act) or threatened ecological communities (TEC) listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). However, cool temperate rainforest has considerable conservation significance due to its 'overcleared' status. Species of significance occurrence within this community include:

- *Nothofagus moorei* – valued for its limited distribution and Gondwanan heritage; and
- *Denhamia moorei* – a species endemic to the Upper Dorrigo Plateau, Point Lookout and Styx River area. Also sits at its eastern limit of occurrence at Dangar Falls.



Photo 1: PCT 3052 – Northern Escarpment Antarctic Beech Rainforest

2.3.2. PCT 3146: Dorrigo Red Gum Grassy Forest

This area is predominately planted and was mapped as ‘PCT of best fit’. This community has been highly modified from its original state through clearing and grazing and is subject to weed infestation, active weed management is not currently regular. This area occurs on the southern side of Bielsdown River with a drier aspect. Canopy is dominated by *Eucalyptus amplifolia* (Cabbage Gum) and *Eucalyptus dorrigoensis* (Dorrigo White Gum). Midstorey consists of *Leptospermum polygalifolium* and *Allocasuarina littoralis* (Black Sheoak). Groundcover is dominated by exotic pasture grass Kikuyu (*Cenchrus clandestinus*) and Cocksfoot (*Dactylis glomerata*) which forms a dense carpeted groundcover (from neighbouring pasture and historic landuse). Native ground cover *Pteridium esculentum*, *Geranium solanderi* (Native Geranium), *Themeda triandra* (Kangaroo Grass), *Dichondra repens* (Kidney Weed) and *Rubus parviflorus* (Native Raspberry) also occur.

This area also supports Small-leaved Privet infestations occurring on the steeper slopes. Previous attempts at restoration resulted in only limited success. Much of this area is still predominantly open and grassy with only minor tree regrowth, and hence is subject to significant weed infestation pressures. This area also supports a mixture of exotic pasture species. Species of significance occurring within this community include Dorrigo White Gum (*Eucalyptus dorrigoensis*) which has a limited distribution, predominantly on the eastern edge of the northern tablelands/Dorrigo plateau.



Photo 2: PCT 3146 Dorrigo Red Gum Grassy Forest

2.3.3. PCT 3207: Northern Escarpment Layered Blackbutt Fern Forest

Some of this area has been planted/landscaped and was mapped as 'PCT of best fit'. This community occurs on the edge of the Cool Temperate Rainforest.

The canopy within this patch is dominated by *Eucalyptus nobilis* (Ribbon Gum), *Eucalyptus dorrigoensis* (Dorrigo White Gum) and *Eucalyptus nitens* (Shining Gum). Native midstorey species include *Banksia integrifolia* subsp. *monticola* (Mountain Banksia), *Callistemon salignus* (Willow Bottlebursh), *Acacia melanoxylon* (Blackwood), *Acacia implexa* (Hickory Wattle), and *Persoonia media*. Groundcover includes *Commelina cyanea*, *Geranium solanderi* (Native Geranium), *Lomandra longifolia* (Spiny-headed Mat-rush) and *Entolasia marginata* (Bordered Panic).

Some weed incursion including Small-leaved Privet, Broad-leaved Privet (*Ligustrum lucidum*), English Ivy (*Hedera helix*), Trad, Japanese Honeysuckle (*Lonicera japonica*), and Tobacco Bush occurs.



Photo 3: PCT 3207 Northern Escarpment Layered Blackbutt Fern Forest

2.3.4. PCT 3823: Cascades Cypress Tea-tree Riparian Forest

This vegetation community occurs on the southern side of Bielsdown River. The canopy is dominated by *Callitris rhomboidea* (Port Jackson Pine). Midstorey species include *Leptospermum petersonii* (Lemon-scented Tea Tree), *Banksia integrifolia* subsp. *montana* (Mountain Banksia), *Acacia melanoxylon* (Blackwood), *Denhamia moorei* (Mountain Denhamia) and *Lomatia arborescens* (Tree Lomatia). The grassy groundcover consists of *Entolasia stricta* (Wiry Panic), *Lomandra spicata*, *Poa* spp. and *Commelina cyanea*

This area occurs in predominately good condition with moderate weed incursion from edge effects such as Small-leaved Privet, Japanese Honeysuckle, Carpet Grass (*Axonopus fissifolius*) and Tobacco Bush.

Species of significance occurring within this community include;

- *Callitris rhomboidea* – a species that is not common on the Dorrigo Plateau.
- *Denhamia moorei* – a species endemic to the Upper Dorrigo Plateau, Point Lookout and Styx River area. Also sits at its eastern limit of occurrence at Dangar Falls.



Photo 4: PCT 3823 Cascades Cypress Tea-tree Riparian Forest

2.4. Weeds

The NSW *Biosecurity Act 2015* and regulations provide specific legal requirements for state level priority weeds (Table 2). Under the Act all plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.

Specific legal requirements apply to State determined priorities under the draft *North Coast Regional Weeds Plan 2023 – 2027* (LLS North Coast 2022). Refer to the NCRWMP for species specific management objectives and obligations under each management category (LLS North Coast 2022). Weeds listed as ‘other weeds of regional concern’ under the plan warrant resources for local control or management programs and are a priority to keep out of the region. Inclusion in this list may assist Local Control Authorities and/or land managers to prioritise action in certain circumstances where it can be demonstrated the weed poses a threat to the environment, human health, agriculture and the like.

A total of 23 weed species were recorded within the VMP area. The weeds identified during the field survey, include two which are listed as State level priority weeds, and seven listed as other weeds of regional concern. The weeds present; their priority listing under the Act; the associated asset / value at risk; and whether they are Weeds of National Significance (WoNS) are presented in Table 2. A list of weeds recorded within the VMP area is provided in **Appendix B**.

Other weeds recorded within the VMP areas are English Ivy (*Hedera helix*), Inkweed (*Phytolacca octandra*), Broadleaf Paspalum (*Paspalum mandiocanum*), Vasey Grass (*Paspalum urvillei*), Carpet Grass (*Axonopus fissifolius*), Cobblers Pegs (*Bidens pilosa*), Lamb's Tongues (*Plantago lanceolata*), Veined rigida (*Verbena rigida*), Curled Dock (*Rumex crispus*), Spear Thistle (*Cirsium vulgare*), Whitetip Nightshade (*Solanum chenopodioides*), Cocksfoot (*Dactylis glomerata*), Annual Ragweed (*Ambrosia artemisiifolia*), and Blue Billygoat Weed (*Ageratum houstonianum*). Significant weed infestations are shown in Figure 4.

Table 2: A list of priority weeds and Weeds of National Significance identified within Dangar Falls Reserve

| Scientific Name | Common Name | Weeds of National Significance (WoNS) | DPI Weed Wise*^ | North Coast Strategic Management Plan 2023-2027 objective/s | Regional Weed |
|--|----------------------|---------------------------------------|--|---|---------------|
| State level priority weeds (whole of State) | | | | | |
| <i>Senecio madagascariensis</i> | Fireweed | Yes | General Biosecurity Duty and Prohibition on certain dealings | Containment and Asset Protection | and/or |
| <i>Rubus fruticosus</i> | Blackberry | Yes | General Biosecurity Duty and Prohibition on certain dealings | Containment and Asset Protection | and/or |
| Other weeds of regional concern | | | | | |
| <i>Ageratina adenophora</i> | Crofton Weed | No | General Biosecurity Duty | Additional species of concern | of |
| <i>Araujia sericifera</i> | Moth vine | No | General Biosecurity Duty | Additional species of concern | of |
| <i>Ligustrum lucidum</i> | Broad-leaved Privet | No | General Biosecurity Duty | Additional species of concern | of |
| <i>Ligustrum sinense</i> | Small-leaved Privet | No | General Biosecurity Duty | Additional species of concern | of |
| <i>Lonicera japonica</i> | Japanese Honeysuckle | No | General Biosecurity Duty | Additional species of concern | of |
| <i>Solanum mauritianum</i> | Tobacco Bush | No | General Biosecurity Duty | N/A | |
| <i>Tradescantia fluminensis</i> | Trad | No | General Biosecurity Duty | N/A | |

*General Biosecurity Duty: All pest plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.

^ Prohibition on certain dealings: Must not be imported into the state, sold, bartered, exchanged or offered for sale.

BSC has historically undertaken an extensive and ongoing weed eradication program which commenced in 2007. The weed eradication program has involved dividing the Reserve into zones based on vegetation type, slope and scale of infestation with primary work being undertaken in priority areas and

undertaking subsequent follow up maintenance works (GeoLink 2015). Ongoing weed management is required to control current weed infestations and prevent the introduction and spread of any biosecurity weeds that are present within the Reserve and surrounding areas including Small-leaved Privet, Blackberry, Fireweed and Japanese Honeysuckle.



Figure 2: Vegetation communities / PCTs

3. Construction works

As part of the Dangar Falls Reserve works program BSC shall be responsible for the following.

3.1. Buffers and signage

Sections of the VMP area that are currently impacted are to be protected from future disturbance by the installation of buffers in the form of native plantings. Where possible BSC are to install and maintain a buffer strip of suitable native species between the curated picnic/park areas and the VMP area. It may be in the form of a "garden bed" type strip or as densely planted *Lomandra* spp. as a visual barrier. This currently exists in some areas. These buffers areas can be maintained by Landcare volunteers.

Existing fencing will be maintained to prevent pedestrians and vehicles from degrading or damaging native habitat and the natural environment, but primarily perform a safety barrier from the steeper escarpment sections.

Interpretative signage is to be located at strategic locations to advise the reserve users of the importance of the bushland and its environment and inhabitants (Figure 4). Interpretative signage will contain similar information to the following:

'The vegetation within this Reserve is protected. Activities such as creating walking tracks through bushland, illegal camping, firewood collection, bushrock removal, picking of native flowers, defecation and dumping of garden waste or rubbish are prohibited. Please only use the defined tracks provided.'

3.2. Track closure

Areas of valuable remnant vegetation are being degraded and trampled via the creation of informal foot tracks by members of the public. Access to the natural attributes of the reserve and Bielsdown River should be via dedicated formal walking tracks.

It is important to monitor new foot tracks being formed over time, and to actively discourage this practise through public education and closing certain tracks off.

Physical barriers (e.g. installation of large rock boulders) will be installed to block selected informal foot tracks. Approximate locations of existing informal tracks (some of which require definition via fencing installation or closure) are detailed in Figure 4.

3.3. Earthworks

Any future earthworks in the VMP areas (i.e. formalising roadside carpark areas or creating track boundaries) will ensure the natural soil is retained (stockpiled) and returned to the area from which it came following works. This will occur as soon as possible after works, to ensure the soil biota remains healthy and viable.

3.4. Tree clearance / supervision

Any BSC activities which involve tree removal should be undertaken with a qualified fauna ecologist or wildlife carer present to supervise works. All timber should be retained on-site, with mulch stockpiled

for use within VMP area and/or all timber cut into logs to be utilised as habitat for native fauna, to define track edges or block off unwanted tracks.

No native vegetation (trees, understorey and/or ground layer) is to be removed without assessment by a qualified ecologist and prior consent of Council.

3.5. Fauna habitat enhancement

The protection of native biodiversity is important in the long-term health and rehabilitation of native ecological communities. Although the VMP areas support a high proportion of exotic vegetation, native fauna, namely birds, reptiles and amphibians, have adapted to these environments. The removal of a large coverage of weeds from within the VMP areas in a relatively short timeframe may result in the displacement of native fauna species. This is a concern for maintaining local biodiversity.

Practical management techniques to minimise the impacts to native fauna during bush regeneration works include:

- staged or mosaic pattern of weed removal in highly degraded areas, involving areas no larger than 20 m x 20 m.
- concentrating the removal of dense woody weed infestations (e.g. Small-leaved Privet) outside peak bird breeding times and when they are not providing a major food source.
- retention and/or possible re-introduction of logs, branches and natural debris.
- spraying herbicides in cooler seasons to reduce impacts on amphibians.
- retain non-regenerative weed stockpiles (e.g. Small-leaved Privet) as fauna habitat and for erosion control.
- work in areas where native resilience is higher before targeting more highly degraded patches.

Additionally, large fallen branches and trunks (<10 cm diameter) should be used as habitat structures or to block off unwanted pedestrian access along informal tracks within the VMP areas. This includes the use of fallen woody debris as habitat piles or for mulch. Mulch should be free of weed propagules. Woody material provides microhabitat for fauna species, soil stability and assists in nutrient cycling. Exotic vegetation which readily regenerates on contact with soil (e.g. Trad and Small-leaved Privet) will be taken off-site and disposed of appropriately and should not be used in habitat enhancement.

The placement of all fauna habitat augmentation including nest boxes, where required, is to be carried out by a qualified bushland regenerator or ecologist.

In the event that exotic or native hollow-bearing trees are felled (e.g. during Council works or storm events) any hollows identified should be cut out and used as habitat in the VMP areas, in proximity to where they were originally formed.

4. Vegetation management works

4.1. VMP management zones

Dangar Falls Reserve covers an area of approximately 12.14 hectares (ha) with 10.77 ha included as the VMP area. The vegetation zones are presented in Table 3 and their location show in Figure 3. There are seven vegetation management zones defined as part of this VMP. The vegetation management zones have been derived from vegetation conditions classes within each PCT e.g. 'Poor' or 'Moderate'.


Table 3: Dangar Falls Reserve Plant Community Type, vegetation zones and conditions.

| Plant Community Type | Zone | Condition | Area within Council reserve (ha) |
|---|------|-----------|----------------------------------|
| PCT 3052: Northern Escarpment Antarctic Beech Rainforest | 1a | Poor | 1.61 |
| PCT 3052: Northern Escarpment Antarctic Beech Rainforest | 1b | Moderate | 0.89 |
| PCT 3146: Dorrigo Red Gum Grassy Forest | 2 | Poor | 3.53 |
| PCT 3207: Northern Escarpment Layered Blackbutt Fern Forest | 3a | Poor | 2.21 |
| PCT 3207: Northern Escarpment Layered Blackbutt Fern Forest | 3b | Moderate | 0.74 |
| PCT 3823: Cascades Cypress-Tea-tree Riparian Forest | 4a | Poor | 0.38 |
| PCT 3823: Cascades Cypress-Tea-tree Riparian Forest | 4b | Moderate | 1.41 |
| Total | | | 10.77 |

4.1.1. VMP management zone actions

VMP management zone actions including weed management actions and revegetation recommendations are provided in Table 4. Refer to Figure 3 for locations of each VMP management zone.

Table 4: Management Actions for VMP Management Zones

| VMP Management Zone | Area (ha) | Description | Weed Management Actions and Revegetation | Photo |
|---|-----------|---|---|--|
| Northern Escarpment Antarctic Beech Forest | | | | |
| Zone 1a: Poor | 1.61 | The vegetation throughout this zone is dominated by woody weeds with minimal native species. Dominant woody weeds include mature Small-leaved Privet and Tobacco Bush. Other weeds recorded within this zone area Inkweed (<i>Phytolacca octandra</i>), Japanese Honeysuckle, Cobblers Pegs (<i>Bidens pilosa</i>) and Trad. Trad occurs as a dense carpeted area along the path on top of the escarpment on the boundary of the Northern Escarpment Layered Blackbutt Fern Forest (Photo 7). | <p>Primary, secondary and follow-up weed control works are required. Weed management should primarily focus on:</p> <ul style="list-style-type: none"> Treating woody weeds in particular mature growth Small-leaved Privet and Japanese Honeysuckle along the riparian zone. Treat these weeds in a mosaic pattern to prevent bank de-stabilisation and erosion, and allow natural regeneration of native canopy, shrubs and groundcovers. <p>Following primary weed control, this area is expected to require revegetation at the canopy and mid stratum layers to reinstate the native Northern Escarpment Antarctic Beech Rainforest community.</p> <ul style="list-style-type: none"> All species for planting must be sourced from Northern Escarpment Antarctic Beech Rainforest community as per the recommended planting list included in Appendix D. Planting densities are to be determined by the Bush Regenerator contractor in consultation with BSC and the local |  |

| VMP Management Zone | Area (ha) | Description | Weed Management Actions and Revegetation | Photo |
|---------------------|-----------|---|--|---|
| | | | LandCare group. Refer to Table 7 for recommended planting densities. Refer to Appendix E for reference photos of this area. | |
| Zone 1b: Moderate | 0.89 | <p>The vegetation throughout this zone contains large old growth <i>Nothofagus moorei</i>. Other upper storey species include <i>Doryphora sassafras</i> and <i>Cryptocarya meissneriana</i>.</p> <p>Midstorey is predominately comprised of <i>Acacia melanoxylon</i> (Blackwood), <i>Lomatia fraseri</i> and <i>Dicksonia antarctica</i>. Groundcover within this zone was dominated by <i>Blechnum</i> spp., <i>Entolasia marginata</i>, <i>Commelina cyanea</i> and <i>Lomandra</i> spp.</p> <p>This zone has high weed cover towards the edges predominately Small-leaved Privet and Tobacco Bush.</p> | <ul style="list-style-type: none"> • Hand removal techniques should be utilised to prevent minimal disturbances to native species. • No foliage spraying or splattering with herbicide is recommended due to the potential for off target mortality. • Other non-invasive removal techniques are recommended including hand removal, scrape and paint and cut and paint. • Regular follow up sweeps are recommended at the maintenance stage to prevent any recurring specimens from establishing. • Plantings are only recommended within this zone if the area does not restore naturally following weed control. |  |

Dorrigo Red Gum Grassy Forest

| VMP Management Zone | Area (ha) | Description | Weed Management Actions and Revegetation | Photo |
|---------------------|-----------|--|---|---|
| Zone 2: Poor | 3.53 | <p>The zone is predominately cleared with high exotic grass cover with occasional scattered Eucalypt trees present; <i>Eucalyptus amplifolia</i> and <i>Eucalyptus dorrigoensis</i>.</p> <p>This zone supports patches of Small-leaved Privet infestation which increases towards the northerly corner (Photo 9). Other weeds recorded within this zone include Kikuyu (<i>Cenchrus clandestinum</i>), Cocksfoot (<i>Dactylis glomerata</i>), Inkweed, Tobacco Bush, Spear Thistle (<i>Cirsium vulgare</i>), Annual Ragweed (<i>Ambrosia artemisiifolia</i>), Veined Verbena (<i>Verbena rigida</i>) and Japanese Honeysuckle.</p> | <p>Primary, secondary and follow-up weed control works are required. Weed management should primarily focus on:</p> <ul style="list-style-type: none"> • Treating woody weeds in particular Small-leaved Privet. • Exotic grasses throughout this zone should be slashed and sprayed using a non-selective herbicide (e.g. Roundup Biactive®) via spray ring circles in preparation for revegetation works for planted trees. This will reduce competition with native plantings. Care must be taken to prevent off-target spraying of native groundcovers. • No splatter or foliage spraying should occur within 40 m of Bielsdown River. • The edge of the zone should be treated to prevent weed spread further into the intact areas of bushland. • Revegetation is only recommended once Small-leaved Privet infestations and exotic grasses are under control. <p>Following primary weed control, this area is expected to require revegetation at all stratum layers to reinstate the native Dorrigo Red Gum Grassy Forest community.</p> <ul style="list-style-type: none"> • All plantings must be sourced from Dorrigo Red Gum Grassy Forest community as per the recommended planting list included in Appendix D. • Planting densities are to be determined by the Bush Regenerator contractor in |  |

| VMP Management Zone | Area (ha) | Description | Weed Management Actions and Revegetation | Photo |
|---------------------|-----------|-------------|--|-------|
|---------------------|-----------|-------------|--|-------|

consultation with BSC and the local LandCare group. Refer to Table 7 for recommended planting densities. Refer to Appendix E for reference photos of this area.

Northern Escarpment Layered Blackbutt Fern Forest

Zone 3a: Poor 2.21 The vegetation throughout this zone contains a high cover of exotic species and occasionally native canopy. This zone is dominated by a dense infestation of woody weed species Small-leaved and Broad-leaved Privet (Photo 8) and English Ivy (*Hedera helix*) (Photo 6). Patches of predominately cleared vegetation occur within this zone and are dominated by exotic grasses such as Carpet Grass (*Axonopus fissifolius*), Vasey Grass (*Paspalum urvillei*), Broadleaf Paspalum (*Paspalum mandiocanum*) and Cocksfoot. A dense carpet of Trad also occurs within parts of this area as it merges into the Northern Escarpment Antarctic Beech Forest.


Other weeds which occur within this zone include Inkweed, Japanese Honeysuckle (*Lonicera japonica*), Moth Vine (*Araujia sericifera*), Blue Billygoat Weed (*Ageratina houstonianum*), Cobblers Pegs (*Bidens pilosa*), Fireweed (*Senecio madagascariensis*), Trad (*Tradescantia fluminensis*), Tobacco Bush, Curled Dock

Primary, secondary and follow-up weed control works are required. Weed management should primarily focus on:


- Treating woody weeds in particular mature Small-leaved Privet and Japanese Honeysuckle along the riparian zone.
- Treat these weeds in a mosaic pattern to prevent bank de-stabilisation and erosion, and allow natural regeneration of native canopy, shrubs and groundcovers.
- Exotic grasses throughout this zone should be slashed and sprayed using a non-selective herbicide (e.g. Roundup Biactive®) via spray ring circles in preparation for revegetation works. This will reduce competition with native plantings. Care must be taken to prevent off-target spraying of native groundcovers.
- No splatter or foliage spraying should occur within 40 m of Bielsdown River. The edge of the zone should be treated




| VMP Management Zone | Area (ha) | Description | Weed Management Actions and Revegetation | Photo |
|---------------------|-----------|---|---|-------|
| | | (<i>Rumex crispus</i>), Annual Ragweed (<i>Ambrosia artemisiifolia</i>), Blackberry (<i>Rubus fruticosus</i>), Whitetip Nightshade (<i>Solanum chenopodioides</i>), and Veined Verbena (<i>Verbena rigida</i>). | <p>to prevent weed spread further into the intact areas of bushland.</p> <ul style="list-style-type: none"> Revegetation is only recommended once Small-leaved Privet infestations are under control. <p>Following primary weed control, this area is expected to require revegetation at canopy and mid stratum layers to reinstate the native Northern Escarpment Layered Blackbutt Fern Forest community.</p> <ul style="list-style-type: none"> All plantings must be sourced from Northern Escarpment Layered Blackbutt Fern Forest community as per the recommended planting list included in Appendix D. Planting densities are to be determined by the Bush Regenerator contractor in consultation with BSC and the local LandCare group. Refer to Table 7 for recommended planting densities. Refer to Appendix E for reference photos of this area. | |

| VMP Management Zone | Area (ha) | Description | Weed Management Actions and Revegetation | Photo |
|---------------------|-----------|--|--|---|
| Zone 3b: Moderate | 0.74 | <p>The vegetation within this zone contains native canopy species <i>Eucalyptus nitens</i> (Shining Gum) and <i>Eucalyptus nobilis</i> (Ribbon Gum). The midlayer within this zone is predominately sparse with occasional native species occurring. Groundcover consist of a mixture of exotic and native groundcover. Previous bush regeneration works are evident in this zone with native plantings present.</p> <p>Within this zone some weed incursion occurs including Small Leaf Privet, Cocksfoot, Trad, Japanese Honeysuckle, Blackberry (<i>Rubus fruticosus</i>), Whitetip Nightshade and Moth Vine (<i>Araujia sericifera</i>).</p> | <ul style="list-style-type: none"> • Hand removal techniques should be utilised to prevent minimal disturbances to native species. • Other non-invasive weed control techniques area recommended including scrape and paint and cut and paint. • No foliage spraying or splattering is recommended to reduce off target mortality. • Plantings are only recommended within this zone if the area doesn't natural restore following weed control. |  |

Cascades Cypress Tea-tree Riparian Forest

| | | | | |
|---------------|------|--|--|--|
| Zone 4a: Poor | 0.38 | <p>The vegetation within this zone supports a high cover of exotic species. Small-leaved Privet dominates the midlayer with Japanese Honeysuckle occurring within the canopy and Tobacco Bush scattered throughout (Photo 5). Groundlayer weeds include exotic grasses such as Carpet Grass and Cocksfoot.</p> | <p>Primary, secondary and follow-up weed control works are required. Weed management should primarily focus on:</p> <ul style="list-style-type: none"> • Exotic grasses throughout this zone should be slashed and sprayed using a non-selective herbicide (e.g. Roundup Biactive®) via spray ring circles in preparation for revegetation works. This will reduce competition with native plantings. Care must be taken to prevent off-target spraying of native groundcovers. |  |
|---------------|------|--|--|--|

| VMP Management Zone | Area (ha) | Description | Weed Management Actions and Revegetation | Photo |
|---------------------|-----------|-------------|--|-------|
| | | | <ul style="list-style-type: none"> The edge of the zone should be treated to prevent weed spread further into the intact areas of bushland. Revegetation is only recommended once Small-leaved Privet and exotic grass infestations are under control. <p>Following primary weed control, this area is expected to require revegetation at canopy and mid stratum layers to reinstate the native Cascades Cypress Tea-tree Riparian Forest community.</p> <ul style="list-style-type: none"> Where possible all plantings must be sourced from Cascades Cypress Tea-tree Riparian Forest community as per the recommended planting list included in Appendix D. Planting densities are to be determined by the Bush Regenerator contractor in consultation with BSC and the local LandCare group. Refer to Table 7 for recommended planting densities. Refer to Appendix E for reference photos of this area. | |

| VMP Management Zone | Area (ha) | Description | Weed Management Actions and Revegetation | Photo |
|---------------------|-----------|--|---|---|
| Zone 4b: Moderate | 1.41 | <p>The vegetation within this zone is in moderate condition with <i>Callitris rhomboidea</i> (Port Jackson Pine) dominating the canopy.</p> <p>Midstorey within this zone is dominated by native species including <i>Leptospermum polygalifolium</i>, <i>Banksia integrifolia</i> subsp. <i>montana</i>, <i>Acacia melanoxylon</i>, <i>Denhamia moorei</i> (Mountain Denhamia) and <i>Lomatia arborescens</i> (Tree Lomatia). The ground layer consists of a mixture of exotic and native cover. Weed incursion occurs within this zone from edge effect such as Carpet Grass, Tobacco Bush, Japanese Honey suckle and Small-leaved Privet.</p> | <ul style="list-style-type: none"> • Hand removal techniques should be utilised to prevent minimal disturbances to native species. • Other non-invasive hand removal techniques are recommended including hand removal, scrape and paint and cut and paint. • No herbicide foliage spraying or splattering is recommended to reduce off target mortality. • Plantings are only recommended within this zone if the area doesn't naturally restore following weed control. |  |

Key Points for all management zones:

- Weed control to be carried in 'Moderate' zones should:
 - Use methods such as hand removal, cut and paint and spot spraying only, to minimise harm to native plants and encourage natural regeneration.
 - Limit spot spraying - to be used only if deemed necessary.
 - Undertake sweeps through the native vegetation of these VMZ's as part of every site visit (Refer to **Section 6.3**).

- Native mulch:
 - Is to be installed within the ring circles for canopy and shrub plantings in **VMP management zones 1a, 2, 3a and 4a** only. NB: Due to the steepness of the Reserve and access difficulties, transporting large quantities of mulch into some zones may be impracticable.
 - Where possible will be used to suppress weed growth, increase water retention in soils and provide protection against erosion issues that may occur due to the removal of vegetation.
 - Mulch will need approximately 3 to 4 weeks to settle prior to any plantings.
 - Ongoing weed control is to be maintained in mulched areas.

- Revegetation works:
 - Planting should commence in Autumn, however assisted plant establishment via watering will be at the discretion of the contractor and with due consideration of seasonality.
 - Although not a requirement, planting of the riparian zone should comply with DPI NRAR *Guidelines for vegetation management plans on waterfront land* (DPI NRAR 2012, p. 1) for best practice (Refer to **Appendix A**).

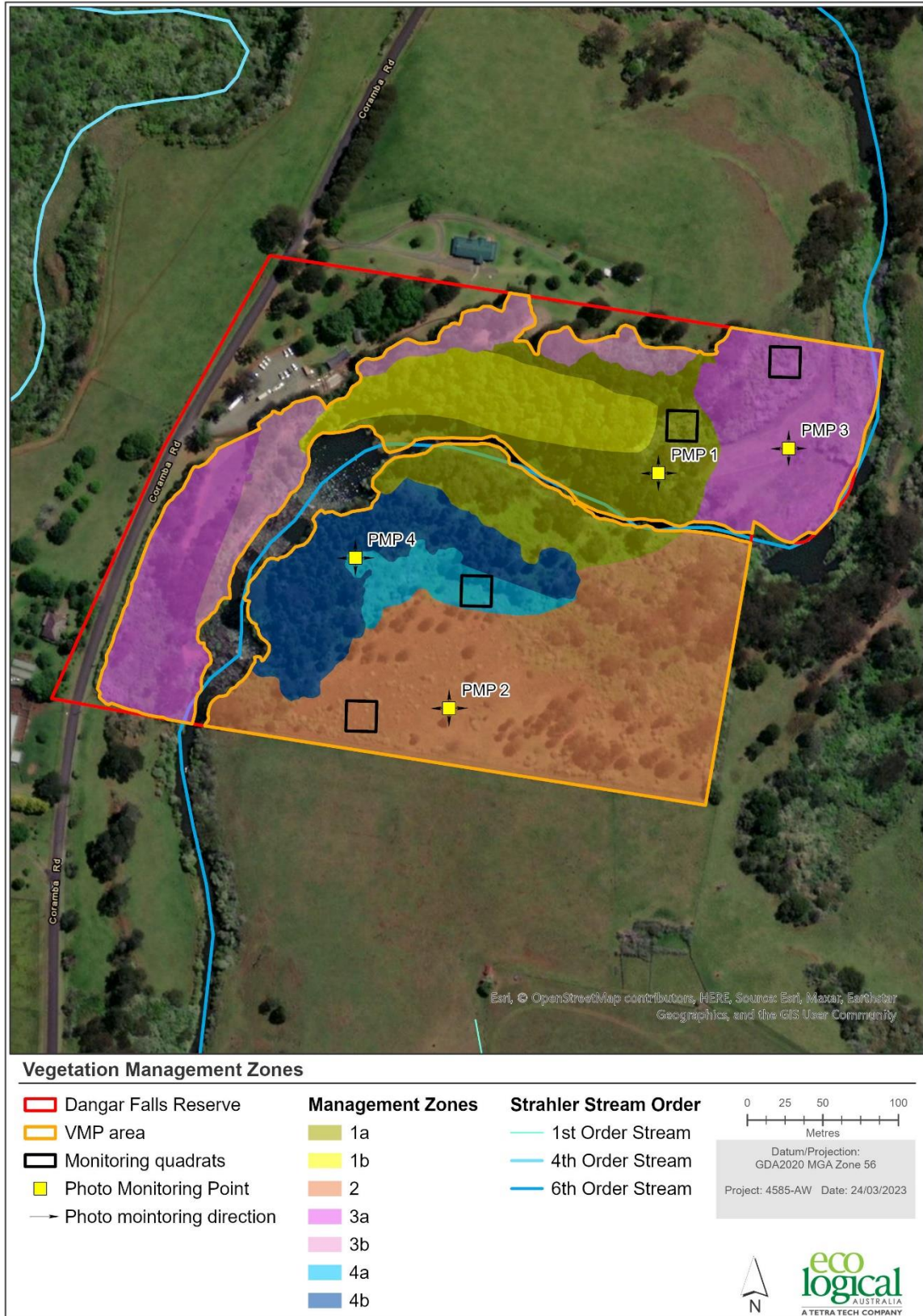


Figure 3: Vegetation Management Zones



Photo 5: Infestations of Japanese Honeysuckle and Small-leaved Privet within red circle within PCT 3823 viewed from the viewing platform.



Photo 6: Weeds present within PCT 3207 including English Ivy suffocating trees with Tobacco Bush, Broad-leaved and Small-leaved Privet



Photo 7: Trad incursion along the existing path on top of the escarpment in PCT 3052 and PCT 3207. Small-leaved Privet appears in the background as the landscape falls towards Bielsdown River.



Photo 8: Wall of Small-leaved Privet on boundary of PCT 3207 and 3052



Photo 9: Dense Small-leaved Privet infestation within PCT 3146

4.2. Weed control

4.2.1. Primary and secondary weed control

All weeds, including woody weeds in the understorey will require treatment. Secondary and follow up weed control will be required following revegetation. During these weed control activities (particularly during any spot spraying) care must be taken to avoid natural regeneration of native species.

Primary and secondary weed control will include woody weed and vine control, specifically the control of Small-leaved Privet (*Ligustrum sinense*), Broad-leaved Privet (*Ligustrum lucidum*), Japanese Honeysuckle (*Lonicera japonica*), Blackberry (*Rubus fruticosus* agg.) Moth Vine (*Araujia sericifera*) and English Ivy (*Hedera helix*). Juvenile woody weed and vine weed seedlings can be hand-pulled, provided the whole root is removed. Larger specimens of Small-leaved Privet can be treated using cut-and-paint method. In areas where Small-leaved Privet is dense brushcutting may be utilised followed by the paint method. Larger Moth Vine and Japanese Honeysuckle plants can be treated using the scrape-and-paint method. Thicker growth of these vine species may require using the skirting method, a brush hook or similar tools to bring down the top part of the plant from trees. Chemical and mechanical control techniques will be required in follow-up treatments. Follow-up treatments of woody weeds, including Small-leaved Privet seedling growth, will be required. For more information on specific weed control techniques refer to **Appendix C**.

4.2.2. Maintenance

Following secondary weed removal and revegetation, all areas will require ongoing maintenance to control weed regrowth from the soil seed bank. Maintenance work is to be undertaken by a qualified bush regeneration contractor(s) as per specifications provided in **Appendix C**.

Maintenance will be undertaken on a regular basis in the peak growing seasons (spring and summer), with less frequent visits in cooler periods (autumn and winter). Maintenance programs will also comment on other site issues such as pest animal activity. Maintenance work will include actions to encourage native regeneration where it is not occurring naturally. These actions include techniques such as soil disturbance, niche seeding and transplanting.

4.3. Mulching

Mulch has been shown to increase the survival rate of plants in soils with poor water holding ability, however excessive (thick) mulching may limit the likelihood of natural regeneration. The following provide a guide to the use of mulch:

- Mulch should be established to a depth of 75mm -100 mm.
- All mulch shall be free of contaminants including plastic waste and in particular weed seeds and propagules.
- Mulch should ideally be derived from local native vegetation. Pine mulch should be avoided as the higher acidity level is not generally suitable for the native vegetation.
- Mulch should be installed soon after weed control activities to allow for mulch to settle into soil.
- Jute mesh or matting is to be used instead of or with mulch in areas of high erosional potential (i.e. steep slopes).

4.4. Regeneration

As per Draft Bush Regeneration Plan for Dangar Falls Reserve (provided by BSC) it is recommended BSC use a mixture of natural regeneration and assisted regeneration via plantings.

Natural Regeneration: Existing remnant native vegetation with a good diversity and cover of native species ('Moderate' condition zones) can usually regenerate successfully after the removal of weeds that compete for light, water and nutrients. Existing native vegetation often improves in vigour, flower and set seed following weed removal. Following the disturbance of weed removal, seeds in the soil seed bank may also be stimulated to grow. The aim with this approach is to restore and maintain an ecosystem in which natural regeneration can occur.

Assisted Regeneration: Generally carried out in highly disturbed areas ('Poor' condition zones), natural regeneration may occur too slowly to outcompete weed species, prevent erosion, or too few species be represented to replenish native seed banks. Preference for planting species that are suited to the locality and representative of the target PCT will speed the regeneration process.

4.5. Revegetation

Revegetation works are required within all 'poor' condition zones. A total of 350 plantings have been committed by BSC for procurement, as well as 16.5 bush regenerator days (team of 4 people) (Table 5).

Revegetation works will include planting of primarily native canopy and shrub species using tube stock and Hiko / Viro cells followed by native groundcover species if feasible. Direct seedling may also be used where appropriate, as determined by a qualified bush regeneration contractor(s). It is recommended canopy and shrub plantings are well-established prior to revegetating the groundcover. Groundcover plantings are unlikely to survive if exotic groundcover is left unmanaged.

All plantings are to be sourced from local provenance stock, as per Florabank guidelines (Mortlock, 2000). Naturally occurring remnant vegetation, preferably from the local area, is the best source of seed and/or vegetative material for revegetation. Generally, these plants will have evolved to suit local environmental conditions and assist in the preservation of local provenance / genetic stock. On this basis, native plants for revegetation shall be sourced from suppliers that have obtained their stock by harvesting seed from local populations, however if unavailable, seed or tube stock must be sourced from the Bellingen LGA. More information on revegetation and seed collection specifications is provided in **Appendix C**.

Table 6 indicates the assumed revegetation areas within each VMP management zone, as well as assumed areas required for mulching. Recommended planting densities for the 'poor' management zones are provided in Table 7. Table 7 is best used as a guide only to inform any future grants or funding for the VMP area. The actual on-site revegetation densities for each management zone will be allocated at the discretion of the bushland regeneration contractor. A recommended planting list is provided **Appendix D**.

Table 5: Draft works Plan for Dangar Falls (provided by BSC)

| Activity | Who | Hours/plants | Timeline |
|--|---|-----------------|----------|
| Primary weed control of Small-leaved Privet, Broad-leaved Privet, Blackberry, Japanese Honeysuckle & English Ivy | Bush regeneration contractor | 288 hours | Year 1 |
| Supplementary Planting | Bush regeneration contractor and Landcare | 150 plants | Year 1 |
| Supplementary Planting | Bush regeneration contractor | 100 plants | Year 2 |
| Follow up weeding | Bush regeneration contractor /Landcare | 105 hrs +inkind | Year 2 |
| Supplementary Planting | Bush regeneration contractor | 100 plants | Year 3 |
| Follow up weeding | Bush regeneration contractor/ Landcare | 70 hrs + inkind | Year 3 |

Table 6: Assumed revegetation areas and mulch requirements within VMP area

| Zone | Description | Total area (m ²) | Revegetation Area (%) | Revegetation area (m ²) | Mulch (%) | Mulch area (m ³)* |
|--------------|-------------|------------------------------|-----------------------|-------------------------------------|-----------|-------------------------------|
| 1a | Poor | 16,100 | 50 | 8,050 | 30 | 2,42 |
| 1b | Moderate | 8,900 | - | - | - | - |
| 2 | Poor | 35,300 | 100 | 35,300 | 30 | 1,059 |
| 3a | Poor | 22,100 | 80 | 17,680 | 30 | 5,30 |
| 3b | Moderate | 7,400 | - | - | - | - |
| 4a | Poor | 3,800 | 100 | 3,800 | 30 | 1,14 |
| 4b | Moderate | 14,100 | - | - | - | - |
| Total | | 107,700 | | 64,830 | | 1,945 |

*Based on a maximum of 100mm depth of mulch

Table 7: Recommended revegetation densities by ELA

| Zone | Description | PCT | Revegetation area (m ²) | Planting densities (plants/per m ²) | | | | Total |
|------|-------------|--|-------------------------------------|---|-----------------------------|---------------------------|---------------------------|----------------|
| | | | | Trees | Shrubs | Sedges / Grasses | Ferns | |
| 1a | Poor | Northern Escarpment Antarctic Beech | 8,050 | 1/10 (805 individuals) | 3/20 (1,208 individuals) | 3 (24,150 individuals) | 1 (8,050 individuals) | 34,213 |
| 2 | Poor | Dorrigo Red Gum Grassy Forest | 35,300 | 1/20 (1,765 individuals) | 1/10 (3,530 individuals) | 2 (70,600 individuals) | 0 | 75,895 |
| 3a | Poor | Northern Escarpment Layered Blackbutt Forest | 17,680 | 1/10 (1,768 individuals) | 3/20 (2,652 individuals) | 2 (35,360 individuals) | 1 (17,680 individuals) | 57,460 |
| 4a | Poor | Cascades Cypress Tea-tree Riparian Forest | 3,800 | 1/10 (380 individuals) | 3/20 (570 individuals) | 3 (11,400 individuals) | 1 (3,800 individuals) | 16,150 |
| | | Total | 64,830 | 4,718 | 7,960 | 141,510 | 29,530 | 183,718 |

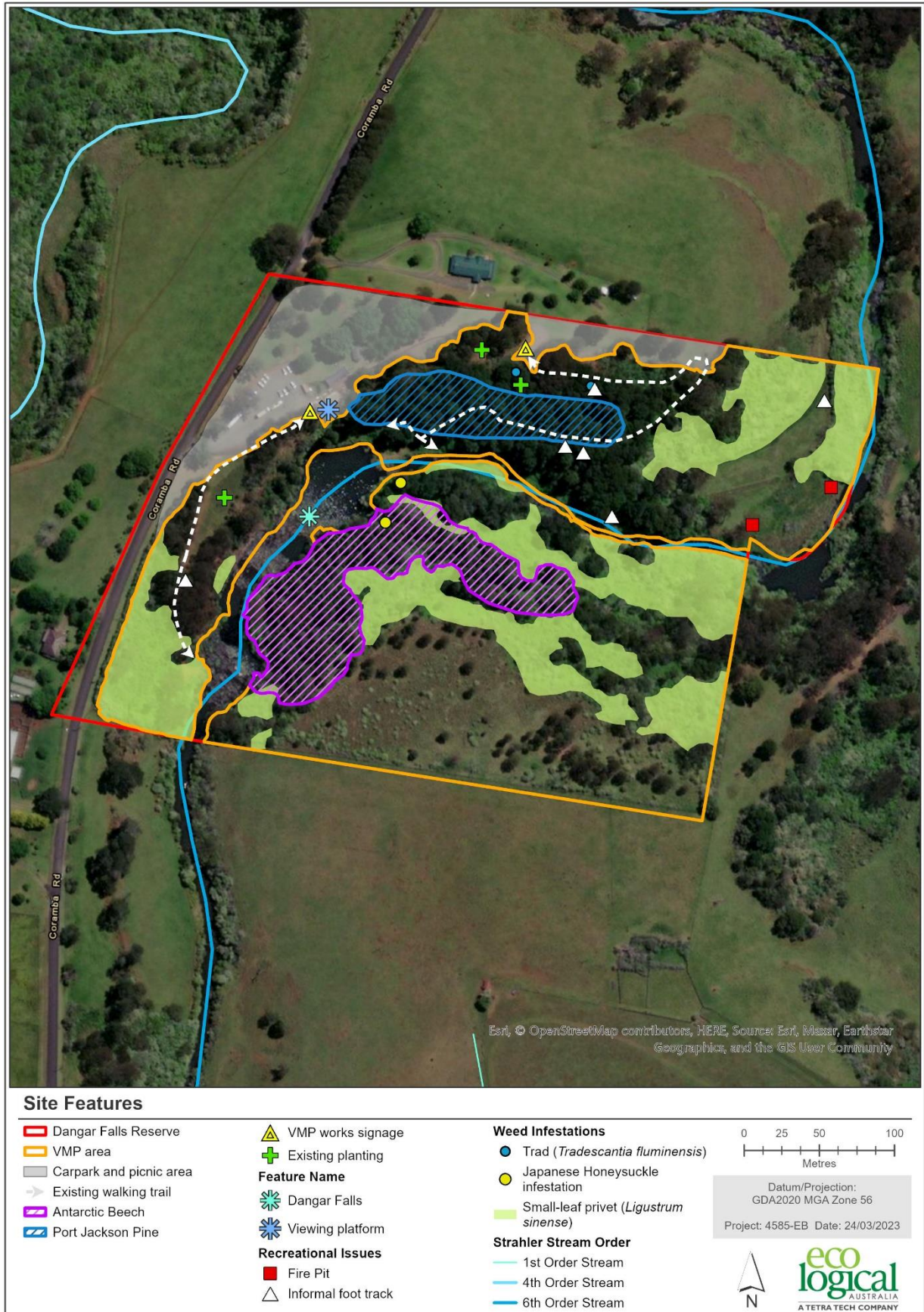


Figure 4: Site Features

5. Implementation schedule

5.1. Implementation schedule

The VMP areas will be managed in perpetuity with an initial implementation period of 5 years.

An indicative implementation schedule for the initial 5 years has been provided in Table 8.

Responsibilities have been identified as below:

| | | |
|-----|--|--|
| Key | Infrastructure construction activities | |
| | Vegetation management works | |

5.2. Adaptive management

As this is a long-term project, an adaptive management approach will be implemented that enables the successful contractor to learn from and respond to successful and unsuccessful techniques used on each site. In its simplest form, this may include the substitution of species identified in the planting table or for undertaking advanced direct seeding techniques in place of manual planting techniques for revegetation.

The success of the works will be determined by meeting the performance criteria. Contractors have the flexibility to implement different techniques to those specified here providing that performance criteria are met. Any major departures from the VMP or proposed changes to performance criteria must be approved in writing by BSC.

5.3. VMP area management after the initial five-year period (in perpetuity)

After the completion of the initial five-year period works as described within this VMP, on-going inspections of the vegetation within the VMP areas is to be carried out at least every three years to ensure the areas meet the ongoing performance criteria.

Areas that do not conform to the performance criteria are required to be reassessed to see if the rehabilitation techniques and goals were realistic using the methods outlined within this VMP. Survey at these inspections is to include both priority and environmental weed populations. A review of the current VMP will be needed at the 5-year completion period to assess its value and update as required.

Table 8: Implementation schedule

| Treatment | Year 1 | | | | Year 2 | | | | Year 3 | | | | Year 4 | | | | Year 5 | | | |
|---|--------|---|---|---|--------|---|---|---|--------|---|---|---|--------|---|---|---|--------|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Infrastructure works | | | | | | | | | | | | | | | | | | | | |
| Install fencing | ■ | | | | | | | | | | | | | | | | | | | |
| Close tracks | ■ | | | | | | | | | | | | | | | | | | | |
| Install informational signage | ■ | | | | | | | | | | | | | | | | | | | |
| Revegetation | | | | | | | | | | | | | | | | | | | | |
| Seed collection, cleaning, storage | ■ | | | | | | | | | | | | | | | | | | | |
| Site preparation | ■ | | | | | | | | | | | | | | | | | | | |
| Install jute matting / mulch (where required) | ■ | | | | | | | | | | | | | | | | | | | |
| Tubestock, supply and install | | ■ | ■ | | | | | | | | | | | | | | | | | |
| Replacement tubestock, supply and install | | | | | | ■ | ■ | | | | | | | | | | | | | |
| Irrigation | | ■ | ■ | | | ■ | ■ | | | | | | | | | | | | | |
| Weed control | | | | | | | | | | | | | | | | | | | | |
| Primary | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | | | | | | | |
| Secondary | | | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | | | | | |
| Maintenance | | | | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| Other works | | | | | | | | | | | | | | | | | | | | |
| Monitoring and reporting | ■ | | | ■ | | | | ■ | | | | ■ | | | | ■ | | | | ■ |
| VMP review / update | | | | | | | | | | | | | | | | | | | | ■ |

6. Monitoring and reporting

The bush regeneration contractor and the land manager will monitor the vegetation for changes over time. Information gained through the monitoring and reporting process will identify works that have and have not been successful, and the reasons for their success or failure.

The aim of monitoring is to measure the effectiveness of the control actions being undertaken to achieve the desired outcome. It will identify non-conformance and provide the land manager with the ability to implement corrective actions. Information derived from the results of monitoring will also be used in adaptive management (i.e. learning from past experience to inform future priorities and work plans). For example, as annual grass weeds are removed, herbaceous and perennial weeds may establish.

Finally, monitoring and reporting will help determine and quantify the costs related to weed management and the cost effectiveness of the VMP.

6.1. Baseline Vegetation Monitoring

Monitoring will be undertaken by photo monitoring points within each 'poor' vegetation zone. Monitoring will need to be implemented prior to works commencing to establish a benchmark for performance, and to occur on an annual basis until the completion of the project. Monitoring results will be included in the progress report.

6.1.1. Photo monitoring points (PMPs)

Temporary PMPs were established to provide a visual representation of the condition of vegetation at the photo point site. The photos taken at these points will provide a reference to record any disturbance and change over time. PMPs were established at four locations within the reserve (Table 9, Figure 3). Four photos were taken at each PMP within each poor condition zone; photo direction in the order of north, east, south, and west (Appendix E).

Table 9: Photo monitoring points

| PMP | PCT | Eastings | Northings |
|-----|--|-----------|------------|
| 1 | 3052: Northern Escarpment Antarctic Beech Rainforest | 472762.79 | 6645376.47 |
| 2 | 3146: Dorrigo Red Gum Grassy Forest | 472624.12 | 6645220.79 |
| 3 | 3207: Northern Escarpment Layered Blackbutt | 472849.01 | 6645392.77 |
| 4 | 3823: Cascades Cypress Tea tree Riparian Forest | 472562.14 | 6645320.37 |

Photo monitoring points are to include:

- Place one star picket (replace the current temporary orange poles currently established).
- Record the location (eastings and northings) of the star picket with a GPS.
- Take a digital photo from the star picket looking north, east, west and south
- Label each digital image with a unique reference number that indicates where the photo was taken (i.e. the photo monitoring point) and the date it was taken (e.g. PMP1 Photo 1 – 12.03.23 North for a photo taken looking north at the first photo monitoring point on the 12th March 2023).

6.1.2. Vegetation monitoring surveys

Quadrat data points will be established within the VMP area to monitor changes in the vegetation through time. The quadrat data forms the baseline for monitoring against the performance criteria for the first five years of the duration of the VMP. Floristic plot data is to be collected including species richness, cover and abundance in a quadrat, in accordance with the 20m x 20m floristic data collected per BAM 2020. The recommended locations for monitoring quadrats are shown in Figure 3.

6.1.2.1. Northern Escarpment Antarctic Beech Forest

Set up a minimum of one quadrat monitoring plots within the VMP area.

6.1.2.2. Dorrigo Red Gum Grassy Forest

Set up a minimum of one quadrat monitoring plots within the VMP area.

6.1.2.3. Northern Escarpment Layered Blackbutt Fern Forest

Set up a minimum of one quadrat monitoring plots within the VMP area.

6.1.2.4. Cascades Cypress Tea-tree Riparian Forest

Set up a minimum of one quadrat monitoring plots within the VMP area.

Biodiversity Assessment Method (BAM) benchmark conditions (BioNet 2021) for each PCT are provided in Table 11. These provide a general comparison point for monitoring how the vegetation is responding to restoration works over time.

6.2. Progress reports

One progress report is to be provided for the VMP area on an annual basis until the completion of the project (5 years). This reporting includes the implementation of the monitoring actions specified in **Section 6.1** and a description of the works that have been undertaken. These reports will be submitted to BSC. Reports will include at a minimum:

- the time period the report relates to.
- qualifications and experience of contractors.
- certification of seed and local provenance stock.
- a summary of works carried out within the period including:
 - date and time of site visits.
 - works completed on the site at each visit.
 - a table detailing total man hours for each task carried out on-site.

- methods of weeding undertaken and details of herbicide use.
- numbers of tubestock planted if applicable.
- methods implemented for Assisted Natural Regeneration.
- photo and quadrat monitoring results to date.
- a description of any problems encountered in implementing the works recommended in the VMP areas and how they were overcome.
- any observations made, including new plant species recorded (native and weed species), comments on rates of regeneration and any problems which impact on the implementation of the VMP (per VMP area).
- if applicable, the results of the implementation works in relation to the relevant performance criteria.

6.3. Performance criteria

The VMP performance criteria are detailed in Table 10.

Failure to meet these performance criteria will mean that the maintenance period will be extended until they are achieved. Therefore, maintenance must continue until BSC agrees that the objectives and performance criteria have been met and the maintenance period has concluded. The author of this VMP or equally qualified and experienced person must prepare a statement certifying the compliance of the performance criteria at the end of the five-year period.

If monitoring indicates that the VMP tasks are not resulting in achievement of the performance criteria, the task program will be revised. The civil contractor and the bush regeneration contractor, in consultation with Council, can adapt these criteria as required in response to the success of rehabilitation works.

Installed canopy tree and shrub plantings are not expected to achieve BAM benchmark (BioNet 2021) cover abundances identified in Table 11 by the end of the five-year VMP period. However, canopy trees and shrubs must achieve 90% survival rate and must be at a height to suggest health, vigour and capacity to achieve BAM cover abundances.

The following performance criteria will need to be achieved in perpetuity:

- across the VMP area, <10% priority weeds cover and <20% environmental weeds cover.
- no infiltration by exotic garden escapes into the VMP area.
- no dumped garden waste within the VMP area.
- no bare areas > 5 m² or erosion from exposed surfaces.
- species richness and cover goals after the initial five-year implementation period based on BAM benchmark conditions for each vegetation community present within the VMP area, this benchmark data should be used as a guide and as a reference to achieve desired planting densities (Table 11).

Table 10: Performance criteria

| Management Zones | Year 1 | Year 2 | Year 3 – 4 | Year 5 |
|------------------|---|---|---|---|
| All Zones | <ul style="list-style-type: none"> • Commencement of all tasks outlined in the VMP or evidence of planning for their implementation • Infrastructure construction works: • Native plant buffers and sediment fencing installed • Information signage installed • All earthworks completed under the supervision of an ecologist or bush regenerator • Soil preparation works completed to specifications in Section 3 • All rubbish and debris removed • Vegetation management works: • Revegetation is to be undertaken with a minimum of 40% of the benchmark levels for species diversity provided in Table 11 <ul style="list-style-type: none"> ○ A minimum of 85% survival rate of all vegetation strata planted in each zone (e.g. tree, shrub and groundcover) ○ No area greater than 5 m x 5 m without surviving revegetation. ○ Maintenance replanting is to replace plants by the same species, or where that species is not available, with the same growth form (i.e. tree for tree, etc.) and must not decrease species diversity. Any new species must be from the community being emulated and of local provenance. ○ Treatment of any new weed breakouts. ○ Monitoring and reporting undertaken in accordance with Section 6. | | | |
| All Zones | <ul style="list-style-type: none"> • Treat 100% of priority weeds • Treat 95% of other weeds • Treatment of new weed breakouts | <ul style="list-style-type: none"> • No greater than 30-40% cover by priority weeds • No greater than 30-40% cover by other weeds • Suppression of all weeds during revegetation • Shrub and groundcover cover no less than 40% of their respective benchmark levels provided in Table 11 • 85% survival rate of plantings, replacement plantings where required | <ul style="list-style-type: none"> • No greater than 5% cover by priority weeds • No greater than 10% cover by other weeds • Shrub and groundcover cover no less than 60% of benchmark levels provided in Table 11 | <ul style="list-style-type: none"> • No greater than 10% cover by priority weeds • No greater than 10-20% cover by other weeds • Shrub and groundcover cover no less than 70% of benchmark levels provided in Table 11 • Overall decrease in exotic diversity and increase in native diversity. Benchmark diversity levels provided in Table 11 can be used as a guide. |

Table 11: General benchmark conditions for each PCT within the VMP area

| PCT | PCT Name (BioNet 2021) | Species richness* | | | | | | Cover* (%) | | | | | |
|------|---|-------------------|-------|-------------------------------|------|------|-------|------------|-------|-------------------------------|------|------|-------|
| | | Canopy | Shrub | Grass and Grass Like | Forb | Fern | Other | Canopy | Shrub | Grass and Grass Like | Forb | Fern | Other |
| 3052 | Northern Escarpment Antarctic Beech Rainforest | 6 | 5 | 2 | 3 | 8 | 7 | 79 | 7 | 0 | 0 | 44 | 48 |
| 3146 | Dorrigo Red Gum Grass Forest | 6 | 7 | 8 | 17 | 3 | 7 | 54 | 10 | 71 | 11 | 6 | 13 |
| 3207 | Northern Escarpment Layered Blackbutt Fern Forest | 7 | 11 | 5 | 11 | 3 | 7 | 59 | 42 | 28 | 5 | 7 | 13 |
| 3823 | Cascades Cypress Tea-tree Riparian Forest | 3 | 13 | 7 | 7 | 2 | 3 | 2 | 96 | 38 | 3 | 1 | 0 |

* Based on monthly average following average rainfall year in NSW North Coast IBRA.

7. Approximate Hours

The hours needed for implementation for five-year period are approximately 1, 826 hours. An indicative timeline for labour hours is provided in Table 12.

7.1. Vegetation management works

7.1.1. Weed control techniques

BSC has committed 463 hours of bush regenerator contractor works to this VMP as per Dangar Falls Draft bush regeneration plan, 163 hours of which has been budgeted as a part of the Crown Lands grant. Bush regeneration contractors will implement the weed control treatments identified in this VMP. It is anticipated that 40 bushland regeneration team days (team of four) will be needed to carry out the primary and secondary weed control works over the initial 12 months, and 6 LandCare team (based on a minimum team of four) days over the remaining 4 years. There is also a commitment for 2 LandCare working bee's in addition to their weekly meet ups at no additional cost.

7.1.2. Revegetation treatments

Bush regeneration contractors will implement the revegetation works identified in this VMP.

BSC has committed **350** plantings over a 5-year period for this VMP. According to Section 4.3 and Table 7 the recommended planting densities exceed this number, where approximately **12,678** canopy and shrub plantings have been recommended to achieve reasonable/practical ecological resilience for these vegetation communities into the future. Tubestock installation labour hours include mulch, tree guards, planting, water crystals, fertiliser and initial watering, with a 10% replacement rate as separate task. It is anticipated a total of 192 hours (team of 4) are required for revegetation works. This is based on 20 plants/ hour / person. Number of plants will vary significantly depending on topography, site access, mulch transportation, jute matting, hard ground and plant density.

It has been assumed that mulch will need to be brought from a sustainable source and be installed and spread, this has been estimated as 242 m³.

Hours for the collection of seed has been included as a separate task. If further seed collection works are required, this may require additional hours.

7.1.3. Monitoring and reporting

Bush regeneration contractors or ecologists will undertake the monitoring and reporting identified in this VMP. This includes:

- conducting the baseline surveys
- preparing a yearly and final report, including photo points and vegetation surveying until the completion of the project

A total of 56 hours of monitoring and reporting have been allocated.

Table 12: Implementation hours

| Treatment | Establishment – Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Total |
|---|---|---------------------------------|---------------------------------|----------|----------|-------------------|
| Revegetation | | | | | | |
| Seed collection, cleaning, storage | 10 hours | - | - | - | - | 10 hours |
| Site preparation | 32 hours | - | - | - | - | 32 hours |
| Jute matting / Mulch | 242m ³ | - | - | - | - | 242m ³ |
| Install tubestock: mulch, tree guards, planting, water crystals, fertiliser and initial watering (canopy and shrub only). Approx. 6 days with 4 people. | Canopy (4718 plants) 60 hours | Shrub (3980 plants) 50 hours | Shrub (3980 plants) 50 hours | - | - | 160 hours |
| Replacement tubestock: mulch, tree guards, planting, water crystals, fertiliser and initial watering (Approx. 2 days with 4 people) | Canopy and Shrub (1268 plants) 32 hours | | | | - | 32 hours |
| Irrigation | 6 hours / event | - | - | - | - | TBC |
| Weed control | | | | | | |
| Primary (30 days with 4 people) | 960 hours | - | - | - | - | 960 hours |
| Secondary (10 days with 4 people) | 320 hours | - | - | - | - | 320 hours |
| Maintenance (6 days with 4 people) | | 64 hours | 64 hours | 64 hours | 64 hours | 256 hours |
| Monitoring and reporting | 16 hours | 8 hours | 8 hours | 8 hours | 16 hours | 56 hours |
| Total hours | 1430 hours (not including all irrigation event/s) | 122 hours | 122 hours | 72 hours | 80 hours | 1826 |

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Appendix A Riparian buffer guidelines

Controlled activities – Guidelines for riparian corridors on waterfront land

Controlled activities carried out in, on or under waterfront land are regulated by the *Water Management Act 2000* (WM Act). The Department of Planning and Environment administers the WM Act and is required to assess the impact of any proposed controlled activity to ensure that no more than minimal harm will be done to waterfront land as a consequence of carrying out the controlled activity.

Waterfront land includes the bed and bank of any river, lake or estuary and all land within 40 metres of the highest bank of the river, lake or estuary.

This means that a controlled activity approval must be obtained from the department before commencing the controlled activity.

What is a riparian corridor?

A riparian corridor (RC) forms a transition zone between the land, also known as the terrestrial environment, and the river or watercourse (aquatic environment). Riparian corridors perform a range of important environmental functions such as:

- providing bed and bank stability and reducing bank and channel erosion
- protecting water quality by trapping sediment, nutrients and other contaminants
- providing a diversity of habitats for terrestrial, riparian and aquatic plants (flora) and animals (fauna)
- providing connectivity between wildlife habitats
- conveying flood flows and controlling the direction of flood flows
- providing an interface or buffer between developments and waterways
- providing passive recreational uses.

The protection, restoration or rehabilitation of vegetated riparian corridors is important for maintaining or improving the shape, stability (or geomorphic form) and ecological functions of a watercourse.

Changes to controlled activities within riparian corridors

On 1 July 2012 rules commenced regarding controlled activities within riparian corridors. The rules amend the riparian corridor widths that apply to watercourses, providing more flexibility in how riparian corridors can be used and making it easier for applicants to determine the department's controlled activity approval requirements.

Key aspects of the changes include:

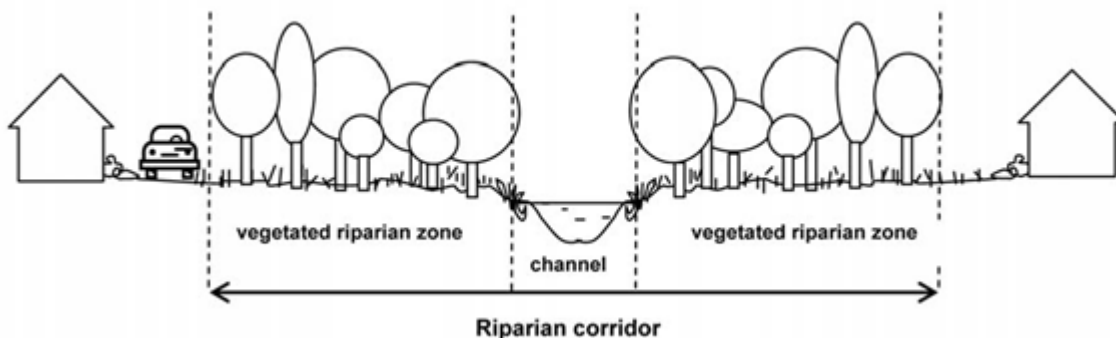
- provision of greater flexibility in the allowable uses and works permitted within riparian corridors
- the core riparian zone and vegetated buffer have been combined into a single vegetated riparian zone (VRZ)
- the width of the VRZ within the riparian corridor has been pre-determined and standardised for first, second, third and fourth order and greater watercourses
- where suitable, applicants may undertake non-riparian corridor works or development within the outer 50% of a VRZ, as long as they offset this activity by connecting an equivalent area to the RC within the development site
- a ‘riparian corridors matrix’ enables applicants to determine what activities can be considered in riparian corridors.

These changes will simplify the controlled activities application and assessment process, provide greater flexibility, help make more land available for housing, support floodplain, stormwater and bushfire management, and allow riparian corridors to be used for public amenity whilst continuing to deliver environmental outcomes required under the WM Act.

The riparian corridor (figure 1) consists of the:

- channel which comprises the bed and banks of the watercourse (to the highest bank)
- VRZ adjoining the channel.

Figure 1. The riparian corridor



Riparian corridor widths

The department recommends a VRZ width based on watercourse order as classified under the Strahler System of ordering watercourses and using current 1:25 000 topographic maps (see Figure 1 and Table 1). The width of the VRZ should be measured from the top of the highest bank on both sides of the watercourse.

Figure 2. The Strahler system

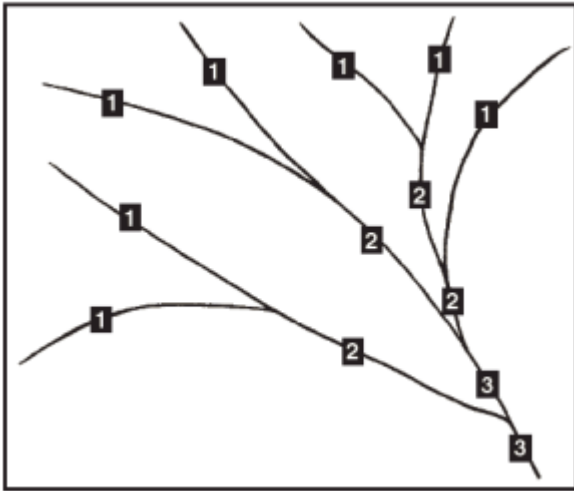


Table 1. Recommended riparian corridor widths

| Watercourse type | VRZ width (each side of watercourse) | Total RD width |
|--|--------------------------------------|----------------------|
| 1 st order | 10 metres | 20 m + channel width |
| 2 nd order | 20 metres | 40 m + channel width |
| 3 rd order | 30 metres | 60 m + channel width |
| 4 th order and greater (includes estuaries, wetlands and any parts of rivers influenced by tidal waters) | 40 metres | 80 m + channel width |

Note: where a watercourse does not exhibit the features of a defined channel with bed and banks, the department may determine that the watercourse is not waterfront land for the purposes of the WM Act.

Objectives for riparian corridor management

The overarching objective of the controlled activities provisions of the WM Act is to establish and preserve the integrity of riparian corridors.

Ideally, the environmental functions of riparian corridors should be maintained or rehabilitated by applying the following principles:

- identify whether or not there is a watercourse present and determine its order in accordance with the Strahler System
- define the RC/VRZ on a map in accordance with Table 1 if a watercourse is present
- maintain or rehabilitate a RC/VRZ with fully structured native vegetation in accordance with Table 1

- minimise disturbance and harm to the recommended RC/VRZ
- minimise the number of creek crossings and provide perimeter road separating development from the RC/VRZ
- locate services and infrastructure outside of the RC/VRZ. Within the RC/VRZ provide multiple service easements and/or utilise road crossings where possible
- treat stormwater run-off before discharging into the RC/VRZ.

The department, however, does allow for a range of works and activities on waterfront land and in riparian corridors to better meet the needs of the community, so long as they cause minimal harm as outlined in the riparian corridor matrix below.

Riparian corridor matrix

The riparian corridor matrix enables applicants to identify certain works and activities that can occur on waterfront land and in riparian corridors. Applicants should note that the matrix relates to controlled activity approvals under the WM Act only. They are still required to comply with other relevant government legislation, such as threatened species, flood planning levels and fisheries guidelines.

Table 2: Riparian corridor matrix

| Stream order | VRZ | RC offsetting for non-RC uses | Cycleways and paths | Detention Basins | | Stormwater outlet structures and essential services | Stream realignment | Road crossings | | |
|-------------------|-----|-------------------------------|---------------------|---------------------------|--------|---|--------------------|----------------|---------|--------|
| | | | | Only within 50% outer VRZ | Online | | | Any | Culvert | Bridge |
| 1 st | 10m | • | • | • | • | • | • | | | |
| 2 nd | 20m | • | • | • | • | • | | • | | |
| 3 rd | 30m | • | • | • | | • | | | • | • |
| 4 th + | 40m | • | • | • | | • | | | • | • |

Key

Stream order: the watercourse order as classified under the Strahler System based on 1:25,000, 1:50,000 or 1:100,000 topographic maps whichever is the smallest scale available. A full list is provided in Part 2, Schedule 2 of the Water Management (General) Regulation 2011.

Vegetated riparian zone (VRZ): the required width of the VRZ measured from the top of the high bank on each side of the watercourse.

Riparian corridor (RC) off-setting for non-RC uses: non-riparian uses, such as Asset Protection Zones are allowed within the outer 50% of the VRZ, so long as offsets are provided in accordance with the averaging rule as seen in Figure 3.

Cycleways and paths: cycleways or paths no wider than four metres total disturbance footprint can be built in the outer 50% of the VRZ.

Detention basins: detention basins can be built in the outer 50% of the VRZ or online where indicated. Refer to the department's [Guidelines for outlet structures](#) and [Guidelines for in-stream works](#). Online basins must:

- be dry and vegetated
- be for temporary flood detention only with no permanent water holding
- have an equivalent VRZ for the corresponding watercourse order
- not be used for water quality treatment purposes.

Stormwater outlet structures and essential services: stormwater outlets or essential services are allowed in the RC. Works for essential services on a fourth order or greater stream are to be undertaken by directional drilling or tied to existing crossings. Refer to the department's [Guidelines for outlet structures](#) and [Guidelines for in-stream works](#).

Stream realignment: indicates that a watercourse may be realigned. Refer to the department's [Guidelines for in-stream works](#).

Road crossings: indicates permitted road crossing methods. Refer to the department's [Guidelines for watercourse crossings](#) and NSW Department of Primary Industries [Policy and Guidelines for Fish Friendly Waterway Crossings](#).

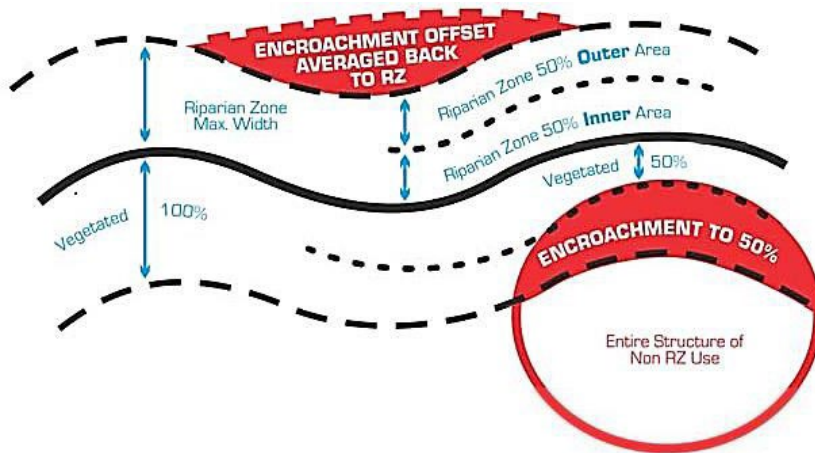
The averaging rule

Non-riparian corridor works and activities can be authorised within the outer riparian corridor, so long as the average width of the vegetated riparian zone can be achieved over the length of the watercourse within the development site. That is, where appropriate 50% of the outer vegetated riparian zone width may be used for non-riparian uses including asset protection zones, recreational areas, roads, development lots and infrastructure. However, an equivalent area connected to the riparian corridor must be offset on the site (see Figure 3) and the inner 50% of the vegetated riparian zone must be fully protected and vegetated with native endemic riparian plant species.

Bridges, cycleways, paths, stormwater outlets and other essential services do not need to be offset but must comply with the requirements set out in the riparian corridor matrix (Table 2) and other relevant departmental controlled activities guidelines. Offline detention basins do not need to be offset so long as there is an equivalent VRZ for the corresponding watercourse and they are built in compliance with the department's [Guidelines for watercourse crossings](#) and [Guidelines for in-stream works](#). If a proposed basin will not have an equivalent VRZ for the corresponding watercourse, it may still be built in the outer 50% of the VRZ but must be offset.

The averaging rule should generally be applied to cleared waterfront land. Development proposals involving waterfront lands that contain existing native vegetation should seek to preserve that riparian vegetation according to the minimum riparian corridor requirements outlined in Table 1.

Figure 3: Averaging rule



Applications for controlled activity approvals

Applications for controlled activities approvals should be informed by the riparian corridor matrix shown in Table 2 and prepared by visiting the [NSW Planning Portal](#). For assistance, refer to the [departments website](#). Other controlled activity guidelines are available on the [department's website](#) and outline relevant considerations for applicants when proposing activities and works on waterfront lands.

Streamlined assessment

Where applications are presented in accordance with the riparian corridor matrix (Table 2) and other departmental controlled activity guidelines, they will be assessed under a streamlined process. This may decrease the amount of time it takes the department to make a determination, saving applicants time and money.

Applications that do not conform to the matrix and/or relevant departmental controlled activity guidelines will continue to be subject to merit assessment to ensure that the proposals meet the requirements of the WM Act. All applications will still need to demonstrate that minimal harm will occur to waterfront land before a controlled activity approval will be issued.

More information

- For more information about controlled activities on waterfront land, visit the department's website at water.dpie.nsw.gov.au/licensing-and-trade/approvals.
- Copies of the Acts and associated regulations are available on the NSW Government legislation site at www.legislation.nsw.gov.au.

If you think you need to make a controlled activity application, our easy-to-use online support tool Water Assist can help you. Visit www.dpie.nsw.gov.au/water/water-assist.

Appendix B Flora list

| Family | Scientific Name | Common Name | Exotic |
|--------------------|------------------------------------|------------------------|--------|
| Apocynaceae | <i>Araujia sericifera</i> | Moth Vine | Yes |
| Araliaceae | <i>Hedera helix</i> | English Ivy | Yes |
| Asparagaceae | <i>Lomandra longifolia</i> | Spiny-headed Mat-rush | |
| Asparagaceae | <i>Lomandra spicata</i> | | |
| Asparagaceae | <i>Lomandra spp.</i> | | |
| Aspleniaceae | <i>Asplenium australasicum</i> | Bird's Nest Fern | |
| Asteraceae | <i>Ageratina adenophora</i> | Crofton Weed | Yes |
| Asteraceae | <i>Ageratum houstonianum</i> | Blue Billygoat Weed | Yes |
| Asteraceae | <i>Ambrosia artemisiifolia</i> | Annual Ragweed | Yes |
| Asteraceae | <i>Bidens pilosa</i> | Cobblers Pegs | Yes |
| Asteraceae | <i>Cirsium vulgare</i> | Spear Thistle | Yes |
| Asteraceae | <i>Senecio madagascariensis</i> | Fireweed | Yes |
| Atherospermataceae | <i>Doryphora sassafras</i> | Sassafras | |
| Blechnaceae | <i>Blechnum spp.</i> | | |
| Caprifoliaceae | <i>Lonicera japonica</i> | Japanese Honeysuckle | Yes |
| Casuarinaceae | <i>Allocasuarina littoralis</i> | Black Sheoak | |
| Celastraceae | <i>Denhamia moorei</i> | Mountain Denhamia | |
| Commelinaceae | <i>Commelina cyanea</i> | | |
| Commelinaceae | <i>Tradescantia fluminensis</i> | Trad | Yes |
| Convolvulaceae | <i>Dichondra repens</i> | Kidney Weed | |
| Cupressaceae | <i>Callitris rhomboidea</i> | Port Jackson Pine | |
| Dennstaedtiaceae | <i>Pteridium esculentum</i> | Common Bracken Fern | |
| Dicksoniaceae | <i>Dicksonia antarctica</i> | Soft-tree-fern | |
| Fabaceae | <i>Acacia melanoxylon</i> | Blackwood | |
| Geraniaceae | <i>Geranium solanderi</i> | Native Geranium | |
| Lamiaceae | <i>Plectranthus parviflorus</i> | Cockspur flower | |
| Lauraceae | <i>Cryptocarya meissneriana</i> | Thick-leaved Laurel | |
| Myrtaceae | <i>Eucalyptus amplifolia</i> | Cabbage Gum | |
| Myrtaceae | <i>Eucalyptus dorrigoensis</i> | Dorrigo White Gum | |
| Myrtaceae | <i>Eucalyptus nitens</i> | Shining Gum | |
| Myrtaceae | <i>Eucalyptus nobilis</i> | Ribbon Gum | |
| Myrtaceae | <i>Leptospermum petersonii</i> | Lemon-scented Tea Tree | |
| Myrtaceae | <i>Leptospermum polygalifolium</i> | Tantoon | |

| Family | Scientific Name | Common Name | Exotic |
|----------------|--|---------------------|--------|
| Nothofagaceae | <i>Nothofagus moorei</i> | Antarctic Beech | |
| Oleaceae | <i>Ligustrum lucidum</i> | Broad-leaved Privet | Yes |
| Oleaceae | <i>Ligustrum sinense</i> | Small-leaved Privet | Yes |
| Phytolaccaceae | <i>Phytolacca octandra</i> | Inkweed | Yes |
| Plantaginaceae | <i>Plantago lanceolata</i> | Lamb's Tongues | Yes |
| Poaceae | <i>Axonopus fissifolius</i> | Carpet Grass | Yes |
| Poaceae | <i>Cenchrus clandestinum</i> | Kikuyu | Yes |
| Poaceae | <i>Dactylis glomerata</i> | Cocksfoot | Yes |
| Poaceae | <i>Entolasia marginata</i> | Bordered Panic | |
| Poaceae | <i>Entolasia stricta</i> | Wiry Panic | |
| Poaceae | <i>Paspalum mandiocanum</i> | Broadleaf Paspalum | Yes |
| Poaceae | <i>Paspalum urvillei</i> | Vasey Grass | Yes |
| Poaceae | <i>Poa</i> spp. | | |
| Poaceae | <i>Themeda triandra</i> | Kangaroo Grass | |
| Polygonaceae | <i>Rumex crispus</i> | Curled Dock | Yes |
| Polypodiaceae | <i>Microsorium scandens</i> | Fragrant Fern | |
| Proteaceae | <i>Banksia integrifolia</i> subsp. <i>monticola</i> | | |
| Proteaceae | <i>Lomatia arborescens</i> | Tree Lomatia | |
| Proteaceae | <i>Lomatia fraseri</i> | Silky Lomatia | |
| Proteaceae | <i>Persoonia media</i> | | |
| Rosaceae | <i>Rubus fruticosus</i> | Blackberry | Yes |
| Rosaceae | <i>Rubus parviflorus</i> | Native Raspberry | |
| Smilacaceae | <i>Smilax australis</i> | Lawyer Vine | |
| Solanaceae | <i>Solanum chenopodioides</i> | Whitetip Nightshade | Yes |
| Solanaceae | <i>Solanum mauritanum</i> | Tobacco Bush | Yes |
| Verbenaceae | <i>Verbena rigida</i> | Veined Verbena | Yes |

Appendix C Weed Control, Techniques and Specifications

Weed control

Weed control involves a combination of mechanical, physical and chemical techniques to remove the weeds and prevent regrowth. Weed control will be undertaken in all VMZ's. A selection of the best suited weed control method within the site depends on a number of factors including:

- the species or combination of weeds being targeted
- the density of the weeds
- resources available (time, labour, equipment and finances)
- weather conditions of the day.

General

- The contractor shall take all care not to poison existing desirable vegetation when undertaking herbicide control methods;
- The correct herbicide shall be selected and used appropriately to ensure effective results on all Biosecurity weeds;
- Herbicide control is not to be used within or near water courses. The contractor shall obtain all required permits prior to use of herbicides near any water course and submit details of proposed spraying and chemicals to be used for approval prior to commencement;
- Biosecurity weed removal shall be carried out as described utilising weed removal techniques outlined in this specification. Should the contractor feel that techniques selected in the report will prove un-effective or inefficient; the contractor shall notify the ecologist nominating alternative procedures for review;
- All herbicide spraying is to be undertaken using apparatus deemed as appropriate, generally this will be Knap-Sack or vehicle mounted spray boom in large areas. All other methods of herbicide application are not to be used onsite unless discussed and approved in writing by the Ecologist; and
- The contractor shall ensure any spray drift is kept to an absolute minimum.

Note this list is not exhaustive, however intended to provide a guide to assist in VMP implementation.

Herbicide Spraying

- Herbicides should not be applied prior to rain occurring. This reduces the herbicides effectiveness as well as being transported in runoff to creek lines and waterways. The use of herbicides should be considered when;
- There are small areas of dense Biosecurity weeds with few or no native plants to protect;
- There are large areas of Biosecurity weeds;
- The Biosecurity weeds are growing too rapidly for physical removal; and
- The spraying of weeds must only be undertaken by experienced persons with Chemcert or equivalent qualifications. The success of each treatment must be evaluated by the operator after a set period of time and re-applied (if Necessary) according to the labelled effectiveness

for each herbicide. Care must be taken when applying herbicides near drainage lines to avoid excess use due to the sensitivity of the alter bodies into which runoff will eventually flow.

Mechanical Removal

- Mechanised removal using plant in a manner that does not impact the watercourse bed and bank.
- Once initial treatment has occurred follow up cut and paint will be required to ensure any remaining plants are treated. Should any plants be found that are small enough to pull out successfully by hand this is preferred. Ensure that all roots are removed. Hand pulling techniques are outlined below; and
- Hand removal will be required most probably after initial treatment and will be used in the event of new seedling emergence which will have recolonised after initial removal. Hand removal shall be employed ensuring that all roots are removed as described below.

Hand Removal

- Best undertaken when the soil profile is moist to ensure full and ease of removal and disposal off site;
- Apparent seeds and fruit are to be removed and placed in a bag for removal and disposal off site;
- Firmly take hold of the seedling at ground level, pull and manipulate backwards and forwards until it releases cleanly. If the plant is held too high it may break resulting in root material left behind in the soil. Remaining plant material may re-establish in this instance;
- All roots remaining within the soil shall be removed;
- Should the seedling have a spreading root system, roots will require individual removal; and
- All seedlings and hand pulled weeds are to be placed in a bag, removed from site and disposed of sensibly.

Woody Weed Removal Techniques

- Cut and Paint woody weeds to 10cm basal diameters;
- Stem injection;
- Frilling or Chipping - Plants should be actively growing and in good health;
- Deciduous plants should be treated in spring and autumn when leaves are fully formed;
- For multi-stemmed plants, inject or chip below the lowest branch to treat each stem individually; and
- Herbicides must be injected immediately before plant cells close (within 30 seconds) and translocation of herbicide ceases

Revegetation works

Revegetation has the twin aims of both re-establishing the original native vegetation community at the site and reducing erosion along the length of the riparian corridor, which will carry greatly increased peak flows due the increased run-off from the hard surfaces created by the associated development.

Any plantings should consist of local provenance stock.

Planting of Hiko for trees is the preferred method. Planting should be done via a low impact method such as hand digging or hand auger. The holes dug for each plant should be at least 1.5x the width and 2x the depth of the rootball. Fertiliser should be added to each hole dug as per the label specifications. Water crystals or wetting agents should be added to each plant hole. This will increase the water holding capacity of the soil and reduce watering schedules. Initial irrigation of the plantings is essential to ensure that the soil forms around the rootball and no air pockets are left. This will be required unless sufficient rainfall (approximately 10 mm) occurs on the day of planting.

Tree guards will need to be installed on each tree or shrub to protect seedlings from extreme weather (frosts and heat), herbivorous grazing and herbicide drift during maintenance. Bio-degradable tree guards are recommended to protect the seedlings. Following the revegetation works, irrigation needs to be undertaken for at least 8 weeks following planting to ensure the establishment of the plants. The level of irrigation will be determined by rainfall and temperature experienced at the planting site.

Mulch should be used where identified. The use of mulch is very important because it provides organic matter to the top soil, improves soil structure and aeration, water infiltration, nutrient availability, and is also useful in the suppression of weed growth (Buchanan 2009). Mulch should be sourced from within the local area. Mulch must be free of weed propagules and invasive woody species. Mulching should not be undertaken within areas of high potential erosion. It is recommended jute matting is used in these areas prior to revegetation.

A temporary irrigation system should be installed to assist in the establishment of vegetation. Timing of the planting of these areas will need to take into consideration surrounding civil works and erosion/sediment control requirements, these areas will not be planted until earthworks have been completed. A maximum rate of attrition of 10% is to be tolerated, with any plant loss above this rate to be replaced at the expense of the contractor.

Seed collection

For the growth of the plants used in the revegetation works, seed must be collected from local provenance species within the Coffs Harbour region (flats, drainage lines and river terraces of coastal floodplains). Riparian/wetland species are typically widely dispersed and may be collected from the Coffs Harbour region. However, seed must be sourced from within a 20km radius where available.

Where species identified in this VMP cannot be sourced, they may be substituted for other Swamp Sclerophyll Forest species as identified by the NSW Scientific Committee. Species must be substituted with species of a similar form (e.g. tree for tree etc.). Only wild native species are to be used. Plants are not to be substituted with horticultural varieties under any circumstances.

Record keeping of seed collection and planting locations are to follow the Florabank guidelines (Mortlock 1999). A Section 132C licence under the NSW National Parks and Wildlife Act 1974 will be required to undertake seed collection works. The bush regeneration contractor is responsible for recording this information and providing it to MCC.



Only wild native species are to be used. Plants are not to be substituted with horticultural varieties under any circumstances.

Bush regeneration contractors

All vegetation management works in the establishment phase will be undertaken by suitably qualified and experienced bush regeneration contractors and/or similar person with bush regeneration experience and ChemCert. The contractor will need to carry out best practice bush regeneration techniques as described by Buchanan (2009). A flexible approach to this site is recommended since techniques may need to be changed or modified to suit site conditions. This approach is consistent with adaptive management and allows the contractor to develop and build on site knowledge whilst implementing this VMP. Monitoring will assist in the development of the VMP actions in subsequent years.

Target Weed Species

| Target Species | | Control technique |
|--|---|--|
| Blackberry (<i>Rubus fruticosus agg</i>) |  | <p>Long term control of blackberry is an ongoing process. A combination of control methods and follow up is needed.</p> <p>Chemical Control</p> <p>Glyphosate 360 g/L (Various products) Rate: 10–13 mL per 1 L of water Comments: Flowering to leaf fall. Use higher rate on old, dense infestations.</p> <p>Triclopyr 600 g/L (Garlon® 600) Rate: 280 mL per 10 L of water Comments: Gas gun / Splatter gun application. Good control will be achieved, similar to high volume application, where bush size enables good coverage of entire bush. The use of marking agent is recommended.</p> |
| Small Leaf Privet (<i>Ligustrum sinense</i>) |  | <p>Wide dispersal of seed by birds cannot be controlled; therefore controlling the spread of privet requires the removal of seed trees and young seedlings before they produce seed. Successful weed control requires follow up after the initial efforts.</p> <p>Cut stump method</p> <p>This method is effective on young plants, suckers, and regrowth. Cut trunks or stems, and apply herbicide to the stump immediately (within 15 seconds of cutting). Treat every stump.</p> <p>Stem injection</p> <p>This method is suitable for large plants and has the lowest risk of damage to other vegetation. It is also cost effective in terms of labour and volume of herbicide required. Drill or make cuts into the sapwood and fill with herbicide immediately (within 15 seconds of making the cut). Treat every stem.</p> |

| Target Species | Control technique |
|--|--|
| | <p>Glyphosate 360 g/L (Various products) Rate: Undiluted (1–2 mL per cut) Comments: Stem injection technique, as per label.</p> <p>Privets can cause the following health problems: Eating the berries may cause abdominal pain, nausea, vomiting and diarrhoea. Touching leaves or berries can cause skin or eye irritation. The flower perfume may cause respiratory irritation. People who are sensitive to grass pollen can become sensitive to privet, producing allergic reactions.</p> |
| <p>Japanese honeysuckle (<i>Lonicera japonica</i>)</p>  | <p>Cut Stump where accessible. Glyphosate 360 g/L (Various products) Rate: 400 mL in 600 mL of water</p> <p>Spot spray for hard to access infestations. Add surfactant Metsulfuron-methyl 600 g/kg (Various products) Rate: 10 - 20 g in 100 L of water</p> <p>Japanese honeysuckle is toxic to humans, causing discomfort and irritation but is not life threatening. The berries and leaves are poisonous if ingested, causing gastro-intestinal irritation. It is also a skin irritant causing rashes on contact with the plant.</p> |
| <p>English Ivy (Hedera helix)</p>  | <p>Physical removal – Volunteers where accessible</p> <p>Hand pulling or digging out plants. To avoid damaging plants covered with ivy, cut stems at ground level and leave to dry out on trees and shrubs, but take care to: remove all stems that are in contact with the ground dig out and remove all root material dispose of plants properly.</p> <p>Cut stump Cut the stems horizontally back to the rhizome and apply the gel across the surface of the rhizome.</p> <p>Scrape and paint</p> |

| Target Species | Control technique |
|----------------|--|
| | <p>Cut and scrape the stems and apply the herbicide mix within 15 seconds of scraping.</p> <p>Glyphosate 360 g/L (Various products) Rate: 1 part glyphosate to 1.5 parts water Comments: Cut stump/scrape stem.</p> |

Trad
 (*Tradescantia fluminensis*)



By hand For Volunteers mostly.
 Very small infestations can be pulled out by hand but every single stem node must be removed. Larger infestations can be raked first and then followed up by hand weeding. Plants can be composted under black plastic in full sun. Contact your local council for advice on how to dispose of this weed.

Chemical control
 Spraying is best for dense infestations which are not close to desirable species. Thoroughly cover all parts of the plant with herbicide.
 Weed wipers can be used for Trad growing amongst native plants to avoid off target damage from spray drift.
Glyphosate 360 g/L (Various products)
 Rate: 200 mL per 10 L of water
 Comments: Treat in winter or early spring. For best results, add a surfactant. Apply two sprays, 6–8 weeks apart. Repeat treatments are essential.

Repeat applications are often needed.

Appendix D Recommended Planting List

Table 13: Recommended planting list for PCT 3052

| Form | Scientific Name | Common Name |
|-----------|------------------------------------|-------------------------|
| Canopy | <i>Nothofagus moorei</i> | Antarctic Beech |
| | <i>Doryphora sassafras</i> | Sassafrass |
| | <i>Trochocarpa montana</i> | |
| | <i>Cryptocarya nova-anglica</i> | Mountain Laurel |
| | <i>Acacia melanoxylon</i> | Blackwood |
| | <i>Hedycarya angustifolia</i> | Native Mulberry |
| | <i>Quintinia sieberi</i> | Possumwood |
| | <i>Vesselowskya rubifolia</i> | Southern Marara |
| | <i>Banksia integrifolia</i> | Coast Banksia |
| | <i>Cryptocarya foveolata</i> | Mountain Walnut |
| | <i>Cryptocarya meissneriana</i> | Thick-leaved laurel |
| | <i>Diploglottis australis</i> | Native Tamarind |
| | <i>Notelaea longifolia</i> | Mock Olive |
| | <i>Orites excelsus</i> | Prickly Ash |
| | <i>Trochocarpa laurina</i> | Tree Heath |
| Midstorey | <i>Coprosma quadrifida</i> | Prickly Currant Bush |
| | <i>Dicksonia antarctica</i> | Soft Tree Fern |
| | <i>Elaeocarpus holopetalus</i> | Black Olive Berry |
| | <i>Alyxia ruscifolia</i> | Prickly Alyxia |
| | <i>Lomatia fraseri</i> | Silky Lomatia |
| | <i>Tasmannia purpurascens</i> | Broad-leaved Pepperbush |
| | <i>Tasmannia stipitata</i> | Northern Pepperbush |
| | <i>Aristotelia australasica</i> | Mountain Wineberry |
| | <i>Myrsine howittiana</i> | Brush Muttonwood |
| | <i>Denhamia moorei</i> | Mountain Denhamia |
| | <i>Leptospermum polygalifolium</i> | Tantoon |
| | <i>Notelaea venosa</i> | Veined Mock-olive |
| | <i>Alchornea ilicifolia</i> | Native Holly |
| | <i>Atherosperma moschatum</i> | Black Sassafrass |
| | <i>Elaeocarpus reticulatus</i> | Blueberry Ash |

| Form | Scientific Name | Common Name |
|-----------------------|--------------------------------|-----------------------|
| Grasses or Grass Like | <i>Leucopogon lanceolatus</i> | |
| | <i>Olearia oppositifolia</i> | |
| | <i>Pimelea ligustrina</i> | Tall Rice Flower |
| | <i>Pittosporum multiflorum</i> | Orange Thorn |
| | <i>Polyscias sambucifolia</i> | Elderberry Panax |
| | <i>Lomandra spicata</i> | |
| | <i>Carex appressa</i> | Tall Sedge |
| | <i>Microlaena stipoides</i> | Weeping Grass |
| | <i>Carex austrotanella</i> | |
| | <i>Poa queenslandica</i> | Queensland Grass |
| | <i>Lepidosperma laterale</i> | |
| | <i>Poa sieberiana</i> | Snowgrass |
| | <i>Carex inversa</i> | |
| | <i>Gahnia melanocarpa</i> | Black-fruit Saw Sedge |
| | <i>Gahnia sieberiana</i> | Red-fruit Saw-sedge |
| Ferns | <i>Lomandra confertifolia</i> | Mat-rush |
| | <i>Lomandra longifolia</i> | Spiny-headed Mat-rush |
| | <i>Blechnum watsii</i> | Hard Water Fern |
| | <i>Pyrrosia rupestris</i> | Rock Felt Fern |
| | <i>Histiopteris incisa</i> | Bat's Wing Fern |
| | <i>Blechnum patersonii</i> | Strap Water Fern |
| | <i>Blechnum nudum</i> | Fishbone Water Fern |
| | <i>Doodia aspera</i> | Prickly Rasp Fern |
| | <i>Blechnum cartilagineum</i> | Gristle Fern |
| | <i>Blechnum watsii</i> | Hard Water Fern |

Table 14: Recommended planting list for PCT 3146

| Form | Scientific Name | Common Name |
|-----------|---------------------------------|-------------------|
| Canopy | <i>Eucalyptus amplifolia</i> | Cabbage Gum |
| | <i>Eucalyptus dorrigoensis</i> | Dorrigo White Gum |
| Midstorey | <i>Allocasuarina littoralis</i> | Black Sheoak |
| | <i>Rubus parvifolius</i> | Native Raspberry |

| Form | Scientific Name | Common Name |
|-----------------------|--------------------------------|----------------------|
| Grasses or Grass Like | <i>Dichelachne micrantha</i> | Shorthair Plumegrass |
| | <i>Echinopogon caespitosus</i> | Bushy Hedgehog-grass |
| | <i>Poa sieberiana</i> | Snowgrass |
| | <i>Themeda triandra</i> | Kangaroo Grass |
| | <i>Carex inversa</i> | |
| | <i>Juncus usitatus</i> | |
| | <i>Sorghum leiocladum</i> | Wild Sorghum |

Table 15: Recommended planting list for PCT 3207

| Form | Scientific Name | Common Name |
|-----------------------|---|-----------------------|
| Canopy | <i>Eucalyptus nobilis</i> | Ribbon Gum |
| | <i>Eucalyptus dorrigoensis</i> | Dorrigo White Gum |
| | <i>Eucalyptus nitens</i> | Shining Gum |
| | <i>Eucalyptus campanulata</i> | New England Blackbutt |
| | <i>Eucalyptus obliqua</i> | Messmate |
| | <i>Eucalyptus saligna</i> | Sydney Blue Gum |
| | <i>Eucalyptus cameronii</i> | Diehard Stringybark |
| | <i>Eucalyptus laevopinea</i> | Silvertop Stringybark |
| Midstorey | <i>Banksia integrifolia</i> subsp. <i>monticola</i> | Mountain Banksia |
| | <i>Callistemon salignus</i> | Willow Bottlebrush |
| | <i>Acacia melanoxylon</i> | Blackwood |
| | <i>Acacia implexa</i> | Hickory Wattle |
| | <i>Persoonia media</i> | |
| | <i>Cyathea australis</i> | Rough Tree-fern |
| | <i>Elaeocarpus reticulatus</i> | Blueberry Ash |
| | <i>Ackama paniculosa</i> | Soft Corkwood |
| | <i>Trochocarpa laurina</i> | Tree Heath |
| | <i>Acacia irrorata</i> | Green-stemmed Wattle |
| | <i>Leucopogon lanceolatus</i> | |
| Grasses or Grass Like | <i>Polyscias sambucifolia</i> | Elderberry Panax |
| | <i>Synoum glandulosum</i> subsp. <i>glandulosum</i> | Scentless Rosewood |
| | <i>Lomandra longifolia</i> | Spiny-headed Mat-rush |

| Form | Scientific Name | Common Name |
|-------|-------------------------------|----------------|
| | <i>Poa sieberiana</i> | Snowgrass |
| | <i>Dianella caerulea</i> | Blue Flax Lily |
| | <i>Entolasia marginata</i> | Bordered Panic |
| Ferns | <i>Blechnum cartilagineum</i> | Gristle Fern |
| | <i>Calochlaena dubia</i> | Rainbow Fern |

Table 16: Recommended planting list for PCT 3823

| Form | Scientific Name | Common Name |
|-----------------------|--------------------------------|------------------------|
| Canopy | <i>Callitris rhomboidea</i> | Port Jackson Pine |
| | <i>Acacia melanoxylon</i> | Blackwood |
| | <i>Guioa semiglauca</i> | Guioa |
| | <i>Trochocarpa laurina</i> | Tree Heath |
| Midstorey | <i>Leptospermum petersonii</i> | Lemon-scented Tea Tree |
| | <i>Hakea ochroptera</i> | |
| | <i>Acacia floribunda</i> | White Sally Wattle |
| | <i>Acrotriche aggregata</i> | Red Cluster Heath |
| | <i>Backhousia myrtifolia</i> | Lemon Myrtle |
| | <i>Breynia oblongifolia</i> | Coffee Bush |
| | <i>Denhamia celastroides</i> | Orange Boxwood |
| | <i>Denhamia moorei</i> | Mountain Denhamia |
| | <i>Hovea longifolia</i> | Rusty Pods |
| | <i>Myrsine variabilis</i> | Muttonwood |
| | <i>Pittosporum multiflorum</i> | Orange Thorn |
| | <i>Stenocarpus salignus</i> | Scrub Beefwood |
| | <i>Notelaea</i> sp. A | |
| Grasses or Grass Like | <i>Entolasia stricta</i> | Wiry Panic |
| | <i>Poa sieberiana</i> | Snowgrass |
| | <i>Lepidosperma laterale</i> | |
| | <i>Oplismenus imbecillis</i> | Creeping Beard Grass |
| | <i>Schoenus melanostachys</i> | Black Bog-rush |
| Ferns | <i>Adiantum aethiopicum</i> | Maidens Fern |
| | <i>Asplenium australasicum</i> | Birds Nest Fern |

| Form | Scientific Name | Common Name |
|------|---|-------------------|
| | <i>Doodia aspera</i> | Prickly Rasp Fern |
| | <i>Davallia solida</i> var. <i>pyxidata</i> | Hare's Foot Fern |
| | <i>Pellaea paradoxa</i> | |
| | <i>Pyrrosia rupestris</i> | Rock Felt Fern |

Appendix E Photo Monitoring Points

PMP 1 – 3052: NORTHERN ESCARPMENT ANTARCTIC BEECH RAINFOREST



Photo 10 PMP1 Photo 1 – 12.03.23 North



Photo 11 PMP1 Photo 2 – 12.03.23 East



Photo 12 PMP1 Photo 3 – 12.03.23 South



Photo 13 PMP1 Photo 4 – 12.03.23 West

PMP2 – 3146: DORRIGO RED GUM GRASS FOREST



Photo 14 PMP2 Photo 1 – 12.03.23 North



Photo 15 PMP2 Photo 2 – 12.03.23 East



Photo 16 PMP2 Photo 3 – 12.03.23 South



Photo 17 PMP2 Photo 4 – 12.03.23 West

PMP3 - 3207: NORTHERN ESCARPMENT LAYERED BLACKBUTT



Photo 18 PMP3 Photo 1 – 12.03.23 North



Photo 19 PMP 3 Photo 2 – 12.03.23 East



Photo 20 PMP 3 Photo 3 – 12.03.23 South



Photo 21 PMP 3 Photo 4 -12.03.24 West

PMP 4 – 3823 CASCADES CYPRESS TEA-TREE RIPARIAN FOREST



Photo 22 PMP 4 Photo 1 – 12.03.23 North



Photo 23 PMP 4 Photo 2 – 12.03.23 East



Photo 24 PMP 4 Photo 3 – 12.03.23 South



Photo 25 PMP 4 Photo 4 – 12.03.23 West