



Catherine McAuley Catholic College, Medowie Vegetation Management Sub Plan – Construction Phase

FINAL REPORT

Prepared for North Construction and Building Pty Ltd

29 October 2019

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- Anne Murray (mapping).

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Glossary

BC Act	<i>NSW Biodiversity Conservation Act 2016</i>
Biosecurity Act	<i>Biosecurity Act 2015</i>
CEEC	Critically Endangered Ecological Community
DPI	NSW Department of Primary Industries
DPIE	NSW Department of Planning, Industry and Environment
EEC	Endangered Ecological Community
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
GIS	Geographic Information System
LEP	Local Environmental Plan
LGA	Local Government Area
LLS	Local Land Services
NPW Act	<i>National Parks and Wildlife Act 1974</i>
NSW	New South Wales
NRAR	Natural Resources Access Regulator
PCT	Plant Community Type
Study area	2 Kingfisher Close, Medowie
TEC	Threatened Ecological Community
VMP	Vegetation Management Plan
VMSP	Vegetation Management Sub Plan
VRZ	Vegetated Riparian Zone
WoNS	Weeds of national significance

1 Introduction

1.1 Project background

Biosis Pty Ltd was commissioned by North Construction and Building Pty Ltd on behalf of the Trustees of the Roman Catholic Diocese Maitland in Newcastle to develop a Vegetation Management Sub-Plan (Construction Phase) (VMSP). The VMSP is to guide vegetation management actions during the construction phase of the development of Catherine McAuley Catholic College (the development) located at 2 Kingfisher Close, Medowie (hereafter referred to as the study area) (Figure 1). The development will involve the demolition of an existing dwelling, shed and outbuildings, the construction of a three stream primary school, seven stream high school, a Chapel and a child care centre. Associated works including a car park, retaining walls and landscaping. It will also involve the establishment and ongoing maintenance of Asset Protection Zones (APZs) necessary to meet bushfire protection requirements (NBC 2018).

Due to the scale of the proposed development, the project will be assessed under Part 4 Division 4.1 Section 89C of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) as a State Significant Development (SSD). Under this application, draft Development Consent and conditions were issued for the project (SSD 8989) by the Department of Planning, Industry and Environment (DPIE) V3 dated 2019.

The VMSP – Construction Phase is required for the project prior to the issue of the Construction Certificate (CC), which will form part of a Construction Environmental Management Plan (CEMP) and Biodiversity Management Sub-Plan (BMSP) in accordance with the below conditions of consent:

- C11. Prior to the commencement of construction, the Applicant must submit a Construction Environmental Management Plan (CEMP) to the satisfaction of Planning Secretary. The CEMP must include, but not be limited to, the following:
 - (e). Biodiversity Management Sub-Plan (see condition C17);
- C17. The Biodiversity Management Sub-Plan (BMSP) must address, but not be limited to the following:
 - (a) the BMSP must be prepared by a suitably qualified person and submitted to the Planning Secretary for approval prior to the commencement of construction works on site.
 - (b) include all recommendations to mitigate the direct, indirect and prescribed impacts for works contained in the endorsed BDAR and the management and mitigation measures in EIS and Response to Submissions;
 - (c) include details of measures to protect the vegetation on the south western part of the Site, specifically the coastal wetlands mapped under the Coastal management.
 - (d) Include a Vegetation Management Sub-Plan (VMSP) for the Site during the construction works;

A VMP has previously been prepared (Biosis 2018) based on recommendations in the Environmental Impact Statement (EIS) (De Witt Consulting 2018), the Biodiversity Development Assessment Report (BDAR) (Biosis 2018) for the development and in guidance from NSW DPI received during EIS exhibition (OUT18/10643). The VMP was prepared in accordance with the aforementioned documents and the guidelines and documents below:

- *Vegetation technical specification* (Port Stephens Council, May 2014).
- *Controlled activities on waterfront land:- guidelines for riparian corridors on waterfront land* - Department of Primary Industries – (NSW Office of Water 2012a).

- *Controlled activities on waterfront land: Guidelines for watercourse crossings on waterfront land.* Department of Primary Industries –Office of Water. (NSW Office of Water 2012b).
- *Guidelines for vegetation management plans on waterfront land* - Department of Primary Industries – (NSW Office of Water 2012c).

The proposed works involve the removal of 1.55 hectares of native vegetation that provide limited foraging resources for threatened fauna (Biosis 2018) and the retention of 25 hectares of native vegetation suitable for fauna shelter.

This VMSP herein provides controls and actions required to manage the retained native vegetation within the study area during the construction phase of the project only (the VSMP area) (Figure 1).

1.1.1 Application of the VMSP

This VMSP applies to the proposed earthworks and construction activities within the development footprint (Figure 2) during the construction phase of the proposed development. The aim of this VMSP is to ensure all sediment, erosion, hydrological and weed control measures are applied during construction phase activities to prevent direct and indirect negative impacts on the VMSP area. The key objectives of VMSP are the protection of the watercourse and riparian corridor, Hunter Lowland Redgum Forest (EEC) and Swamp Sclerophyll Forest (EEC) within the broader study area (Figure 2).

The original VMP shall be applied along with this VMSP-Construction Phase during the construction phase where activities are to be undertaken within the VMSP area.

1.2 Description of study area

The study area is located at 2 Kingfisher Close Medowie, NSW within the Port Stephens Local Government Area (LGA) and the Hunter Local Land Services Region. It is located approximately 4 kilometres south west of the township of Medowie, and approximately 32 kilometres by road north east of Newcastle. The study area is located within Lot 412 and 413 DP 1063902 and covers a total area of 25 hectares zoned as Large Lot Residential (R5), Low Density Residential (R2) and Rural Landscape (RU2). The VMSP area is defined as the development footprint only, which covers approximately 7.49 hectares (Figure 2). The study area occurs within:

- NSW North Coast IBRA bioregion
- Karuah Manning IBRA subregion
- Hunter River Basin (Hunter River catchment)
- Hunter Local Land Services (LLS) Management Area
- Port Stephens Council Local Government Area (LGA).

The study area supports 25 hectares of native vegetation with varying levels of disturbance (Figure 2). The western portion of the study area consists mostly of native vegetation in varying condition. The eastern portion, where the proposed development is centred, is largely cleared with scattered remnant trees. Local land use over time has contributed to the partial fragmentation and degradation of native vegetation within the area identified for the construction footprint.

The development footprint is partially covered by exotic Slash Pine *Pinus elliottii* and exotic pasture, with native vegetation restricted to small isolated paddock trees. Shrub and mid layer vegetation strata are mostly absent in the development footprint except where the subject land intersects the edge of larger, more intact remnant vegetation patches.

The broader study area is within the Newcastle 1:100k soil landscape (Matthei 1995). The study area is largely mapped as the Tea Gardens Aeolian soil landscape, consisting of Pleistocene sandsheets of marine and Aeolian quartz sands which supports wet heath forest (in the south), and wet heath and sedgeland (north west of the site).

Dominant soil materials are mapped as sandy peat, loose loamy sand, bleached loose sand, massive organic pan, coarse saturated mottled sand, and saturated brownish black massive coarse light sandy clay loam. The composition of the soil is highly influential on the vegetation communities observed. The following native Plant Community Types (PCT) were assessed as present within the study area:

- PCT 1598 Endangered Ecological Community (EEC) under the BC Act. Forest Red Gum grassy open forest on floodplains of the lower Hunter. Equivalent to EEC *Hunter Lowland Redgum Forest in the Sydney Basin and NSW North Coast Bioregions*, referred to in this VMSP as Hunter Lowland Redgum Forest.
- PCT 1718 EEC under the BC Act. Swamp Mahogany – Flax leaved Paperbark swamp forest on coastal lowlands of the Central Coast. This PCT forms part of the EEC *Swamp sclerophyll forest on coastal floodplains of the NSW North Coast Sydney Basin and South East Corner bioregions*, referred to in this VMSP as Swamp Sclerophyll Forest.

An unmapped first order watercourse is located in the south of the subject land and appears to connect constructed waterbodies of the golf course east of Medowie Road, with the SEPP 14 wetland to the west of the subject land.

1.3 Potential ecological impacts

Key aspects of the proposed works that have potential to result in ecological impacts include:

- Clearing of native vegetation and habitat.
- Invasion by exotic species, weeds, pests and pathogens.
- Impacts on threatened species and their habitats.
- Works around and within watercourses.
- Noise, vibration, light and vehicular movement impacts.
- General earthworks resulting in disturbance of soils, erosion and the mobilisation of sediment.



Legend

- VMP sub plan area
(Construction phase)
- Overarching VMP area (Biosis
2019) / Study area
- State Environmental Planning
Policy (Coastal Management)
2018

Figure 1 Location of study area

0 100 200 300 400 500
Metres

Scale: 1:10,000 @ A3
Coordinate System: GDA 1994 MGA Zone 56



Albury, Ballarat, Melbourne,
Newcastle, Sydney, Wangaratta & Wollongong

Matter: 30449
Date: 30 July 2019,
Checked by: TPS, Drawn by: AEDM, Last edited by: amurray
Location: P:\30400s\30449\Mapping\30449_F1_Locality

2 VMSP scope and objectives

2.1 Scope

The scope of this VMSP is to develop a framework for the management of the riparian corridor, retained vegetation communities, native vegetation removal and the ongoing management of weeds within the study area during the construction phase only.

The VMSP will apply to the construction phase associated with the proposed development only and will be included in the CEMP for the proposed development.

2.2 Objectives

The specific objectives of this VMSP are to:

- Outline strategies to avoid or minimise impacts on vegetation during the construction phase of the proposed development.
- Outline the management requirements for any vegetation to be retained, including details on tree and vegetation protection measures e.g. fencing and signage during construction phase only.
- Describe required weed management activities.
- Provide schedules for inspection, monitoring, management and corrective actions.

3 Methods

3.1 Desktop research

A review of all available design plans and reports relating to the site and adjacent areas was conducted, as well as relevant legislation, recent vegetation mapping and other documentation relevant to the current project including:

- Catherine McCauley Catholic College, Medowie BDAR (Biosis 2018)
- Preliminary Stage 1 Plans (Webber Architects 2544_01_0031_D)
- Preliminary Early Works Plans (Webber Architects 2544_01_0021_E)
- *Port Stephens LEP 2013*
- *Port Stephens Development Control Plan 2014*
- Lower Hunter Vegetation Mapping (Cockerill *et al.* 2013)
- Department of the Environment and Energy (DEE) Protected Matters Search Tool for matters protected by the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- DPIE, NSW BioNet, the database for the Atlas of NSW Wildlife, for matters protected under the *Biodiversity Conservation Act 2016* (BC Act).

3.2 Field investigation

A general site investigation of the study area was conducted on 6 November 2018 by a qualified and experienced Restoration Ecologist, Tobias Scheid. The study area was surveyed using random meander methods. This involved:

- The identification of native and exotic plant species, according to the *Flora of NSW* (Harden 1992, 1993, 2000, 2002) and the *Field Guide to the Native Plants of Sydney* (Robinson 2003), with reference to recent taxonomic changes .
- The identification and mapping of plant communities according to the structural definitions of *Lower Hunter Vegetation Mapping* (Cockerill *et al.* 2013).
- Identifying fauna habitats, assessing their condition and assessing their value to threatened fauna species.
- Observations of animal activity and searches for indirect evidence of fauna (such as scats, nests, burrows, hollows, tracks, scratches and diggings).
- An assessment of the natural resilience of the vegetation of the site.
- Identification of previous and current factors threatening the ecological function and survival of native vegetation within and adjacent to the study area.
- Determination of appropriate rehabilitation and bush regeneration techniques for the native vegetation of the site.

The conservation significance of plant species and plant communities was determined according to:

- BC Act for significance within NSW
- EPBC Act for significance within Australia.

3.3 Limitations

Ecological surveys provide a sampling of flora and fauna at a given time and season. There are a number of reasons why not all species will be detected at a site during survey. For flora, this may include species dormancy and seasonal climatic conditions. The ephemeral status of waterbodies, as well as migration and breeding behaviours influence the occurrence of some fauna. In many cases these factors do not present a significant limitation to assessing the overall ecological values of a site.

Database searches, and associated conclusions on the likelihood of species to occur within the study area, are reliant upon external data sources and information managed by third parties.

4 Site description

4.1 Vegetation communities

The study area contains three vegetation communities:

- Exotic grassland with scattered retention trees.
- PCT 1598 *Forest Red Gum grassy open forest on floodplains of the lower Hunter*.
- PCT 1718 *Swamp Mahogany – Flax leaved Paperbark swamp forest on coastal lowlands of the Central Coast*. Includes watercourse and riparian corridor.

Exotic grassland

This PCT is predominately covered by exotic pasture with exotic Slash Pine and scattered Eucalyptus retention trees within the development footprint and the surrounding APZ. Scattered occurrences of native grasses and forbs were also observed including Blady Grass *Imperata cylindrica*, Common Couch *Cynodon dactylon* and Hairy Guinea Flower *Hibbertia pedunculata*.

PCT 1598 Forest Red Gum grassy open forest on floodplains of the lower Hunter

Despite the low abundance of mid-storey and shrub layer species, the Hunter Lowland Redgum Forest in the subject land was considered to be in moderate condition, given the moderate native species diversity, abundance and relatively low weed cover.

This PCT is located along the western boundary of the subject land, draining into the swamps on the study area's western section. The canopy is dominated by Red Mahogany *Eucalyptus resinifera* and Forest Red Gum *Eucalyptus tereticornis*. The shrub layer is very sparse consisting of Notched Bush-pea *Pultenaea retusa* and Coffee Bush *Breynia oblongifolia*. The ground cover is dominated by native grasses including Blady Grass, Silvertop Wallaby Grass *Rytidosperma pallidum*, Smallflower Wallaby Grass *Rytidosperma setaceum* and Common Couch. The most abundant weeds included Buffalo grass *Stenotaphrum secundatum*, Whisky Grass *Andropogon virginicus* and Paspalum *Paspalum dilatatum*.

This species assemblage is associated with Forest Red Gum grassy open forest on floodplains of the lower Hunter, Equivalent to EEC *Hunter Lowland Redgum Forest in the Sydney Basin and NSW North Coast Bioregions* referred to in this VMSP as Hunter Lowland Redgum Forest.

PCT 1718 Swamp Mahogany – Flax leaved Paperbark swamp forest on coastal lowlands of the Central Coast.

This PCT is part of a larger and relatively intact swamp forest patch is the western portion of the study area. This PCT was considered to be in good condition, given its structure, high native species diversity, abundance and relatively low weed cover. This PCT encompasses the riparian corridor identified within the study area which connects to a larger area mapped under SEPP14 Coastal wetlands to the south of the study area.

This PCT is located along the south west boundary of the subject land and dominates the wetter habitat within the study area (Figure 2). Native canopy species include Swamp Mahogany, *Eucalyptus robusta*, Swamp oak *Casuarina glauca* and Broad-leaved Paperbark *Melaleuca quinquenervia*. Tall Saw-sedge *Gahnia clarkei* dominated the mid storey in moist portions of the community and was associated with native shrub species such as Coastal Wattle *Acacia longifolia* subsp. *spohorae* and Flax-leaved Paperbark *Melaleuca linariifolia*, as well as climbers such as Dusky Coral Pea *Kennedia rubicunda*. Throughout this PCT the ground-storey included

a variety of native ferns, grasses, rushes and forbs such as Gristle Fern *Blechnum cartilagineum*, Rainbow Fern *Calochlaena dubia*, Wiry Panic *Entolasia stricta*, *Juncus prismatocarpus* and Slender Knotweed *Persicaria decipiens*. Weed species recorded included Blackberry complex *Rubus fruticosus*, Narrow-leaved Carpet Grass *Axonopus fissifolius* and Crofton Weed *Ageratina adenophora*.

This species assemblage is consistent with *Swamp Mahogany – Flax leaved Paperbark swamp forest on coastal lowlands of the Central Coast*. This PCT forms part of *Swamp sclerophyll forest on coastal floodplains of the NSW North Coast Sydney Basin and South East Corner bioregions* listed as an EEC under the BC Act referred to in this VMSP as Swamp Sclerophyll Forest.

Watercourse and riparian corridor

The vegetation structure of the first order watercourse and associated riparian corridor is considered marginally different from the surrounding PCT 1718 Swamp Sclerophyll Forest, based on weed establishment and lack of a native canopy. The watercourse and riparian corridor is located in the south eastern corner of the study area and covers approximately 0.33 hectares of exposed weedy riparian corridor and 0.18 hectares of intact riparian vegetation in good condition.

Native vegetation recorded in the watercourse and riparian corridor included patches of Tall Saw-sedge *Gahnia clarkei*, Pouched Coral Fern *Gleichenia dicarpa* and the climber Dusky Coral Pea in the mid storey. Instream and ground species were dominated by a mix of native aquatic and rush species including Water Primrose *Ludwigia peploides*, Marsh Club-rush *Bulboschoenus fluviatilis* and Slender Knotweed *Persicaria decipiens*. The watercourse and riparian corridor contains several exotic terrestrial and aquatic species including Slash Pine, Budding Club-rush *Isolepis prolifera*, Blackberry complex *Rubus fruticosus*, Large-leaf Pennywort *Hydrocotyle bonariensis* and *Paspalum dilatatum*.

The eastern portion of waterway is moderately modified due to its location within a routinely mown landscape, past canopy clearing and weed infestation. There is an existing culvert structure connecting the waterway with the southern section of the study area. A number of additional small culverts provide access across the waterway within the south-western sections of the study area and an existing vehicle track crosses the stream near the western boundary of the study area.

The unnamed stream is not Key Fish Habitat as defined by DPI (2013) as it is considered to be a first order gaining stream (Biosis 2018). The stream experiences intermittent flows and offers sporadic refuge, breeding and/or feeding areas for aquatic fauna within semi-permanent pools.

Further discussion on offsetting for the riparian corridor in accordance with NRAR guidelines is provided in the Overarching VMP (Biosis 2019).

4.2 Fauna habitats

The development footprint area is considered to be devoid of fauna habitat as it is subject to clearing addressed in the BDAR (Biosis 2018). Further description of fauna habitat features of the study area is discussed in detail within the overarching VMP document (Biosis 2019).

4.3 Threatened species habitats

Habitat for threatened species within the development footprint is considered to be very limited. Historic and ongoing disturbance in the form of vegetation removal, periodical grass mowing and invasion of dense and smothering exotic plant species has significantly degraded the habitats present. However good habitat can be

found in the western and eastern portion of the study area, providing contiguous linkages to less disturbed plant communities, that has the potential to support a number of locally occurring threatened species.

Review of the OEH Bionet Atlas (OEH 2018) and the DoEE Protected Matters Search Tool (Commonwealth of Australia 2018) found records of 11 threatened flora species and 46 threatened fauna species as previously recorded, or predicted to occur, within a 5 kilometre (flora) and a 15 kilometre radius of the study area. Of these locally occurring threatened species the following are considered most likely to occur, based on habitat suitability within the study area:

- Netted Bottle Brush *Callistemon linearifolius* (Vulnerable, BC Act)
- *Eucalyptus parramattensis* subsp. *decadens* (Vulnerable, BC Act and EPBC Act)
- *Maundia triglochinos* (Vulnerable, BC Act)
- Biconvex Paperbark *Melaleuca biconvexa* (Vulnerable, BC Act and EPBC Act)
- Koala *Phascolarctos cinereus* (Vulnerable, BC Act and EPBC Act).

4.4 Priority and environmental weeds

Five weeds listed as a priority weed in the Port Stephens Council Local Government Area (LGA) under the NSW *Biosecurity Act 2015* (Biosecurity Act) were recorded within the study area. Landowners and occupiers legal obligations to manage such species are in line with the General Biosecurity Duty which states:

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.

Four Weeds of National Significance (WoNS) were also recorded within the subject site (Table 1).

Table 1 Priority weeds and WoNS recorded within the study area

Scientific name	Common name	General Biosecurity Duty	WoNS
<i>Ageratina adenophora</i>	Crofton Weed	General Biosecurity Duty <i>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.</i>	no
<i>Chrysanthemoides monilifera</i> subsp. <i>rotundata</i>	Bitou Bush	Mandatory Measure <i>Must not be imported into the State or sold.</i>	yes
<i>Lantana Camara</i>	Lantana	Mandatory Measure <i>Must not be imported into the State or sold.</i>	yes
<i>Rubus fruticosus</i>	Blackberry complex	Mandatory Measure	yes

Scientific name	Common name	General Biosecurity Duty	WoNS
		<p><i>Must not be imported into the State or sold.</i></p> <p>Regional Recommended Measure</p> <p><i>The plant should not be bought, sold, grown, carried or released into the environment. Land managers should mitigate the risk of the plant being introduced to their land. Land managers should mitigate spread from their land. Land managers to reduce impacts from the plant on priority assets.</i></p>	
<i>Senecio madagascariensis</i>	Fire Weed	<p>Mandatory Measure</p> <p><i>Must not be imported into the State or sold.</i></p>	yes

5 Vegetation management

5.1 General approach

The overarching VMP (Biosis 2019) provides a prioritised succession of restoration works that have considered a long term commitment to biodiversity management and time frames for the reinstatement of important ecological values. The key to prioritising areas for restoration and the order of which works should be undertaken are the established principles of 'retain, regenerate and revegetate'. Inherent in this approach is the need to work from areas of more resilient bushland to areas of more degraded bushland (Buchanan 1989, DEC 2005).

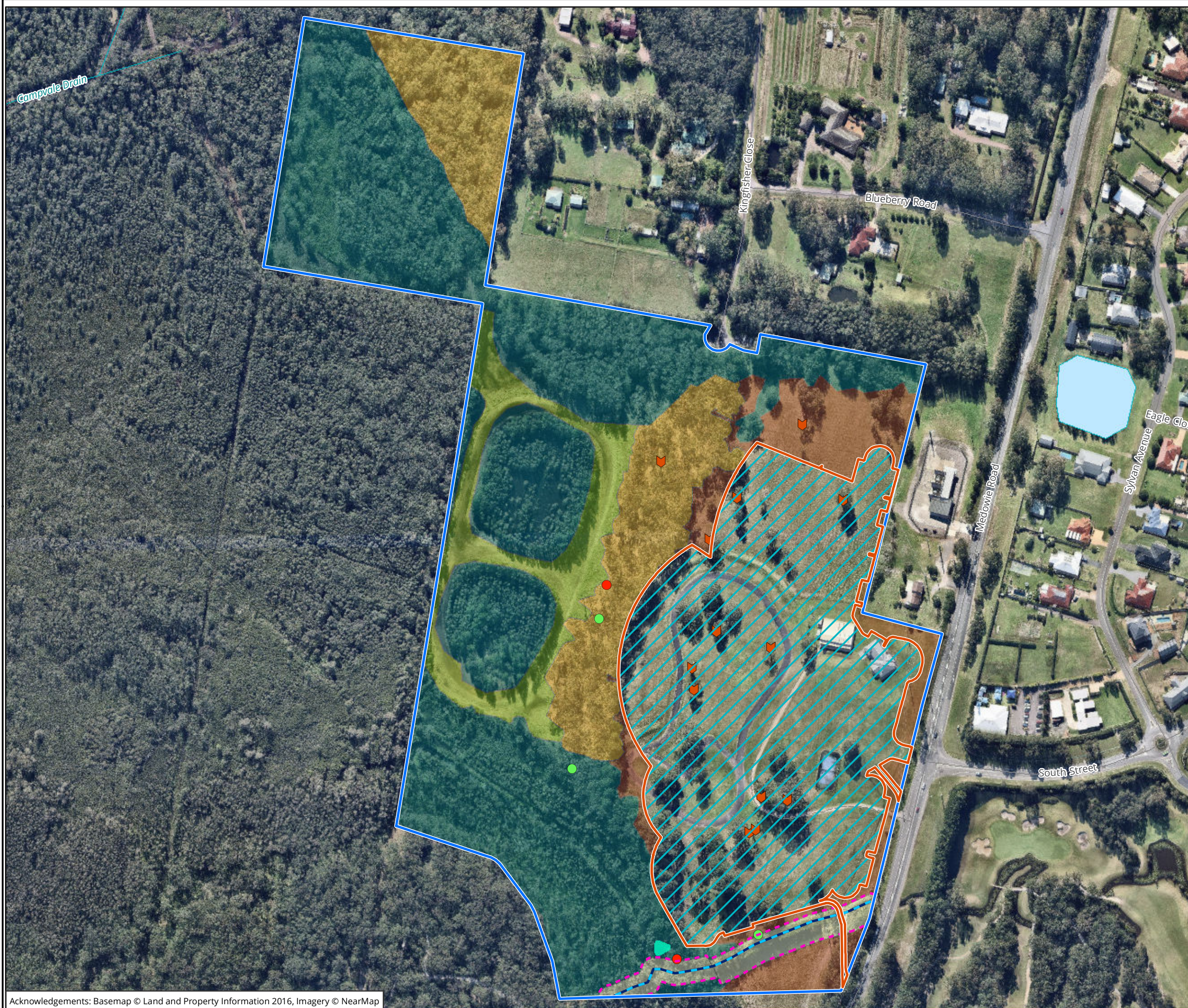
This VMP sub-plan includes management actions relevant to the construction activities only, in the interest of minimising the potential for environmental impacts to surrounding EECs and important ecological features such as watercourses and riparian corridors.

5.2 Vegetation management zones

There is one vegetation management zone (MZ1) detailed within this VMSP covers the potential development footprint only. Management actions are outlined prior and during the construction phase only.

This management zone has been identified as the development footprint / VMSP area (Figure 2). The objectives of this management zone (MZ1) are summarised below:

- Installation of exclusion fencing along the MZ1/Development footprint boundary in accordance with the Koala Management Sub-Plan (KMSP).
- Implement sediment and erosion controls to prevent run-off towards the surrounding riparian corridor, Hunter Lowland Red Gum Forest and Swamp Sclerophyll Forest of the study area.
- Control exotic weed species.
- Ecological supervision of vegetation clearing.



Legend

- VMP sub plan area (Construction phase)
- Overarching VMP area (Biosis 2019) / Study area
- Riparian corridor
- HydroLine (Biosis 2018)
- Hollow bearing tree
- Arum lily - *Zantedeschia aethiopica*
- Blackberry
- Rubbish

Vegetation

- Riparian corridor - planted and intact
- Hunter Lowland Redgum Forest - PCT 1598 - moderate condition
- Swamp Sclerophyll Forest - PCT 1718 poor condition
- Swamp Sclerophyll Forest - PCT 1718 moderate condition
- Open Woodland / recreation area

Management zones

- Development footprint - MZ1 (VMSP)

Figure 2 Vegetation management zones

0 50 100 150
Metres

Scale: 1:3,000 @ A3
Coordinate System: GDA 1994 MGA Zone 56

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Albury, Ballarat, Melbourne,
Newcastle, Sydney, Wangaratta & Wollongong

Matter: 30449
Date: 30 July 2019
Checked by: TPS, Drawn by: AEDM, Last edited by: amurray
Location: P:\30400s\30449\Mapping\30449_F2_VMP

6 Specific management actions

6.1 Construction activities

6.1.1 Site inductions

The construction contractor is required to identify all potential environmental impacts and to implement and maintain control measures, procedures and constraints accordingly. These should be documented as part of the Construction Environmental Management Plan (CEMP).

6.1.2 Photo reference points

Photo reference points are to be established by the project ecologist or Bush regeneration contractor prior to the commencement of construction phase activities, including but not limited to vegetation clearing and bulk earthworks. Visual markers for photo reference points are to be composed of capped star pickets that have been flagged so that they are visually conspicuous and GPS locations should be recorded. Photographs at each photo reference point should be taken on a fixed bearing. A minimum of two photo points are to be installed within MZ1. These photo reference points will be used to monitor the implementation and management of actions contained within this VMSP for the duration of the construction phase. Results from photo monitoring will form part of the VMSP- Construction phase monitoring report(s).

6.1.3 Exclusion fencing

Native vegetation to be retained will be shown on relevant sensitive site maps and physically delineated on site using protective fencing and signposting. Exclusion fencing is to be installed before the commencement of earthworks and associated construction works. The alignment of this fencing is to be in accordance with the Australian Standard *Protection of Trees on Development Sites (AS4970-2009)* and the relevant tree protection zones for trees and associated vegetation are to be protected by the exclusion fencing.

At a minimum the fencing should be constructed of capped star pickets and high visibility para-webbing and have appropriate signage stating that it is an environmentally sensitive area to inform and educate construction personnel. Exclusion zones are to be clearly marked and labelled on design drawings issued for construction and should be displayed in prominent places and provided in site inductions. A register of sensitive area maps will be maintained.

The requirements for the tree protection and exclusion zones are:

- The boundaries of the tree protection zones should correspond with the canopy spread for each tree and be installed as per the Australian standard (AS4970-2009).
- Temporary fencing is to be installed around the entirety of the development footprint (Figure 2) and where applicable meet exclusion fencing standards specified in this plan and the KMSP.
- No equipment, materials or fill are to be stored within tree protection and exclusion zones.
- No preparation of chemicals or concrete to be mixed in or adjacent these areas.
- No fuel, paints or other chemicals are to be stored within tree protection zones.
- No excavation is to occur within tree protection zones.

6.1.4 Erosion and sediment controls

Earthworks are not to commence until sediment and erosion controls have been installed as per an approved Erosion and Sediment Control Plan / Soil and Water Management Plan. All erosion and sediment control

measures must be effectively implemented and maintained at or above design capacity for the duration of the construction works and until such time as all ground disturbed by the works have been stabilised and rehabilitated so that it no longer acts as a source of sediment. At a minimum, a continuous length of silt fencing is to be installed around the boundary of the development footprint to protect the surrounding native vegetation, riparian corridor, stormwater easements and drains from sedimentation.

Erosion and sediment control is to be monitored for the entire construction phase of the development. All objectives and measures outlined within *Landcom Managing Urban Stormwater: Soils and Construction* (2004), this VMSP and the Sediment and Erosion Control Plan for the development are to be enforced.

All stockpiled material soil or otherwise is to be placed as far as possible from the riparian corridor along the southern boundary of the development footprint. All soil stockpiled soils are to be bunded by sediment fencing or equivalent sediment/erosion control methods.

6.1.5 Vegetation clearing and civil works supervision

The clearing extent is to be marked out prior to clearing, clearing limits can be marked with high visibility tape or other appropriate boundary markers. To avoid unnecessary damage to vegetation, vegetation clearing is to be restricted to this delineated area. Condition of Consent (COC) C29 (c) (SSD 8989) for the development states:

any hollows removed be salvaged and replaced into trees within the vegetated areas to be retained or they be replaced with nest boxes in consultation with Council suitable to native fauna likely to use the site;

As such all vegetation clearing in the development footprint (MZ1) should be undertaken under supervision of the project ecologist. The BDAR (Biosis 2018) identified 10 hollow bearing trees within the development footprint/MZ1. Prior to vegetation clearing these trees need to be appropriately marked in the field and felled separately from other non-hollow containing vegetation. All hollows are to be salvaged and stockpiled for replacement into the surrounding retained vegetation under guidance by the project ecologist.

Non hollow containing woody debris derived from tree felling and vegetation clearing activities (under the direction of a suitably qualified Ecologist) is to be cut into 2 to 4 metre lengths (where applicable) or chipped and stockpiled for reuse on site in accordance with the overarching VMP (Biosis 2019) to create additional habitat.. Any chipped woody debris should be stockpiled for future reuse in revegetation activities required under the overarching VMP, provided it is native and inspected to be free of weed seed and exotic plant propagules. All fruit laden limbs are to be applied as brush matting to areas specified as Swamp Sclerophyll Forest- PCT 1718 poor condition (Figure 2) to slow overland water flow and encourage natural regeneration, as detailed in the overarching VMP document.

The CEMP and Fauna Management Plan (FMP) prepared for the project contains measures for staged vegetation clearing to manage fauna species during tree removal, including having a spotter / catcher present. Stage 1 removal involves clearing of understorey vegetation and non-hollow-bearing trees, with removal of hollow-bearing trees in Stage 2. There should be a minimum of 24 to 48 hours between Stage 1 and Stage 2.

6.1.6 Weed management

This proposed works have the potential to introduce and promote weeds and pathogens in the development footprint as well as in the surrounding area. Environmental weeds are exotic species considered either a high risk of dispersing and becoming established in adjacent native vegetation, or have the potential to cause significant ecological harm. Recommended actions for weed management and methods for control of environmental weeds recorded on site, along with priority species, are outlined in Section 7 and Appendix 1.

Additionally, any stockpiled soil generated during earthworks and vegetation clearing is to be covered by geofabric material or equivalent and surrounded by appropriate soil erosion controls consistent with measures outlined within *Landcom Managing Urban Stormwater: Soils and Construction* (Landcom 2004) to minimise the germination and spread of weeds, soil loss and potential dust pollution during high wind and rainfall events. Any re-used soil should be monitored and treated for any weed re-growth. Monitoring should be undertaken for a period of weeks to months prior to installation to ensure exhaustion of the exotic seedbank.

6.1.7 Hygiene protocols

All personnel and vehicles entering the study area will be required to implement strict hygiene protocols to reduce the potential introduction or spread of pests, weeds or diseases. Exotic weed species are the primary focus of these measures, however other pests / diseases may require hygiene procedures during the operational phase of the wind farm as necessary. All vehicles and equipment exiting a known or potentially contaminated site will be decontaminated to prevent the spread of pests, weeds or diseases. A vehicle washdown bay will be provided on site and the location will be clearly identified for all personnel working on the Catherine McAuley Catholic College.

Hygiene checks / decontamination will focus on ensuring no weed vegetation / seed / mud / soil material enters the site (or leaves known infestation areas within the site), with all machinery, vehicles and equipment including footwear will be cleaned prior to entering the site, and when working within a known contaminated area within the site, prior to exiting the contaminated area. Good biosecurity hygiene practises will be routine for any site visit.

A hygiene / decontamination checklist for vehicles and machinery is provided in Appendix 2. An overview of the recommended decontamination process (based on DPI 2015) if required, is outlined below:

- Preparation for decontamination:
 - Position vehicle/equipment safely and ensure stability e.g. chock wheels, brake applied.
 - Remove excessive gross material (soil, debris) – ideally done where material can be left or collected for disposal. Use dry cleaning methods before wet where possible e.g. brush down before pressure hosing with water.
 - Detach removable items/parts and decontaminate individually.
- Procedure for decontamination of external surfaces to include:
 - Start at top of vehicle or equipment and work down.
 - Vehicles or equipment with moving parts e.g. wheels, tracks, tipper tray, dingo bucket etc. will need to have these moved during decontamination to access all areas.
 - Wet decontamination procedure – Apply disinfectant/detergent and leave for appropriate contact time (usually 10 minutes). Rinse with clean water.
 - If other techniques e.g. heat, fumigation for tools, equipment and other things are required, ensure exposure requirements are met as required by disease/pest guidelines.
- Procedure for decontamination of internal surfaces:
 - Internal surfaces of vehicles will only require decontamination if they have been exposed to potential contamination whilst on site.
 - Protective covers on internal surfaces e.g. seat covers will be removed and disposed/cleaned.

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- Remove solid materials with a vacuum, cloth or brush.
 - Air filters will be removed and replaced or cleaned. A skilled technician may be required.
 - Surfaces can be wiped or sprayed with 70% alcohol or another appropriate disinfectant.
 - In addition, imported materials such as sand and gravel will be sourced from weed free sources and areas.

7 Vegetation management actions

Table 2 Vegetation management actions and performance criteria

Management action	Management zone	Responsibility	Task / performance criteria	Timing
Photo reference points	MZ1	Bush Regeneration Contractor / Project Ecologist	Minimum of two photo points installed within MZ1 / development footprint. Photo monitoring data be collected prior to the commencement of construction activities, earthworks and vegetation clearing. Photo point data to be included in six-monthly monitoring during and at the completion of the construction phase and will make up a component of the final monitoring report for the VMSP.	Temporary photo points established prior to the commencement of construction activities, earthworks and vegetation removal. Data collection ongoing until completion of construction phase.
Define vegetation clearing boundary and install vegetation exclusion fencing	MZ1	Construction contractor / Vegetation management consultant	Vegetation clearing extent to be delineated from retained vegetation. Exclusion fencing is to be installed as per the specifications above (Section 6.1.3) and where possible in accordance with the Koala exclusion fencing detailed within the KMSP.	Prior to commencement of construction activities, earthworks and vegetation removal.
Silt fencing installed	MZ1	Construction contractor	Silt fencing installed around the perimeter of the development area/MZ1.	Prior to commencement of construction activities, earthworks and vegetation removal.
Stockpiled material not impacting riparian corridor	MZ1	Construction Contractor	All stockpiled material soil or otherwise is to be placed within the development area and as far as possible from the riparian corridor along the southern boundary of the development footprint. All stockpiled soils are to be bundled by sediment fencing or equivalent sediment/erosion control methods.	During construction phase

Management action	Management zone	Responsibility	Task / performance criteria	Timing
Hollow bearing trees marked	MZ1	Project Ecologist / Construction Contractor	The 10 hollow bearing trees identified in the BDAR (Biosis 2018) are to be flagged prior to removal.	Prior to commencement of construction activities, earthworks and vegetation removal.
Vegetation clearing extent delineated	MZ1	Construction Contractor	Vegetation to be removed within the development footprint needs to be clearly delineated from vegetation to be retained to ensure no over clearing occurs.	Prior to commencement of construction activities, earthworks and vegetation removal.
10 hollows from cleared vegetation within the development footprint salvaged and stockpiled for reuse	MZ1	Project Ecologist / Construction Contractor	Vegetation clearing and hollow salvage will be supervised by an ecologist. Where possible a specialist contractor may be required including but not limited to an arborist or Vegetation Clearing Specialist to ensure the safe felling, salvage and relocation of 10 hollows.	During vegetation clearing
Non-hollow woody debris generated from the vegetation clearing to be stockpiled for reuse	MZ1	Construction Contractor	Any chipped woody debris should be stockpiled for future reuse for revegetation activities required under the overarching VMP a providing it is native and inspected to be free of weed seed and exotic plant propagules. All Slash Pine <i>Pinus elliottii</i> biomass resulting from clearing in MZ1 is to be removed from site and is not suitable for mulching or reuse within the overarching VMP area.	During vegetation clearing
All fruit laden <i>Eucalyptus</i> limbs generated from vegetation clearing to be used as brush matting	MZ1	Bush Regeneration Contractor/ Construction Contractor	Fruit laden limbs to be collected during vegetation clearing and reused as brush matting within the area identified as Swamp Sclerophyll Forest –PCT 1718 poor condition (Figure 2)	During vegetation clearing

Management action	Management zone	Responsibility	Task / performance criteria	Timing
Soil stockpiles to be covered in Geofabric and surrounded by silt fencing during construction works.	MZ1	Construction Contractor	Any stockpiled soil generated during earthworks and vegetation clearing is to be covered by geofabric material or equivalent and surrounded by appropriate soil erosion controls (silt fencing) consistent with measures outlined within <i>Landcom Managing Urban Stormwater: Soils and Construction</i> (Landcom 2004) to minimise the germination and spread of weeds, soil loss and potential dust pollution during high wind and rainfall events.	During construction activities, earthworks and vegetation removal.
Weed treatment during construction phase	MZ1	Construction Contractor / Bush regeneration Contractor	If priority weeds are detected within the development footprint during six monthly monitoring events a Bush Regeneration Contractor is to be engaged to undertake primary and secondary weed control in accordance with Table 1 and Appendix 1.	Prior to commencement of construction activities, earthworks and vegetation removal.
Hygiene protocols	MZ1	Construction Contractor	Strict hygiene protocols implemented to reduce the potential introduction or spread of invasive flora and fauna species as per Section 6.1.7 of this VMSP Hygiene checklist completed (Appendix 2). Evidence of completed VMSP hygiene checklists.	Prior to commencement of construction activities, earthworks and vegetation removal.
Monitoring program	MZ1	Project Ecologist / Construction Contractor	Once photo points established, complete monitoring as outlined in Table 3 below.	Every six months for the construction phase of the VMSP
Reporting program	MZ1	Project Ecologist / Construction Contractor	At the completion of the Construction phase, a single report compiling results from all monitoring inspections will be prepared. This report will be forwarded to DPIE and will provide record of the implementation of the VMP and VMSP during the construction stage of the proposed development.	After construction phase is complete

Table 3 Vegetation management actions - Monitoring

Management action	Specification / Requirement
Ecological Monitoring Framework	<p>Ecological monitoring works are to be undertaken by the Project Ecologist and will be required every six months for the life of the VMSP-Construction Phase. At the completion of the Construction Phase, a single report compiling results of all six monthly monitoring inspections will be prepared.</p> <p>The monitoring shall occur prior to the commencement of earthworks, vegetation clearing and construction activities and will include the establishment of a minimum of two fixed photo points that will be used to collect baseline data and document six monthly progress thereafter.</p> <p>The monitoring will include the following activities:</p> <ul style="list-style-type: none"> • Collection of photo point data • Note any weed outbreaks across the development footprint/MZ1 area, this can be done while walking between monitoring points. • Note that sediment and erosion fences and other controls are in place. • Note that stockpiled soil is free from weeds, covered in Geofabric or similar and surrounded by appropriate silt fencing. • Ensure that materials are not stockpiled near to the southern development footprint boundary and riparian corridor. • Note any other emerging soil and erosion control issues or areas of sedimentation. • Include additional photos of the southern boundary / riparian corridor interface to assess encroachment and the effectiveness of silt fencing installed.

8 Schedule of works

The VMSP will be undertaken in general accordance with the schedule of works provided below and the relevant specifications provided. The responsibility for completing the actions within the schedule of works will be attributed to the principal bush regeneration contractor that is engaged to complete the work.

Table 4 Schedule of VMSP Construction Phase works

Actions	Timeframe		
	Pre-construction	During construction	Completion of construction phase
Install exclusion fencing along vegetation clearance boundary			
Install and monitor sediment control fencing around perimeter of development footprint			
Hollow bearing trees marked			
Vegetation clearing extent delineated			
Hollows salvaged and stockpiled for replacement			
Stockpile logs and wood chip for use in rehabilitation			
Lay fruit laden limbs as brush matting in Swamp Sclerophyll Forest – Poor condition area			
Six-monthly monitoring			
Preparation of monitoring report			
Removal of all Slash pine biomass generated during vegetation clearing offsite*			

* All Slash Pine *Pinus elliotii* biomass resulting from clearing in MZ1 is to be removed from site and is not suitable for mulching or reuse within the overarching VMP area.

References

- Biosis 2018. Catherine McCauley Catholic College, Medowie BDAR. Report for Webber Architects. Authors: A Barreto, S Allison, C Corden, Biosis Pty Ltd, Newcastle. Project no.26652
- Biosis 2019 Catherine McCauley Catholic College, Medowie VMP for Webber Architects. Authors: Scheid T and Price P, Biosis Pty Ltd, Newcastle. 28870
- Cockerill, A., Harrington, S and Bagel, T. 2013 *Lower Hunter Vegetation Mapping*. Report funded by the department of Sustainability, Environment, Water, Population and Communities through the Sustainable Regional Development Program. Parsons Brinkerhoff, Canberra.
- Commonwealth of Australia 2018. Protected Matters Search Tool. Australian Government Department of the Environment, Water, Heritage & the Arts, Canberra. Accessed 5/03/2018 at <https://www.environment.gov.au/epbc/protected-matters-search-tool>
- DEC 2005. New South Wales. Dept. of Environment and Climate Change and New South Wales. Dept. of Environment and Conservation *Recovering Bushland on the Cumberland Plain: Best practice guidelines for the management and restoration of bushland*. Dept. of Environment and Conservation (NSW), Sydney, NSW.
- de Witt Consulting 2018. Environmental Impact Statement (EIS) – Proposed Catholic College at Medowie. Report for Trustees of the Roman Catholic Church for the Dioceses of Maitland-Newcastle. Authors: M Maund, de Witt Consulting Pty Ltd. Project no. 7484
- DPI 2018. *New South Wales Weed Control Handbook - A guide to weed control in non-crop, aquatic and bushland situations*, 7th Edition. NSW Department of Primary Industries.
- DPI 2015. *NSW Department of Primary Industries Procedure: Decontamination of vehicles and equipment*, accessed 17/04/2018, http://www.dpi.nsw.gov.au/data/assets/pdf_file/0010/545554/procedure-decontamination-vehicles-and-equipment.pdf
- DPI 2013. *Policy and guidelines for fish habitat conservation and management (2013 update)*. NSW Department of Primary Industries.
- Harden G 2002. *Flora of New South Wales*, Revised Edition, NSW University Press, Kensington.
- Landcom 2004. *The Blue Book – Managing Urban Stormwater: Soils and Construction*. Lancom, NSW.
- Matthei, LE. 1995. *Soil Landscapes of the Newcastle 1:100 000 Sheet Report*, Department of Land and Water Conservation, Sydney.
- Newcastle Bushfire Consulting (NBC). 2018, *Bushfire Assessment Report (proposed school alternate solution) - Lot 412 and 413 DP 1063902 507 Medowie Road, Medowie*. Report for Catherine McCauley Catholic College.
- NSW Office of Water 2012a. *Controlled activities on waterfront land: Guidelines for riparian corridors on waterfront land*. Department of Primary Industries – Office of Water.
- NSW Office of Water 2012b. *Controlled activities on waterfront land: Guidelines for watercourse crossings on waterfront land*. Department of Primary Industries – Office of Water.
- NSW Office of Water 2012c. *Guidelines for vegetation management plans on waterfront land*. Department of Primary industries – Office of water.
- OEH 2011b. *Conservation Management Notes, Managing bushland and wildlife habitat – Revegetation*. NSW Office of Environment and Heritage.

OEH 2018. NSW Bionet Threatened Biodiversity search tool. NSW Government Office of Environment and Heritage. Accessed online 6/12/2018 at: <https://www.environment.nsw.gov.au/AtlasApp>

Port Stephens Council (PSC). 2013. *Port Stephens Environmental Plan 2013*.

Port Stephens Council (PSC). 2014. *Port Stephens Development Control Plan 2014*.

Appendices

Appendix 1 Weed management measures

General weed management measures that should be undertaken prior to and during revegetation works:

- Use a range of weed management methods such as slashing or mowing (physical and mechanical control) as well as a range of herbicides (to avoid herbicide resistance).
- Mow/slash areas infested with weeds before they seed (avoiding native vegetation).
- Employ appropriate vehicle hygiene such as:
 - Clean machinery, vehicles and footwear before moving to a new location.
 - Securely cover loads of weed-contaminated material.
 - Dispose of weed contaminated soil at an appropriate waste management facility.
 - Remove weeds immediately and dispose of without stockpiling.
 - Separate weeds from native vegetation to be mulched – do not use weeds for mulch.
 - Minimise soil disturbance in weed infested areas.

Weed control methods adopted in the implementation of this VMSP are based on a combination of the current site management, bush regeneration industry standards and botanical knowledge of the weeds. Techniques and methods recommended in following sections such as 'hand weeding' are described in detail in various publications such as *Recovering Bushland on the Cumberland Plain: Best practice guidelines for the management and restoration of bushland*. (DEC 2005). The publication *New South Wales Weed Control Handbook: A guide to weed control in non-crop, aquatic and bushland situations, 7th Edition* (DPI 2018) provides descriptions on general and standard weed control methods.

Application of herbicide during weed control works will depend on species targeted and the growing situation. For example the selection of an herbicide and the application method for a particular species or class of plant will be determined by factors such as the degree of infestation of target species, limiting damage to off target native flora and preventing herbicides entering waterways. The DPI (2018) document cited above should be referred to as guide for specific herbicides, record keeping and herbicide application techniques.

Use of herbicides must be according to the NSW *Pesticides Act 1999*, Material Safety Data Sheets and labelling instructions for specific trade name herbicides and off label use permits registered with the APVMA. The use of herbicide as part of this VMSP will be limited to direct application to cut stumps and spot spraying. Any contractors using herbicides on the site must be trained and appropriately qualified to do so (ChemCert Level 2 or equivalent for subordinates and ChemCert Level 3 or equivalent for supervisors).

Slashing can be used to prevent weeds from flowering and setting seed. This method can be undertaken with a tractor and slashing implement or by using a hand held brush cutter (DPI 2018). In addition DEC (2005) have highlighted that slashing or mowing can also be used in bushland areas (with grassy native understorey) as an initial or holding treatment to reduce weed mass. This allows for more efficient follow-up as fast growing reshooting weeds can be spot sprayed with herbicide among areas of native grasses and herbs. DEC (2005) also suggest that to effectively control exotic annual herbs and grasses, mowing or slashing must be done at least monthly in summer (possibly more frequently if conditions are warm and wet and weed growth is accelerated). For perennial weeds which mature in mid to late summer, mowing or slashing may be reduced to two to three times each season, with the final treatment being applied late in the season ideally before fruit ripens and seed becomes viable (DEC 2005). Further simple techniques for reducing the potential for assisting the dispersal of weed species as a result of slashing are to:

- Slash from areas of dominated by native species to more degraded areas dominated by introduced species.
- Shake or wash down slashing implements in disturbed and managed areas prior to use in more intact areas.

In summary it is recommended that a combination of reducing the height and number of occasions slashing occurs and appropriate weed hygiene protocols be implemented.

Species specific control for priority and environmental weeds recorded within the study area are provided in Table 5 below.

Table 5 Priority and environmental weed management measures

Botanical name	Common name	Initial treatment	Follow up control
Annual weed species	Various	Hand remove Or chemically treat (spray) deseeded mature specimens with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water (1:100).	Monitor for seedlings. Hand remove and/or remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water.
<i>Ageratina adenophora</i>	Crofton Weed	Cut and paint stems with 'neat' 360g/L Glyphosate based herbicide to reduce collateral damage to natives and riparian areas Or Chemically treat (spray) deseeded mature specimens with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water (1:100).	Hand remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water prior to flowering. A DPI approved biocontrol (Rust) may be applied to assist in control of large and remote locations.
<i>Andropogon virginicus</i>	Whiskey Grass	Hand remove Or chemically treat (spray) deseeded mature specimens with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water (1:100). May require brushcutting or slashing to promote new growth prior to application.	Hand remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water.
<i>Asparagus aethiopicus</i>	Ground Asparagus Fern	Hand remove in area of high regeneration potential ensure that all fruiting bodies and central 'rhizome' has been removed and disposed offsite. Aerial tubers do not require removal and can act as a preventative measure against soil erosion. Large infestations to be chemically treated (spray) with a Metsulfuron-methyl 600 g/kg based herbicide at a diluted rate of 1 –2 g per 10 L of water plus a non-ionicsurfactant. As per APVMA approved Offlabel permit PER9907.	Hand remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water. All seeds and biomass are to be disposed offsite.
<i>Bidens pilosa</i>	Cobblers Pegs	Hand remove Or chemically treat (spray) deseeded mature specimens with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water (1:100).	Hand remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water.

Botanical name	Common name	Initial treatment	Follow up control
<i>Chrysanthemoides monilifera</i> subsp. <i>monilifera</i>	Boneseed	Cut and paint stems with 'neat' 360g/L Glyphosate based herbicide Or Chemically treat 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water.	Hand remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water. Seeds and very persistent, ongoing follow up works will be regularly required post treatment of large infestations.
<i>Conyza bonariensis</i>	Fleabane	Hand remove in area of high regeneration potential. Flowers and seeds to be removed and disposed of site. Remaining biomass can be composted on site on. Larger infestations can be chemically treated using a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water. Treatment prior to flowering to reduce seed set is recommended.	Hand remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water.
<i>Lantana camara</i>	Lantana	Small or isolated infestations: Hand remove or Cut and paint stems with 'neat' 360g/L Glyphosate based herbicide in areas of high regeneration potential. Large infestations: can be cleared/treated in a mosaic pattern to reduce impacts to wildlife and the incidence of mass germination of secondary weed species. Can be chemically treated (foliage spray) via the use of a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water or a broadleaf selective herbicide such as a Metsulfuron-methyl 600 g/kg based herbicide.	Hand remove seedlings/shooting nodes or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water.
<i>Pinus elliottii</i>	Slash Pine	Hand remove small individuals entirely or cut and paint stems with 'neat' 360g/L Glyphosate based herbicide in areas of high regeneration potential. Large infestations: can be cleared/treated in a mosaic pattern to reduce impacts to wildlife and the incidence of mass germination of secondary weed species.	Hand remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water.

Botanical name	Common name	Initial treatment	Follow up control
<i>Rubus fruticosus</i> aggregate	Blackberry	Dig out single plants (biomass to remain on site) or scape and paint using a 'neat' 360g/L Glyphosate based herbicide (off label permit: PER9907). Chemically treat larger infestations using either a 360g/L Glyphosate based herbicide at a diluted rate of 10–13mL per 1L of water or a APVMA approved broad leaf selective herbicide applied at the registered rate. Slashing may be require to gain access and stimulate new growth.	Hand remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water.
<i>Senecio madagascariensis</i>	Fireweed	Hand remove isolated infestation in areas of high regeneration potential. Spot spray using 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water.	Hand remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water.
<i>Sida rhombifolia</i>	Paddy's Lucerne, Common Sida	Cut/paint, scrape/paint and apply 'neat' 360g/L Glyphosate based herbicide to actively growing stems in areas of in areas of high regeneration potential (off label permit : PER9907). Spot spray with a with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water.	Hand remove seedlings or spot spray with a 360g/L Glyphosate based herbicide at a diluted rate of 10ml/L of water.

Appendix 2 VMP Vehicle and Machinery hygiene / decontamination checklist

Vehicle and machinery hygiene / decontamination checklist

Site:

Vehicle/Equipment:

Date:

Decontamination team:

SAFETY – Flat ground Engine off & keys removed Wheels chocked Moving/raised parts secured

	Contamination point	Decon		Contamination point	Decon
Body	Step treads		Wheels & arches	Wheel arches	
	Bumper/s			Wheel caps & rims	
	Around fuel tank caps			Tyre tread/tracks	
	Around tray body			Mudflaps	
Under carriage	Axels & differentials		Interior / Cabin	Brakes	
	Struts & stabilisers			<i>Remove items for disposal/cleaning</i>	
	Steering components			Foot wells	
	Chassis rails, inc recesses & holes			Seats	
	Spare tyre & mounts			Air vents	
	Fuel tank			Glove box, centre console	
Engine bay	Front grill			Tool boxes	
	Radiator, oil coolers			Boot or recesses, inc spare tyre well	
	Top of gearbox		Attachments	Bull bar	
	Battery recess & tray			Tow ball	
	Air filters			Winch	
	Engine mounts			Bucket, blade, boom, ripper etc	
	Engine recesses or manifold			Hydraulic arms	