



Oakdale West Estate

Vegetation Management Plan

prepared for

Goodman Property
Services (Aust.) Pty Ltd

écologique | environmental consulting

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Revision Schedule

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1	19/07/2019	Draft VMP for review	Goodman
2	05/08/2019	VMP for MOD 1 submission	Goodman

Executive Summary

Background

Goodman Property Services (Aust.) Pty Ltd (Goodman) are currently developing the Oakdale West Industrial Estate (Oakdale West) under State Significant Development approval (SSD7348). Consent approved the removal of approximately 4.4 ha of native vegetation.

Consent conditions are based on various assessment and strategy reports lodged and approved under the original SSD7348, which has included:

- Biodiversity Assessment Reports (2017, 2018) prepared under the NSW Framework for Biodiversity Assessment (FBA), which calculated that 172 ecosystem credits would need to be retired to offset native vegetation clearing (consent condition D82).
- Biodiversity Offsetting Strategies (2017, 2018), which specified how Goodman would establish and manage a biodiversity offset area in order to offset the required ecosystem credits as conditioned under consent condition D83 (which required the establishment of a biodiversity conservation area)

However, during the time since the SSD7348 was lodged and assessed, the *Threatened Species Conservation Act 1995* (TSC Act), under which the FBA was based, has been repealed and replaced by the *Biodiversity Conservation Act 2016* (BC Act).

Transitional arrangements provisioned for under the *Biodiversity Conservation (Savings and Transitional) Regulation 2017* (BC Reg.) expired in February 2018. This has resulted in the redundancy of the approved Biodiversity Offset Strategy.

Purpose of VMP

This Vegetation Management Plan (VMP) has been prepared to support a development modification (MOD 1) for Oakdale West. Relevant to the site's biodiversity, the intent of MOD 1 is as follows:

- To overcome the redundancy of the BOS while avoiding lengthy delays associated with reassessment under new legislation.
- Meet the objectives of the *Water Management Act 2000* (WM Act) through the rehabilitation and restoration of a riparian corridor along Ropes Creek, which would otherwise have been restored as part of the proposed biodiversity offset area.

This VMP applies to an area of approximately 4.2 ha which extends along the western side of Ropes Creek as shown in Figure 1-2. The areas of the Ropes Creek corridor are considered commensurate with the proportion of the SSD7348 development footprint that has encroached onto waterfront land.

Site constraints that have been considered in determining the extent of the VMP proposed are shown on Figure 1-1 and outlined below:

- The alignment of the future Southern Link Road (SLR) which traverses the Ropes Creek riparian corridor;
- Feasible management boundaries and access constraints, given that Oakdale South's boundaries extend to the western side of Ropes Creek and conflict with the future development of Oakdale West under SSD7348;
- The alignment of the existing electricity easement, which also precludes restoration works; and
- The proposed preferred alignment of the Western Sydney Freight Line (WSFL), which has been identified by Transport for NSW as requiring a 60m easement along the northern boundary of Oakdale West.

Goodman may choose to establish the remainder of the former biodiversity offsetting area as a Biodiversity Stewardship Site under agreement with the Biodiversity Conservation Trust (BCT). In the interim this area will continue to be protected by way of the following:

- Removal of cattle, replacement of redundant fencing and installation of new fencing
- Habitat placement (large woody debris), which is provisioned for in civil contracts for the development and detailed in the Flora and Fauna Management subplan to the Construction Environmental Management Plan (CEMP)
- Targeted weed control of scheduled weeds in accordance with the Biosecurity Act 2015 and as listed in the Greater Sydney Regional Strategic Weed Management Plan 2017-2022

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Glossary / Abbreviations

Abbreviations	Expanded text
BAR	Biodiversity Assessment Report
BC Act	NSW Biodiversity Conservation Act 2016
BC Reg.	NSW Biodiversity Conservation (Savings and Transitional) Regulation 2017
BCT	NSW Biodiversity Conservation Trust
BOS	Biodiversity Offset Strategy
CEEC	Critically Endangered Ecological Community
CEMP	Construction Environmental Management Plan
DoEE	Australian Department of Environment and Energy
DOI	NSW Department of Industry
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EPA	Environment Protection Authority
EPBC Act	Environmental Protection and Biodiversity Conservation Act 1999
FM Act	Fisheries Management Act 1994
MNES	Matters of National Environmental Significance
OEH	NSW Office of Environment and Heritage
PCT	Plant community type
RTS	Response to Submissions
SSD	State Significant Development
TSC Act	NSW Threatened Species Conservation Act 1995
VMP	Vegetation Management Plan
WM Act	NSW Water Management Act 2000
WNSLR	Western North South Link Road

1. Introduction

1.1 Overview

Oakdale West Industrial Estate (Oakdale West) is a State Significant Development (SSD7348) being developed by Goodman Property Services (Goodman).

Oakdale West is a staged development for a warehousing and distribution hub, which includes estate-wide earthworks, infrastructure and services and the construction of the Western North South Link Road (WNSLR).

The SSD7348 application was supported by the following documentation in response to SEARs and subsequent stakeholder submissions:

- Environmental Impact Statement (EIS) (Urbis, November 2017)
- Response to Submissions (RTS) (Urbis, May 2018)
- Supplementary RTS (Urbis, October 2018)
- Biodiversity Assessment Report (BAR) (Cumberland Ecology 2017 and écologique 2018)
- Biodiversity Offset Strategy (Cumberland Ecology 2017 and écologique 2018)

Consent for SSD7348 approves the removal of approximately 4.41 hectares (ha) of remnant native vegetation, subject to the following consent conditions:

- D82. Within 12 months of the date of this development consent, or as otherwise agreed with the Planning Secretary, the Applicant must retire 172 ecosystem credits to offset the removal of 4.41 hectares of native vegetation on the Site.
- D83. The Applicant shall establish a Biodiversity Offset Area on the Site, consistent with the area described in the RTS, in accordance with a Biodiversity Stewardship Agreement with the Biodiversity Conservation Trust.

The Biodiversity Offset Strategy (BOS) specified how Goodman would meet the above consent conditions. However, during the time since the SSD7348 was lodged and assessed, the *Threatened Species Conservation Act 1995* (TSC Act) was replaced by the *Biodiversity Conservation Act 2016* (BC Act).

Investigations and assessment required to prepare both the Oakdale West BAR and BOS used the former TSC Act biodiversity assessment methods.

Transitional arrangements provisioned for under the *Biodiversity Conservation (Savings and Transitional) Regulation 2017* (BC Reg.) expired in February 2018. This has resulted in the redundancy of the BOS, which was approved under SSD7348.

This Vegetation Management Plan (VMP) has been prepared to support a development modification (MOD 1) for Oakdale West. Relevant to the site's biodiversity, the intent of MOD 1 is as follows:

- To overcome the redundancy of the BOS while avoiding lengthy delays associated with reassessment under new legislation
- Meet the objectives of the *Water Management Act 2000* (WM Act) through the rehabilitation and restoration of a riparian corridor along Ropes Creek, which would otherwise have been restored as part of the proposed Biodiversity Offset Area.

1.2 Consultation

1.2.1 Department of Planning and Environment

The neighbouring Oakdale South Estate (Oakdale South SSD6917) recently lodged a modification (MOD 11) for the same reasons as the Oakdale West SSD7348 MOD 1.

In preparing the Oakdale South SSD6917 MOD 11, consultation was undertaken with the Department of Planning and Environment (the Department) and that the same issue would occur for Oakdale West SSD7348 was also discussed.

In response the Department consulted with Office of Environment and Heritage (OEH) on the matter, and issued the following suggestions which applied to both Oakdale South SSD6917 and Oakdale West SSD7348:

- Purchase of appropriate BBAM credits from the market (i.e. credits assessed and calculated under repealed legislation) available on the market assessed under the repealed legislation), or
- Obtain a statement of reasonable equivalence to convert the existing BBAM credit obligation into BAM credits (i.e. credits assessed and calculated under the BC Act) and,
 - Enter into a biodiversity stewardship agreement under the BC Act on a parcel of land to generate the relevant credit types, then retire the relevant credits, or
 - Pay an amount equivalent to those credits into the Biodiversity Conservation Trust (BCT).

Oakdale South SSD6917 has obtained a statement of reasonable equivalence from the OEH and will be fulfilling its offsetting requirements through a combination of purchasing and retiring ecosystem credits from the market and direct payment to the BCT.

Oakdale West SSD7348 intend on taking the same approach and propose also to restore/rehabilitate and maintain areas of the Ropes Creek riparian corridor to fulfil the objects of the WM Act.

1.2.2 Department of Industry

The Department of Industry (DOI) was consulted during the assessment of SSD7348, specifically in relation to the proposed Biodiversity Offsetting Strategy encompassing the Ropes Creek riparian zone and meeting the objects of the WM Act.

The RTS and supplementary RTS for Oakdale West SSD7348 provided a number of diagrams in response to DOI's submissions, which illustrated the areas of the proposed development's footprint that encroached onto waterfront land.

The masterplan footprint for Oakdale West SSD7348 has been amended since the issue of the RTS and supplementary RTS. As a result the areas of the development that encroach onto waterfront land have also been amended and are illustrated in Figure 1-1 of this VMP.

1.3 Land to which this VMP applies

This VMP applies to an area of approximately 4.2 ha which extends along the western side of Ropes Creek as shown in Figure 1-2.

The areas of the Ropes Creek corridor are considered commensurate with the proportion of the SSD7348 development footprint that has encroached onto waterfront land.

Site constraints that have been considered in determining the extent of the VMP proposed are shown on Figure 1-1 and outlined below:

- The alignment of the future Southern Link Road (SLR) which traverses the Ropes Creek riparian corridor;
- Feasible management boundaries and access constraints, given that Oakdale South's boundaries extend to the western side of Ropes Creek and conflict with the future development of Oakdale West under SSD7348;

- The alignment of the existing electricity easement, which also precludes restoration works; and
- The proposed preferred alignment of the Western Sydney Freight Line (WSFL), which has been identified by Transport for NSW as requiring a 60m easement along the northern boundary of Oakdale West¹.

The remainder of the biodiversity offsetting area identified in the redundant BOS will continue to be protected by way of the following:

- Removal of cattle, replacement of redundant fencing and installation of new fencing
- Habitat placement (large woody debris), which is provisioned for in civil contracts for the development and detailed in the Flora and Fauna Management subplan to the Construction Environmental Management Plan (CEMP)
- Targeted weed control of scheduled weeds in accordance with the Biosecurity Act 2015 and as listed in the Greater Sydney Regional Strategic Weed Management Plan 2017-2022

Goodman may choose to establish this area in the future as a Biodiversity Stewardship Site under agreement with the Biodiversity Conservation Trust (BCT).

¹ Should the WSFL eventually be constructed at this location, the impacts to the remnant native vegetation that would result will become the responsibility of TfNSW. For the purpose of SSD7348 MOD 1, the proposed development will not impact on this area.

Oakdale West Estate

Vegetation Management Plan

RIPARIAN GUIDELINES

- Ropes Creek 3rd order
- Tributary 1st order
- - - 40m - waterfront land
- 30m - riparian buffer
- ▨ Waterfront land encroachment

OAKDALE WEST

- ▭ Oakdale West boundary
- ▭ Native vegetation to be retained
- ▨ Fenced conservation area
- Oakdale West siteworks
- WNSLR siteworks

SITE CONSTRAINTS

- - - Electricity easement
- - - Future WSFL
- Future Southern Link Road

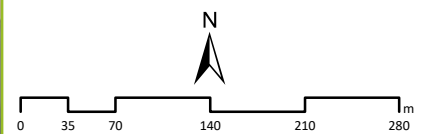
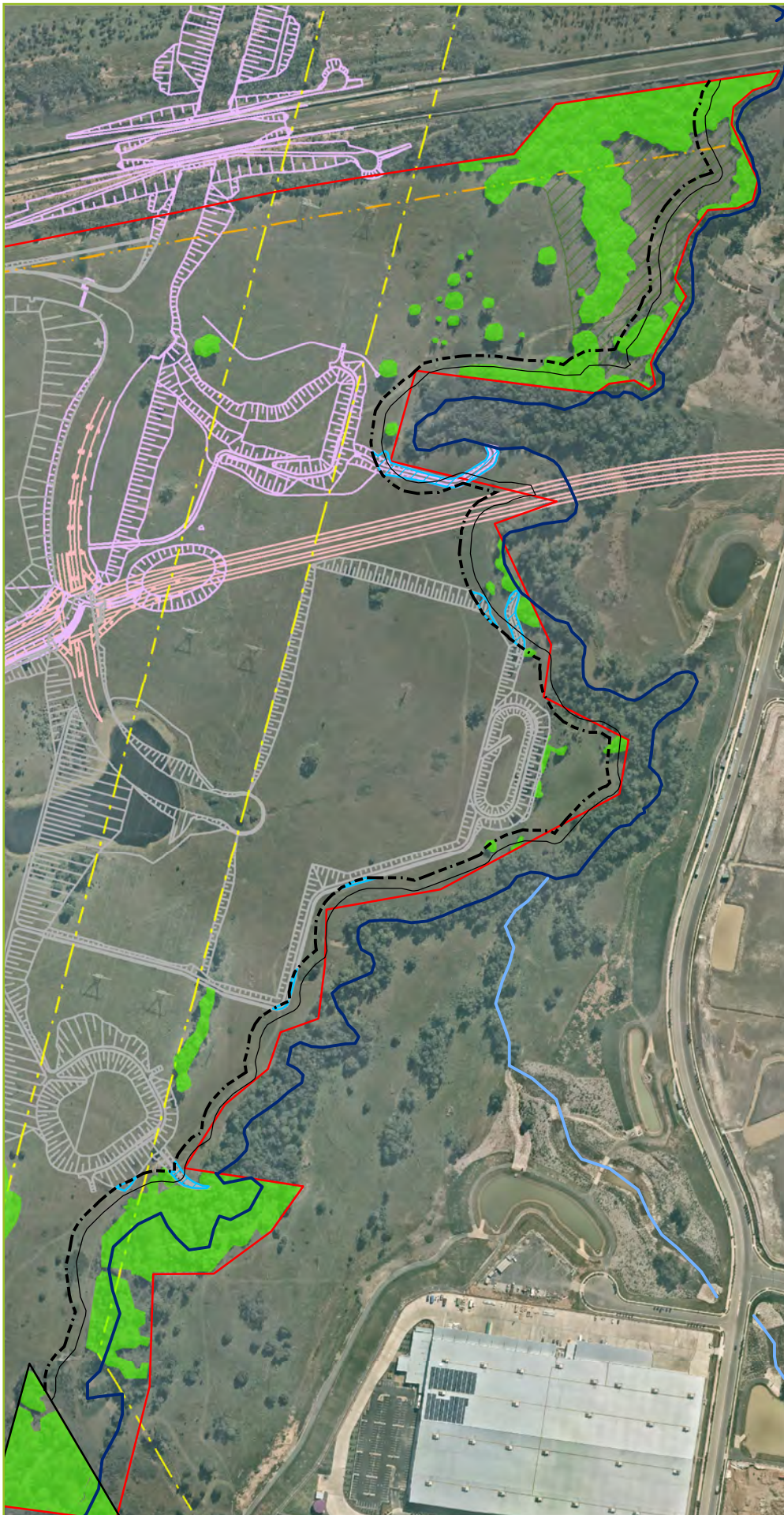
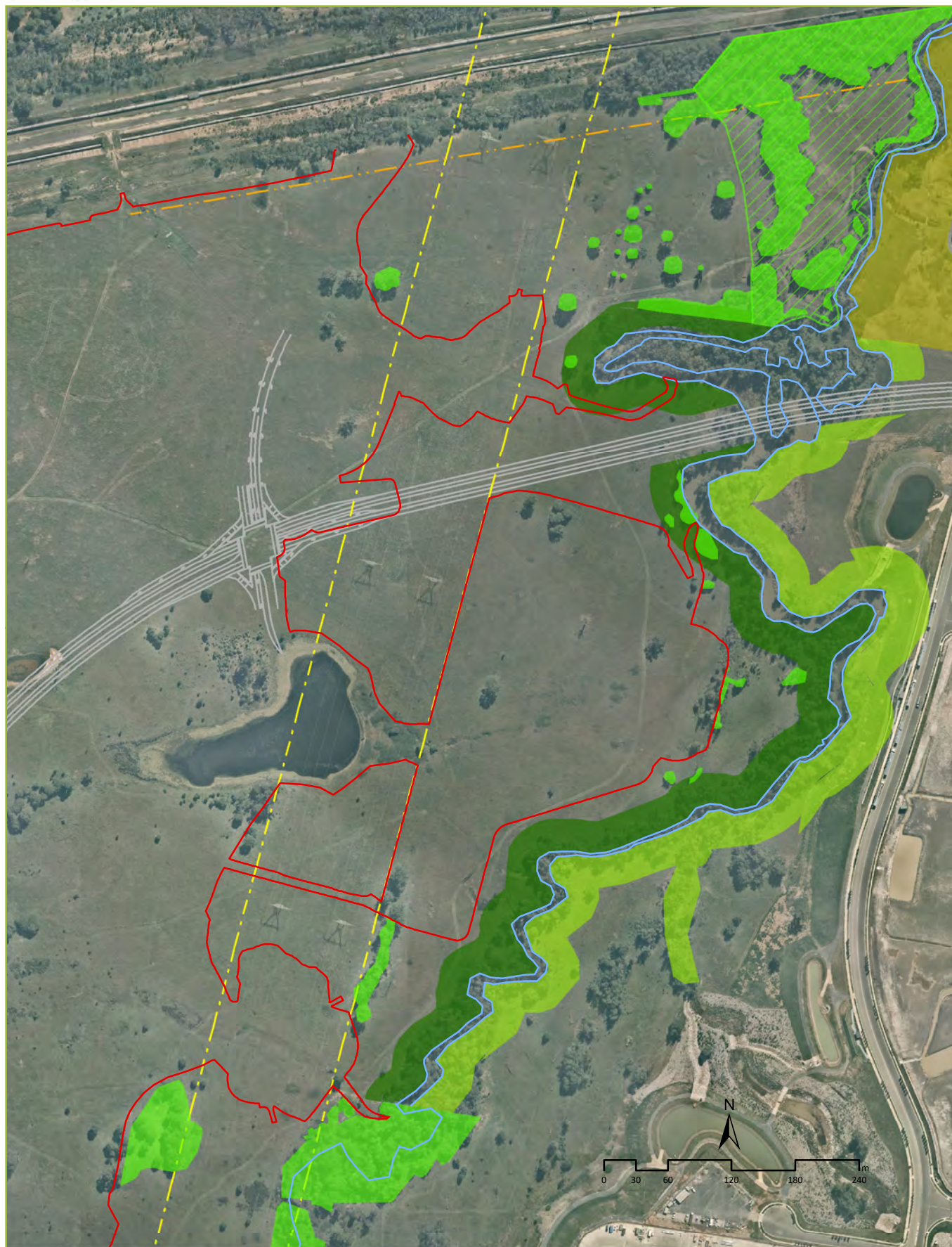


Figure 1-1
Site constraints

Coordinate System: MGA Zone 56 (GDA 94)
Image sources: Nearmap 7 April 2019





Oakdale West Estate VMP

Figure 1-2 Proposed VMP extent

Coordinate System: MGA Zone 56 (GDA 94)
Image sources: Nearmap 7 April 2019

- | | |
|---|--|
| Oakdale West VMP extent | Extent of works |
| Oakdale South VMP extent | Ropes Creek |
| Native vegetation to be retained | Electricity easement |
| Oakdale Central biodiversity area | Future WSFL |
| Fenced conservation area | Future Southern Link Road |

2. Site Description

2.1 Ropes Creek riparian corridor

As can be seen from Figure 1-1, the Ropes Creek riparian corridor broadly defines the eastern boundary of Oakdale West although much of the creek itself lies within the neighbouring Oakdale South Estate

Ropes Creek is a 3rd order Strahler stream order watercourse, as mapped on the NSW Hydro Line dataset². As such, this watercourse generally needs to be retained with a 30m vegetated riparian zone to each side of the channel.

A 30m riparian zone will be restored from the top of the western bank of Ropes Creek as part of the Oakdale West SSD7348 development. A corresponding 30m riparian zone will be restored from the top of the eastern bank of Ropes Creek as part of the Oakdale South SSD6917 development.

The Oakdale West SSD7348 development footprint encroaches marginally onto waterfront at five separate areas (see Figure 1-1), which in total amounts to 485m².

The outlets from three bioretention basins are located within the riparian corridor (see Figure 1-1), which are permitted, so long as they create minimal harm, and as they relate to meeting the objectives of the WM Act and the DOI's guidelines for controlled activities on waterfront land.

2.2 Native Vegetation

2.2.1 Plant Community Types

The Ropes Creek riparian corridor is subject to a significant level of remnant riparian vegetation. Investigations and assessment under the former biodiversity assessment method (BAM) identified two plant community types (PCTs) within the corridor, as summarised in Table 2-1.

Table 2-1. PCTs identified within the Ropes Creek riparian corridor

ID	PCT common name	Status	
		BC Act	EPBC Act
PCT 835	Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin	Endangered	Not listed
PCT 1232	Swamp Oak floodplain forest fringing estuaries, Sydney Basin Bioregion and South East Corner Bioregion	Endangered	Endangered

Since investigations and collection of floristic data were undertaken to support the SSD7348 development application, a major upgrade to the NSW Vegetation Information System (VIS) took effect for the Sydney Metropolitan region.

Appropriate to the Ropes Creek riparian corridor is the inclusion of "Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley" (PCT 1800) which is a more appropriate PCT than PCT 1232.

² The Water Management (General) Regulation 2018 hydro line spatial data is a dataset of mapped watercourses and waterbodies in NSW. Based on the Spatial Services (Department of Finance, Services & Innovation) the data set is used to determine the Strahler stream order of a stream to identify whether an exemption from the requirement for a water licence or approval under the Water Management (General) Regulation 2018 applies.

The allocation of PCTs is only necessary for the assessment of native vegetation removal and calculation of ecosystem credits that are required to offset impacts to native vegetation. For the purpose of this VMP the appropriateness of PCT allocation is provided to justify the assemblage of vegetation communities and associated constituent plant species) proposed for restoration purposes.

A further consideration is the dominance of *Casuarina glauca* (swamp oak), which is regenerating through widespread suckering and resultant monospecific gene pool. The aim of this VMP is to ensure that a diverse range of endemic riparian flora is reinstated, which includes genetic diversity.

2.2.1 Flora species

Native flora species observed within the riparian corridor consists of a canopy dominated by swamp oak and *Melaleuca styphelioides* (prickly-leaf paperbark) with less frequently occurring *Eucalyptus tereticornis* (river redgum), *E. moluccana* (grey gum) and *Angophora floribunda* (rough barked apple gum).

Regenerating *Bursaria spinosa* (native blackthorn) is the most dominant species in the shrub layer species with various acacia species also present (*Acacia implexa*, *A. decurrens*, *A. floribunda* and *A. parramattensis*).

Native ground layer plant species are scattered throughout the riparian corridor including patches of native grasses such as *Microleana stipoides* (weeping meadow grass) and other herbs (such as *Dichondra repens*, *Pratia purpurascens*, *Brunoniella australis*).

Given the extent of remnant vegetation within the corridor, a medium to high level of natural resilience is expected.

2.3 Introduced Vegetation

Sections of Ropes Creek are infested with *Juncus acutus* (spiny rush) within the channel and lower creek banks. *Alternanthera philoxeroides* (alligator weed) is known to occur upstream of the VMP subject area but has yet to be identified within downstream reaches.

Higher elevated creek banks and the riparian corridor support moderate populations of grazed exotic grasses with scattered patches of *Rubus fruticosus* (blackberry) and individuals of *Lycium ferocissimum* (African boxthorn), *Dovyalis caffra* (kei apple) and *Cestrum parqui* (green cestrum). Most of which are identified as priority weed species in the Greater Sydney Regional Strategic Weed Management Plan 2017-2022 (refer Section 3.4.1).

3. Restoration Approach

3.1 Overview

The specific objectives of this VMP align with those prescribed in the NSW Guidelines for vegetation management plans on waterfront land (DPIW July 2012) (the guidelines). The main objective being to provide a stable watercourse and riparian corridor which will emulate local native vegetation communities. Specific issues that need to be addressed within this VMP include:

- Conserve and protect environmentally sensitive areas and biodiversity values;
- Restore and rehabilitate degraded bushland and areas of significant vegetation;
- Ensure the protection of threatened species, populations or ecological communities;
- Limit the impact of development upon existing native vegetation;
- Provide habitat connectivity and fauna corridors;
- Promote sustainable vegetation management;
- Undertake responsive site management and landscaping to ensure that bushland values are conserved; and
- Specify appropriate environmental protection works to enhance the ecological and bushland amenity value of the site.

A combination of assisted bushland regeneration and reconstruction through revegetation shall be undertaken in areas of remnant native vegetation and pasture land within the VMP riparian zones (respectively).

3.2 Assisted Bushland Rehabilitation

Assisted bushland regeneration works shall be implemented in areas where natural regeneration is likely, by removing obstacles and making amendments to abiotic conditions to effect the regeneration of remnant native vegetation with varying resilience levels.

The aim of assisted bushland regeneration is to create conditions that favour the ecosystem's own recovery processes. The following principles from OEH's Conservation Management Notes (OEH 2011) apply to this VMP:

- Working where the natives are stronger, i.e. looking after the good areas and creating the conditions that promote their expansion into adjoining more degraded areas. An exception to this approach in the VMP riparian corridors will be targeting priority weed species in accordance with the *Biosecurity Act 2015*;
- Avoiding excessive disturbance because it often favours weed regrowth. But employing some disturbance where it is needed to trigger native plant regeneration or to treat compacted soil;
- Avoiding mulching (mostly) because mulch suppresses germination of seedlings, although it should be used in the following circumstances:
 - Small, low resilience patches within the regeneration area where natural leaf litter is available from nearby sources, and
 - On the edges of bushland areas to define the limits of the regeneration zone, and to suppress the encroachment of exotic grasses.
 - Above all, mulching shall avoid burying resilient areas where natural recruitment from the soil seed bank is evident.

Management activities relating to the assisted bushland regeneration are detailed in Section 4.

3.3 Reconstruction through revegetation

Where areas are found to have a low capacity for natural regeneration (i.e. former pasture land), these shall be fully reconstructed through revegetation of canopy, shrub and ground layer plant species constituent of River-flat Eucalypt Forest communities (RFEF). Reconstruction activities generally entail the following:

- Spraying out of introduced pasture grasses, herbs and forbs using a combination of selective and non-selective herbicides and high volume and low volume applications;
- Planting of local RFEF tree, shrub and groundlayer species; and
- Jute matting or mulching, depending on the location.

Section 4 details management activities relating to the reconstruction through revegetation.

3.4 Threatening processes

The most significant threatening processes that contribute or have contributed to degradation of the site's riparian corridors include:

- Past clearing of native vegetation;
- Grazing;
- Weed infestations, and
- Disturbance of soil and soil-stored native seed from various works associated with past land uses and proposed development.

The site's boundary will be securely fenced and grazing cattle removed. The existing natural riparian corridors will be demarcated as 'no go' zones and silt fencing installed to prevent movement of sediments in runoff entering these zones, during construction.

3.4.1 Weed infestations

Weed infestations will be managed as outlined in this VMP and in accordance with the *Biosecurity Act 2015*. The *Biosecurity Act 2015* replaces the *Noxious Weeds Act 1993*, which was repealed in August 2017.

The *Biosecurity Act 2015* itself is tenure neutral, in that unlike the previous *Noxious Weeds Act 1993* there is no scheduled "list" of weeds. As such all weeds need to be categorised by a risk they pose in relation to human health, biodiversity or agricultural production. The General Biosecurity Duty (GBD) is a key feature of the *Biosecurity Act 2015* (S22). Simply put, it means that all private and public land managers (or anyone who deals with weeds) must prevent, eliminate or minimise the risk of those weeds present.

The Greater Sydney Regional Strategic Weed Management Plan 2017-2022 identifies both State level and regionally determined priority weeds and high-risk activities that are relevant to the Oakdale West are listed in Appendix 1.

4. Management Actions

4.1 Management Zones

The VMP applies to two management zones: (a) assisted bushland regeneration, and (b) reconstruction through revegetation.

Work activities specific to these management zones are summarised in Table 4-1 and detailed in the following Sections with relevant work areas shown in Figure 4-1.

4.2 Weed Control

4.2.1 Primary weeding

Primary weeding is the first stage of bushland regeneration and reconstruction, which will require a range of techniques such as: the selective spraying of weeds with herbicides; cutting/scraping and painting deep rooted woody weeds and climbers with hand tools, chainsaws and brushcutters and painting cut stumps with herbicide; and selective hand removal of weeds.

Primary weeding is required in all VMP zones with a priority given to:

- Species scheduled under the *Biosecurity Act 2015* (see Table A, Appendix A);
- Widespread growth of spiny rush; and
- Woody weeds and climbers.

Additionally:

- Herbicide should not be allowed to fall into a watercourse or when wind conditions could cause drift outside the area to be treated or onto desirable plants.
- Weeds that cannot be removed by hand are to be manually removed, ensuring that the entire weed including all roots is removed;
- Damage to native plant species should be avoided during any weeding works; and
- All seed, flowering and invasive vegetative parts of weeds should be bagged and disposed of appropriately off site.

4.2.2 Secondary weeding

Secondary weeding involves the selective removal or treatment of weeds, whilst allowing regenerating or planted native plants to increase in size, abundance and percentage cover.

Secondary weeding should be undertaken at intervals of not more than four weeks following the completion of primary weeding and continue throughout the plant establishment period in reconstruction areas and as an ongoing task in assisted bush regeneration areas.

All herbaceous weeds should be managed to be at very-low percentage cover levels, (as a minimum 5% cover), or better. Particularly problematic herbaceous weeds with wind-blown seeds should be prevented from seeding at all times throughout the site.

4.2.3 Maintenance weeding

It can be expected that the remnant and revegetated areas in each VMP zone will always require a certain level of maintenance weeding, as weed seeds and vegetative propagules make their way on site from the soil stored seedbank, via water, wind and bird droppings. However, it can be expected that the amount of weeding required will decrease once the regenerating native plants grow, recover and become more resistant to disturbance and weed colonisation.

Maintenance weeding shall extend for a minimum of three years following the completion of the Plant Establishment / Defects Liability Period (refer Section 4.5.4) or until such time as a minimum

80% survival rate for all plantings and a maximum five percent (5%) weed cover for each VMP management zone.

4.3 Soil amelioration

In areas not subject to construction disturbance it is anticipated that existing soils will be suitable for revegetation following weed control without the need for amelioration.

Where construction activities have disturbed site soils (e.g. compaction, loss of topsoil) the following shall apply:

- All debris, stones and left over building materials (arising from the works) are to be removed from site.
- Stones exceeding 25 mm, clods of earth exceeding 50 mm, and weeds, rubbish or other deleterious material brought to the surface during excavation or cultivation, must be removed.
- Supply and cultivate/spread 50mm layer of organic compost within 50mm layer of topsoil.
- Organic compost to be pH neutral; low in phosphorus suitable for planting Australian natives; free from clods of soil, rock, rubbish, and other non-organic matter.

4.4 Mulching

The higher elevated parts of VMP reconstruction zones are to be mulched with a minimum 100mm layer of mulch to assist with weed suppression, improve soil water conservation and soil erosion control.

Mulch is to be placed to the required depth, clear of plant stems, and raked to an even surface flush with the surrounding finished levels. Mulch is to be spread so that after settling it is:

- Smooth and evenly graded between design surface levels
- Flush with adjacent finished levels
- Of the required depths (100 mm depth)
- Sloped towards the base of plant stems, but not in contact with the stem

4.5 Planting program

4.5.1 Plant procurement

Plant procurement involves the sourcing of plant species that are consistent with those provided in the Planting Schedule (provided in Appendix B).

Plant procurement shall either be undertaken by Goodman or the Contractor (to be determined on engagement of Contractor).

Most commercial nurseries that supply plant stock to the Western Sydney Region have the capacity to provide suitable seed or other propagative materials without the need for targeted collection of seed/ propagation materials. However at least four to six months advance notice will be required to ensure that the species listed the Planting Schedule (provided in Appendix B) are able to be supplied at the intended commencement of planting.

Plant stock is to be inspected by the Contractor and Site Superintendent (or otherwise appointed Goodman representative) at least one month prior to commencement of planting works and on delivery to the site.

Plants that are not: true to species; vigorous and healthy; with a well-developed root system; free from disease / pests; and are not without scars or dead wood; are to be rejected at delivery.

Planting shall be undertaken immediately after acceptance of plant delivery. If this is not possible: appropriate storage to keep the plants in good condition on the site, adequately protected from frost, wind, sun and vermin, and secured from vandals; shall be facilitated.

4.5.2 Planting procedure

Planting shall generally entail the following:

- Dig hole sufficient for root ball of plant. The removal from the container and the positioning of the plant is to be done with minimum disturbance to the roots.
- Slow-release native plant fertiliser (low phosphorous formulated native plant fertiliser tablet/granules) and water saving crystals shall be placed into the planting hole.
- After planting, the soil shall be replaced and carefully firmed, leaving a slight depression around each plant to allow for water collection. Soil is to be replaced in the hole so that the base of the stem is level with the soil surface, not set below the soil, or sitting above.
- All plants should be watered-in thoroughly after planting to settle any air pockets around the root ball of the plant and to give the plant a good initial supply of water.

4.5.3 Practical completion

It is anticipated that Practical Completion can be achieved within six months from commencement of the bush regeneration/restoration works in each VMP zone. During this time planting establishment is to be achieved through watering, weeding, pest/disease control, replacing dead plant material and repairing/replacing erosion control matting/mulch. All plants should be watered thoroughly on at least 4 to 6 occasions, during this period.

Failure to maintain each VMP management zone in a stable and healthy condition may result in the Superintendent arranging for the maintenance work to be carried out by others at the expense of the Contractor.

Practical Completion shall require a minimum 80 per cent survival rate of each species planted and a maximum of:

- 5 per cent weed cover in restoration zones
- 10 percent weed cover in rehabilitation zones

4.5.4 Planting establishment /defects liability

The Plant Establishment / Defects Liability Period shall be in force for 18 months after Practical Completion of each stage of the works or until the site is stable, whichever is the longer period.

Any defective work, whether the result of poor workmanship, use of defective materials, damage through carelessness, or of any other cause, shall be removed and replaced at the Contractor's expense by work or materials of the required standard.

4.6 Performance measures

Performance targets are necessary to objectively measure the progress and the achievement of the VMP objectives. The anticipated timing of VMP management activities and related performance measures are outlined below and in Table 4-1.

- 1) All environmental and priority weeds are to be continuously suppressed and, if possible, eradicated from the site using recognised appropriate bush regeneration methods in accordance with best practice.
- 2) Weed control and revegetation works are to be carried out by a qualified bushland regeneration contractor for a period of 5 years.
- 3) Regeneration/restoration specified vegetation communities with a minimum 80% cover of native species achieved.
- 4) Weed control targets should eventually progress down to between 5% - 10% (or less) at the end of year 5.

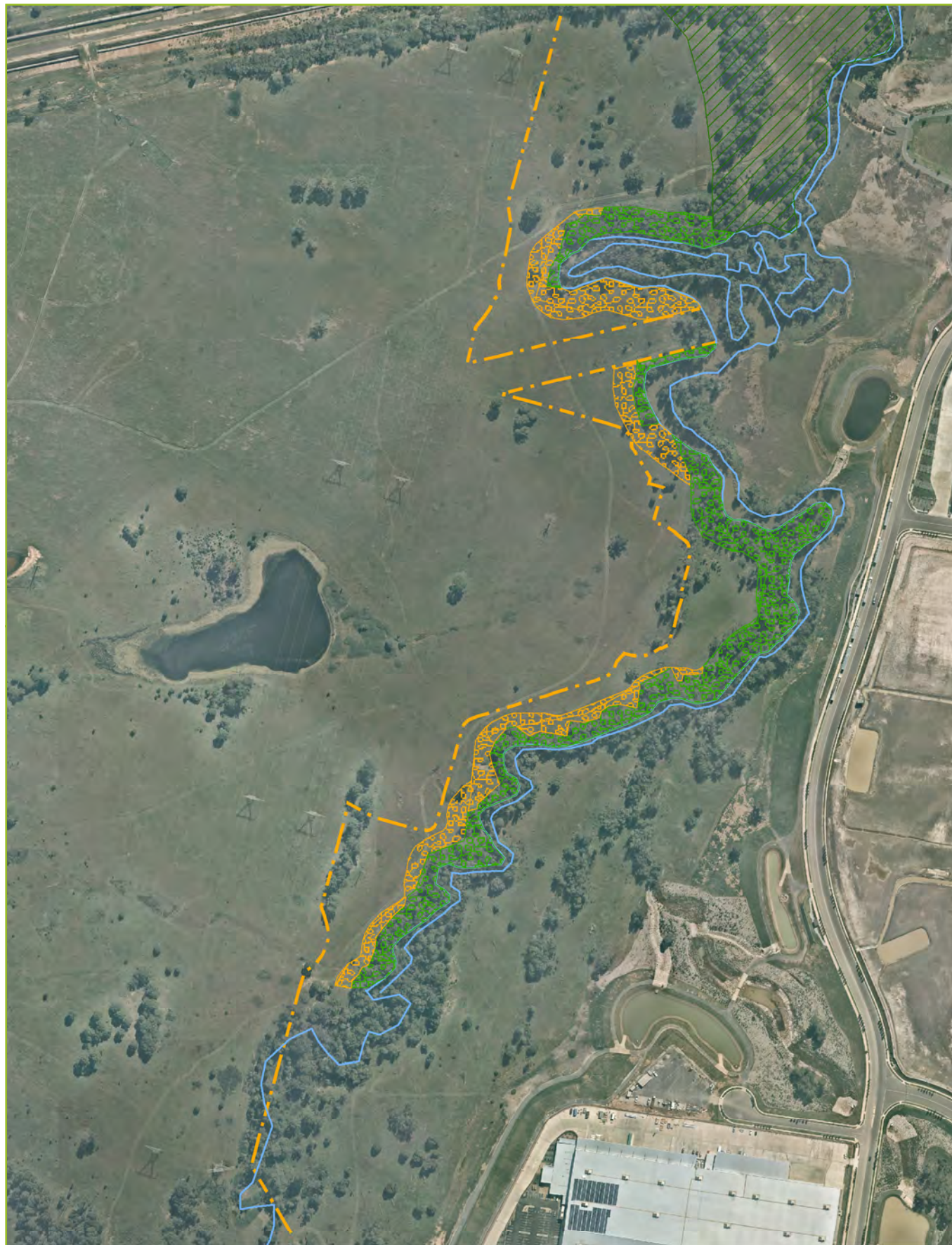
Table 4-1. VMP implementation schedule






Task	Timing	Performance measure
Plant procurement	Minimum 4-6mths pre-commencement of VMP implementation	Plants that are not: true to species; vigorous and healthy; with a well-developed root system; free from disease / pests; and are not without scars or dead wood; shall be rejected at delivery.
Completion of revegetation planting works	Practical Completion	<ul style="list-style-type: none"> 100% of management zones treated 100% of plants installed
Plant establishment	6 months	<ul style="list-style-type: none"> Minimum 90% per cent survival rate of each species planted in all zones Maximum 10% weed cover in reconstruction zones Maximum 20% weed cover in regeneration zones
Defects Liability Period	18 months	<ul style="list-style-type: none"> Minimum 80% per cent survival rate of each species planted in all zones Maximum 10% weed cover in reconstruction zones Maximum 20% weed cover in regeneration zones
Maintenance Period	36 months	<ul style="list-style-type: none"> Minimum 80% per cent survival rate of each species planted in all zones Maximum 5% weed cover in reconstruction zones Maximum 10% weed cover in regeneration zones

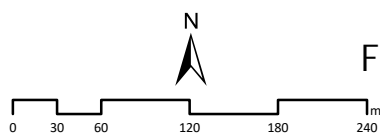
4.7 Compliance certification

Site audits, monitoring and reporting on the progress and achievement of the VMP performance targets shall be undertaken by the Site Superintendent or other representative nominated by Goodman. In general, reporting and compliance certificates shall be issued for the following items:

- Completion of primary weed control works
- Completion of secondary weed control works
- Inspection of plant materials delivered to site prior to commencement of planting works
- Completion of revegetation planting works (Practical Completion)
- Completion of plant establishment period
- Defects Liability Period
- Satisfactory achievement of revegetation/restoration works as per VMP performance targets (Section 4.6).



-  Regeneration
-  Revegetation
-  Fenced conservation area
-  Ropes Creek
-  Former_BOS_extent



Oakdale West Estate VMP

Figure 1-2 Proposed VMP extent

Coordinate System: MGA Zone 56 (GDA 94)
Image sources: Nearmap 7 April 2019

5. References

Cumberland Ecology (2017) Oakdale West State Significant Development Application Biodiversity Assessment Report, prepared for Goodman Property Services (Aust.) Pty Ltd, March 2017.

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DPIW (2012) Controlled activities on waterfront land - Guidelines for vegetation management plans on waterfront land, NSW Office of Water, July 2012

Greater Sydney Local Land Services (2017) Greater Sydney Regional Strategic Weed Management Plan 2017-2022 Version: June 2017

écologique (2018) Oakdale West Estate Biodiversity Assessment Report Amended. Prepared for Goodman Property Services (Aust.) Pty Ltd, 1 October 2018

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Office of Environment and Environment (OEH) (2011) Conservation Management Notes - Managing bushland and wildlife habitat. Office of Environment and Heritage, Department of Premier and Cabinet NSW. ISBN 978 1 74293 316 0 OEH 2011/0659

Appendix A. Weeds of the riparian zone

Species / Common names	Management measures
Shrubs	
<i>Cestrum parqui</i> Green cestrum	<p>Schedule 2: Regional Priority Weed</p> <p>Regional Priority Weed Objective - ASSET PROTECTION:</p> <p>Land managers mitigate the risk of the plant being introduced to land used for grazing of livestock.</p> <p>Land managers prevent spread from their land where feasible.</p> <p>The plant or parts of the plant are not traded, carried, grown or released into the environment.</p> <p>The plant should be fully and continuously suppressed and destroyed on grazing land</p> <p>Implement quarantine and/or hygiene protocols</p> <p>Schedule 3: Local Priority Weed</p> <p>Land managers have mitigated the risk of the plant being introduced to land used for grazing of livestock</p> <p>The plant should be fully suppressed and destroyed on grazing land.</p>
<i>Dovyalis caffra</i> Kei apple	<p>Schedule 2: Regional Priority Weed</p> <p>Regional Priority Weed Objective - ERADICATION</p> <p>The plant is eradicated from the land and the land is kept free of the plant.</p> <p>Destruction of all infestations where feasible.</p> <p>Manage in accordance with New Weed Incursion Plan.</p> <p>Detailed surveillance and mapping to locate all infestations</p> <p>Local Control Authority is notified if the plant is found on the land.</p> <p>The plant or parts of the plant are not traded, carried, grown or released into the environment.</p>
<i>Lantana camara</i> Lantana	<p>Schedule 1: State Priority Weed</p> <p>State Priority Weed Objective - ASSET PROTECTION (Whole of State):</p> <p>Mandatory Measure (Division 8, Clause33, Biosecurity Regulation 2017): A person must not move, import into the State or sell.</p> <p>Regional Strategic Response: Identify priority assets for targeted management.</p>
<i>Lycium ferocissimum</i> African boxthorn	<p>Schedule 1: State Priority Weed</p> <p>State Priority Weed Objective - ASSET PROTECTION (Whole of State):</p> <p>Mandatory Measure (Division 8, Clause33, Biosecurity Regulation 2017): A person must not move, import into the State or sell.</p> <p>Regional Strategic Response: Identify priority assets for targeted management.</p>

Species / Common names	Management measures
<i>Olea europaea</i> subsp. <i>cuspidata</i> African olive	<p>Schedule 2: Regional Priority Weed</p> <p>Regional Priority Weeds Objective - CONTAINMENT:</p> <p>Oakdale West lies within the region classified as the core infestation area. The following applies:</p> <p>The plant or parts of the plant are not traded, carried, grown or released into the environment.</p> <p>Implement quarantine and/or hygiene protocols.</p> <p>Surveillance and mapping to locate all infested properties.</p> <p>Monitor change in current distribution to ensure containment of spread.</p> <p>Land managers prevent spread from their land where feasible.</p> <p>Land managers reduce the impact on priority assets.</p> <p>Identify priority assets for targeted management</p>
<i>Rubus fruticosus</i> agg Blackberry	<p>Schedule 1: State Priority Weed</p> <p>State Priority Weed Objective - ASSET PROTECTION (Whole of State):</p> <p>Mandatory Measure (Division 8, Clause33, Biosecurity Regulation 2017): A person must not move, import into the State or sell.</p> <p>Regional Strategic Response: Identify priority assets for targeted management.</p>
<i>Ulex europaeus</i> Gorse	<p>Schedule 1: State Priority Weed</p> <p>State Priority Weed Objective - ASSET PROTECTION (Whole of State):</p> <p>Mandatory Measure (Division 8, Clause33, Biosecurity Regulation 2017): A person must not move, import into the State or sell.</p> <p>Schedule 2: Regional Priority Weed</p> <p>Regional Priority Weeds Objective - CONTAINMENT:</p> <p>Land managers prevent spread from their land where feasible</p> <p>Destruction of all infestations, aiming at local eradication where feasible.</p> <p>Detailed surveillance and mapping to locate all infestations.</p> <p>Implement quarantine and/or hygiene protocols.</p> <p>Monitor progress towards eradication</p>
Aquatic and semi-aquatic	
<i>Alternanthera philoxeroides</i> Alligator weed - Weed of National Significance	<p>Schedule 1: State Priority Weeds</p> <p>State Priority Weed Objective - CONTAINMENT:</p> <p>Mandatory Measure (Division 8, Clause 33, Biosecurity Regulation 2017): A person must not move, import into the State or sell.</p> <p>Schedule 2: Regional Priority Weed</p> <p>Regional Priority Weeds Objective - CONTAINMENT:</p>

Species / Common names	Management measures
	<p>Oakdale West lies within the region classified as the core infestation area. The following applies:</p> <p>Prevent spread from their land where feasible.</p> <p>Mitigate the risk of the plant being introduced to their land.</p> <p>Reduce the impact on priority assets.</p> <p>Implement quarantine and/or hygiene protocols.</p> <p>Manage in accordance with the Priorities for the control of Alligator Weed in the Sydney Region.</p>
<i>Cyperus difformis</i> Dirty Dora	Other
<i>Cyperus eragrostis</i> Umbrella sedge	Other
<i>Juncus acutus</i> Spiny rush	Other
Vines/scramblers	
<i>Anredera cordifolia</i> Madeira vine	<p>Schedule 1: State Priority Weed</p> <p>State Priority Weed Objective - ASSET PROTECTION (Whole of State):</p> <p>Mandatory Measure (Division 8, Clause33, Biosecurity Regulation 2017): A person must not move, import into the State or sell.</p> <p>Regional Strategic Response:</p> <p>Identify priority assets for targeted management.</p>
<i>Araujia sericifera</i> Moth vine	Other
<i>Asparagus aethiopicus</i> ground asparagus † <i>A. africanus</i> climbing asparagus <i>A. asparagoides</i> bridal creeper <i>A. plumosus</i> climbing asparagus fern	<p>Schedule 1: State Priority Weed</p> <p>State Priority Weed Objective - ASSET PROTECTION (Whole of State):</p> <p>Mandatory Measure (Division 8, Clause33, Biosecurity Regulation 2017): A person must not move, import into the State or sell.</p> <p>Regional Strategic Response: Identify priority assets for targeted management.</p> <p>†<i>A. africanus</i></p> <p>Destruction of all infestations where feasible.</p> <p>Manage in accordance with New Weed Incursion Plan.</p> <p>▫ Detailed surveillance and mapping to locate all infestations</p>
<i>Asparagus virgatus</i> Asparagus fern	<p>Schedule 3: Local Priority Weed</p> <p>The plant or parts of the plant have not been traded, carried, grown or released into the environment.</p> <p>Surveillance and mapping to locate all infested properties and maintain currency of exclusion zone and objectives.</p>
<i>Modiola caroliniana</i> Creeper mallow	Other

Species / Common names	Management measures
Grasses	
<i>Axonopus fissifolius</i> Carpet grass	Other
<i>Briza subaristata</i> hilean quaking grass	Other
<i>Bromus catharticus</i> Prairie grass	Other
<i>Ehrharta erecta</i> Panic veldtgrass	Other
<i>Lolium perenne</i> Ryegrass	Other
<i>Paspalum dilatatum</i> Paspalum	Other
<i>Pennisetum clandestinum</i> Kikuyu	Other
<i>Sporobolus africanus</i> Parramatta grass	Other
Herbs	
<i>Anagallis arvensis</i> Scarlet pimpernel	Other
<i>Brassica fruticulosa</i> Twiggy turnip	Other
<i>Cirsium vulgare</i> Spear thistle	Other
<i>Hypochaeris radicata</i> Catsear	Other
<i>Senecio madagascariensis</i> Fireweed	Schedule 1: State Priority Weed State Priority Weed Objective - ASSET PROTECTION (Whole of State): Mandatory Measure (Division 8, Clause33, Biosecurity Regulation 2017): A person must not move, import into the State or sell. Regional Strategic Response: Identify priority assets for targeted management.
<i>Sida rhombifolia</i> Paddy's lucerne	Other
<i>Solanum americanum</i> American black nightshade	Other
<i>Solanum linnaeanum</i> Apple of Sodom	Other
<i>Sonchus oleraceus</i> Common sowthistle	Other

Appendix B. Planting Schedule

Zone	Species	density/m ²	%mix	Qty
RC reconstruction (15,604m²)				
Trees/large shrubs	Acacia decurrens	0.05	5	40
	Acacia parramattensis	0.05	5	40
	Angophora floribunda	0.05	15	115
	Eucalyptus amplifolia	0.05	15	115
	Eucalyptus eugenoides	0.05	15	115
	Eucalyptus moluccana	0.05	15	115
	Eucalyptus tereticornis	0.05	15	115
	Melaleuca styphelioides	0.05	15	115
			100	770
Smaller shrubs	Acacia floribunda	0.2	8	250
	Breynia oblongifolia	0.2	10	312
	Clerodendrum tomentosum	0.2	10	312
	Daviesia genistifolia	0.2	8	250
	Daviesia ulicifolia	0.2	8	250
	Dillwynia sieberi	0.2	8	250
	Dodonaea spp.	0.2	10	312
	Goodenia ovata	0.2	10	312
	Indigofera australis	0.2	10	312
	Ozothamanthus diosmifolium	0.2	10	312
	Pultenea spp.	0.2	8	250
			100	3,122
Grasses	Aristida ramosa/vagans	2	5	1,560
	Cymbogon refractus	2	10	3,120
	Chloris truncata/ventricosa	2	5	1,560
	Dicanthium sericeum	2	5	1,560
	Dichelachne micrantha	2	10	3,120
	Echinopogon ovata	2	10	3,120
	Eriochloa pseudochritcha	2	5	1,560
	Imperata cylindrica	2	10	3,120
	Microlaeana stipoides	2	10	3,120
	Poa labillardieri	2	10	3,120
	Rytidosperma racemosum	2	10	3,120
	Themeda triandra	2	10	3,120
			100	31,200
Sedges/Sedge-like	Lomandra longifolia	1	50	7,802
	Dianella longifolia	1	50	7,802

Zone	Species	density/m ²	%mix	Qty
			100	15,604
Herbs	Arthropodium spp.	0.05	as available	780
	Bulbine bulbosa	0.05		
	Clematis spp.	0.05		
	Desmodium varians	0.05		
	Dichondra repens	0.05		
	Glycine clandestina	0.05		
	Hardenbergia violacea	0.05		
	Oplismenus aemulus	0.05		
	Oxalis perannans	0.05		
	Plectranthus parviflorus	0.05		
	Pratia purpurescens	0.05		
	Scaveola albida	0.05		
	Veronca plebeia	0.05		
	Wahlenbergia gracilis	0.05		
				780
Total plants RC reconstruction				51,476
RC Regeneration (30% of 26,071m ²)				
Smaller shrubs	Acacia floribunda	0.2	8	125
	Breynia oblongifolia	0.2	10	156
	Clerodendrum tomentosum	0.2	10	156
	Daviesia genistifolia	0.2	8	125
	Daviesia ulicifolia	0.2	8	125
	Dillwynia sieberi	0.2	8	125
	Dodonaea spp.	0.2	10	125
	Goodenia ovata	0.2	10	125
	Indigofera australis	0.2	10	125
	Ozothamanthus diosmifolium	0.2	10	125
	Pultenea spp.	0.2	8	156
			100	1468
Grasses	Aristida ramosa/vagans	2	5	782
	Cymbogon refractus	2	10	1,564
	Chloris truncata/ventricosa	2	5	782
	Dicanthium sericeum	2	5	782
	Dichelachne micrantha	2	10	1,564
	Echinopogon ovata	2	10	1,564
	Eriochloa pseudochritcha	2	5	782
	Imperata cylindrica	2	10	1,564
	Microlaeana stipoides	2	10	1,564
	Poa labillardieri	2	10	1,564

Zone	Species	density/m ²	%mix	Qty
	Rytidosperma racemosum	2	10	1,564
	Themeda triandra	2	10	1,564
			100	15,640
Sedges/Sedge-like	Lomandra longifolia	1	50	3,910
	Dianella longifolia	1	50	3,910
			100	7,820
Herbs	Arthropodium spp.	0.05	as available	391
	Bulbine bulbosa	0.05		
	Clematis spp.	0.05		
	Desmodium varians	0.05		
	Dichondra repens	0.05		
	Glycine clandestina	0.05		
	Hardenbergia violacea	0.05		
	Oplismenus aemulus	0.05		
	Oxalis perannans	0.05		
	Plectranthus parviflorus	0.05		
	Pratia purpurescens	0.05		
	Scaveola albida	0.05		
	Veronca plebeia	0.05		
	Wahlenbergia gracilis	0.05		
Total plants RC revegetation zone				25,319



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